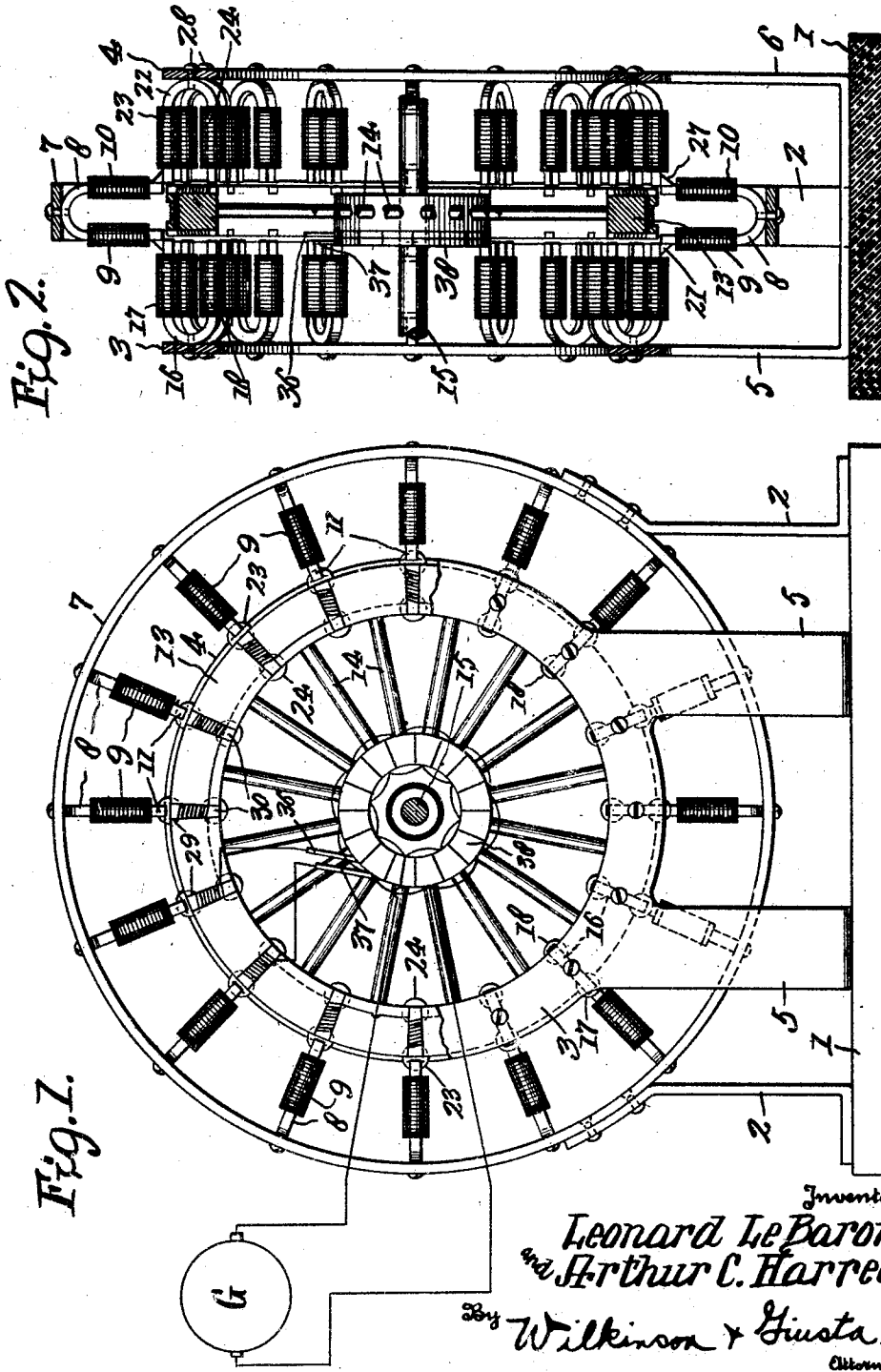


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APPLICATION FILED FEB. 24, 1920.

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2 SHEETS—SHEET 1.

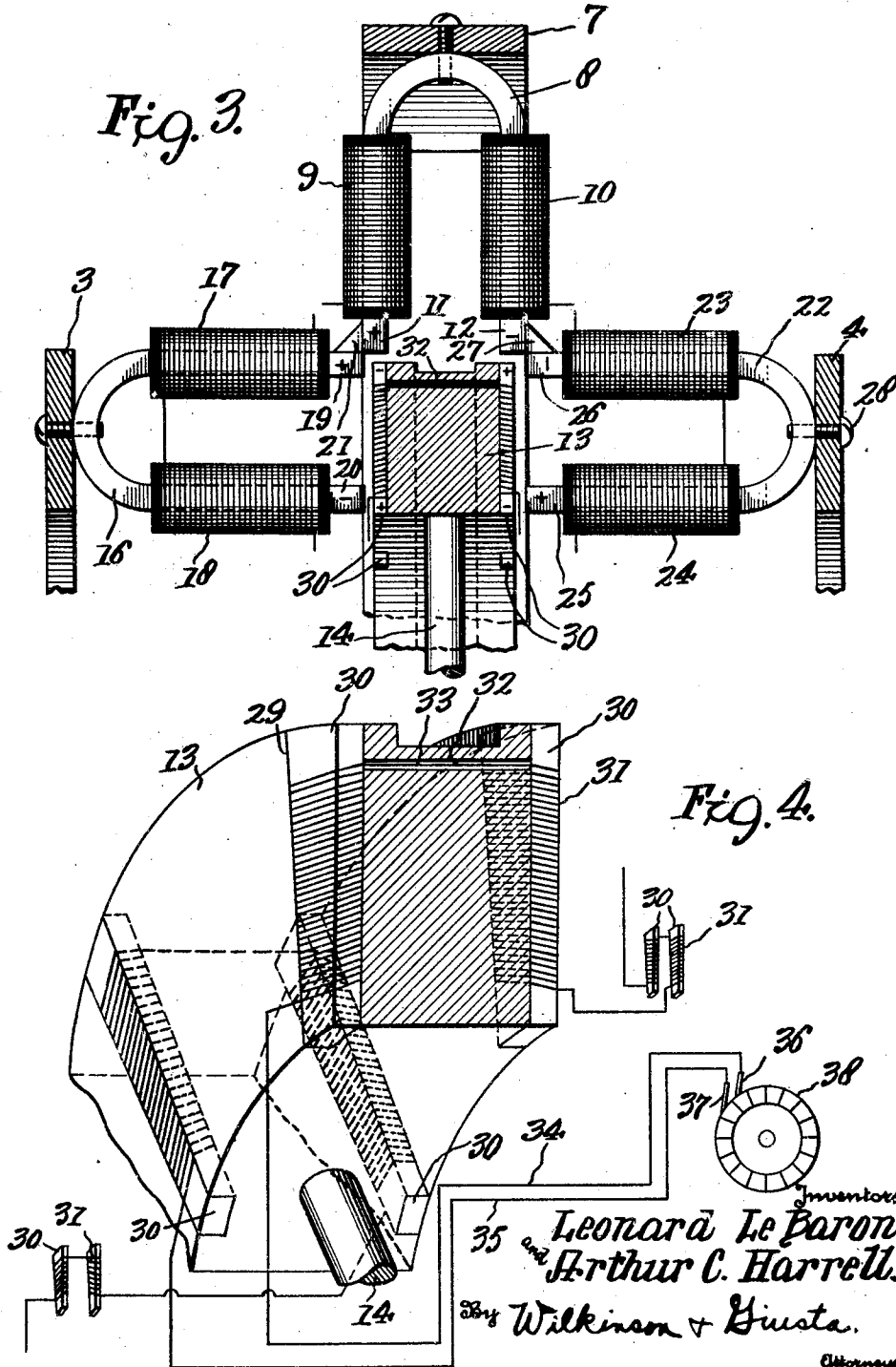


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UNITED STATES PATENT OFFICE.

LEONARD LE BARON AND ARTHUR C. HARRELL, OF PENSACOLA, FLORIDA.

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1,367,486.

Specification of Letters Patent.

Patented Feb. 1, 1921.

Application filed February 24, 1920. Serial No. 361,044.

To all whom it may concern:

Be it known that we, LEONARD LE BARON and ARTHUR C. HARRELL, citizens of the United States, and residing at Pensacola, in the county of Escambia and State of Florida, have invented certain new and useful Improvements in Magneto-Electric Machines; and we do hereby declare the following to be a full and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in magneto electric machines, and has for an object to produce a machine of this character in which high power will be developed by a simple and inexpensive construction.

Another object of the present invention resides in constructing an improved coöperating field structure and armature whereby to exert a comparatively great combined effect for insuring the steady and uniform rotation of the armature.

A further object of the present invention resides in providing a machine of this character in which the elements of the armature may be removable and replaceable by fresh units when the same deteriorate and become worn out.

A still further object of the present invention resides in providing an improved field structure having electromagnetic units disposed not only about the periphery of the armature but also at the sides thereof, and acting in combination with electromagnetic units carried by the armature and under the influence both of the peripheral and lateral electromagnets of the field structure.

In the accompanying drawings forming a part of this application, and in which similar reference symbols indicate corresponding parts in the several views:

Figure 1 is a side elevational view of an improved magneto electric machine constructed in accordance with the present invention.

Fig. 2 is a vertical sectional view through the same.

Fig. 3 is an enlarged sectional view of a portion of the armature and field structure; and

Fig. 4 is a fragmentary perspective view with parts shown in section of the armature and commutator.

Referring more particularly to the draw-

ings, wherein only a single embodiment of the invention is illustrated, 1 designates a suitable base, preferably of insulating material, on which the frame 2 of the machine is mounted. The frame includes a pair of circular bars 3 and 4 spaced apart and supported edgewise and having feet 5 and 6 extending to the bed plate 1. The frame also includes a ring 7 of larger diameter than the rings 3 and 4, and arranged centrally thereof. This ring 7 is arranged flatwise as compared to the edgewise rings 3 and 4, and is supported by the feet 2, as shown in Figs. 1 and 2.

The ring 7 provides for receiving the yokes 8 of a series of concentrically arranged peripheral field magnets 9 and 10 having their respectively positive and negative pole pieces 11 and 12 disposed very close to the opposite edges of the rim 13 of the armature of rotor 14 journaled to rotate about a shaft 15.

The ring 3 is likewise adapted to receive the yokes 16 of a second series of field magnets 17 and 18 having their respectively positive and negative pole pieces 19 and 20 arranged vertically and very close to the vertical inner and outer edges of one side of the armature rim 13, as will be apparent from Fig. 3. A steel, or other block 21 preferably unites the pole pieces 11 and 19, both of which are positive and which thus connect the pole pieces together in angular relation about the angled corner of the armature rim 13.

Similarly, the yokes 22 of a third series of armature field magnets 23 and 24 have their respectively positive and negative pole pieces 25 and 26 arranged very close to the opposite inner and outer edges of the armature rim 13 at the opposite side thereof. A steel, or other block 27 is employed to connect the pole pieces 12 and 26 in angled relation at the other outer corner of the armature rim 13. Screws or other suitable fastenings 28 may be employed to pass through the various supporting rings and enter the yokes of the magnets for the purpose of supporting the various elements of the field structure.

The armature rim 13 is made with radially arranged recesses or sockets 29 at both sides of the same, opening through the inner and outer edges thereof and preferably being tapered to receive correspondingly formed magnetic cores 30 provided with windings 31, preferably of insulated copper wire.

The armature rim 13 is also preferably provided with transverse openings 32 through which connecting wires 33 may be passed from one core to the opposite core, whereby the windings 31 of the cores may be connected in simple series.

Fig. 4 shows the general arrangement of these magnetic cores or units, the same being removable from the recesses or sockets 29 for replacement by fresh units whenever needed.

The windings 31 are connected by leads 34 and 35 to brushes 36 and 37 bearing on the segments of the commutator indicated at 38. Obviously this commutator may be of any suitable character and is supplied with current from a generator indicated in Fig. 1. The arrangement is such that the current will be reversed in the windings 31 as the armature rotates.

The various field magnets may be separately or otherwise excited, and it is immaterial as to how this is done.

The arrangement of the cores 30 is such that their outer poles will come under the influence of the combined pole pieces 11, 19, at one side, and the other combined pole pieces 12, 26, at the opposite sides which are arranged at right angles and will have both a peripheral and a lateral effect to draw the rim 13 around. In addition to this double effect at the outer portion of the rim 13, the pole pieces 20 and 25 will be effective at the inner ends of the cores 30 and will additionally act to draw the armature 13 around.

It will be appreciated from the foregoing that we have provided an improved field structure together with an improved construction of armature which cooperate to produce an increased effect for imparting rotation to the armature.

In our invention we wish it understood that it is not essential that magnetic cores be carried upon the rotor wheel in every construction. Where necessary, or more convenient, they may be arranged on the stator frame while the field magnets, either permanent or electro, may be carried by the rotor. We also wish to make it clear that the placing of the cores upon the rotor wheel is not confined to any particular form, number, or position: for example; they may be placed in groups 2, 4, 6, 8, etc., upon a rim properly shaped for their reception or rotor wheel having one or more rims as convenience and power desired may direct. The location of cores in pockets or sockets as shown is, of course, not necessary, but may be done to cut down atmospheric resistance.

It is obvious that those skilled in the art may vary the details of construction and arrangements of parts without departing from the spirit of our invention, and therefore we do not wish to be limited to such features except as may be required by the claims.

We claim:

1. In an improved apparatus of the character described, the combination of a rotating armature having radially disposed sockets therein, magnetic bars removably fitted in said sockets, windings for said bars, and a field structure composed of peripheral and lateral magnets having their pole pieces arranged close to the inner and outer ends of said bars, substantially as described.

2. In an improved apparatus of the character described, the combination of a rotating armature having radially arranged sockets therein, magnetic bars fitted in said sockets, windings for said bars, the windings of the various bars being connected in series, and a field structure composed of a plurality of peripheral magnets having pole pieces adjacent the armature and arranged near the outer ends of said bars, and two series of lateral magnets having their pole pieces arranged at opposite sides of the armature and respectively close to the inner and outer ends of said bars, substantially as described.

3. In an improved apparatus of the character described, the combination of an armature having wound bars located on opposite sides thereof, a field structure comprising a peripheral series of magnets having the pole pieces thereof arranged close to the outer ends of said wound bars, two other series of magnets disposed laterally with respect to the armature and having the pole pieces thereof arranged close to the sides of the armature and adapted to influence the inner and outer ends of said wound bars, substantially as described.

4. In an improved apparatus of the character described, the combination of an armature having two series of magnetically wound bars at the edges thereof and disposed substantially radially, a field structure having a series of peripheral magnets with their pole pieces adjacent the outer ends of said bars at the opposite edges of the armature, and two other series of magnets having their pole pieces disposed at the sides of the armature and close to the inner and outer ends of said bars, substantially as described.

5. In an improved apparatus of the character described, the combination of an armature having sockets therein opening on opposite faces thereof, wound magnetic bars removably fitted in said sockets and connected in series, means for reversing the polarity in said bars, a field structure composed of a series of peripheral magnets having the pole pieces thereof adjacent the outer ends of said bars, and two series of lateral magnets having their pole pieces fitted close to the sides of the armature and adapted to attract both the inner and outer ends of the bars, substantially as described.

6. In an improved apparatus of the character described, the combination with an ar-

mature having radial sockets on both sides thereof opening through the opposite faces, magnetic bars removably placed in said sockets, windings for said bars connected in series, means for reversing the current through
5 said windings, and a field structure including peripheral and lateral rings, and three series of magnets carried by said rings, one series supported by the peripheral ring and
10 having the pole pieces thereof adjacent the outer currents of the armature and bars, the other two series of magnets having their pole pieces disposed laterally of the armature and influencing both the inner and outer ends of
15 the bars, substantially as described.

7. In an improved apparatus of the character described, the combination of armature having radially arranged sockets therein at both sides opening through the faces

thereof, magnetic bars removably mounted 20 in said sockets, windings for said bars connected in series, means for reversing the current in said windings, a field structure including peripheral and lateral supporting rings, a concentric series of magnets held by 25 said peripheral ring and having the pole pieces thereof disposed near the free outer currents of the armature and influencing the outer ends of said bars, and a pair of lateral series of magnets having the pole pieces 30 thereof disposed respectively near the inner and outer edges of the armature and influencing both the inner and outer ends of the bars, and means for connecting the adjacent pole pieces of the peripheral and lateral 35 magnets, substantially as described.

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