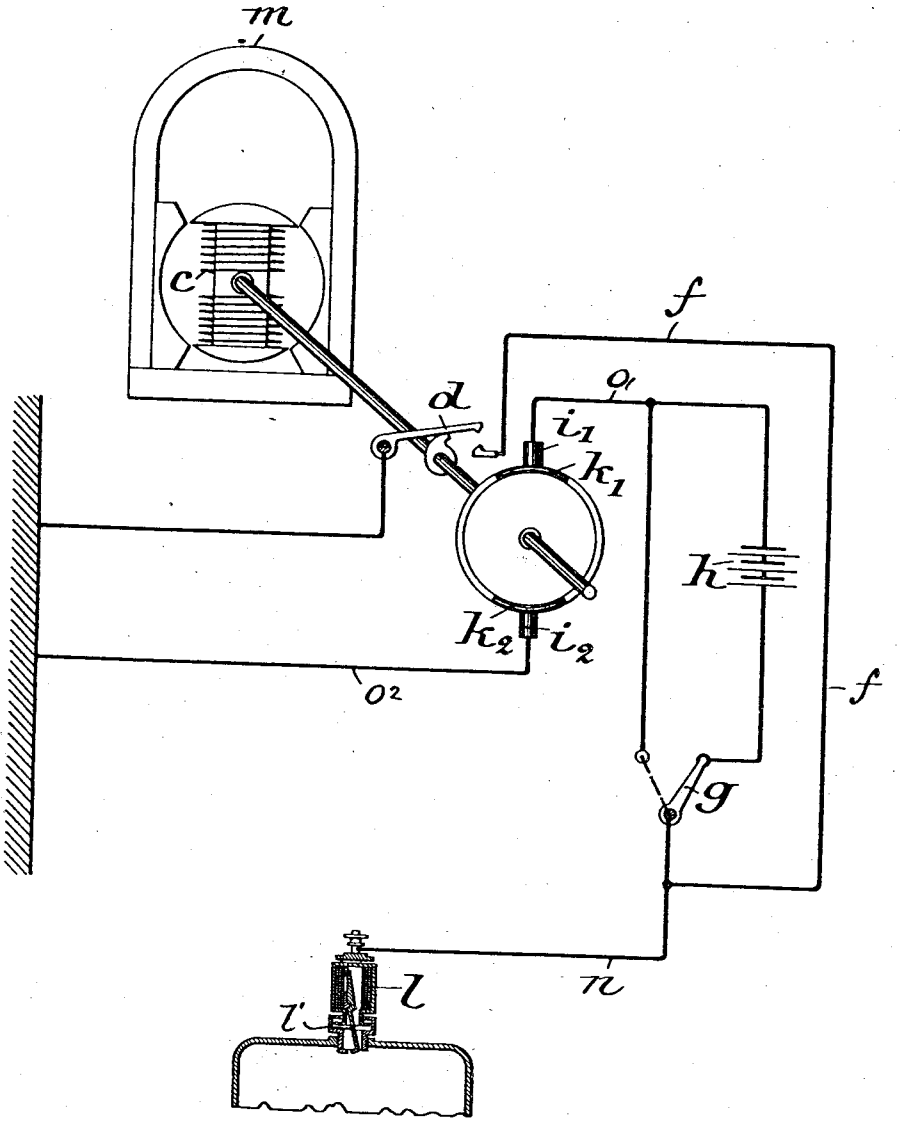
G. HONOLD & O. HEINS.

ELECTRIC IGNITION SYSTEM FOR INTERNAL COMBUSTION MOTORS.

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1,066,904.

Patented July 8, 1913.



WITNESSES

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GOTTLOB HONOLD, OF STUTTGART, GERMANY, AND OTTO HEINS, OF NEW YORK, N. Y., ASSIGNORS TO THE FIRM OF ROBERT BOSCH, OF STUTTGART, GERMANY.

ELECTRIC IGNITION SYSTEM FOR INTERNAL-COMBUSTION MOTORS.

1,066,904. Specification of Letters Patent. Patented July 8, 1913.

Application filed September 16, 1909. Serial No. 518,156.

To all whom it may concern:

Be it known that we, GOTTLOB HONOLD, engineer, a subject of the German Emperor, and resident of 11–13 Hoppenlaustrasse, Stuttgart, Germany, and OTTO HEINS, engineer, a subject of the German Emperor, and resident of 160 West Fifty-sixth street, New York, N. Y., United States of America, have invented certain new and useful Improvements in Electric Ignition Systems for Internal-Combustion Motors; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to a system for the production of ignition sparks for the ignition of the gas mixture in internal combustion motors, and its object is to provide such a system in which there is used a magneto, that is, a magneto electric generator such as the shuttle armature type, without the complication of a secondary winding or an induction coil associated therewith, and which shall still be suitable for use in such service as the driving of motor vehicles, where the motor has to be started by a cranking operation. To this end there is arranged in conjunction with a magneto having a single winding, and an electro-magnetically actuated spark-drawing device, a battery which is so arranged that during the cranking operation, when the battery is in circuit, it is reinforced by the current from the magneto.

The drawing illustrates diagrammatically the proposed system.

m is a magneto of the shuttle armature type having a single winding c and carrying on its armature shaft a cam for actuating the interrupter d and a commutator for commutating the armature current, it being understood that the two ends of the armature winding will be permanently connected, as indicated by conductors a and a', to the two commutator segments k^1 and k^2, which are insulated from each other, in the ordinary way. Associated with the commutator, in position to bear upon the segments k^1 and k^2 are two brushes i^1 and i^2, the brush i^2 being grounded through the lead o^2 and the brush i^1 being connected through the lead o^1 to one side of the battery h on the one hand, and to one point of the two point hand-switch g, on the other hand. The other side of the battery is connected to the other point of the hand-switch g, and from the pivot of that switch the conductor n leads to the electro-magnetically actuated spark-drawing device l. This device is of well known construction and has a pivoted armature l' which, under the action of gravity, remains normally in the position to close the spark contacts. The device also has a winding as shown connected at one end to conductor n and grounded at the other end on the casing of the motor. When current passes into this winding the armature l' is drawn to the position shown in the drawing and thereby draws the spark at the sparking points, and as soon as the current is interrupted returns to its circuit-closing position. There is also led from the pivot of the switch g a conductor f, forming a shunt for conducting the sparking current through the interrupter d to the ground.

The operation will be understood to be as follows: When the motor is to be cranked the switch g is put in the position shown in the drawing and the cranking of the machine rotates the armature of the magneto, which is to be connected to the motor shaft as usual. The interrupter cam is so set as to open the shunt f when the armature of the magneto is at the point of maximum generation, and at this instant the segments k^1 and k^2 are under the brushes, as shown. The result is that the current generated in the magneto flows through conductor a, segment k^1, brush i^1, conductor o^1, battery h, switch g, and, while interrupter d is closed, through the shunt, comprising conductor f, interrupter d, frame of the machine, conductor o^2, brush i^2, segment k^2, and conductor a' to the other end of the armature winding. At the moment of maximum generation the shunt is opened by the interrupter cam and the battery current reinforced by the armature current flows from switch g, through winding of magnet l, frame of the machine, conductor o^2, etc., as before, and the first spark is produced. After a half revolution of the magneto armature the segment k^2 will be under the brush i^1 and the segment k^1 under the brush i^2. The current generated by the magneto will, however, have been reversed with the result that the current supplied to the battery is always in the same direction. If the commutator were

omitted the magneto current would oppose the battery current on every alternate maximum point. After the motor is started the switch *g* will be drawn into the position indicated by a dotted line and the path of the current will be the same as before, except that the battery is cut out.

What we claim is:—

1. An electric ignition system for internal combustion motors, having a magneto and a sparking device to which the current generated by the magneto is supplied, in combination with a battery and a switch and connecting conductors for connecting the battery in series with the armature winding of the magneto or cutting it out of circuit at will, and a commutator between the armature winding of the magneto, and the battery for commutating the current from the magneto, whereby the current from the magneto is supplied to the battery always in the same direction when the battery is in circuit, substantially as described.

2. An electric ignition system for internal combustion motors, having a magneto, a magnetically actuated spark-drawing device, and an interrupter controlling the grounding of the sparking current, in combination with a battery and a switch and connecting conductors for connecting the battery in series with the armature winding of the magneto or cutting it out of circuit at will, and a commutator between the armature winding of the magneto and the battery for commutating the current from the magneto, whereby the current from the magneto is supplied to the battery always in the same direction when the battery is in circuit, substantially as described.

In testimony whereof we affix our signatures, in presence of two witnesses.

GOTTLOB HONOLD.
OTTO HEINS.

Witnesses:
MAX ANSCHÜTZ,
ERNST ULMER.