Jan. 2, 1923. 1,441,019.

H. J. MORAN.

MAGNETO.

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Fig. 1.

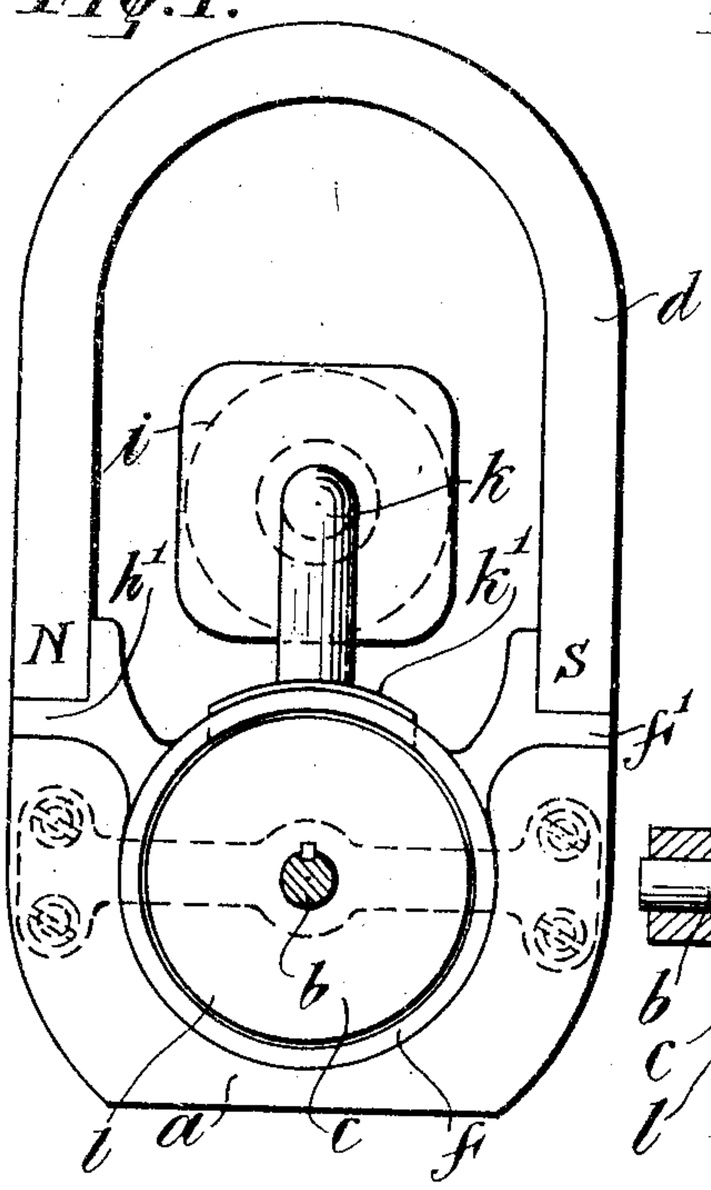


Fig. 2.

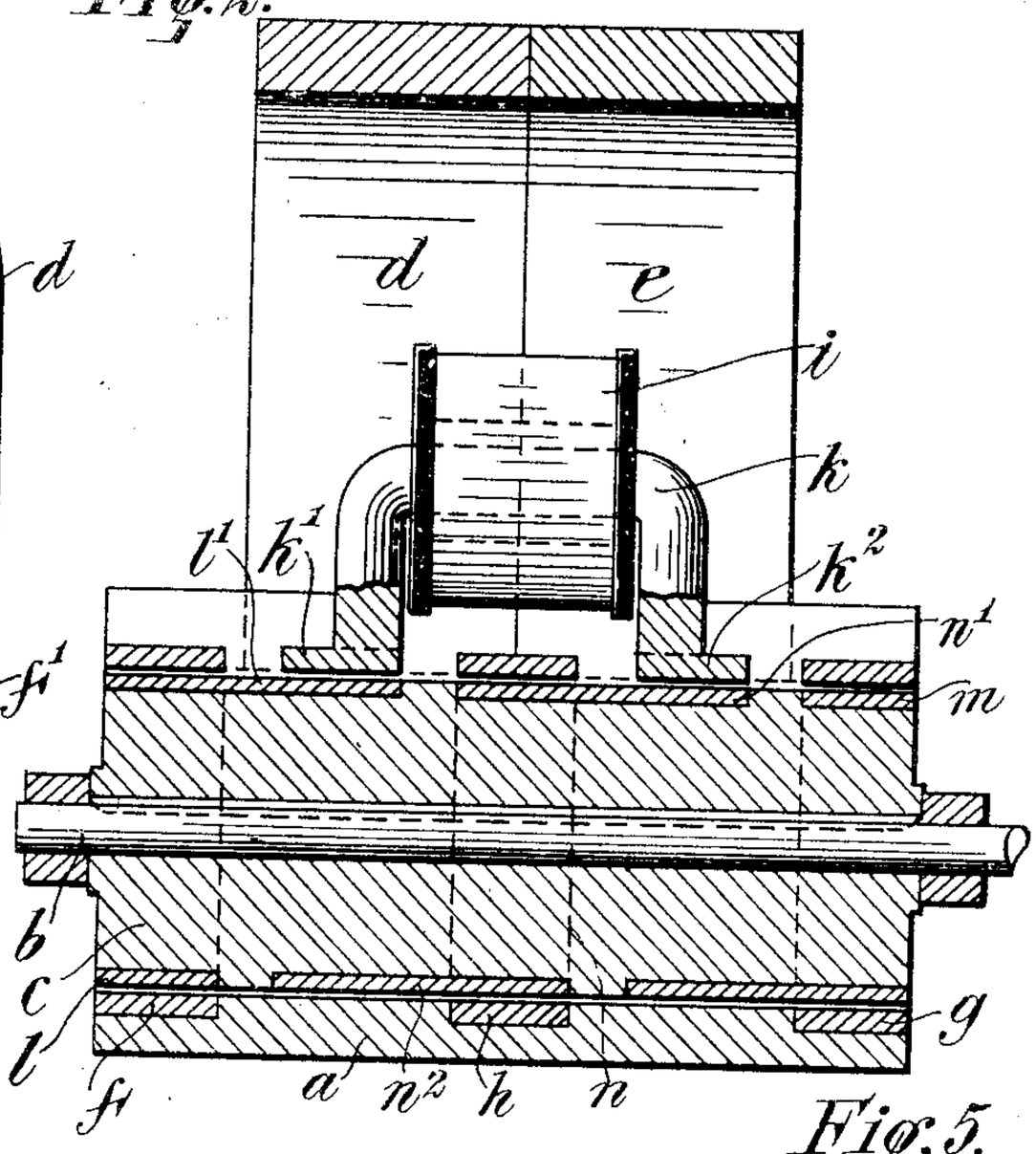


Fig. 3.

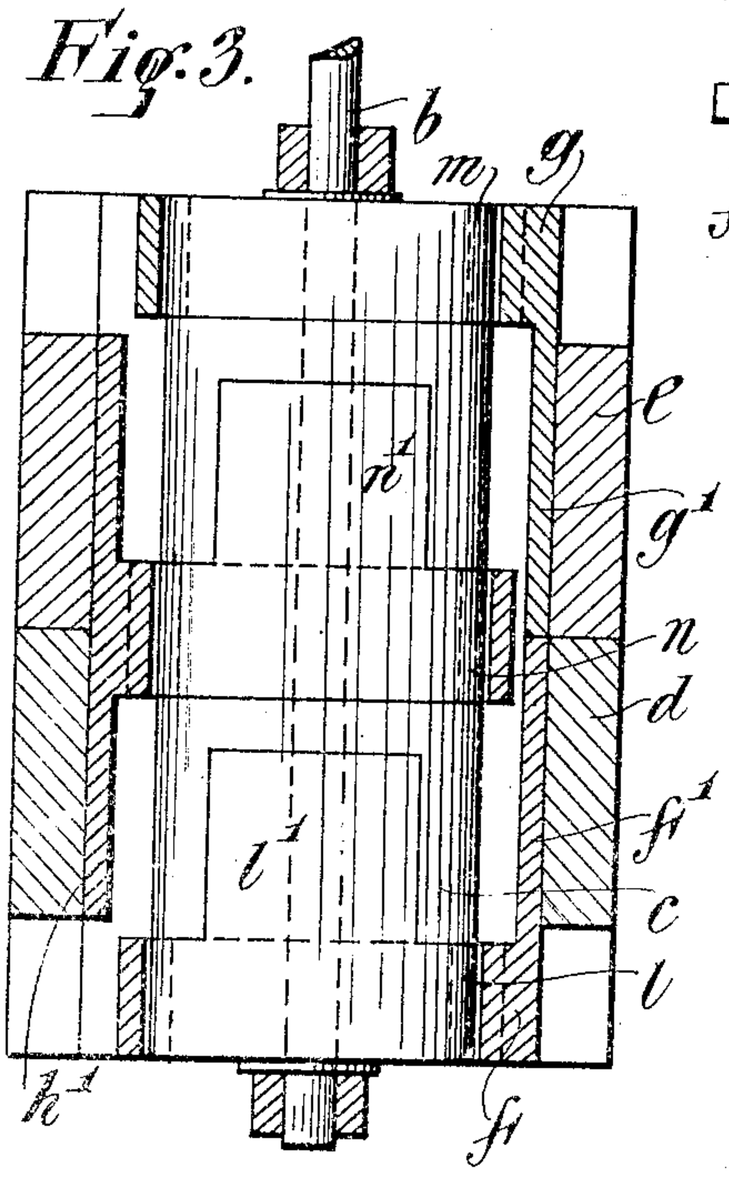


Fig. 4.

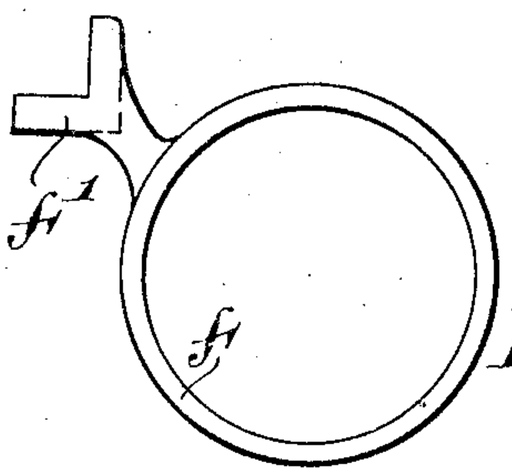


Fig. 5.

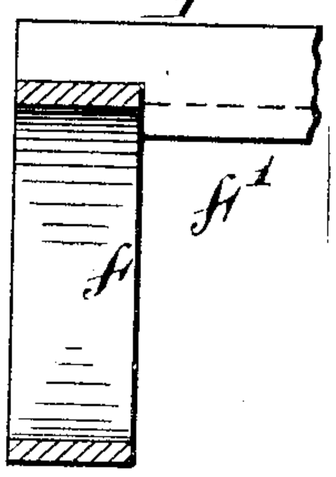
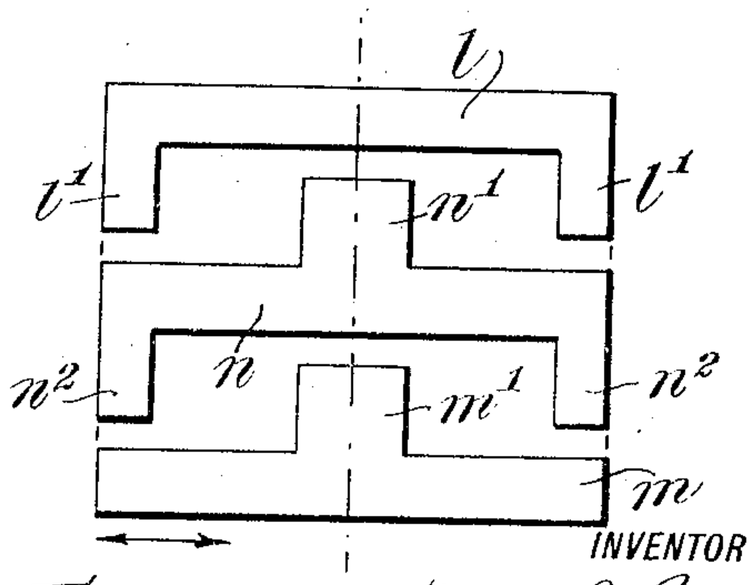


Fig. 6.



INVENTOR

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BY

Redding & Greeley

Its ATTORNEYS

Patented Jan. 2, 1923. 1,441,019

UNITED STATES PATENT OFFICE.

HENRY J. MORAN, OF CONCORD, NEW HAMPSHIRE, ASSIGNOR OF ONE-HALF TO ALFRED F. MASURY, OF NEW YORK, N. Y.

MAGNETO.

Application filed October 21, 1920. Serial No. 418,492.

To all whom it may concern:

Be it known that I, HENRY J. MORAN, a citizen of the United States, residing in the city of Concord, in the State of New Hampshire, have invented certain new and useful Improvements in Magnetos, of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof.

This invention relates to a magneto of the inductor type in which current is induced in a stationary winding by effecting flux reversals in the core thereof. Magnetos of this type have been proposed, but have very definite limitations and objections, the chief one of which is directly related to the efficiency. Such known types of magnetos have their parts so related as to require the inclusion of a great number of air gaps with consequent flux leakage and reluctance in the flux path. To meet the limitations in such known machines their capacities have been increased by enlarging the elements and particularly the permanent magnets. Such known machines are further open to the objections of cost and bulk.

The principal object of the present invention is to provide an inductor magneto which shall be simple in construction, inexpensive to manufacture, compact in structure and built up with its parts readily accessible so as to facilitate their assembling and removal by a perfectly unskilled workman. More particularly the invention seeks to reduce to a minimum, in a machine of this character, the number of air gaps and to provide for the flux the shortest and least reluctant path possible between the pole pieces so that the efficiency shall be maintained at the highest point. Still another object is to provide in an inductor magneto flux pieces which are of such form and relation to each other, to the rotor, to the magnetic pole pieces and to the core of the winding, as to effect reversals of flux in said core with maximum efficiency and yet without requiring a reversal of flux within themselves. The invention will be described with reference to the embodiment of the magneto illustrated somewhat schematically in the accompanying drawing where there is shown so much of a machine as will enable one skilled in the art to understand the principle of operation. In the drawing—

Figure 1 is a view in end elevation of a magneto embodying the invention. Figure 2 is a view in vertical section taken on the diameter of the rotor of the machine shown in Figure 1.

Figure 3 is a horizontal sectional view through the rotor shown in Figure 1.

Figure 4 is a detail view in elevation of one of the supporting pole pieces for the magnets.

Figure 5 is a fragmentary view in side elevation of the pole piece shown in Figure 4.

Figure 6 is a schematic projection of the flux pieces of the rotor illustrated in Figures 2 and 3.

The cast base *a* of the magneto is one of any suitable nonmagnetic material and supports a rotating shaft *b* on which is keyed a rotor *c* of nonmagnetic material. Permanent magnets *d*, *e* having poles marked N and S are set in juxtaposition to one another and straddling the rotor. In opposite ends of the base *a* are supported magnetic pole rings *f*, *g* formed with angle pieces *f'*, *g'* respectively, on which rest the S poles of the magnets *d*, *e*. Spaced preferably equi-distant from the pole pieces *f*, *g* is a ring pole piece *h* supported on the base *a* and formed with an angle piece *h'* which is set on the other side of the rotor from the aforementioned angle pieces *f'*, *g'* to support the other poles N of the magnets *d*, *e*. Within the magnets *d*, *e*, between their N and S poles, is supported a winding *i* in which the current is to be induced and this winding has extending therethrough a permeable core *k* of generally horseshoe shape terminating in pole pieces *k'*, *k²* at its opposite ends, of arcuate form and concentric to the rotor *c*. In order to induce a current in the winding *i* a path for the flux must be provided from the N poles of the magnets *d*, *e* to the core *k* and from thence to the S poles. A reversal of this flux within the core *k* must then be effected periodically. To accomplish this in the present construction, suitable flux pieces of permeable material, such as soft iron, are mounted on the periphery of the nonmagnetic rotor *c* and these flux pieces are of such form and relation to each other and to the other parts as to provide free paths for the flux from the proper poles of the magnets *d*, *e* to the core *k* at such times as to bring about the efficient induction of current in the winding *i*. As

shown in Figure 6, one of these flux pieces is formed as a ring l which encircles the rotor c, preferably within the plane of the pole ring f, and is provided with a wing l' adapted to extend longitudinally of the rotor and lie under the pole piece k' of the core k when the rotor is in certain positions. When the wing l' lies under the pole piece k' it is evident that a permeable path for the flux between the pole piece f and the core k is afforded and by reason of the coincidence of the circular pole piece f with the circular flux member l the flux has an air path of large cross sectional area.

At the other end of the rotor c there is supported on its periphery a flux piece m of ring form lying directly within the circular pole piece g and having a wing m' extending longitudinally of the pole piece and adapted to lie under the pole piece k^2 of the core k when the rotor is in a certain position. The wing m' is positioned on the periphery of the rotor c 180° from the wing l', so that these wings are brought into position under the pole pieces k', k^2, respectively, 180° apart. Intermediate the flux pieces l, m and mounted on the periphery of the rotor c and lying preferably within and in line with the circular pole piece h is another flux piece n, generally ring shaped but having two wing portions n', n^2 extending in opposite directions longitudinally of the rotor c and disposed at diametrically opposite points on its periphery. In the illustrated form, the wing n' extends substantially in line with the wing l' and is adapted to rest under the pole piece k^2 when the wing l' rests under the pole piece k'. In this construction the wing n^2 extends in line with the wing m' and is adapted to rest under the pole piece k' when the wing m' rests under the pole piece k^2.

In understanding the operation of the magneto it is important to remember that the circular pole pieces f and g are magnetized as S poles by the S poles of the magnets d, e, and that the circular pole piece h is magnetized as an N pole by the N poles of the magnets d, e. Accordingly, when the wing n' of the flux piece h' is brought into alinement with the pole piece k^2 at the same time that the wing l' is brought into alinement with the pole piece k', a short and ready flux path is provided from the pole piece h', which is an N pole, through the core k to the pole piece f which is an S pole. In following this path the flux encounters only four air gaps, to wit, that from pole piece h' to the ring n; from the wing n' to the pole piece k^2; from the pole piece k' to the wing l' and from the ring l to the ring f of the pole piece f'. The reduction of the number of air gaps to four in a magneto of this kind is novel where a complete flux path between permanent magnets is afforded. The flux paths are shortened in the present construction by the use of the peculiar flux pieces and the reluctance of the path is materially decreased by the provision of circular pole pieces which are of great cross sectional area to receive the flux. With the flux traveling through the core k from right to left as viewed in Figure 2 in the manner described, it is to be assumed that the rotor will be turned through an angle of 180°. Thereupon the wing n^2 is brought under the pole piece k' while the wing m' is brought under the pole piece k^2. Accordingly, the flux from the N pole will find a path to the core k through the pole piece k' and will leave the core through the pole piece k^2 returning through the wing m' to the S pole piece formed as the ring g of the pole piece g'. Accordingly, a reversal of flux in the core k has been effected with the induction of current in the coil i in a manner which will be understood. Continued rotation of the rotor c will effect alternate reversals as will be clear. The flux pieces l, m and n will not change their polarity nor will they need to be demagnetized at any time to bring about the desired reversals in the core k, The core k alone will be demagnetized by changing the direction of the flux entering periodically.

From the description given it is believed that the advantages accruing in cheapness, compactness and increased efficiency in an electrical sense will be apparent.

I claim as my invention:

1. In a magneto of the inductor type in combination a rotor, permanent magnets, two flux carrying magnet extensions, one of said extensions being channel shape and the other T-shape, a nonmagnetic base in which said extensions are supported in opposed relation to one another and parallel to the rotor, the leg of the T-shaped extension extending between the two legs of the channel extension, the respective legs being spaced axially and having the same axis, a coil supported within the magnets, a core therefor, and flux pieces carried with the rotor and adapted to lead the flux alternately to opposite ends of said core upon rotation of the rotor.

2. In a magneto of the inductor type in combination with permanent magnets, a nonmagnetic base for the machine, a ring supported on the base at each end thereof, brackets carried by said rings for the support of one end of said magnets, a third ring supported on the base intermediate the two first named rings and having a bracket supporting the other end of said magnets, said rings taking the polarity of the ends of the magnets which they support, a rotor of nonmagnetic material supported within said rings, a coil and core therefor supported within the magnets, circular flux pieces

mounted on the periphery of the rotor in line with the respective rings, said flux pieces being of such form and disposition as to establish alternately upon rotation of the rotor through 180° flux paths between the different poles of the magnets and the opposite ends of the said core.

3. In a magneto of the inductor type in combination with permanent magnets therefor, a nonmagnetic base, two rings supported in the base and having brackets on which rest one end of said magnets, a third ring supported on the base intermediate the first two rings and having a bracket to support the other end of said magnets, all of said rings assuming the polarity of the ends of the magnets which they support, a rotor of nonmagnetic material mounted within the rings, a coil and core therefor mounted within the magnets, said core having pole pieces extending into juxtaposition to the rotor, three flux rings mounted on the surface of the rotor and alined with the respective first named rings, wings on the flux pieces within the two first named rings extending longitudinally of the rotor and disposed 180° apart, oppositely extending wings on the flux piece within the said intermediate ring disposed 180° apart, the last named wings being alined with the first named wings respectively, whereby flux paths are established between the pole pieces of the magnets and the coil to lead the flux to the core in alternate directions for every half revolution of the rotor.

This specification signed this 18th day of October, A. D. 1920.

HENRY J. MORAN.