LA VERNE W. NOYES.

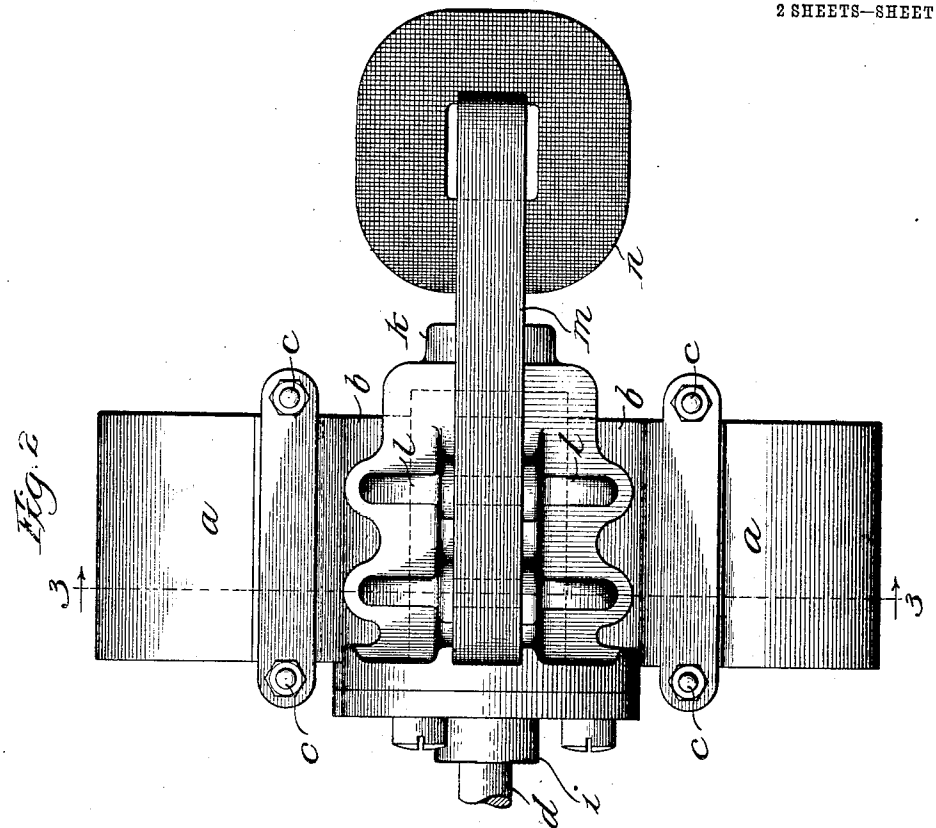
MAGNETO GENERATOR.

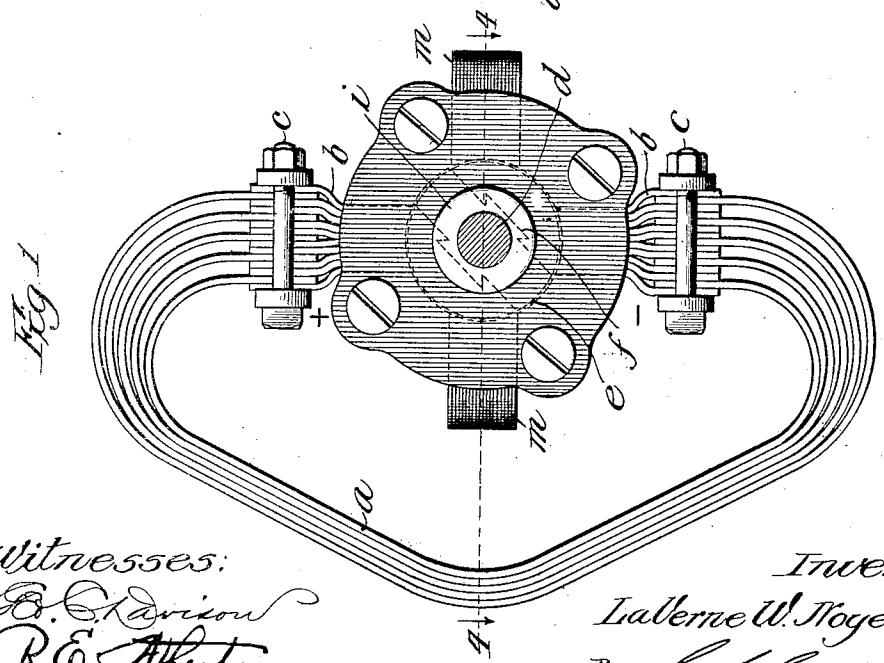
APPLICATION FILED JAN. 27, 1910.

965,484.

Patented July 26, 1910.

2 SHEETS—SHEET 1.





Witnesses:

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2 SHEETS—SHEET 2.

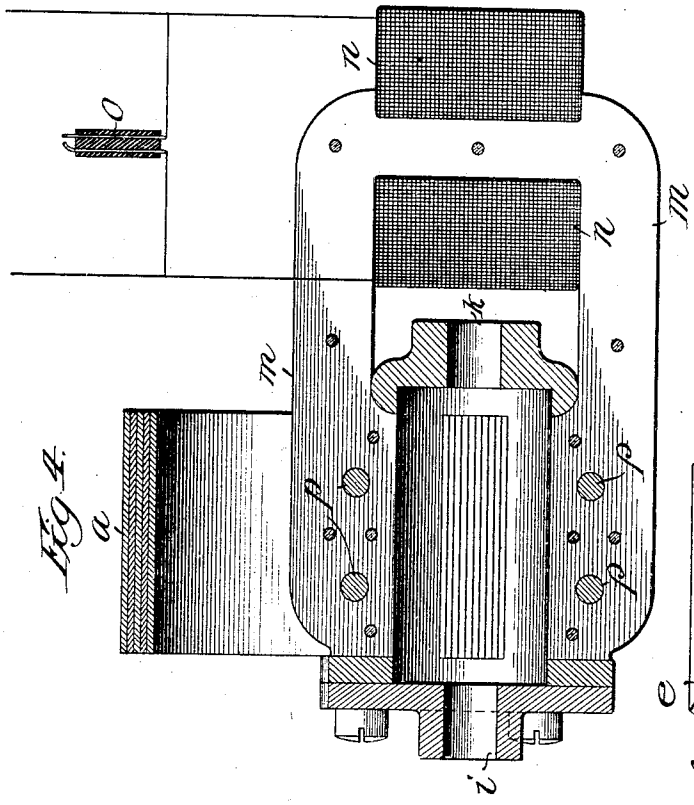

Fig. 4.

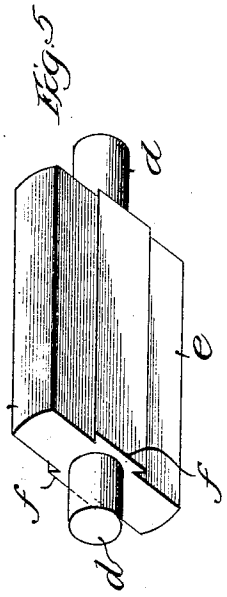

Fig. 5.

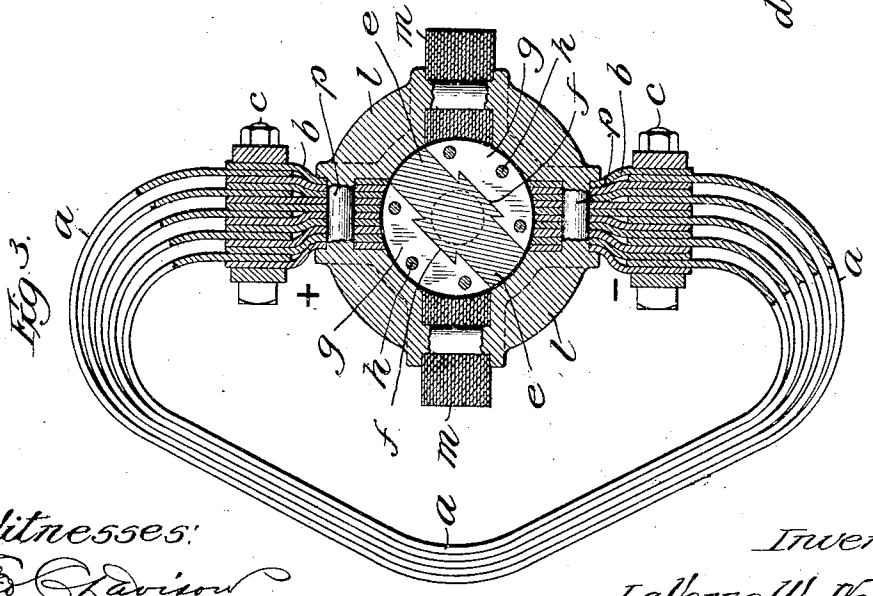

Fig. 3.

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UNITED STATES PATENT OFFICE.

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MAGNETO-GENERATOR.

965,484. Specification of Letters Patent. Patented July 26, 1910.

Applicati filed January 27, 1910. Serial No. 540,343.

To all whom it may concern:

Be it known that I, LA VERNE W. NOYES, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Magneto-Generators, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to magneto generators and has for its general object improved construction and rearrangement of component parts of magneto generators to simplify their formation and assemblage, a magneto generator constructed in accordance with my invention being highly efficient in the generation of alternating current.

The generator of my invention is of particular service in supplying alternating current to spark plugs that enter into the construction of internal combustion engines, though I do not wish to be limited to the use to which the invention is put.

I will explain my invention more particularly by reference to the accompanying drawings showing the preferred embodiment thereof as embodied in a two pole generator, in which—

Figure 1 is an end elevation of a magneto generator constructed in accordance with my invention; Fig. 2 is a view of the structure taken in the direction of arrow 2 of Fig. 1; Fig. 3 is a sectional view on line 3 3 of Fig. 2; Fig. 4 is a sectional view on line 4 4 of Fig. 1, an induced circuit being diagrammatically indicated; Fig. 5 is a view in perspective of a nonmagnetic mounting for two magnetic bodies which enter into the construction of the rotor and which serve to effect periodical reversal of magnetic flux for the purpose of setting up alternating current.

Like parts are indicated by similar characters of reference throughout the different figures.

The field portion of the generator is in the form of a compound permanent magnet *a*, the different elements of the compound permanent magnet being desirably in the form of superposed laminæ. The compound permanent magnet is desirably provided with soft iron insetting polar extensions *b*, also formed of laminæ and interleaved with the component laminæ of the compound permanent magnet, as illustrated most clearly in Figs. 1 and 3, suitable clamping mechanism *c* being employed to bind the interleaved laminæ together, it being understood that the engaged faces of the interleaved laminæ are preferably flat, smooth, bright and clean to eliminate reluctance in the magnetic circuit of the compound magnet where the compound magnet is joined with its soft iron pole pieces, while the contacting surfaces of the laminæ of the compound magnet *a*, as well as the contacting surfaces of the laminæ of the pole pieces *b* may be rusty to reduce loss that would otherwise be occasioned by induction of eddy currents, as is well known by those skilled in the art.

In order to increase the areas of the pole faces, I desirably interpose pairs of laminæ composing the pole pieces *b* between the laminæ of the permanent magnet *a*, the laminæ of the pole pieces being closely pressed together at their inner ends and fanned apart where they are interleaved with the laminæ of the compound permanent magnet. By the preferred construction of the permanent magnet and the pole pieces described, said pole pieces and magnet have spaced apart portions that are interleaved or intermeshed at their contiguous ends. The rotor that moves within the field of the permanent magnet includes, in the embodiment of the invention illustrated, a shaft *d* whose intermediate portion *e* is desirably of the construction illustrated in Figs. 1, 3 and 5, this intermediate portion having dovetail tenons *f* that engage corresponding mortises provided in the portions *g* of the rotor.

In the embodiment of the present invention illustrated, the portion *e* of the rotor is composed of nonmagnetic material and the portions *g* are composed of laminæ of soft iron which are maintained in assembled relation by riveting pins *h*. The bearings *i* and *k* receiving the ends of the shaft *d* of the rotor are carried by a body or structure *l* of nonmagnetic material, desirably generally cylindrical in form and through diametrically opposite parts of which the pole pieces *b* project. The bearing *k* may be an integral part of the body *l*, the companion bearing *i* being separably secured to the body *l*. The body *l* thus constitutes a housing for the rotor and a support for its bearings and the soft iron polar extensions of the permanent magnet, this housing body maintaining the rotor and the magnet poles

in their proper relation, and, prior to assemblage, holding the pole pieces *b* in proper relative positions to have the compound permanent magnet *a* secured thereto, the outer ends of the laminæ of the polar extensions *b* being spread apart to afford spaces therebetween in which the laminæ of the compound magnet *a* are received, diverged outer ends of the laminæ of the pole pieces *b* being located in close proximity to the housing *l*. The structure illustrated includes a fixed or stationary laminated soft iron core portion *m* of U-shape whose base is surrounded by the induced coil *n* that supplies alternating current to the work circuit and the translating devices connected with the work circuit, a single spark plug *o* being diagrammatically indicated in bridge between the sides of the work circuit. The ends of the U-shaped core *m* are inturned and project through the housing or holding structure *l* in a plane at right angles to the plane occupied by the pole pieces *b*, the housing *l* firmly securing the inturned ends of the core *m* in place, said housing thereby supporting said core and, through the intermediation of said core, also supporting the induced coil *n*.

As the parts are illustrated in Fig. 3, the magnetic flux finds path from the upper (positive) pole of the permanent magnet across the air gap intervening between this pole and the contiguous soft iron laminated rotor segment *g*, through this segment, thence across the gap intervening between this segment and the contiguous end of the core *m*, through said core, across the air gap intervening between the other end of the core and the remaining soft iron laminated rotor segment *g*, through this latter segment, thence across the air space intervening between it and the lower pole piece *b*, the circuit of the magnetic flux being completed by the permanent magnet *a* which furnishes the magnetic flux. The direction just described in which the flux passes through the soft iron core *m* is reversed at approximately each quarter revolution of the rotor, there thus being impressed upon the work circuit an alternating electromotive force of two cycles per revolution of the rotor.

The housing or holding structure *l* is desirably made by casting nonmagnetic metal into a mold in which the soft iron pole pieces *b* and the soft iron core *m* are secured in the relative positions they are to occupy in the completed structure. The cast metal, upon cooling, will very firmly grip the pole pieces *b* and the core *m* so that these elements are very securely held in fixed relation with each other and with the bearings *i k* for the rotor. Two apertures are desirably formed in each end of the core *m* and each of the soft iron pole pieces *b*, through which apertures the molten metal flows to constitute shanks *p* which tend further to maintain the parts in their proper positions and also to prevent movement of the pole pieces and the core *m* in the respective planes of their laminæ in the event of imperfect casting.

It is of course understood that the winding *n* is of such design that with a predetermined speed of the rotor, the requisite electromotive force is impressed upon the work circuit.

While the laminæ illustrated are not very thick in proportion to their other dimensions, yet I do not limit myself to the thickness or thinness of the laminæ and therefore use the expression in its broadest sense of superposed, piled or overlying layers of any selected suitable thickness.

I have herein shown and particularly described a magneto generator adapted to impress alternating electromotive force of two cycles per rotor revolution, but I do not wish to be limited to this relationship, nor to the type of rotor shown, nor to the precise details of construction shown, nor to a stationary inducing coil, as changes may readily be made without departing from the spirit of the invention, but

Having thus described my invention, I claim as new and desire to secure by Letters Patent the following:—

1. A magneto generator including a compound permanent magnet formed of laminæ spaced apart near a polar end and having a pole piece terminating in spaced apart laminæ that are interleaved with the aforesaid laminæ; and a structure holding said pole piece, and outside of which the portion of the permanent magnet between its polar ends is located.

2. A magneto generator including a compound permanent magnet having spaced apart portions near a polar end and a pole piece terminating in spaced apart portions that are intermeshed with the aforesaid spaced apart portions; and a structure engaging and holding said pole piece where the aforesaid portions are not intermeshed.

In witness whereof, I hereunto subscribe my name this 26th day of January, A. D., 1910.

LA VERNE W. NOYES.

Witnesses:
G. L. Cragg,
R. E. Atherton.