G. P. B. HOYT.

SPARK PLUG.

APPLICATION FILED MAR. 25, 1908.

916,871.

Patented Mar. 30, 1909.

2 SHEETS—SHEET 1.

Fig. 1,

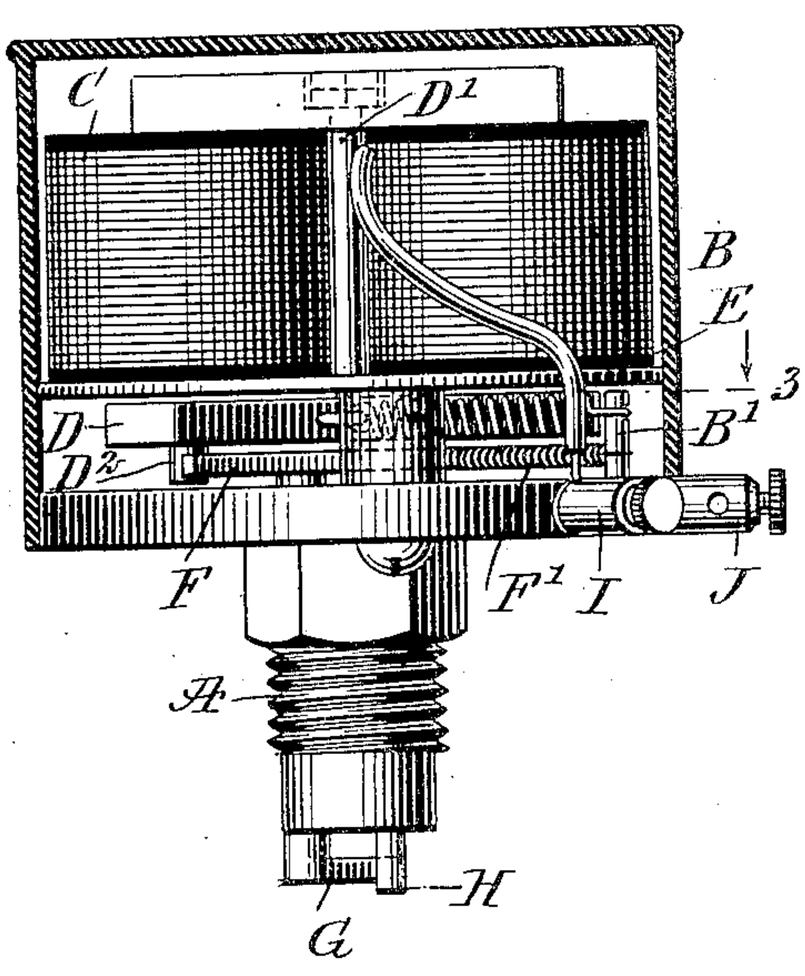


Fig. 2,

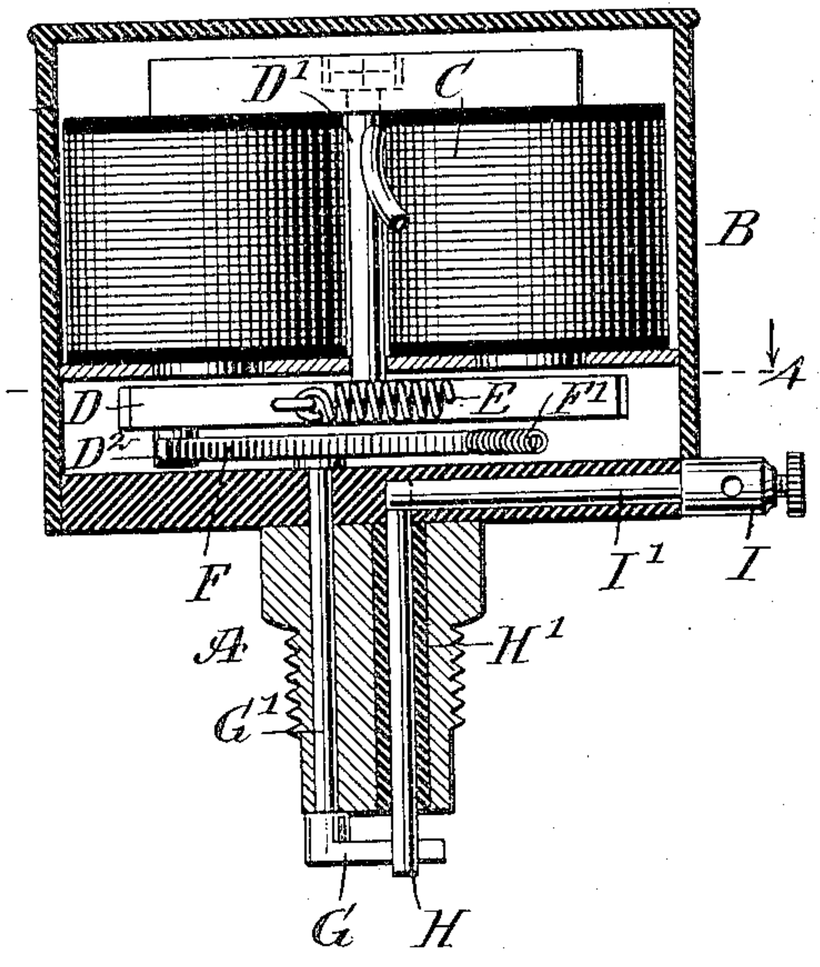


Fig. 3,

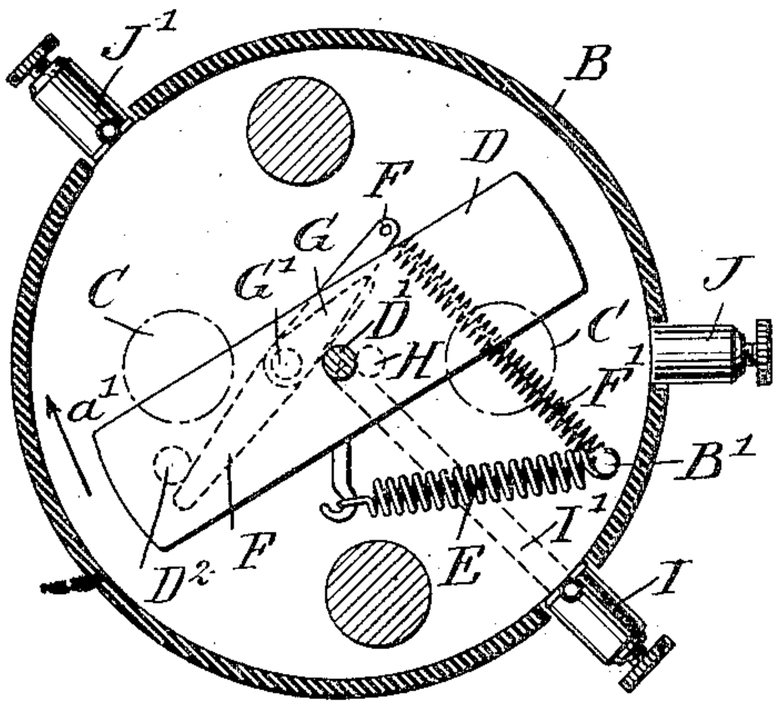
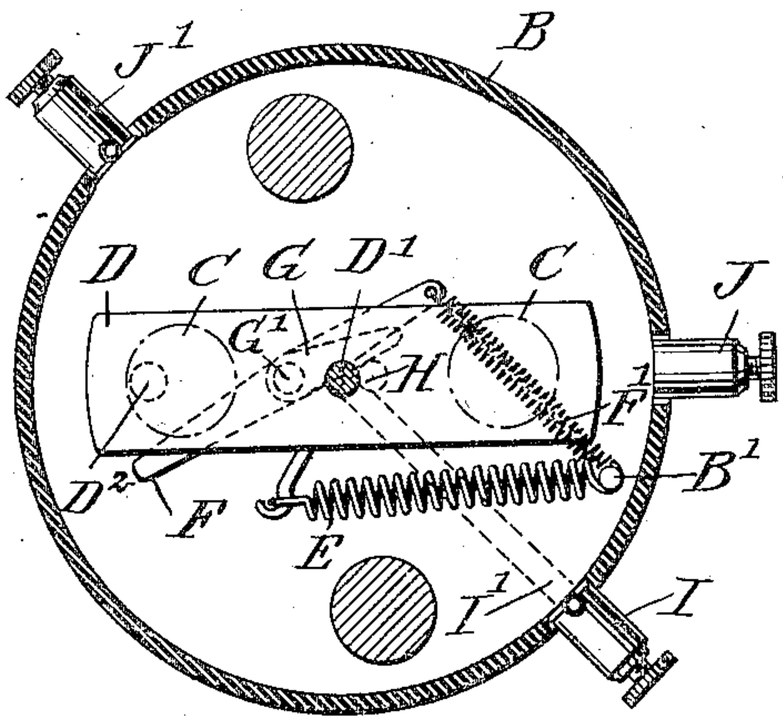


Fig. 4,



WITNESSES

Edward Thorpe

Rud. J. Hoster

INVENTOR

Gabriel P. B. Hoyt

BY Munn & Co.

ATTORNEYS

G. P. B. HOYT.

SPARK PLUG.

APPLICATION FILED MAR. 25, 1908.

916,871.

Patented Mar. 30, 1909.

2 SHEETS—SHEET 2.

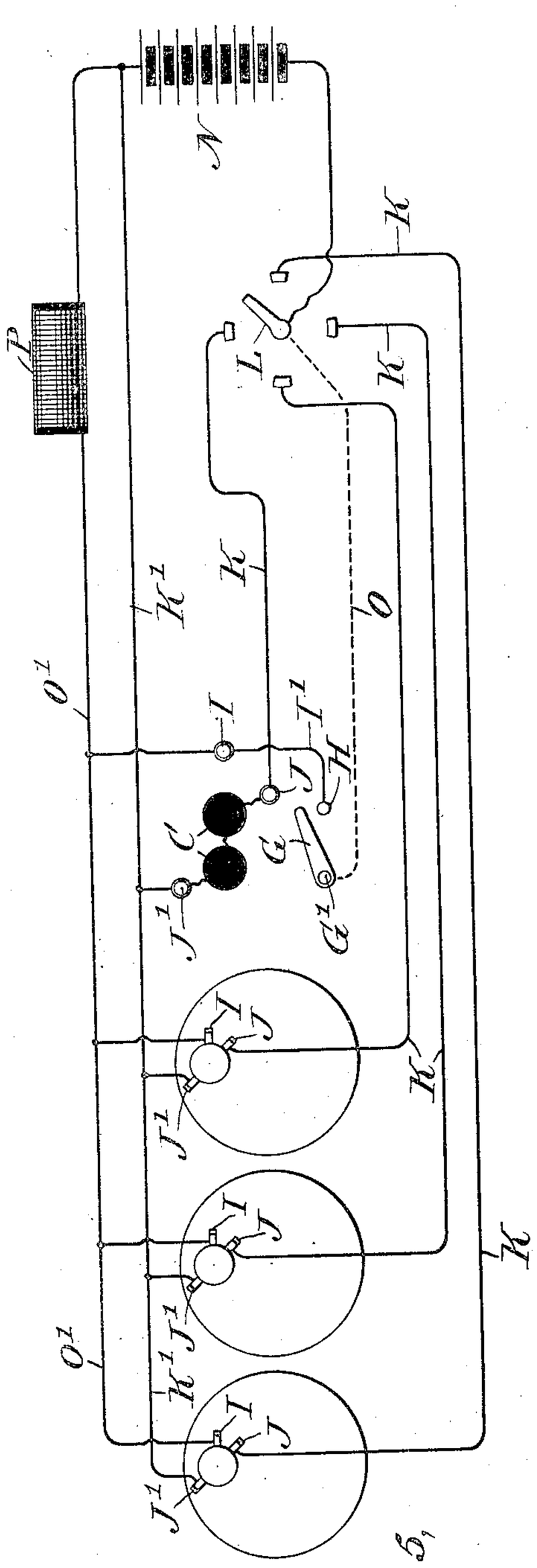


Fig. 5.

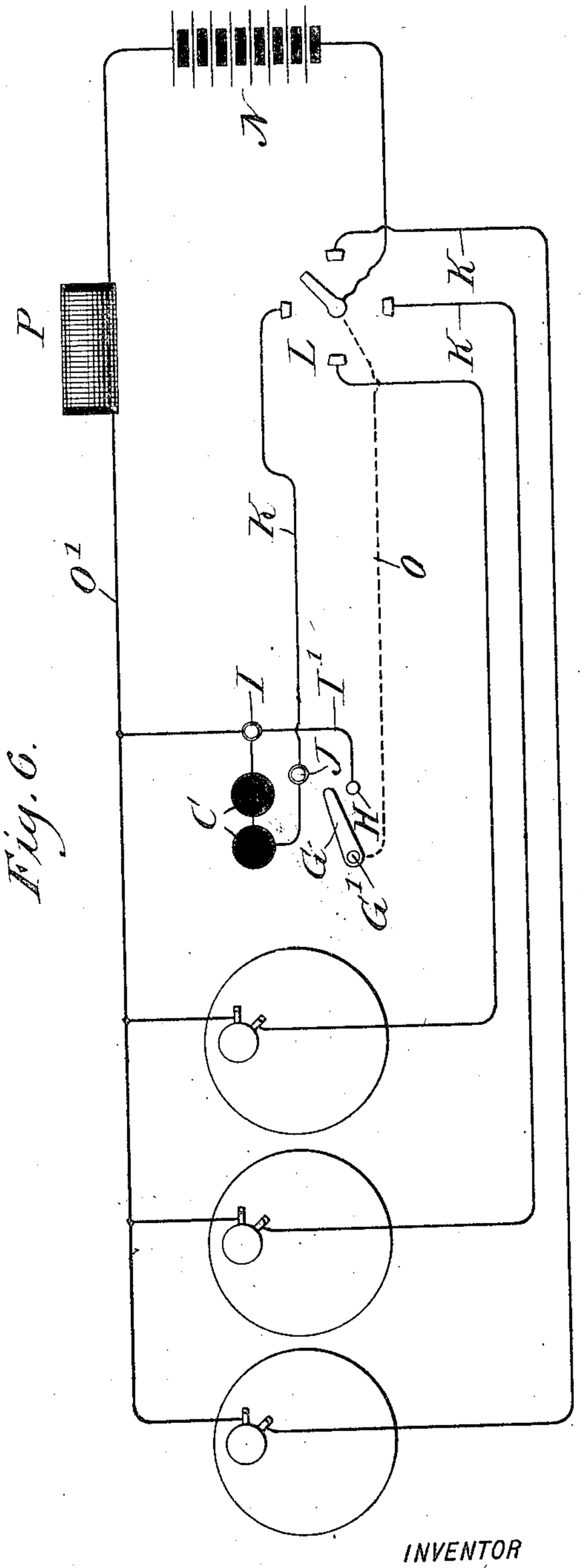


Fig. 6.

WITNESSES

Edward Thorpe.

Percy J. Hoover.

INVENTOR

Gabriel P. B. Hoyt

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

GABRIEL P. B. HOYT, OF NEW YORK, N. Y.

SPARK-PLUG.

No. 916,871. Specification of Letters Patent. Patented March 30, 1909.

Application filed March 25, 1908. Serial No. 423,195.

To all whom it may concern:

Be it known that I, GABRIEL P. B. HOYT, a citizen of the United States, and a resident of the city of New York, Jamaica, borough of Queens, in the county of Queens and State of New York, have invented a new and Improved Spark-Plug, of which the following is a full, clear, and exact description.

The invention relates to igniting devices of the make and break contact type, and its object is to provide a new and improved spark plug for use on internal combustion engines and other apparatus, and arranged to insure the production of a powerful spark with great accuracy.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement, the casing appearing in section and the parts in the position of rest; Fig. 2 is a sectional side elevation of the same, showing the armature attracted; Fig. 3 is a sectional plan view of the improvement on the line 3—3 of Fig. 1; Fig. 4 is a like view of the same on the line 4—4 of Fig. 2; Fig. 5 is a diagrammatic view of the improvement as applied to a multiple cylinder engine; and Fig. 6 is a diagrammatic view of the improvement and showing a modified form of the electrical connections.

On the screw cap A is secured a casing B, preferably made of hard rubber, fiber or other suitable insulating material, and in the casing B is mounted an electro-magnet C having an oscillating armature D, the shaft D′ of which is mounted in a suitable support arranged on the electro-magnet. The armature D is pressed on by a spring E connected with a post B′ arranged in the casing B, and the said spring E serves to normally hold the armature D in an inactive position, that is, out of alinement with the cores or poles of the electro-magnet C, as plainly indicated in Figs. 1 and 3.

On one end of the armature D is arranged a pin D^2 adapted to engage one end of an arm F, secured on the upper end of the shaft G′ of the movable electrode G, adapted to contact with the fixed electrode H extending through an insulating bushing H′ arranged in the screw cap A, as plainly indicated in Fig. 2. The shaft G′ extends through the screw cap A and through the bottom of the casing B to the inside thereof, to support the arm F, which latter is pressed on by a spring F′ connected with the post B′ or other support, and somewhat weaker than the armature spring E.

The upper end of the fixed electrode H connects with the shank I′ of a binding post I held on the casing B, which latter also supports the binding posts J and J′ connected with the positive and negative wires of the electro-magnet C. When the several parts are in the position of rest illustrated in Figs. 1 and 3, then the movable electrode G is out of contact with the fixed electrode H, and the armature D is out of register with the cores of the electro-magnet C. Now when the electro-magnet C is energized and the armature D is caused to swing in the direction of the arrow *a′*, then the arm F follows the armature owing to the tension of the spring F′, so that the electrode G makes contact with the electrode H previous to the armature D reaching the end of its stroke. Now when the electro-magnet C is deënergized, then the armature D is caused to swing in the reverse direction of the arrow *a′* by the action of the spring E, and in doing so the armature D, after it has acquired some momentum, strikes the arm F by the pin D^2, so that the arm F is caused to swing quickly in the inverse direction of the arrow *a′*, thus causing a turning of the shaft G′ and the electrode G, to break contact with the electrode H, thereby producing a powerful spark. It is understood that the armature D on its return stroke under the tension of the spring E, overcomes the tension of the spring F′ connected with the arm F, and consequently the armature D causes a quick breaking of the contact between the electrodes G and H, by delivering a strong blow on the arm F by the pin D^2.

The electrical connections for high speed engines are shown in Fig. 5, while in Fig. 6 is represented the electrical connections for low speed engines.

In the diagrammatic view illustrated in Fig. 5, the binding post J is connected by the wire K with the circuit closer L of any approved construction and connected with the battery N or other suitable source of electrical supply, the battery being also con-

nected by the wire K′ with the other binding post J′. The circuit closer L is also connected through the ground on engines represented by line O with the movable electrode G by way of the engine cap A and the shaft G′, and the binding post I is connected by a wire O′ with the spark coil P connected with the battery N. Now by the arrangement described the electro-magnet C is energized whenever the circuit closer L closes the battery circuit K, K′, and consequently the armature D is actuated as previously described, to allow the electrode G to make contact with the electrode H by the action of the spring F′. When this takes place the circuit O, O′ containing the spark coil P is closed, and when the circuit closer L breaks the battery circuit K, K′ then the armature D returns, but the primary coil circuit O, O′ remains closed and consequently the full power of the battery N passes through the contacting electrodes G and H. Now while the armature D is returning it moves away from the cores of the electro-magnet C and finally strikes the arm F, to disconnect the electrode G from the electrode H, thus producing a spark of the full power of the battery. It is understood that the above-described operation is repeated for each igniting device of each cylinder, as will be readily understood by reference to Fig. 5.

In the arrangement shown in Fig. 6, the battery circuit K′ is dispensed with, and in this case the electro-magnet C is connected with the binding post I, so that all the current passes through the electro-magnet C first, till contact is made between the electrodes G and H, when the entire current is short circuited to the electrodes G and H until the contact is broken between the electrodes G and H.

It is understood that when the armature D is on the return stroke, the entire attraction of the cores of the electro-magnet C has ceased at or before the time the pin D^2 strikes the arm F, so that the full power of the spring E is utilized in addition to the acquired momentum of the armature, to forcefully break the contact between the electrodes G and H, and as the entire electrical energy passes through the electrodes, a very powerful spark is produced.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A sparker, comprising an electro-magnet, a swinging armature, a spring normally acting to move the armature away from the magnet, a fixed electrode, a movable electrode, a swinging arm rigid with the movable electrode, a spring acting on the arm to normally retain the movable electrode in contact with the fixed electrode, and a pin on the armature for engaging the arm to move the electrodes out of contact, the spring connected with the armature being of greater strength than the spring connected with the swinging arm.

2. A sparker comprising an electro-magnet, a swinging armature, a spring normally acting to move the armature away from the magnet, a fixed electrode, a movable electrode, a swinging arm rigid with the movable electrode, a spring acting on the arm to normally retain the movable electrode in contact with the fixed electrode, and a pin on the armature for engaging the arm to move the electrodes out of contact, the spring connected with the armature being of greater strength than the spring connected with the swinging arm, an electric circuit for the electro-magnet, a spark coil circuit for the electrodes, and a circuit breaker for closing the said electro-magnet circuit.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GABRIEL P. B. HOYT.

Witnesses:
THEO. G. HOSTER,
JOHN P. DAVIS.