C. E. JOHNSON.

MAGNETO.

APPLICATION FILED AUG. 30, 1909

1,038,592.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

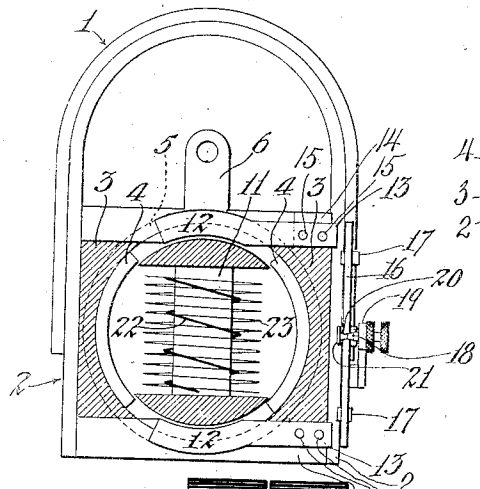


Fig. 3.

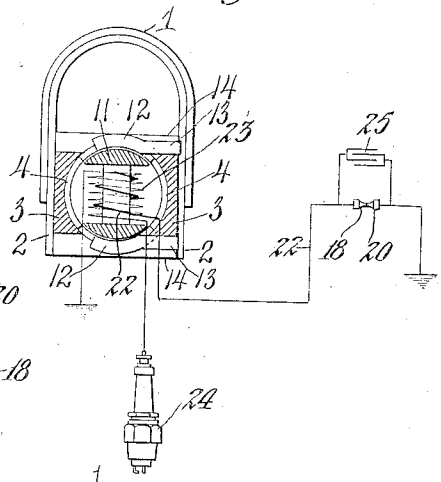


Fig. 2.

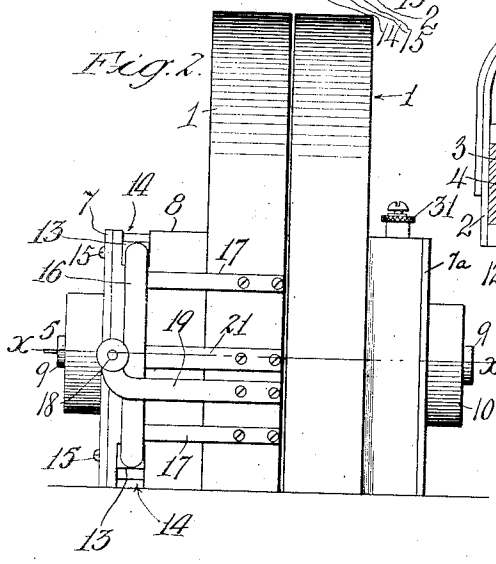
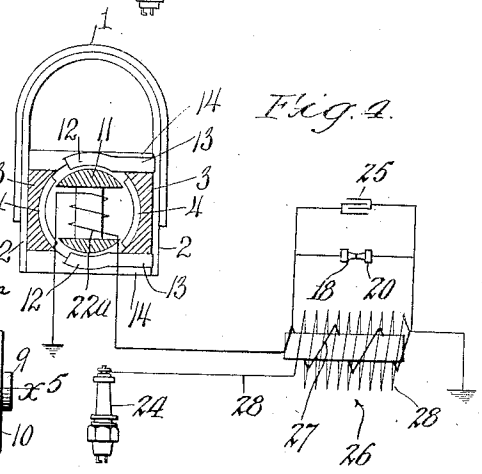


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

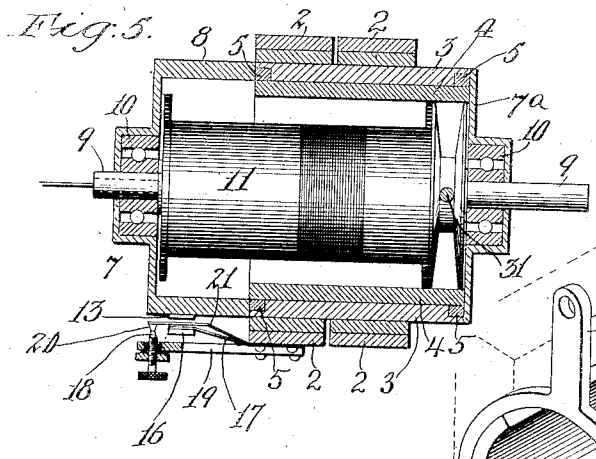


Fig. 8.

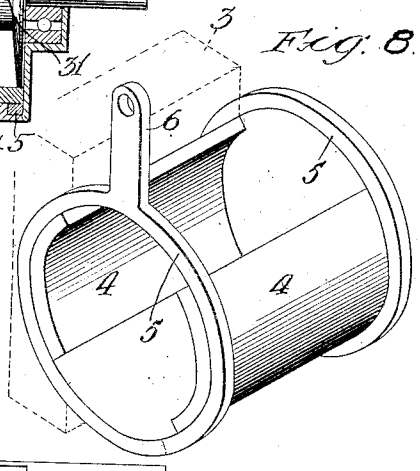


Fig. 6.

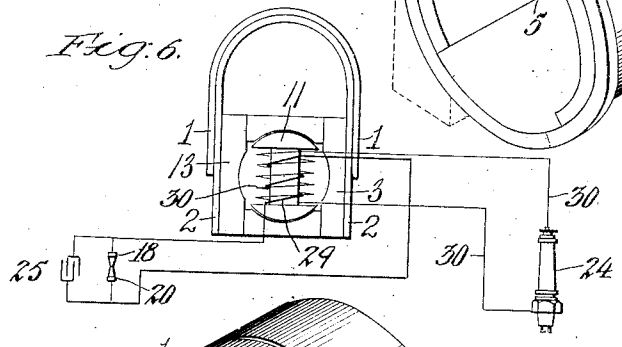
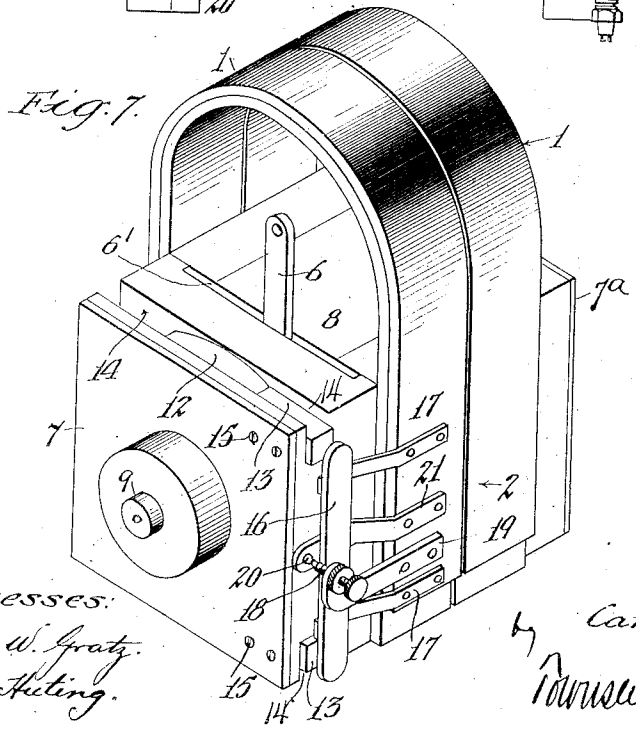


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MAGNETO.

1,038,592. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed August 30, 1909. Serial No. 515,329.

To all whom it may concern:

Be it known that I, CARL E. JOHNSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Magneto, of which the following is a specification.

This invention relates to magnetos and particularly to that type of magneto which is employed in the ignition apparatus of internal combustion engines. In such magnetos that circuit has heretofore been made and broken by a mechanically operated circuit breaker, or interrupter, and the main object of the present invention is to make and break the circuit by magnetically operated means, the magnetism used for this purpose being produced by the magneto, the advantages arising therefrom being greater simplicity of the machine on account of elimination of the more or less complex circuit breaker, elimination of moving and wearing parts, and perfect action on account of direct application of force from the magneto. A further advantage is that it is possible to vary the time of producing the spark through a much greater arc than can be secured by adjusting the timers heretofore employed.

The invention may be employed in magnetos wherein a transformer is employed externally of the magneto, the armature having a primary winding only, or where the armature is provided with a primary winding and a so-called secondary winding without an external transformer, or is adapted to be used in any of the well-known types of magnetos.

In one form of the invention I employ two auxiliary pole pieces in addition to the regular pole pieces, for attracting an armature to separate contact points and break the circuit. In another form I dispense with the auxiliary pole pieces and employ the lower ends of the regular poles of the U-shaped magnet for attracting the circuit controlling armature to separate the contact points. The contact points are moved together preferably by spring means. In the present embodiment the poles which attract the circuit controlling armature are fixed and bear a constant angular position. By adjusting the regular pole pieces I am enabled to vary the point in the cycle at which the electric pressure within the armature winding attains its maximum value so that excitation of the circuit controlling armature will correspond to the adjustment and the consequent attraction of the circuit controlling armature and break of the circuit will occur accordingly.

A quick break in the primary circuit is of importance and a further object is to so construct the device that a sudden break is produced in the primary circuit.

Referring to the drawings: Figure 1 is a side elevation of the magneto, partly in section. Fig. 2 is a front elevation. Fig. 3 is a diagrammatic view showing the method of winding in which no external transformer is employed, there being a primary winding and a so-called secondary winding on the armature. Fig. 4 is a diagrammatic view showing the armature having a primary winding only, there being an external transformer. Fig. 5 is a cross section on line x^5—x^5 Fig. 2. Fig. 6 is a diagrammatic view showing the connections wherein the armature is wound with both primary and secondary coils, both coils being separated from each other. Fig. 7 is a perspective view of one end of the magneto showing adjacent portions of the circuit controlling parts. Fig. 8 is a perspective view of the adjustable pole pieces.

In the form shown in Fig. 1, 1 designates the regular magnet having poles 2 provided with main pole pieces 3 and adjustable portions or shoes 4, the latter fitting revolubly in the main pole pieces 3 and being connected at each end by a ring 5 from one of which an arm 6 extends through a slot 6′ to permit the arm 6 to be moved to adjust the shoes. Plates 7 are secured to the ends of the box 8 of non-magnetic material. Both plates 7 are of a non-magnetic material. 9 designates the armature shaft mounted at each end in bearings 10 in the plates 7 and 7ª. The armature shaft 9 carries a rotating armature 11 of the H-type. Auxiliary pole pieces 12 are arranged above and below the armature 11 and are supported by arms 13 which extend through slots 14 formed in the box 8 and are secured to the end plate 7 by screws 15.

A circuit controlling armature 16 is supported by springs 17 and is adapted to be attracted by the two arms 13 of the auxiliary pole pieces 12.

18 is a stationary contact point supported by a stationary bracket 19, and 20 is a movable contact supported by a spring 21, the latter being at a distance from the armature 16 when the armature 16 is away from the arms 13 and the armature 16 is normally held retracted by the springs 17. The contact points 18 and 20 are located in the primary circuit and normally keep the primary circuit closed, the spring 21 pressing the contact 20 against the contact 18. As the armature 11 rotates the auxiliary pole pieces 12 are excited twice in each revolution of the armature and each time they are excited the arms 13 thereof attract the circuit controlling armature 16 and the latter strikes the spring 21 with a hammer-blow and suddenly moves the contact 20 away from the contact 18, thereby breaking the primary circuit and causing sparking at the spark plug in the secondary circuit in the well-known manner.

It is obvious that by adjusting the shoes 4 of the pole-pieces 3 by means of the lever 6 that the time of sparking will be varied accordingly. It is desirable that the pole pieces 12 attract the circuit controlling armature 16 at the time of maximum tension of the electric current, so that the primary circuit will be broken at that time, and the hottest spark be produced. This action will occur when the parts are substantially in the position shown in Fig. 1, the armature 11 being about to leave one pole piece and enter another and the auxiliary pole pieces 12 being substantially midway between the regular pole pieces 3, so that the maximum magnetic excitation of the auxiliary pole pieces 12 and arms 13 will occur at the time of greatest electrical pressure. The springs 17 are set to resist closing of the circuit controlling armature 16, except when the greatest pull is exerted thereon. Adjustment of the shoes 4 to vary the time of magnetic excitation of the auxiliary pole pieces 12 and time of spark will not alter the intensity of the spark.

The armature 11 may be provided with a primary winding 22, as shown in Fig. 3, which is grounded, and a secondary winding 23 on the armature may be connected at one end to the primary winding and thus grounded and its other end connected with the spark plug 24. The primary circuit 22 includes the sparking terminals 18 and 20, and a condenser 25 is preferably connected in parallel with the contacts 18 and 20 to prevent sparking at these contacts.

Fig. 4 shows the armature as provided with the primary winding 22^a only, there being an external transformer 26, the primary winding 27 of which is in circuit with the primary winding 22^a and the secondary winding 28 connects at one end to the primary winding 28 and is there grounded and thence is connected at its other end to the spark plug 24.

In Fig. 6 the armature is shown as provided with a primary winding 29 and a secondary winding 30, both of which windings are separated from each other.

18 and 20 are the contact points in each circuit, and 25 is the condenser. The secondary circuit 30 includes the spark plug 24.

All of these methods of winding and their circuits are well-known in the art and any of them may be employed in carrying out my invention.

The armature winding may be taken off at one end by a brush 31 as shown in Fig. 5, while the other end may be conducted through the hollow shaft 9.

What I claim is:

1. A magneto comprising a magnet, pole pieces on the magnet, adjustable shoes on the pole pieces, means for adjusting the angular relation between the adjustable shoes and the pole pieces, an armature, a primary winding on the armature, a secondary winding and means operated by the pole pieces for breaking the primary circuit.

2. A magneto comprising a magnet with pole pieces thereon, an armature extending beyond the magnet, auxiliary pole pieces at one side of the magnet coöperating with the extended portion of said armature, a primary and secondary circuit, and means operated by said auxiliary pole pieces for breaking the primary circuit.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 24 day of August, 1909.

CARL E. JOHNSON.

In presence of—
G. T. HACKLEY,
FRANK L. A. GRAHAM.