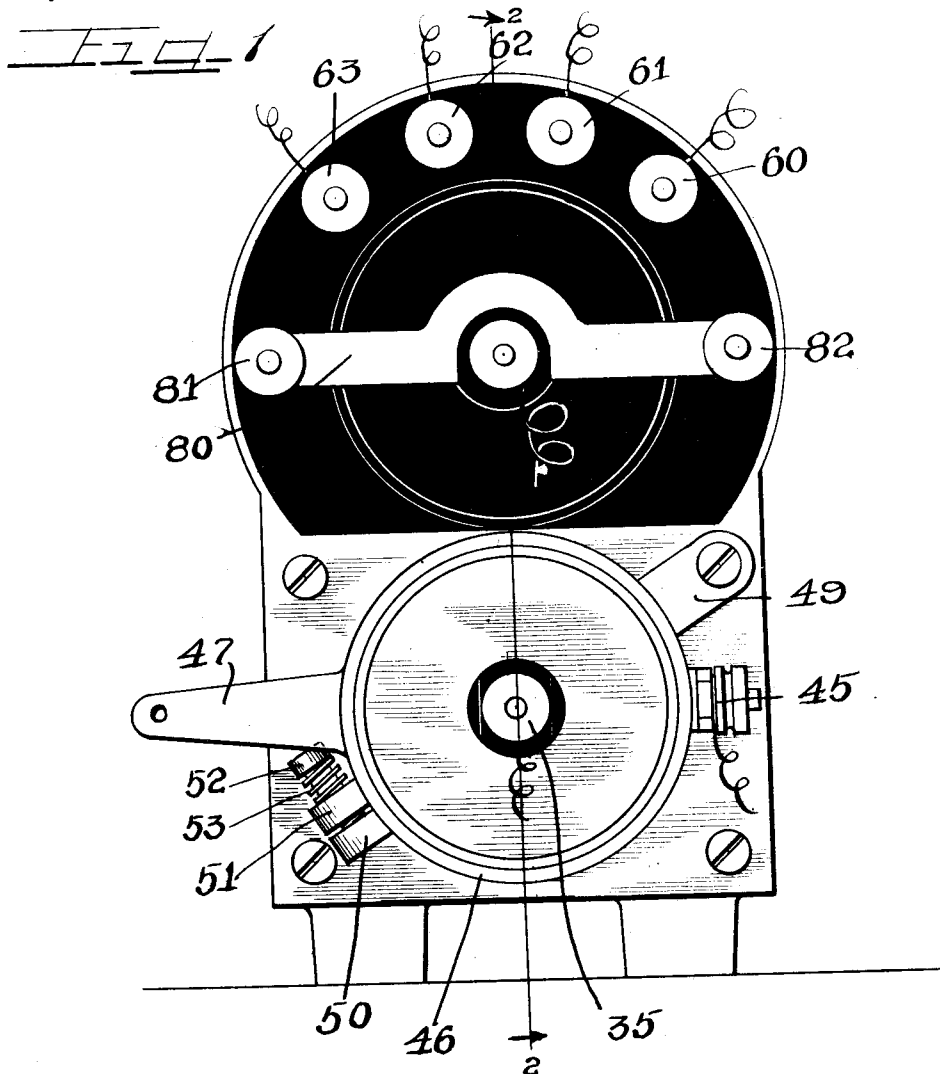


A. L. HEIZER.
IGNITION MAGNETO.
APPLICATION FILED MAR. 2, 1910.

Patented May 20, 1913.

5 SHEETS—SHEET 1.

1,062,156.



WITNESSES

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Alexander L. Heizer.

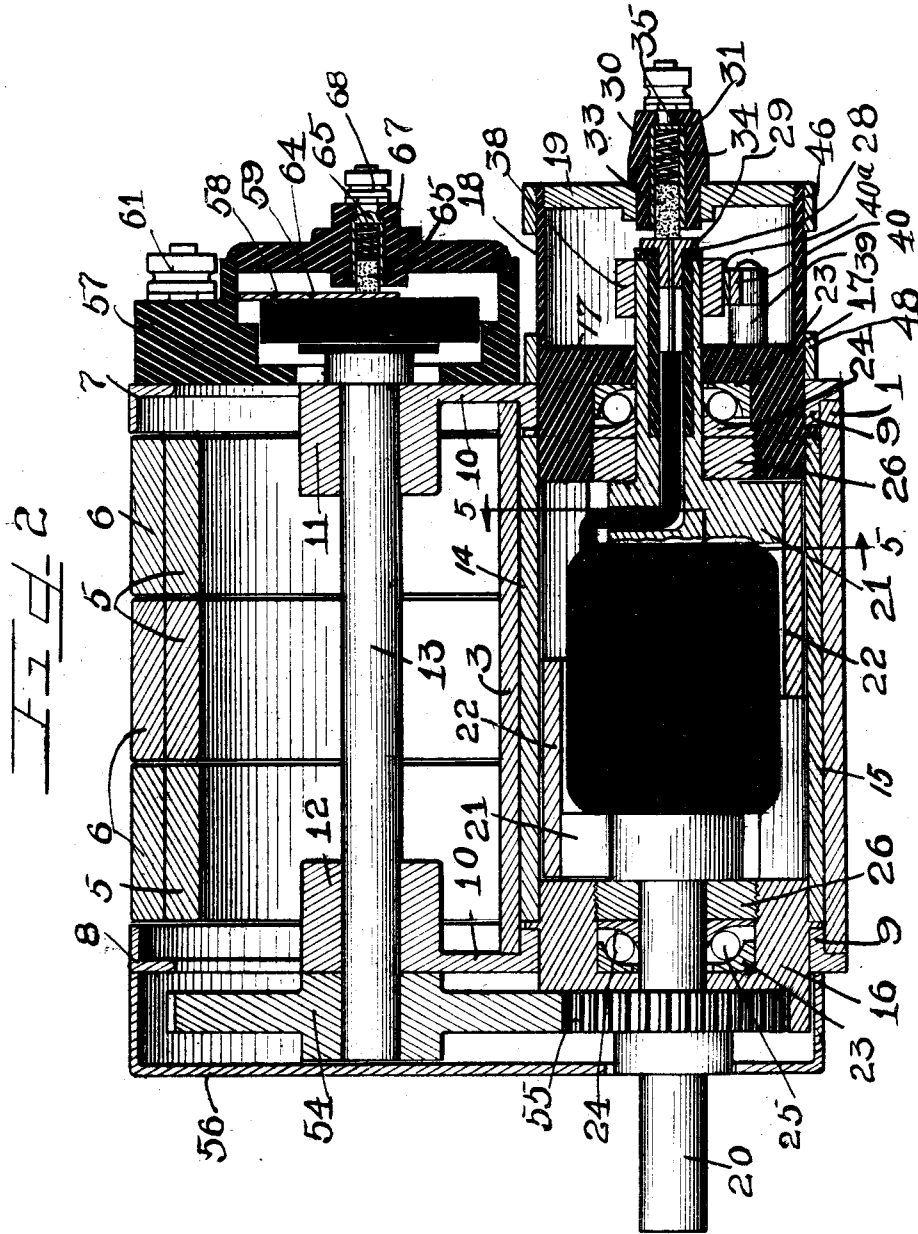
Charles E. Hester ATTORNEY

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6 SHEETS—SHEET 2.



WITNESSES
J. H. Angell.
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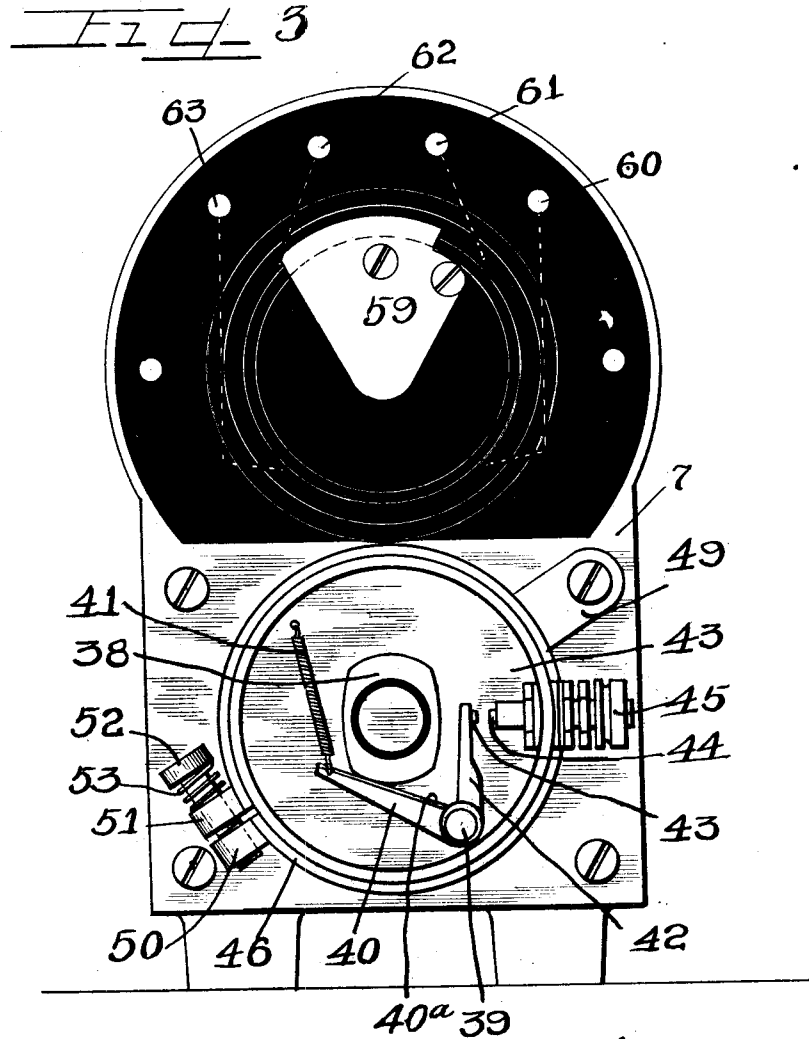
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5 SHEETS—SHEET 3.



WITNESSES

J. H. Angell
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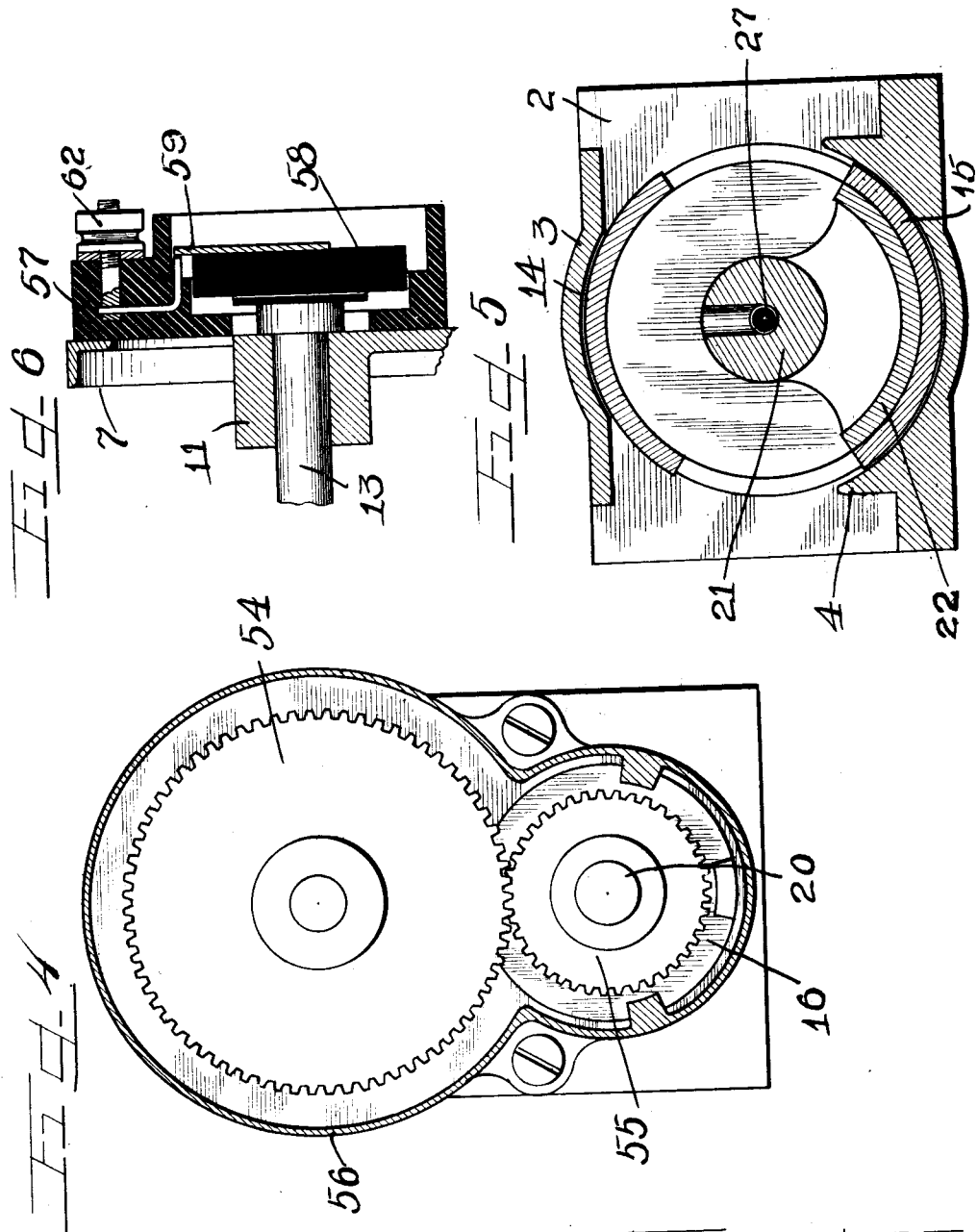
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 5 SHEETS—SHEET 4.

1,062,156



WITNESSES
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R. E. Hammah

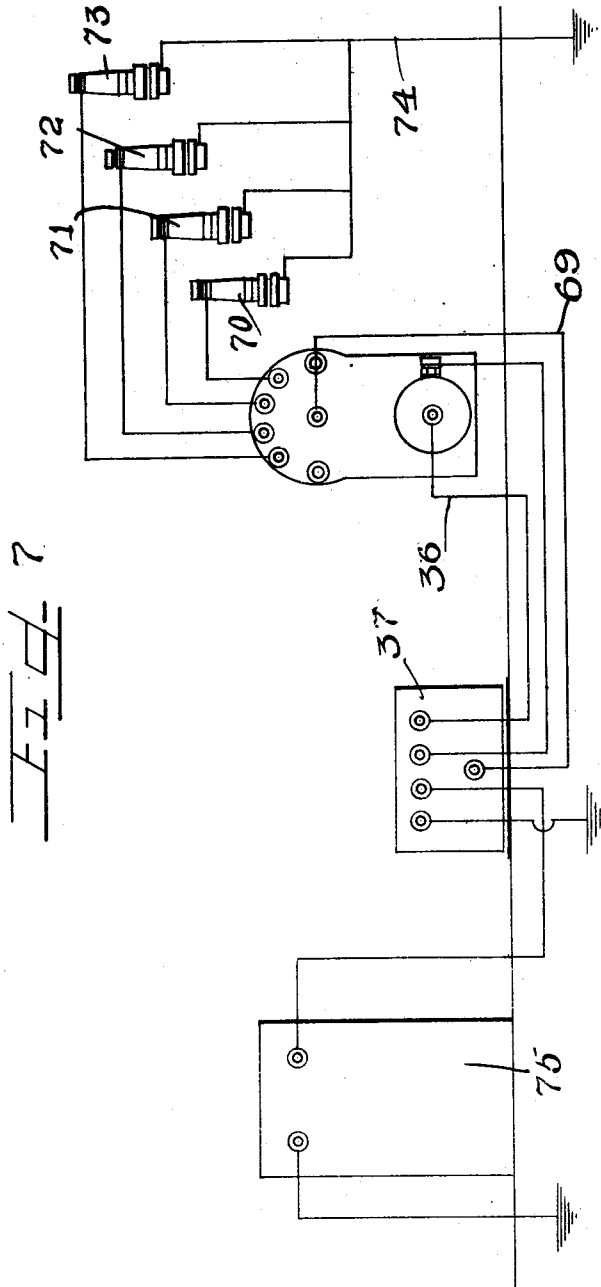
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6 SHEETS—SHEET 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

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IGNITION-MAGNETO.

1,062,156.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed March 2, 1910. Serial No. 546,811.

To all whom it may concern:

Be it known that I, ALEXANDER L. HEIZER, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ignition-Magnetos; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numbers of reference marked thereon, which form a part of this specification.

This invention relates to improvements in magneto electric machines of that class adapted for use for ignition or sparking purposes for hydro-carbon engines. With the introduction and extensive use of motor vehicles propelled by hydro-carbon engines the magneto has come to be relied upon for sparking purposes owing to its economy and reliability. Difficulty with some magnetos however, is sometimes experienced in starting and in others the advancing or retarding of the spark is more or less difficult and uncertain.

The object of this invention is to provide a sparking magneto of the same class as those set forth in my prior applications for United States Letters Patent for "magneto electrical generator," filed April 22, 1909, Serial No. 491,420, and "ignition magneto," filed Aug. 26, 1909, Serial No. 514,736, in which stationary pole pieces as such were omitted and in lieu thereof movable pole pieces are employed to enable the spark to be advanced or retarded, as desired.

It is also an object of the invention to improve the construction of the circuit breaking device and also to incorporate in close association with the magneto a timing mechanism operated from the magneto shaft and by means of which the rythmical sparking of successive cylinders is effected.

The invention embraces many novel features more fully set forth and defined in the appended claims.

In the drawings: Figure 1 is an end elevation of a magneto embodying my invention. Fig. 2 is a longitudinal section on line 2—2 of Fig. 1. Fig. 3 is a view similar to Fig. 1, with the end caps for the timer and the circuit breaker removed. Fig. 4 is a view in elevation of the end opposite that

shown in Figs. 2 and 3, and with the gear casing in section. Fig. 5 is a section on line 5—5 of Fig. 2. Fig. 6 is a section on line 6—6 of Fig. 3. Fig. 7 is a diagrammatic view illustrating one convenient arrangement of the wiring for ignition purposes of the magneto embodying my invention.

As shown in the drawings: Said magneto comprises a base 1, which may be constructed of aluminum or any suitable non-magnetic material and integral end walls, 2, each of which is bored to afford a circular concentric aperture to receive the armature therein. Integral with said end walls is also a top wall 3, which together with the bottom wall is cylindrically concave on the inner side to fit to the cylindric pole pieces. The bottom of said base member is provided with upwardly extending flanges 4, affording outwardly directed lateral shoulders adapted to fit between the legs of the inner magnets 5, of the combined permanent magnets, the outer members of which are indicated by 6. As shown, the top wall 3, is of a width to fit closely between the legs of the magnets 5.

As shown, three sets of magnets are provided each comprising an outer and an inner magnet 5 and 6, respectively, said magnets being secured to the base in the usual or any desired manner to afford sufficient rigidity.

Fitted into the ends of the base frame are end members 7 and 8, which are constructed of non-magnetic material and are provided at their lower ends with flanges 9, which fit into the base frame at each end thereof, as shown in Fig. 2, and as shown, said end frame members extend upwardly above the base and conform generally to the contour of the magnets above the same to afford a finish. As shown, each of said end frame members is provided with an integral web 10, above the base provided substantially at the axis of curvature of the magnets with a boss 11, and 12, respectively, which is bored to journal the timing shaft 13, therein, as shown in Fig. 2. Journaled in the tunnel of said base to permit a slight rotational adjustment are relatively thin soft iron pole pieces 14 and 15, which are arranged diametrically opposite each other and are rigidly secured together by means of the non-magnetic cylindric end members

16, and 17, which fit between the cylindrically concave ends of said pole pieces and are rigidly secured thereto, to hold said pole pieces, which serve also as screens, in unvarying relation with each other.

Integrally connected or otherwise with the end member 17, is a non-metallic shell 18, which extends outwardly thereupon continuous with the outer wall or periphery of the end member 17, and threaded into the end of which is a head 19, thereby providing an inclosed chamber or casing.

The armature is of the type set forth in my two prior applications for patent hereinbefore mentioned, which comprises a soft iron armature shaft 20, having integral or other suitable wings 21, thereon, between the end members 16 and 17, and secured to the wings of which are cheek pieces 22, which are cylindrically convex on their outer face complementary with the cylindrically concave inner faces of the pole pieces 14 and 15, said cheek pieces being rigidly secured to the wings by means of screws or other suitable means and all constructed of metal suitable for the purpose. The armature winding may be such as before described in my prior applications, namely, it may be a continuous winding of suitably insulated wire around the armature core in a direction at a right angle with the length of the shaft, though, of course, any suitable armature winding may be employed for the purpose. Said armature shaft, as shown, is mounted in ball bearings comprising a cup 23, and cone 24, with suitable balls 25, interposed therebetween seated in each of the end members 16 and 17, and against the cone of which and threaded into said end members is an adjusting nut 26, against the ends of which the armature core bears.

One end of the armature windings is secured upon the armature shaft as usual or in any suitable manner, and the other end 27, suitably insulated, leads through a tubular axial bore in the shaft into the casing afforded by the shell 18, and head 19. As shown, a bushing of insulating material 28, is provided in the end of said shaft to insure suitable insulation of said wire and the end of said wire is connected by soldering or in any other suitable manner with the metallic contact piece 29, secured in the outer end of said bushing. Centrally secured in the cap 19, is an insulating shell 30, in which is provided a metallic tubular bushing 31, adapted to contain the brush 33, which presses against the end of the contact piece 29, and which at all times is held in positive engagement by means of the spring 34, contained in said bushing. Electrically connected with said bushing is a binding post 35, adapted to afford connection with one of the lead wires 36, suitably connected with a coil or condenser 37. Se-

cured on the end of said armature shaft in said casing is a cam 38, which, as shown, is provided with diametrically opposite extensions or throws. Journaled upon a suitable post 39, on the inner wall of said casing is a bell crank lever, one arm 40, of which is directed upwardly alongside the cam, as shown in Fig. 3, and at its upper end is connected with a spring 41, secured on the wall of the casing which acts to hold said arm at all times in bearing against the cam, and as shown, a wall plate 40^a, is provided on the wearing face of said arm in engagement with the cam. The other arm 42, of said bell crank lever is directed upwardly and is provided with an outwardly facing contact member 43, which is positioned to engage a contact 44, on a binding post 45, which is engaged through the wall of said shell 18, and may be insulated therefrom in any suitable manner. Engaged around the end of said casing by means of a close fitting clamping band 46, is the adjusting lever 47, which is integral with said band and by means of which the casing and, of course, the end member 17, and the pole pieces or screens 14 and 15, may be turned or adjusted to regulate the making and breaking of the circuit and thereby the spark. As shown, a friction brake ring 48, is secured around said casing closely adjacent to the end frame member 7, and is provided on one side with an arm 49, adapted to be engaged on the end frame member 7. Said ring is split at its opposite side from said arm and is provided with lugs 50 and 51. As shown, an adjusting screw 52, extends loosely through a suitable aperture in the lug 51, and is threaded through the lug 50, and a spiral spring 53, is provided between the head of said adjusting screw and the lug 51, so that the clamping pressure of said friction brake is adjusted by the adjustment of said screw.

The shaft 13, journaled in the bosses 11 and 12, is provided with a gear 54, at the rear end thereof which meshes with a gear or pinion 55, of one half the diameter thereof on the armature shaft, thus affording a two to one gear. A close fitting metallic casing 56, incloses said gears to exclude dust and dirt therefrom. The end of said armature shaft protrudes sufficiently to receive a gear thereon or other suitable means for driving the armature.

At the forward end of the shaft 13, is the timing mechanism for the engine. For this purpose, an insulating plate 57, of hard rubber or other suitable material is secured on the outer face of the frame member 7, above the casing 18, and is centrally bored to receive therein the circular head 58, secured on said timing shaft 13, and which is of ebonite, fiber, hard rubber or any suitable insulating material. Secured on said insulating head 58, is a metallic plate 59, the pe-

riphery of which extends beyond the head 58, and a portion of which extends to and covers the center of said head.

Binding posts 60, 61, 62, and 63, are provided upon the ebonite block or plate 57, wires from which lead inwardly through said block and the ends of which are arranged equal distances apart in the path of the contact member 59, to be engaged thereby as said contact member rotates with the timing shaft 13. As shown, a cap 64, of insulating material is arranged to cover and inclose the timer and extending into and seated in a central bore therein is a tubular metallic post 65, containing a brush 66, and a spring 67, similar to the brush 33, and spring 34, before described, and electrically connected with said tubular post is a binding post 68, whereby connection is afforded with the condenser or coil 37, before described through a lead wire 69. A spring clamp 80, holds said head 64, in place and is secured at its ends to the plate 57, by means of binding posts 81—82.

The magneto may be connected with the hydro-carbon motor with which it is to be used, in any suitable manner. The conventional and diagrammatic arrangement is illustrated in Fig. 7, in which 70, 71, 72, and 73 indicate the spark plugs or other ignition means adapted for connection in the respective cylinders and which are each connected, as shown, with one of the binding posts of the timer. The spark plugs, of course, are also grounded as is usual through suitable conductors 74. The battery 75, is employed as is usual if necessary to first energize the magneto after which the operation continues as is usual with the magneto and condenser. In advancing the spark the pole pieces are rotated by means of the lever 47, thereby distorting the field of force somewhat, delaying slightly the passage of the spark or, of course, in other words, the making and breaking of the circuit at the circuit breaker. If rotated in the opposite direction the reverse effect is true or, in other words, the making and breaking of the circuit is somewhat hastened.

Inasmuch as the timing mechanism for the respective cylinders is all closely associated with the magneto the shifting or changing of the pole pieces effects a corresponding variation in the timing of the spark at the respective cylinders. In this manner an exceedingly compact and simple construction is afforded, and, adjustment having once been effected, is readily maintained by the friction band 48, thus holding

the parts in proper operative relation independent of any possible vibration of the motor.

I have shown merely a preferred form of my invention and it is obvious that the invention admits of considerable variation. The exceedingly strong and simple connection between the movable pole pieces and the end members therefor in which are the anti-friction bearings for the armature shaft and the exceedingly positive and simple construction and housing both for the circuit breaker and for the timing mechanism for the respective cylinders afford great strength and durability and at the same time protect all parts from dirt or injury.

Of course, having shown but a preferred form of the construction, I do not purpose limiting myself otherwise than necessitated by the prior art, as numerous details of the construction and arrangement may be modified without departing from the principles of this invention.

I claim as my invention:

1. In a magneto, a casing, an armature in said casing, adjustable poles for said armature, a shiftable non-magnetic shell connected to said poles to control the position of the latter and acting as a closure for one end of said armature, a lever for shifting said shell and armature poles, a brake engaging said shell to retain it and said poles in any adjusted position, a shaft journaled in said casing and geared to said armature, and a distributing mechanism operated by said shaft.
2. In a magneto, a casing, an armature in said casing, adjustable poles for said armature, a shiftable non-magnetic shell connected to said poles to control the position of the latter and acting as a closure for one end of said armature, a lever for shifting said shell and armature poles, a brake engaging said shell to retain it and said poles in any adjusted position and consisting of a split ring fixed to said casing and provided with lugs at its split ends and a spring-pressed adjusting screw engaging said lugs, a shaft journaled in said casing and geared to said armature, and a distributing mechanism operated by said shaft.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

ALEXANDER L. HEIZER.

Witnesses:

C. W. HILLS,
K. E. HANNAH.