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MAGNETO ELECTRIC IGNITION APPARATUS

Filed Sept. 4, 1925

Fig. 1

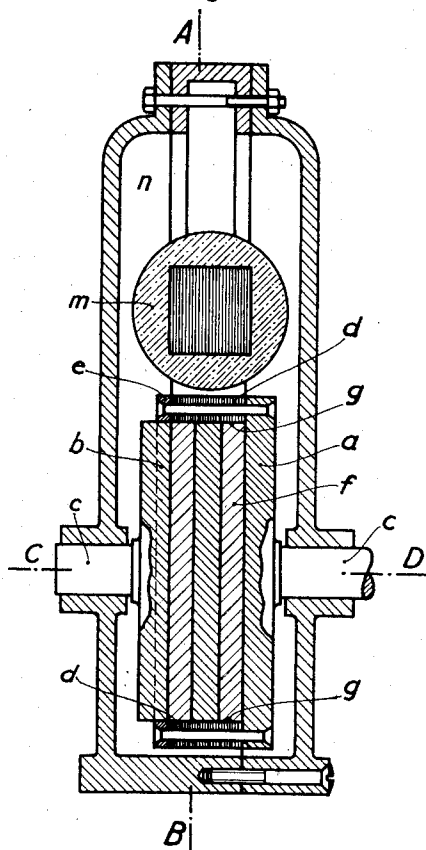


Fig. 2

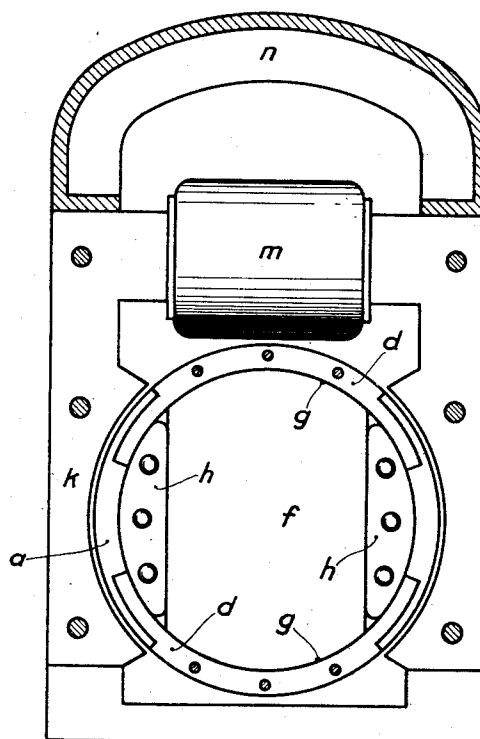


Fig. 3

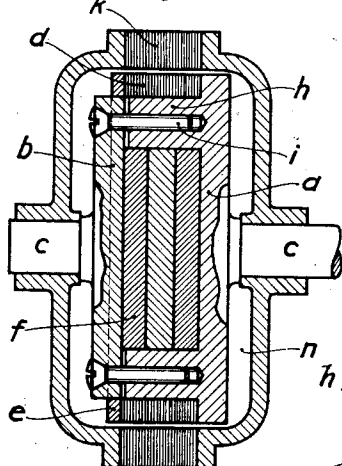


Fig. 4

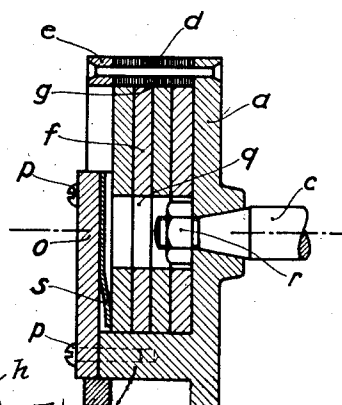
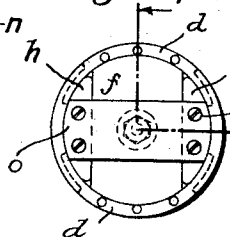


Fig. 5



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UNITED STATES PATENT OFFICE

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MAGNETO-ELECTRIC IGNITION APPARATUS

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My invention relates to magneto-electric ignition-apparatus; more particularly it relates to a rotor for use in connection with electromagnetic ignition apparatus having a stationary coil and a rotary permanent magnet; and the object of my invention is to design an apparatus of the kind stated in which the rotor is composed of a plurality of permanent magnets of very simple contours which are perfectly alike and have only one registering face which requires accurate working. If one fulfils these three conditions, the whole-sale manufacture of the permanent magnets even from magnet-steel which can be worked only with difficulty, properties found especially in the cobalt-steel now coming into use, will be extremely simplified and rendered far cheaper.

I attain the object in view by designing the rotor in such a way that circularly curved segment-shaped pole-shoes form a casing, together with a plate supporting them, the steel-plates forming the permanent magnet of the apparatus being inserted into said casing as is all more fully described herein-after.

My invention is illustrated by way of example in the accompanying drawings in which Figure 1 is a longitudinal section through a magneto-electric ignition apparatus designed according to this invention; Figure 2 is a cross-section on line A—B of Fig. 1; Figure 3 is a longitudinal section on line C—D of Fig. 1; Figs. 4 and 5 show a modification having an overhanging rotor, Fig. 4 being an axial section on line 4—4 of Fig. 5, and Fig. 5 a front elevation, on reduced scale, of the modified rotor construction as viewed from the left end of Fig. 4.

Referring to Figs. 1-3, the rotor is composed, firstly, of two non-magnetic plates *a* and *b*, each of which is provided with a journal or equivalent member *c*. Pole shoes *d*, composed of pieces of sheet metal, are riveted to plate *a*. Non-magnetic ring *e* is also riveted to plate *a* and serves to stiffen the pole shoes against radial forces. All these members form, in their entirety, a casing, into which are inserted therewithin flat bar magnets or straight magnets *f*. Each of these mag-

nets resembles a circular disk, of which two oppositely located segments have been cut away, and each need fit accurately only at its circularly curved portions *g*. The magnets are prevented from rotation in their planes by suitably shaped projections *h* on the plate *a* (Figs. 2 and 3), these projections also serving to center the pole-shoes and to hold the edges of the magnets in alinement with said pole shoes. Axial displacement of the magnets is prevented by the plate *b* which is connected with the projections *h* by screws *i*. These projections are a little shorter or lower than the combined thickness of the magnets *f*, in consequence whereof the plate *b* is pressed by the screws *i* against the magnets rather than against the projections. Radially, the plate *b* is maintained in proper position by the ring *e*.

The other members of the apparatus are designed, arranged, and combined as in the known apparatus. I have omitted them, except the armature *k*, its coil *m*, and the casing *n*.

It will be obvious that the magnets of the constructional form shown and described have very simple contours, and can, therefore, be easily punched, and are not likely to warp. They are all alike which is very important from the standpoint of economy in quantity production. Besides, they need fit accurately only at their circularly curved portions, and there may be left, without scruple, a certain clearance or play between the magnets and the projections *h*. It is also immaterial whether they all are of the same thickness as they are being held together firmly by the plate *b*, and if the rotor should not, perhaps, fit accurately between the collars of its bearings, it is feasible either to re-finish said collars or to employ shims, both means being much cheaper than the working or re-working of the hard magnets.

If the rotor is overhanging, as in Figs. 4 and 5, the second plate (*b*) may be replaced by a bow *o* secured by screws *p* to the projections *h*. The shaft *c* is connected firmly with the other plate (*a*) and secured in place by a nut *r*. In this constructional form the magnets *f* each have a bore *q* for the admission of

said nut *r*, but these bores need not fit accurately relative to each other. Finally, a flat spring *s* is inserted between the bow *o* and the adjacent magnet in order to keep the magnets *f* in their proper position. Such a spring may be employed also with the constructional form shown in Figs. 1-3.

I claim:

1. A rotor for use in connection with a magneto-electric ignition apparatus having a stationary coil, comprising a non-magnetic rotary plate having oppositely located projections extending parallel to the axis of said plate, said pole shoes having smooth circular interior faces; annularly curved pole-shoes affixed to said plate; permanent magnets extending between said pole-shoes parallel to said plate, said magnets being located between said projections, as set forth.

2. A rotor for use in connection with a magneto-electric ignition apparatus having a stationary coil, comprising a non-magnetic rotary plate; annularly curved pole-shoes affixed to said plate, said pole shoes having smooth circular interior faces; permanent magnets extending between said pole-shoes parallel to said plate; and a spring so arranged as to exert upon said magnets an axial pressure in the direction of the said plate, substantially as set forth.

3. A rotor for an ignition device of the stationary coil and revoluble magnet type comprising, a plate, pole shoes affixed to said plate, said pole shoes having smooth circular interior faces, a plurality of magnets extending between said pole shoes, means integral with said plate for maintaining said magnets in alinement with said pole shoes, and means secured to said plate for clamping said magnets in position, said clamping means including a spring member adapted to exert an axial pressure on said magnets.

4. A rotor for an ignition device of the stationary coil and revoluble magnet type comprising, a non-magnetic plate, circularly curved, segment-shaped pole shoes affixed to said plate, said pole shoes having smooth circular interior faces, a non-magnetic ring for bracing said pole shoes against centrifugal force, a second non-magnetic plate mounted to rotate with said first mentioned plate, a plurality of permanent magnets interposed between said plates, the end portions of said magnets contacting with the inner cylindrical surfaces of said pole shoes, and rigid connecting means between said plates, said connecting means being integral with one of said plates and forming, with said pole shoes and plates, a housing conforming to the contour of said magnets.

In testimony whereof I have hereunto affixed my signature.

WILHELM WALTHER.