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MAGNETO

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Fig. 1.

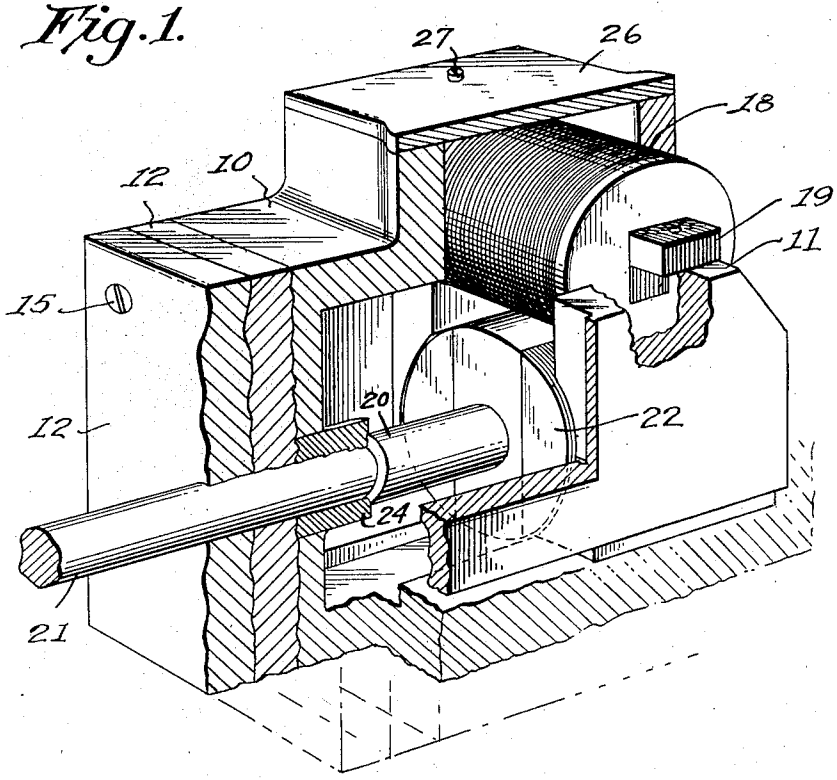

Fig. 2.

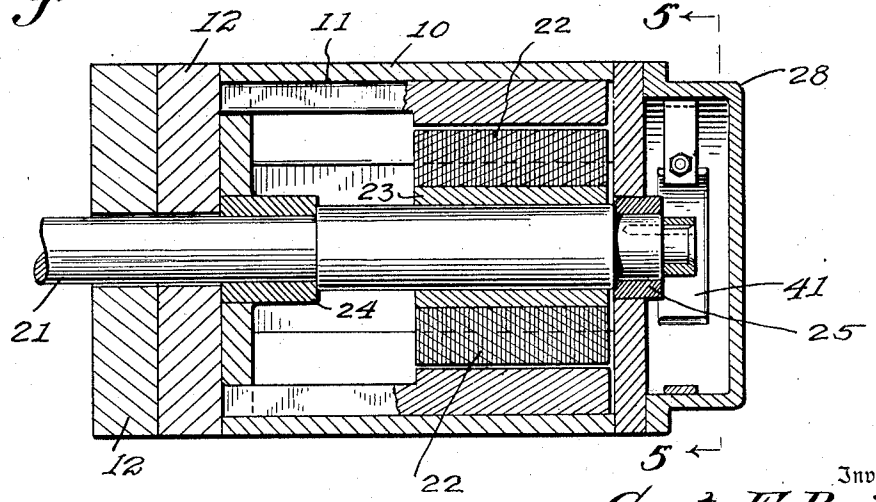

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Fig. 3.

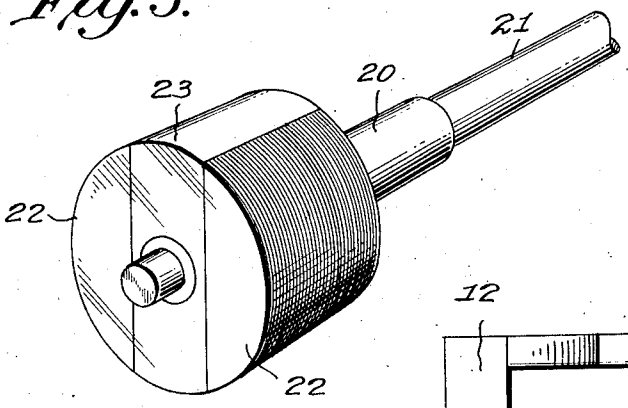
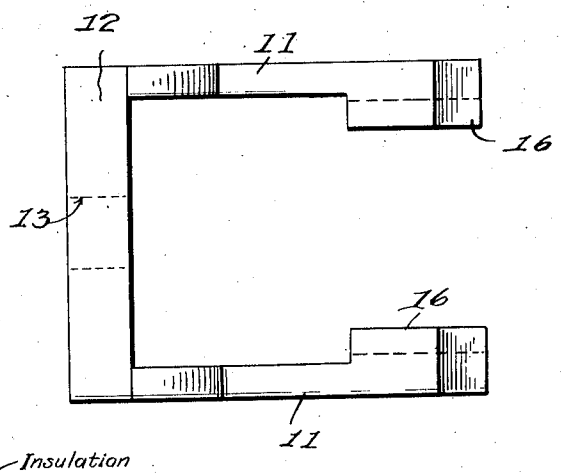


Fig. 4.



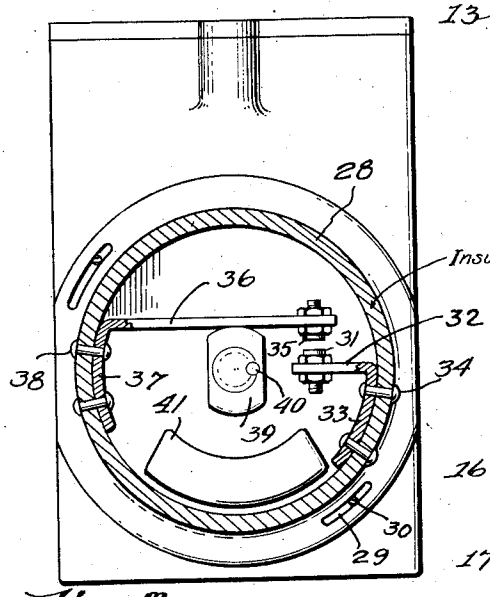


Fig. 5.

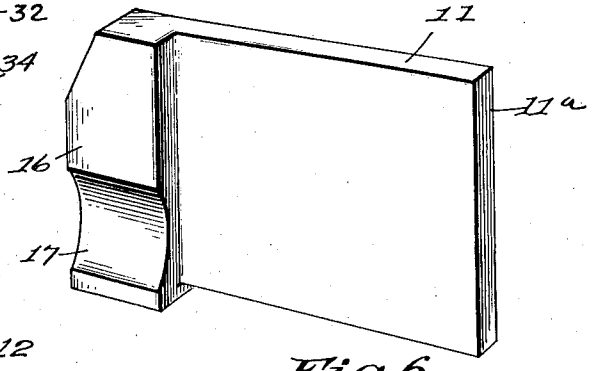


Fig. 6.

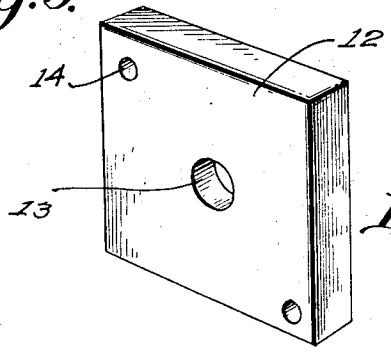


Fig. 7.

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Fig. 8.

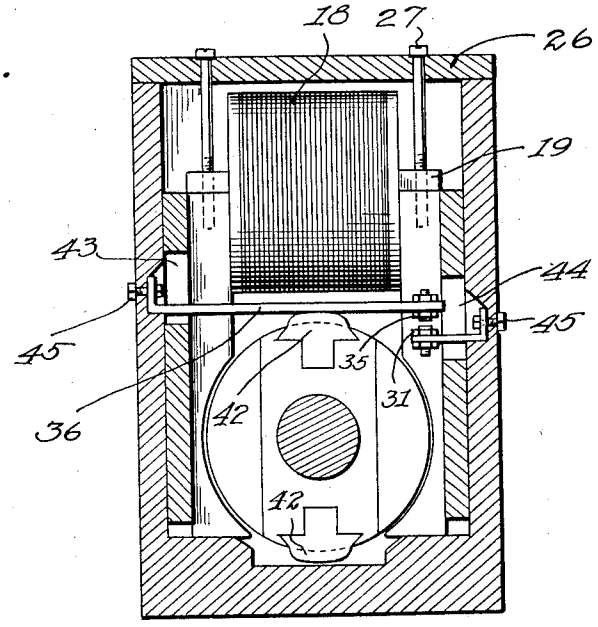
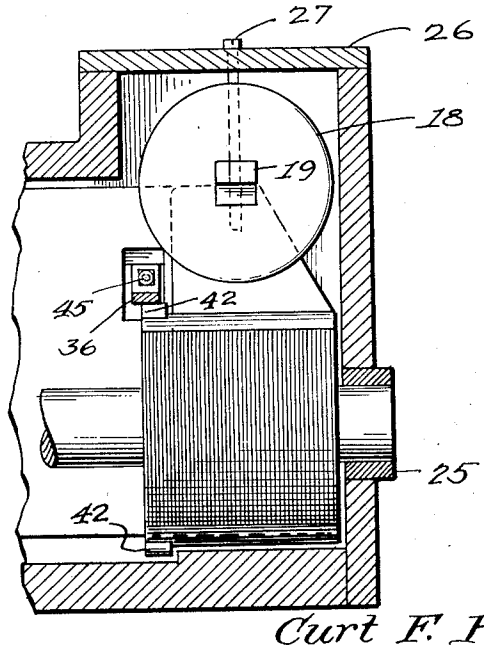


Fig. 9.



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Patented Jan. 2, 1934

1,942,123

UNITED STATES PATENT OFFICE

1,942,123

MAGNETO

Curt F. Reis, Chicago, Ill., assignor to Excel Magneto Co., Chicago, Ill.

Application July 22, 1930. Serial No. 469,882

1 Claim. (Cl. 171—209)

My invention relates to magnetos and particularly to an improved magneto of extreme simplicity, which will be strong and durable and can be manufactured at a minimum cost.

One object of my invention is to provide a magneto in which the magnets may be replaced without dismantling the working parts.

A further object is to provide a magneto wherein the field strength may be changed to agree with varying conditions of use, but without alteration of the fundamental structure.

Still another object is to provide a new form of magnet which does not require annealing, and hence will maintain higher residual magnetism and coercive force than other forms of magnet at present in use.

Other objects will appear from the following description when read in conjunction with the accompanying drawings wherein:

Figure 1 is a perspective view of one form of magneto embodying my invention, parts being broken away to show the interior construction.

Figure 2 is a horizontal sectional view of the complete magneto.

Figure 3 is a perspective view of the rotor.

Figure 4 is a top view of one form of field piece suitable for use in my improved magneto, a pair of these field pieces being shown in assembled relation with a magnet.

Figure 5 is a section on line 5—5 of Fig. 2, showing a breaker construction adapted for use when an adjustable spark is desired.

Figure 6 is a perspective view of one of the pole pieces shown in Fig. 4, illustrating the contour of the polar extensions.

Figure 7 is a perspective view of one of the improved magnets.

Figures 8 and 9 are vertical sectional views, transverse to and parallel to the rotor shaft respectively, both being illustrations of a form of breaker construction adapted for use when a fixed spark is desired.

Similar reference characters refer to similar parts in each of the several views.

Referring to Fig. 1, reference character 10 designates a housing of cast non-magnetic material, such as aluminum, in which are embedded magnetic pole pieces 11, of high permeability iron or of commercial steel laminations. These pole pieces have integral polar extensions 16, cut away at 17 to embrace the rotor of the magneto. Housing 10 is initially constructed by placing pole pieces 11 and the rotor mounted in its bearings in proper relation in a mold and then pouring in the molten non-magnetic material. When the mold is filled to the proper depth, and the cast material has hardened, the mold sections are removed, leaving the housing 10 in the form shown. The pole pieces will be rigidly held in properly spaced relation with the flat end, faces 11*a* flush with the outer face of the housing.

The end of housing 10, where pole piece ends 11*a* are exposed, is flat and adapted to receive one or more flat permanent magnets 12 having central openings 13, through which the rotor shaft extends. These magnets are simple punchings of steel, cut to the required length without heat treatment. Since they are not annealed they will retain their magnetism for a long period and will possess very high coercive force. They may be of chrome, tungsten or cobalt steel and are secured to housing 10 by any suitable means, such as screws 15, passing through openings 14 in the magnets. It will be obvious that the first magnet applied to the housing will contact with the ends 11*a* of the pole pieces as shown in detail in Fig. 4. Any desired field strength may be secured by increasing or decreasing the number of magnets 12, which are employed.

The housing 10 has an open top, through which a generating coil 18 can be inserted for cooperation with pole pieces 11. This coil is carried on a laminated magnetic core 19, having stepped ends which hold the core in bridging relation to the pole pieces 11, the core being secured to the pole pieces by the same screws 27, which secure the magneto cover 26 in place (Fig. 8).

The housing 10 has embedded in its ends, bearings 24 and 25 of any suitable material, such as bronze, carrying a rotor on shaft 21. This shaft is enlarged at 20 to receive the cylindrical rotor, the projecting end of enlargement 20 abutting the bearing 24 to limit end play. The rotor is composed of non-magnetic material 23 cast in place about the enlargement 20, and having embedded in it two sets of magnetic laminations 22. These sets of laminations are placed on diametrically opposite sides of the rotor and are of such angular extent as to be capable of bridging the polar extensions 16, when the rotor is moved through 90 degrees from the position shown in Fig. 1, and of a horizontal length equal to that of polar extensions 16, as clearly shown in Fig. 2.

It is quite usual to provide magnetos of this character with an adjustable circuit breaker and I have shown in Figures 2 and 5, one form of breaker which can be simply constructed, but

which will be satisfactory and durable in operation.

In order to provide for this breaker, a hollow end cap 28, of insulating material is adjustably mounted on the end of housing 10 adjacent to rotor 23, this adjustment being permitted by two spaced circumferential slots 29 cooperating with screws 30. Any suitable adjusting connection, such as a short arm may be applied to this cap. The stationary breaker contact 31 is mounted on an arm 32 having an arcuate extension 33 permanently secured to cap 28 as by rivets 34. In similar manner the cooperating movable contact 35 is carried by a long spring arm 36, having an arcuate extension 37 secured to the cap by rivets 38. The movable contact is operated by a cam 39 secured to the end of rotor shaft 21 by a pin 40. I prefer to make this cam 39 of stamped compressed linen treated with a suitable varnish of phenolic condensation product, as cams of this material are far superior to steel because they do not expand or contract with changes in temperature and require no lubrication. In assembling the breaker, arm 36 is provided with an initial set which biases it downward so as to insure that the contacts 35 and 31 will close when cam 39 rotates through ninety degrees from the position shown. Both of the contacts are adjustable in the usual manner, as shown in Fig. 5, and are bridged by a condenser 41, mounted inside of cap 28.

If a fixed breaker arrangement is desired, the construction of Figures 8 and 9 may be adopted. In this modification the breaker is operated by direct engagement with cams 42 embedded in the material 23 of the rotor. Provision for this is made by having openings 43 and 44 in pole pieces 11 and housing 10 adjacent thereto, the contact arms being secured to the housing by bolts and nuts 45.

When the rotor is set in rotation by any suitable means, the laminations 22 bridge the polar extensions 16 twice during each revolution, thereby providing a parallel shunt path for the flux which normally passes from these polar extensions through core 19 of coil 18, these extensions in turn receiving the flux from magnets 12. Flux, therefore, passes alternately through laminations 22 and core 19 to cause a pulsating flux to cut the turns of coil 18 and set up a flow of current therein. This current may be conducted away from coil 18 in any well known manner.

The magneto herein shown and described is designed to be efficient and durable, and yet capable of manufacture for a very small sum. It has the advantages of few parts, permanent integral assembly, variable field strength and complete enclosure, whereby, dirt and moisture are completely excluded. While I have illustrated a bipolar assembly, it is obvious, that my invention is applicable to magnetos having more than two poles.

Although I have herein shown and described only one form of magneto embodying my invention, it will be obvious that changes may be made in the details, within the scope of the appended claim, without departing from the spirit and scope of my invention.

Having thus described my invention what I claim is:

A magneto comprising a plurality of pole pieces embedded in a housing of cast non-magnetic material, with their ends exposed; a rotor within said housing between said pole pieces; a plurality of flat permanent magnets removably mounted in magnetic relation to the exposed ends of the pole pieces and threaded over the rotor shaft; and a generating coil magnetically associated with said pole pieces and rotor.

CURT F. REIS.