(No Model.) 3 Sheets—Sheet 1.

A. L. PARCELLE.

DYNAMO ELECTRIC MACHINE OR MOTOR.

No. 450,975. Patented Apr. 21, 1891.

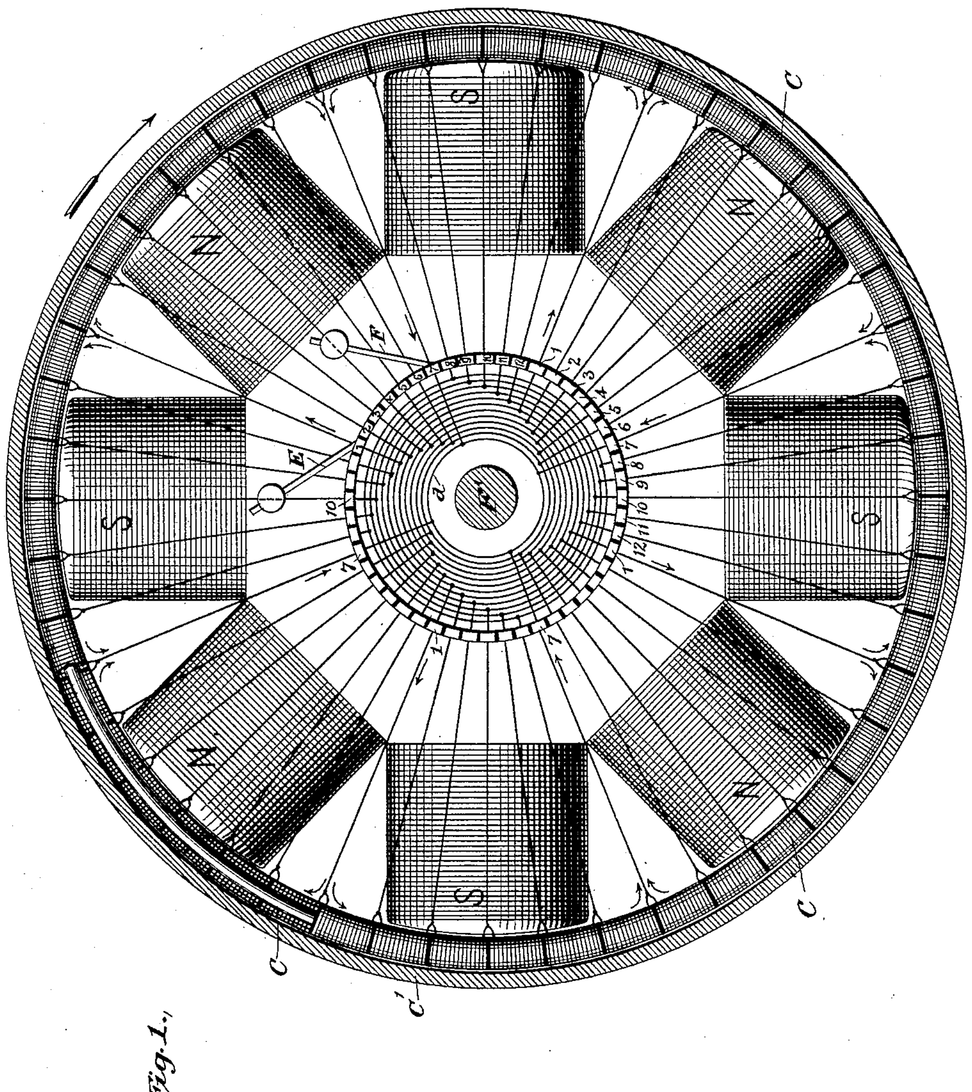

Fig. 1.

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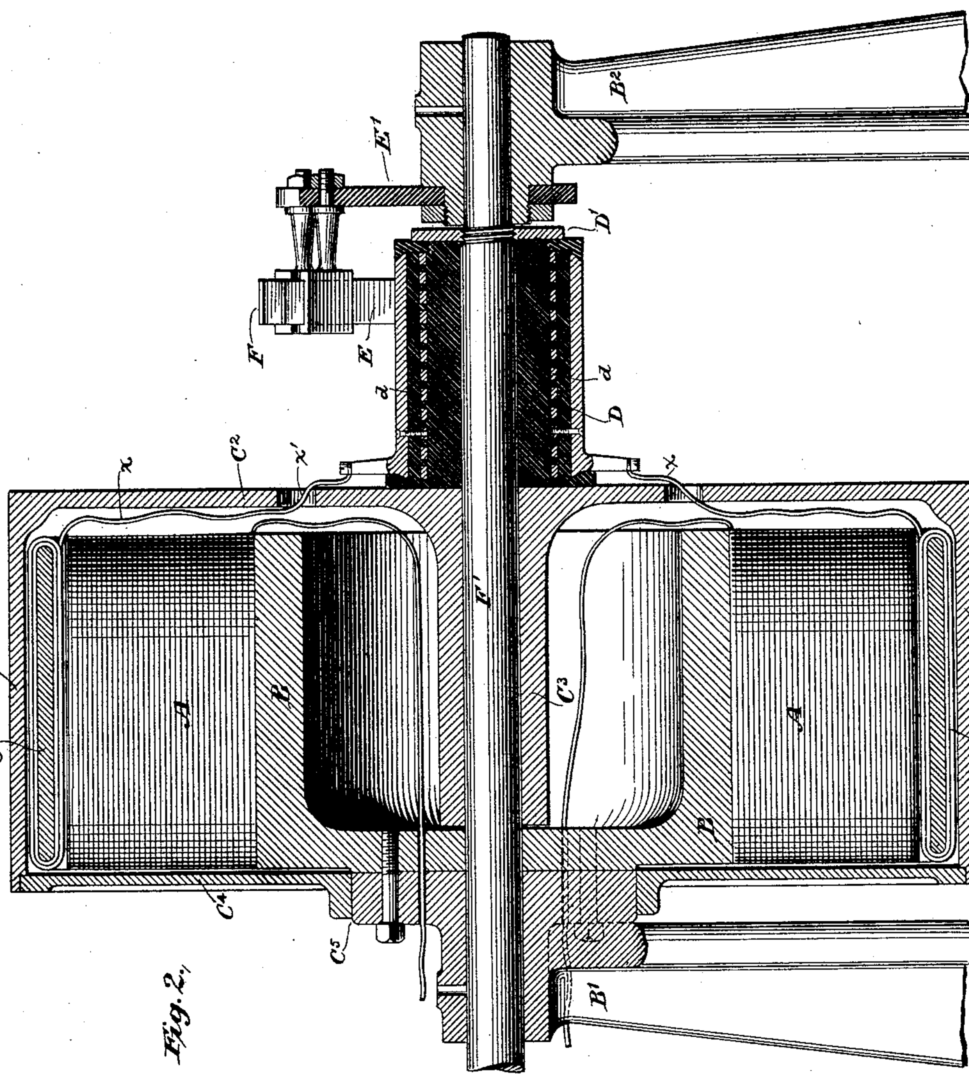

Fig. 2.

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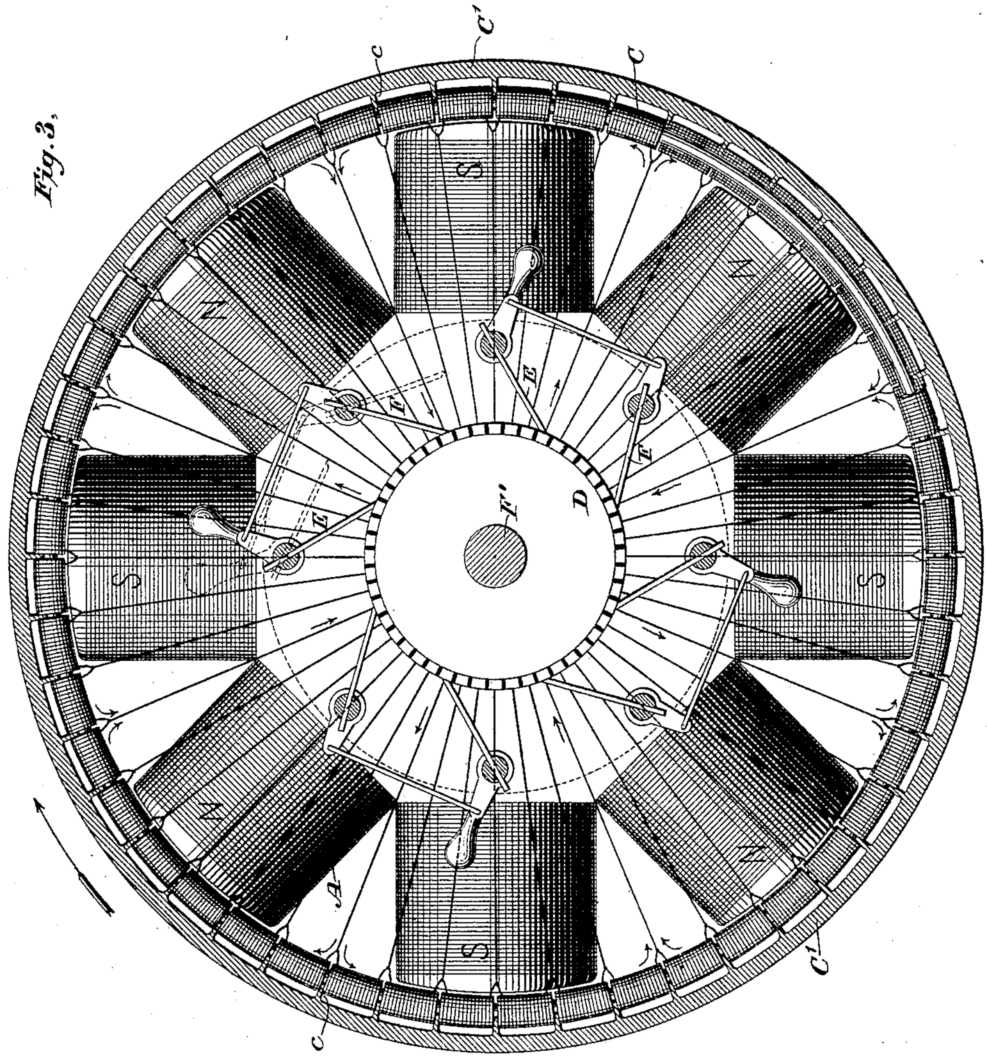
Fig. 3.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT L. PARCELLE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE SIMPLEX MOTOR COMPANY, OF MAINE.

DYNAMO-ELECTRIC MACHINE OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 450,975, dated April 21, 1891.

Application filed October 14, 1890. Serial No. 368,079. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. PARCELLE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification.

My invention relates to that class of multipolar dynamos having ring-armatures rotating around radial field-poles, and is designed more especially as an electrical motor. Its objects are to provide a simple, economical, and commercially efficient slow-speed multi-polar motor, the ring-armature of which shall at all times have a maximum amount of active wire, and each field-pole shall act simultaneously on a number of armature-coils, all tending to cause rotation in the same direction and no dead-points; to employ a large armature giving favorable leverage and relatively low electrical and magnetic resistance; so to organize the machine that the centrifugal force caused by the rotation of the armature tends to withdraw its coils from the faces of the field-magnets, and to provide for the proper mounting, casing, and ventilating of the armature. These ends I attain by mounting a series of multiple radial field-magnets in the same vertical plane in suitable supports and surrounding them by a concentric continuous Gramme-ring armature supported by and inclosed in a suitable frame or casing mounted on a rotating shaft.

The subject-matter claimed consists of certain novel constructions, combinations, and organizations of instrumentalities hereinafter claimed.

The accompanying drawings represent only so much of my improved machine as is necessary to illustrate the subject-matter claimed. Unless otherwise indicated the construction is well known.

Figure 1 is a diagrammatic end or face view illustrating the organization of the field-magnets, armature-coils, and circuit-connections; Fig. 2, a vertical central longitudinal section through the machine, and Fig. 3 a view similar to Fig. 1 of a modified organization.

The cores of the field-magnets A are preferably mounted upon and in magnetic connection with or are solid with an iron hub or yoke B, secured to a standard or frame B′. These cores are so wound as to produce alternate north and south poles, and preferably wound successively so that each pair of adjoining cores constitutes a **U**-magnet, the circuit of which is completed by the yoke B. The drawings show eight of such cores, constituting four **U**-shaped radial magnets all lying in the same vertical plane and all permanently active or energized when the machine is in operation.

The armature is a Gramme ring consisting of a continuous iron core encircled by continuous and contiguous coils C, wound in groups. Forty-eight of such coils are shown as arranged in eight groups of six coils each. The armature is preferably made thin and flat and of a width equal to that of the field-cores, which are oval-shaped or flattened parallel with their shaft. As the centrifugal force generated by the revolution of the armature tends to drive its inner convolutions away from the field-poles, they may be run very close together. The armature is shown as firmly secured on the inner surface of an annular rim or casing C′ by means of teeth c′ thereon interlocking with the coils by projecting inwardly in the space between the coils. This case is preferably of non-magnetic metal. This mode of interlocking holds the coils firmly and prevents their lateral displacement without the necessity of employing bolts or fastenings, which would interrupt the continuity of the coils and tend to produce deleterious magnetic effects. The teeth are in the form of thin transverse plates or ribs only wide enough properly to separate the groups of coils. The rim C′, in which the armature is mounted, is carried by a frame, plate, or spider C^2, radiating from a hub C^3, fast on a revolving shaft F′, all these parts preferably being of metal. The opposite end of the casing is closed by a metal disk, plate, or spider C^4, turning on a bearing C^5 on the frame or standard B′. A commutator D on this shaft may be clamped against the hub C^3 or frame C^2 by a screw-nut D′ or in other ways.

Brushes E F are shown in Fig. 2 as supported by a bracket E′, of insulating material, mounted on the frame or standard B^2 and capable of turning thereon to swing the brushes in either direction.

The commutator-strips are connected with the terminals of their respective armature-coils by wires *x*, united at one end with its respective strip and branched at the other, so as to be connected with the adjacent terminals of the appropriate armature-coils. If a solid plate or frame C^2 is used, these wires are brought out to the commutator through perforations *x′*. Metal rings *d*, insulated from each other in the commutator-hub, connect the commutator-strips in groups. Fig. 1 represents this arrangement diagrammatically, showing four groups of twelve strips each, correspondingly numbered with the corresponding numbers of each group connected. The brushes E F are shown about forty-five degrees apart. The current may be assumed to enter by the brush E resting on a strip numbered 1 and to depart by brush F on a strip numbered 7.

The result of the above-described organization is to keep all the coils continuously active, those in front of each field-pole tending at all times to produce rotation in the same direction. For instance, assuming the polarities of the field-magnets to be as marked in Fig. 1 and the currents traversing the strips as above described, there will be eight groups of six coils each—one group in front of each field-pole—all tending to rotate the armature in the same direction, which relative condition is maintained so long as the armature revolves. There are, therefore, practically no dead-points, and practically all the wire of the armature is active at all times.

If the brushes be shifted forty-five degrees, the motor will be reversed—*i. e.*, if they be so shifted that brush E is upon a 7 strip and brush F upon a 1 strip the direction of rotation of the motor will be reversed. Placing the brushes upon the strips 10 and 4, respectively, produces a condition of equilibrium opposite each field-pole and stops the rotation.

I may of course employ a separate pair of brushes for each **U**-magnet by omitting the connection of the commutator-strips through the rings. Were six field-poles used, I might employ three pairs of brushes, or where eight poles are used, as herein shown, there may be four pairs of brushes. In that event each **U**-magnet would practically be the field of a separate motor, all, however, combined in one machine, which could be regulated according to the requirements by throwing brushes into and out of action. Fig. 3 shows this organization, each pair of brushes being indicated as being capable of being thrown into or out of action independently of all the others by being mounted on rock-shafts linked together in pairs, each controlled by its own lever. Of course when a pair of brushes is thrown out of action the armature-coils in advance of the corresponding field-poles would practically be idle. They will, however, receive some current; but, being shunted by the active coils supplied by the adjacent pairs of brushes, the amount of current passing through them will be small. The throwing of the brushes into and out of action affords, therefore, convenient means for adapting the capacity of the motor to the work to be done.

It will be seen from the foregoing description that one of the principal characteristics of my improved machine is the combination of radial multiple field-poles lying in the same plane with continuous connected groups of armature-coils constituting a Gramme ring, each group of coils being active in front of its respective field-pole, and all the groups co-operating to produce rotation in the same direction—that is to say, the coils forming the groups continually and successively change relatively to each pole-piece as they advance past it, the place of each coil dropped or disconnected from a group in rear of the pole being supplied by a new one advancing at the front.

The advantages incident to my improved organization hereinbefore have been recited in part. I am besides enabled to use a ring-armature of large diameter, with a consequent increase in the number of field-poles, and to run the motor at a comparatively slow speed. The perforations in the disks, plates, or spiders C^2 C^4 afford ample ventilation and permit access to the armature and field coils.

Having thus fully described the construction, organization, and operation of my improved dynamo-electric machine, what I claim therein as new and as of my own invention is—

1. The combination, substantially as set forth, of a series of multiple field-magnet poles of alternate polarity arranged radially in the same plane, a Gramme-ring armature consisting of continuous connected groups of multiple coils arranged outside of the field-poles and in the same plane, a frame or casing carrying the armature, a commutator, its brushes, and electrical connections between the commutator-strips and their appropriate armature-coils, whereby a number of armature-coils are continuously active in front of each field-pole and adjoining groups of such coils in front of adjoining field-poles of opposite polarity co-operate in producing continuous rotation of the armature.

2. The combination, substantially as set forth, of a fixed hub or frame carrying the field-poles, the surrounding ring-armature having multiple coils, and the casing surrounding and carrying the armature and interlocking and rotating therewith.

3. The combination, substantially as hereinbefore set forth, of a rotating casing, its flat annular flange or rim, transverse ribs or teeth on the inner sides of the rim, and a Gramme-ring armature the continuous coils

of which interlock with the teeth to hold the coils securely in place.

4. The hereinbefore-described multipolar dynamo-machine, consisting of the combination, substantially as hereinbefore set forth, of a supporting-standard, a yoke fixed thereon, radial field-poles mounted on the yoke, a main shaft, inclosing-disks, plates or arms mounted thereon and rotating therewith, an annular flange or rim of the casing surrounding the field-poles, a Gramme-ring armature consisting of continuous connected groups of coils secured inside said rim in close proximity to the field-poles, commutators, their brushes, and electrical connections between the brushes and each group of their appropriate armature-coils.

In testimony whereof I have hereunto subscribed my name.

ALBERT L. PARCELLE.

Witnesses:
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ROBT. WALLACE.