

March 22, 1938.

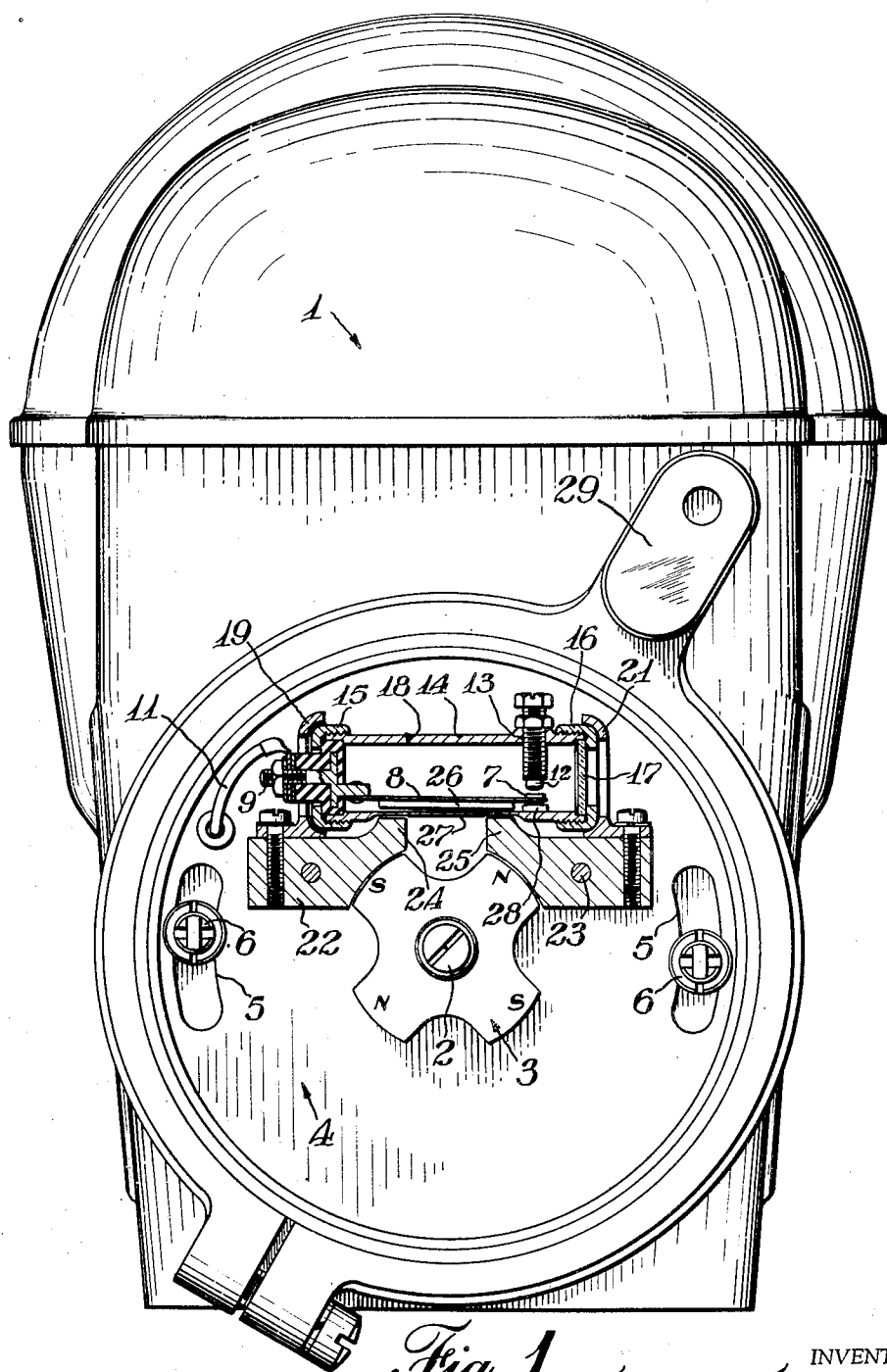
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2,112,214

MAGNETO GENERATOR

Filed Sept. 24, 1936

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

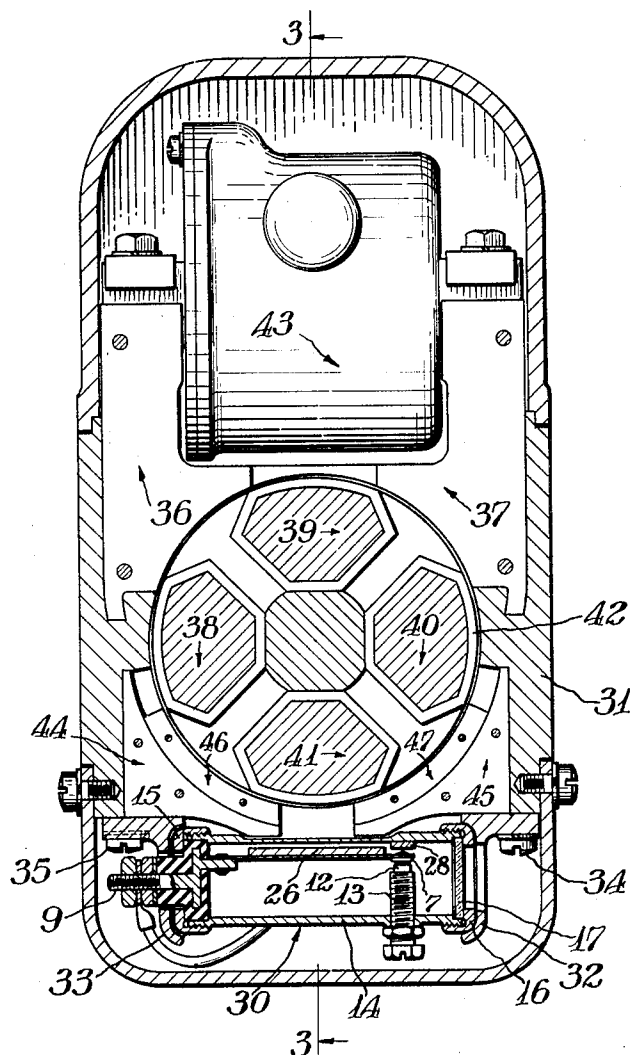


Fig. 2

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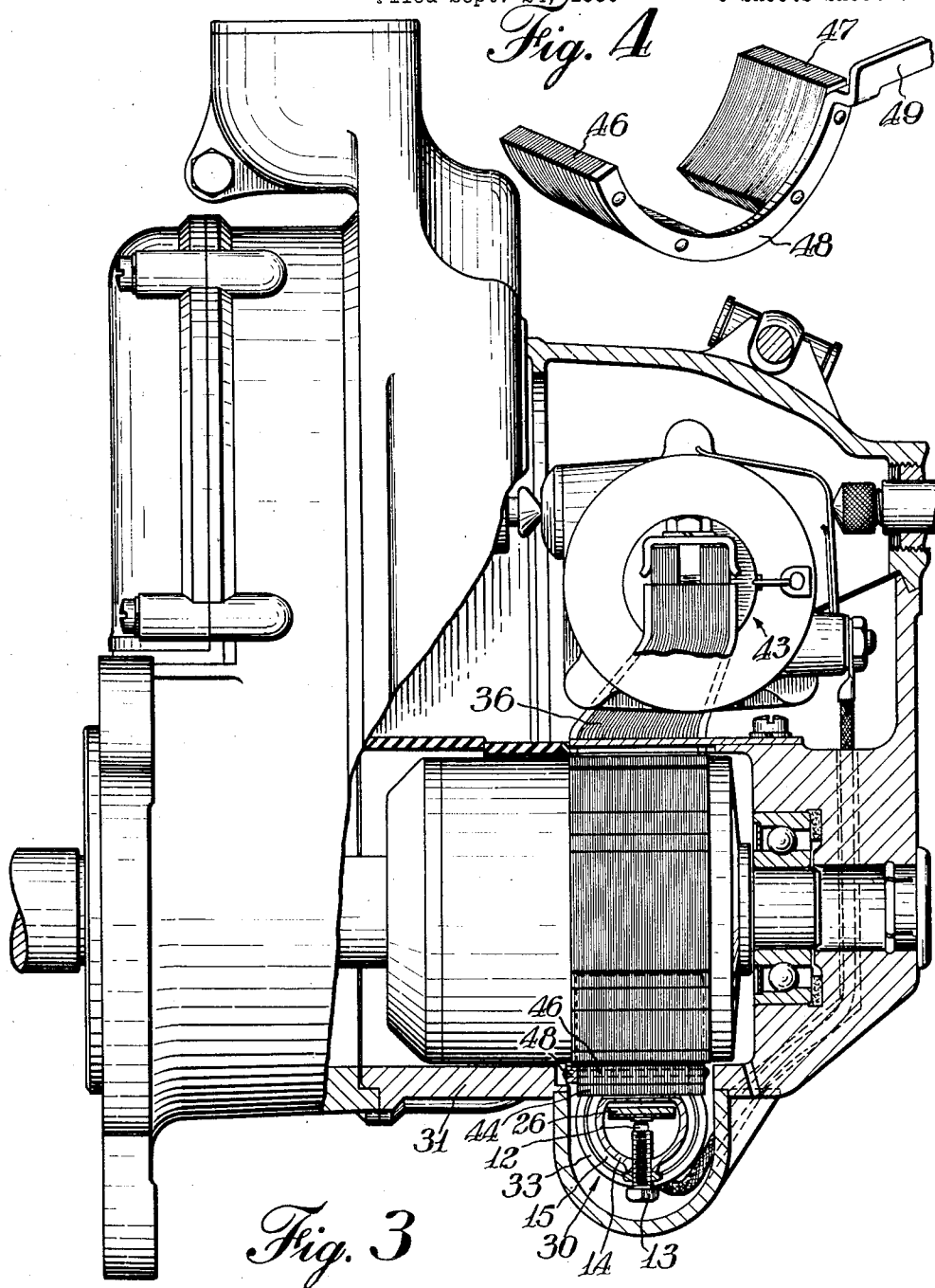
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MAGNETO GENERATOR

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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MAGNETO GENERATOR

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Application September 24, 1936, Serial No. 102,399

4 Claims. (Cl. 171-209)

The present invention relates to magneto generators for ignition systems of internal combustion engines and more particularly to a novel form of breaker mechanism therefor.

One of the most important factors which limit the periods of continuous operation of commercial types of ignition magnetos is the breaker mechanism including the electrical contacts and the cam operating mechanism therefor. The contact points, even though made of refractory and non-corrosive metal, gradually oxidize and pit, and the cam mechanism is subject to wear whereby the adjustment and efficiency of the breaker mechanism is affected.

It is an object of the present invention to provide a novel breaker mechanism for magneto generators in which oxidation of the contact points and wear of the operating mechanism are substantially prevented.

It is another object to provide such a device in which the contact points are enclosed in an inert atmosphere.

It is a further object to provide such a device in which the contact assembly is in the form of a capsule which is readily replaceable as a unit.

It is another object to provide such a device in which the contacts may be observed and adjusted without opening the capsule.

It is another object to provide such a device in which the contacts are operated magnetically, without any moving elements subject to frictional wear.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is an end view of a magneto incorporating one preferred embodiment of the present invention, the cover of the breaker mechanism being removed, and the breaker mechanism being shown substantially in vertical section;

Fig. 2 is a sectional view of a magneto embodying a second preferred form of the present invention;

Fig. 3 is a side elevation of the magneto illustrated in Fig. 2, parts being broken away and shown in section for the sake of clarity; and

Fig. 4 is a detail in perspective of one form of adjusting means to vary the timing of the breaker mechanism.

Referring first to Fig. 1 of the drawings, there is illustrated a magneto indicated generally by the numeral 1 having a rotor shaft 2 on which is fixedly mounted in any suitable manner a permanent magnet structure here shown in the form

of a cross 3 magnetized with subsequent poles of unlike polarity as indicated by the letters N, S. A breaker cup 4 is rotatably mounted on the end of the magneto casing as by means of arcuate slots 5 in the cup and retaining studs 6 threaded into the magneto casing.

According to the present invention, breaker mechanism for the primary circuit of the magneto is provided in the form of a movable contact 7 mounted on a spring 8 anchored to an insulated binding post 9 which is connected by means of a lead 11 to the primary winding of the magneto induction coil, not illustrated. An adjustable stationary contact 12 is arranged to cooperate with the movable contact 7 and, as here shown, is mounted on the end of a stud 13 which is threaded into a metallic casing 14. The casing 14 is closed at its ends by means of caps 15 and 16, the cap 15 being arranged to retain the insulated binding post 9, and the cap 16 being preferably arranged to hold a sealing member 17 of suitable transparent material permitting observation of the breaker points 7 and 12.

The casing 14 and caps 15, 16 form an airtight capsule which is adapted to be evacuated or filled with an inert gas through an opening 18 which is subsequently sealed in order that the contacts may be maintained in an inert atmosphere. The capsule 14, 15, 16 is removably retained in position and grounded to the magneto frame by suitable clamping means such as the brackets 19 and 21 which are suitably fixed to mounting members 22 and 23 which are fixedly attached to the breaker cup 4 in any suitable manner.

The casing 14 and the brackets 19 and 21 are of non-magnetic material, but the mounting members 22 and 23 are made of readily permeable material and are formed as pole pieces adapted to cooperate with the poles of the magnet 3 and having projections 24 and 25 extending into close proximity to the casing 14. An armature 26 of readily permeable material is attached in any suitable way to the spring 8 carrying the movable contact 7 and is located closely adjacent to the interior wall of the casing 14 which may be flattened as indicated at 27 in order to reduce the gaps between the projections 24, 25 of the pole pieces and the ends of the armature 26.

In order to prevent grounding the contact 7 when the armature is attracted by the magnetic pole pieces, a buffer element 28 of suitable insulating material is mounted in the casing 14 in position to limit the travel of the contact 7 away from the fixed contact 12.

In the operation of this embodiment of the invention, the capsule containing the breaker mechanism is mounted in the brackets 19, 21, as illustrated, with the armature 26 adjacent the pole pieces 22, 23, the rotor is turned until a pair of poles of the magnet 3 are in operative relation to the pole pieces, as illustrated, and the contact 12 is adjusted into proper spaced relation with the contact 7. The magneto is then timed in the usual manner and the breaker cup 4 rotated by means of the operating arm 29 to such angular position that the magnet attracts the armature 26 and causes the contacts 7, 12 to open in the proper timed relation with the operation of the engine to be ignited. Thereafter, rotation of the magnet 3 with the magneto rotor causes the contact 7 to be vibrated to open and close the primary circuit of the magneto in the usual manner.

Inasmuch as the contacts 7 and 12 are not subject to any oxidizing action, and the operating mechanism therefor involves no moving parts subject to friction, it is obvious that this arrangement is peculiarly well adapted for reliable operation over long periods of time. If, however, it should become necessary to replace the breaker mechanism, it will be obvious that this is very readily brought about by merely loosening one of the brackets 19 or 21, removing the lead 11, and replacing the capsule as a unit with a new breaker capsule.

In the embodiment of the invention illustrated in Figs. 2 and 3, the magnetic elements of the magneto rotor are used to operate the breaker mechanism without the necessity of an additional magnet for that purpose. As best shown in Fig. 2, the breaker capsule indicated generally by the numeral 30 is removably mounted on the frame 31 of the magneto by means of clamps 32 and 33 fixed thereto as by means of studs 34 and 35. The elements of the breaker mechanism are the same as previously described in connection with Fig. 1 and are similarly numbered.

As shown in Figs. 3 and 2, the breaker mechanism is located on the frame of the magneto in the same plane as the stationary pole pieces 36 and 37 which conduct the flux from the elements 38, 39, 40, 41 of the multi-polar magnetic inductor rotor 42 through the core of an induction coil 43 of the usual type. Auxiliary pole pieces 44 and 45 are provided for conducting the flux from these same rotor magnetic elements to actuate the armature 26 of the breaker mechanism, those magnetic elements of the rotor being utilized for that purpose which are not at that time operative with respect to the induction coil.

Means are preferably provided for adjusting the angular position of the rotor at which the magnetic elements thereof are effective on the armature 26 to open contacts 7, 12. As here shown, this means is in the form of a pair of arcuate shoes 46 and 47 of permeable material mounted on the pole pieces 44 and 45 adjacent the path of the magnetic elements of the rotor 42, these shoes being preferably connected by an arcuate strip of non-magnetic material 48 (Fig. 4) and actuated by any suitable means such as a manually operable arm 49.

In the operation of this embodiment of the

invention, rotation of the magnetic elements of the inductor rotor 42 causes said elements to impress the magnetic flux thereof alternately in opposite directions through the magnetic circuit of the induction coil 43 in the usual manner. At the same time, said elements which are idle with respect to the induction coil, are effective to cause magnetic flux to periodically traverse the pole pieces 44 and 45 and the armature 26 so as to attract the armature and open contacts 7, 12, thus breaking the primary circuit of the induction coil. It will be understood that the shiftable shoes 46, 47 are so adjusted that the flux of the rotor magnets is effective to open said contacts in the proper timed relation to the rotation of the rotor.

Although certain forms of the invention have been shown and described in detail, it will be understood that other forms are possible and that various changes may be made in the design and arrangements of the parts without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. In a magneto generator a rotor, a magnet rotatable thereby, breaker mechanism, a capsule enclosing the breaker mechanism in an inert atmosphere, an armature within the capsule arranged to actuate the breaker mechanism, means forming a magnetic circuit including said magnet and armature, and means for angularly adjusting the operative relationship of the magnet and armature.

2. In a magneto generator a rotor, a magnet rotatable thereby, breaker mechanism, a capsule enclosing the breaker mechanism in an inert atmosphere, an armature within the capsule arranged to actuate the breaker mechanism, means forming a magnetic circuit including said magnet and armature, and means operable outside the capsule for adjusting said breaker mechanism, said capsule having a transparent wall permitting observation of the breaker mechanism.

3. In a high tension magneto a rotor including a multi-polar magnetic inductor, an induction coil having primary and secondary windings, means for conducting flux from said inductor through said coil, breaker mechanism in circuit with said primary winding for periodically interrupting the flow of current therein, a non-magnetic sheath hermetically enclosing said breaker mechanism in an inert atmosphere, means including an armature within the sheath for actuating said breaker mechanism, means including pole shoes adjacent the path of the poles of said inductor arranged to conduct flux from said poles through said armature, and means for angularly adjusting the operative relation of the poles of the inductor with respect to said armature.

4. In a magneto generator, a magnetic rotor, a coil, breaker mechanism for said coil including a sealed tubular capsule containing in an inert atmosphere an insulated movable contact and a grounded fixed contact, means for operating the movable contact including an actuating element in the form of an armature connected thereto, and removable brackets for detachably mounting the capsule with its armature in inductive relation with the rotor.

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