(No Model.) 2 Sheets—Sheet 1.

A. L. RIKER.

MULTIPOLAR DYNAMO.

No. 455,517. Patented July 7, 1891.

FIG. I.

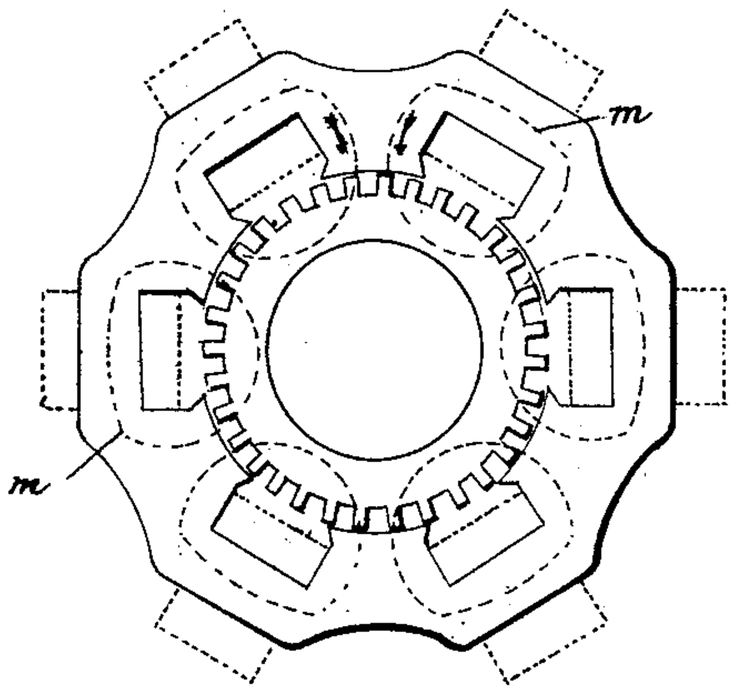


FIG. II.

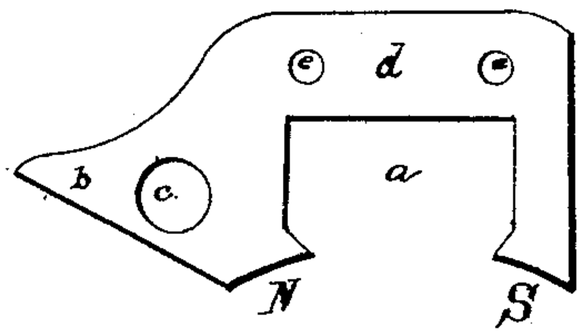
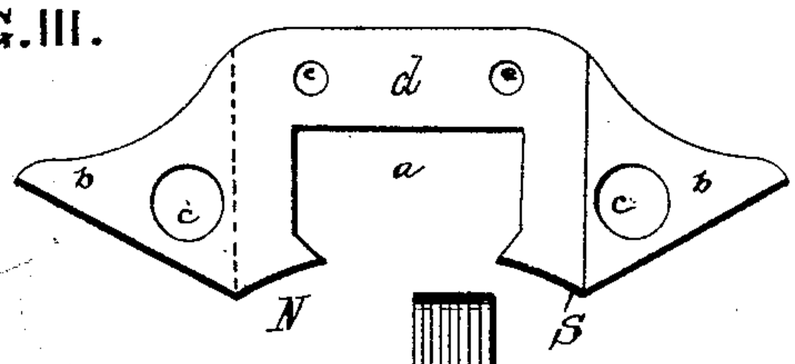


FIG. III.



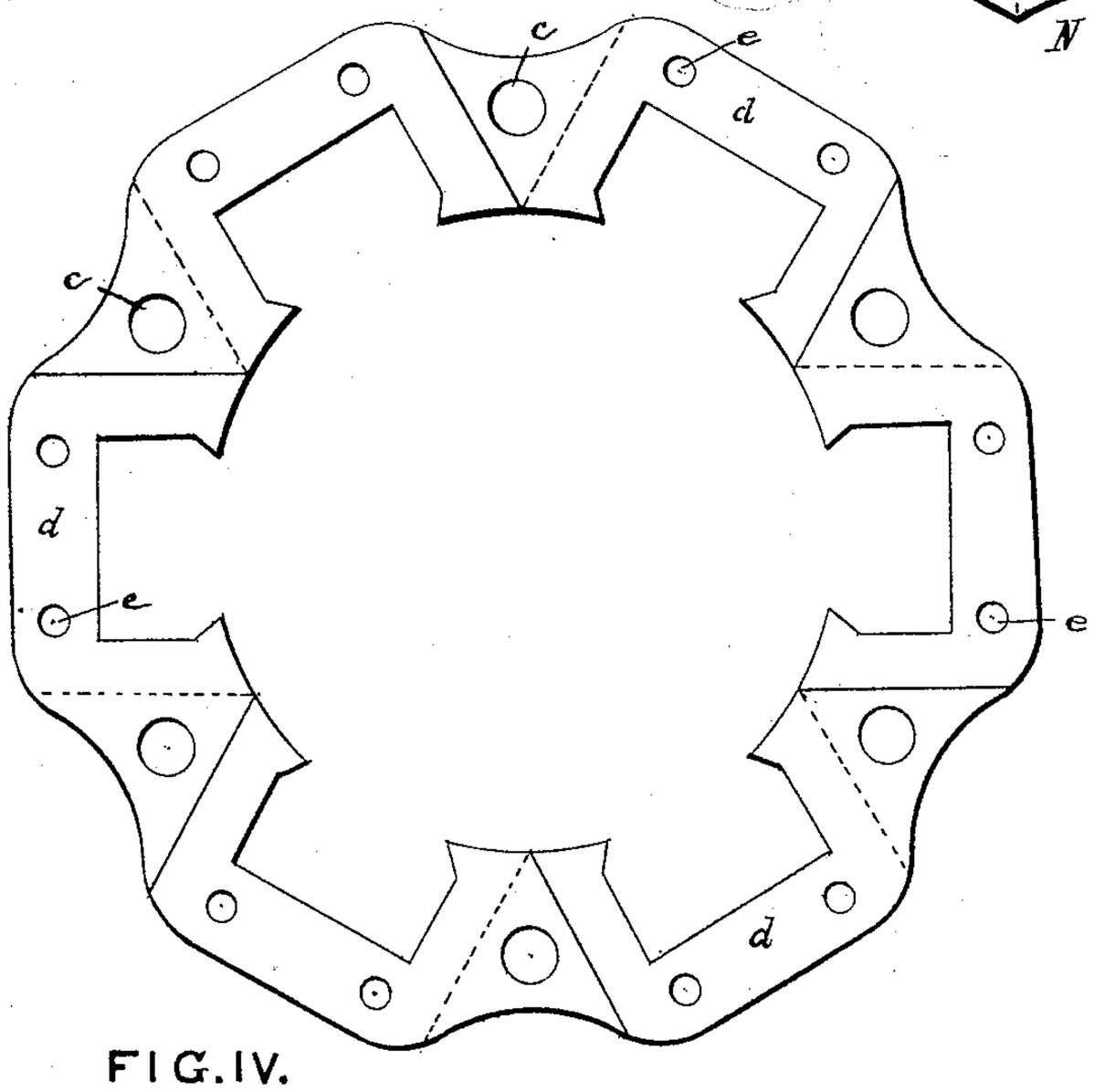


FIG. IV.

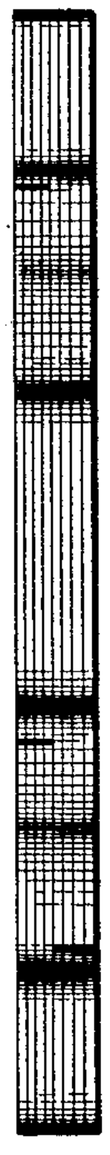


FIG. V.

Witnesses;
Jos. B. Bailey
A. C. Rawlings.

Inventor.
Andrew L. Riker
By Pollard & Mauro.
his attorneys.

(No Model.) 2 Sheets—Sheet 2.

A. L. RIKER.

MULTIPOLAR DYNAMO.

No. 455,517. Patented July 7, 1891.

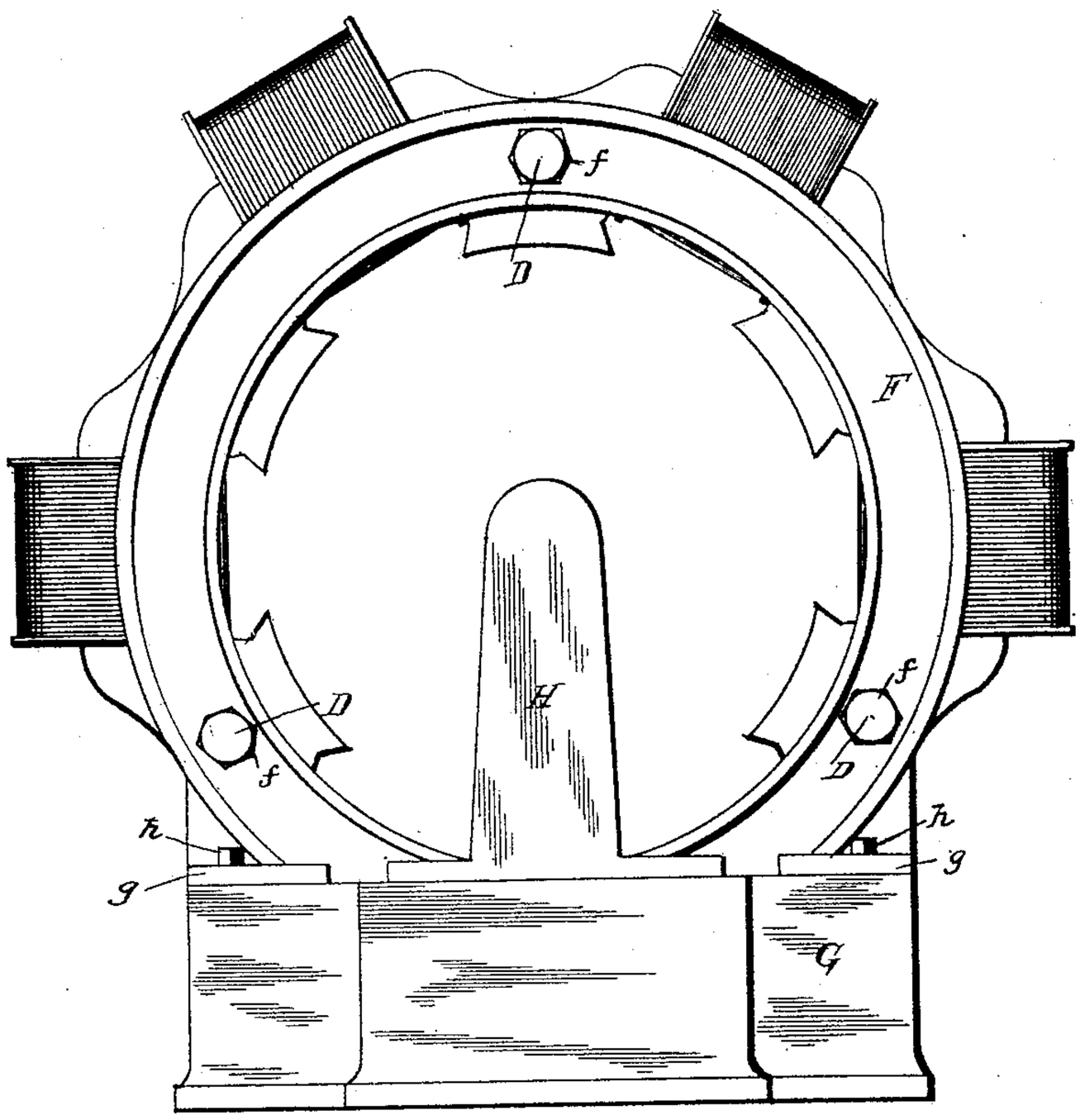


FIG. VI.

Witnesses;
Jona B. Ridley.
A. E. Rawlings.

Inventor;
Andrew L. Riker
By Pollard Mauro.
his Attorneys.

UNITED STATES PATENT OFFICE.

ANDREW L. RIKER, OF NEW YORK, N. Y.

MULTIPOLAR DYNAMO.

SPECIFICATION forming part of Letters Patent No. 455,517, dated July 7, 1891.

Application filed February 7, 1891. Serial No. 380,625. (No model.)

To all whom it may concern:

Be it known that I, ANDREW L. RIKER, a citizen of the United States, and a resident of the city of New York, county and State of New York, have invented a new and useful Improvement in Multipolar Dynamos, which improvement is fully set forth in the following specification.

This invention has reference more particularly to the construction of field-magnets for multipolar dynamos or motors; and its main object is to permit the construction of a continuous laminated frame for field-magnets of large size in an expeditious and economical manner and in a form that admits of winding the cores with facility.

As the advantages of employing laminated field-magnet frames, particularly when toothed armatures are used, are becoming better understood, a practical mode of constructing such frames to any desired size is of great importance and utility. In the construction of machines of this type it is important, moreover, to keep in view economy of size and weight of metal and uniformity of the field of force. These conditions are provided by the type of machine described in my patent, No. 393,266, dated November 20, 1888. The core and pole portions of the field-magnets in this machine are built up of a number of layers or plates of polygonal form stamped out of soft sheet-iron, the blanks being assembled in such manner as to constitute a solid continuous frame with six consequent poles and the same number of alternating coils.

The present invention relates to machines of this type and is designed to preserve the advantageous features thereof while extending their application to machines of large size. In order to realize in practice the theoretical advantages of a machine of this type, the same was, according to said patent, composed of sections separable at opposite sides of the machine, the ends of the sections lapping or breaking joints and being fastened together by bolts. The blanks, being all of the same shape, are quickly and easily made, and the winding of each half or section of the ring is readily performed in a lathe. In order to extend the application of this principle so as to admit of the construction of magnets of indefinite size or as large as may be desired for any purpose, a further development of the plan was found to be necessary. There is a limit beyond which the size of dies or punches cannot be practically extended, and even for machines of moderate size the construction of a die as large as the diameter of the magnetic ring is a matter of great expense. This difficulty is overcome according to the present invention by making each half-ring or interlocking section of the magnetic frame of a number of smaller sections, also interlocking and separable one from the other. To accomplish this I have determined a form of blank which constitutes the unit of the system. These blanks, all made from the same die, though of small size individually, can be assembled in such manner as to build up a continuous ring of any desired size. I have thus produced a field-magnet which possesses all the advantages of my former machine and particularly resembles it in being separable on opposite sides of the inclosed armature, but which differs therefrom in that each part is composed of a number of separable sections and each section of a number of blanks of the same form, and in that the present invention can be applied to and utilized in the construction of machines of the largest size.

For the better understanding of the said invention I will now explain, in connection with the accompanying drawings, the best mode in which I have contemplated applying the principle thereof.

Figure I is a diagram illustrating the magnetic circuit of the machine under consideration and the practical advantages attendant thereon. Fig. II is a detail showing the form of a single blank. Fig. III is a similar view showing two blanks put together; Fig. IV, a face view of the frame assembled; Fig. V, an edge view of the same; and Fig. VI, a side view of the field-magnet and frame-work, the armature not being shown.

Referring to Fig. I, it will be seen that the machine is very compact in form, realizing high efficiency in small space and with minimum weight of metal. The magnetic circuits represented by the broken lines *m* are very short, completely surrounding the armature and necessitating the use of very little copper.

The directions of the lines of force are indicated by the arrows, and the construction shown produces a machine having six consequent poles alternating with the same number of coils. Obviously the same principle can be embodied in machines of any number of poles.

In constructing a field-magnet of this character I use blanks such as shown in Fig. II, the blank being of approximately rectangular form, inclosing on three sides a space *a*, in which the coil is to be wound, and having on one side an extension *b*, through which passes a bolt-hole *c*. *d* is the core, and N S the two pole-pieces projecting at right angles therefrom. Each of these pieces forms a part only of one pole, the other part being formed by the corresponding piece of the contiguous blank. These blanks, when laid together end to end, constitute a closed or continuous frame of polygonal form, as shown in Fig. IV. This frame may be of any desired thickness, according to the capacity to be given to the machine.

Fig. III shows the form of one section or segment of the field. The blanks are so arranged that some have their polar extension *b* projecting on one side, while the others are reversed. It will be observed that the shape of the blank admits of this reversal, and that the core, poles, bolt-holes, &c., register perfectly in either position.

Instead of reversing alternate blanks, so as to break joints at each adjacent ring, I lay a number of plates together the same way, forming a layer, say, an inch thick, and then a corresponding number in the reverse position. This arrangement is illustrated in Fig. V. Its advantage is that while contiguous sections interlock and are connected by a single bolt they can be taken apart with little force, whereas if every alternate blank were reversed great force would be required to fit the sections together and pull them apart.

The small bolt-holes *e* are for joining together all the blanks constituting a single section or segment. The large bolt-holes *c* in the extensions *b* are for bolts D, which hold the contiguous segments together. In mounting the field-magnet three of these bolts D, equidistant from each other, are continued out beyond the frame and are attached by nuts *f* to cast-iron rings F, the latter being provided with flanges *g* and secured by bolts *h* to the cast-iron base or bed G. The armature-shaft is journaled in the standards H, and is thus supported independently of the magnet-frame. This arrangement has certain advantages.

Heretofore the armature-shaft has generally been supported in a yoke attached to the magnet-frame by bolts passing through the same from side to side. Since in a laminated magnet-frame the parts expand and contract and have a tendency to change their relative positions to some extent, the yokes are liable to be deflected and difficulty is experienced in putting the parts together after once separating them and in securing accurate adjustment of the armature-bearings.

In the construction described herein the rings F are always fixed the same distance apart, the laminated frame having sufficient space between them for all necessary play without disturbing the support of the armature.

Having now fully described my said invention, what I claim, and desire to secure by Letters Patent, is—

1. A blank for building up a continuous multipolar field-magnet, said blank being a stamped-out plate of soft sheet-iron of small size comparatively to the circumference of the field, and comprising a core portion, a coil-space, pole-pieces on each side thereof, and an extension from one pole-piece provided with a bolt-hole equidistant between adjacent cores when the blanks are assembled, so that the parts will all register when some of the blanks forming a single segment of the field are reversed with respect to the others, substantially as described.

2. In a multipolar dynamo or motor, a continuous field-magnet frame composed of a number of separable segments of like shape, comprising each a core and pole portions, with projections on each side of the pole portions of less thickness than the core and adapted to overlap the corresponding projections on the adjacent segment, each of said segments being built up of flat blanks, all of the same pattern, substantially as described.

3. In a dynamo or motor, the combination of a laminated field-magnet frame built up from flat blanks assembled into segments comprising a core and pole portions and projections on each side of less thickness than the core and adapted to overlap the corresponding projections on the next segment and to be connected therewith by a single bolt, a pair of metal rings supporting and embracing the said magnet between them, a base or bed-plate to which said rings are bolted, and journal-bearings for the armature-shaft carried by said bed-plate, whereby the armature is supported independently of the field-magnets, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ANDREW L. RIKER.

Witnesses:
SAML. RIKER, Jr.,
CHARLES M. KIRBY.