

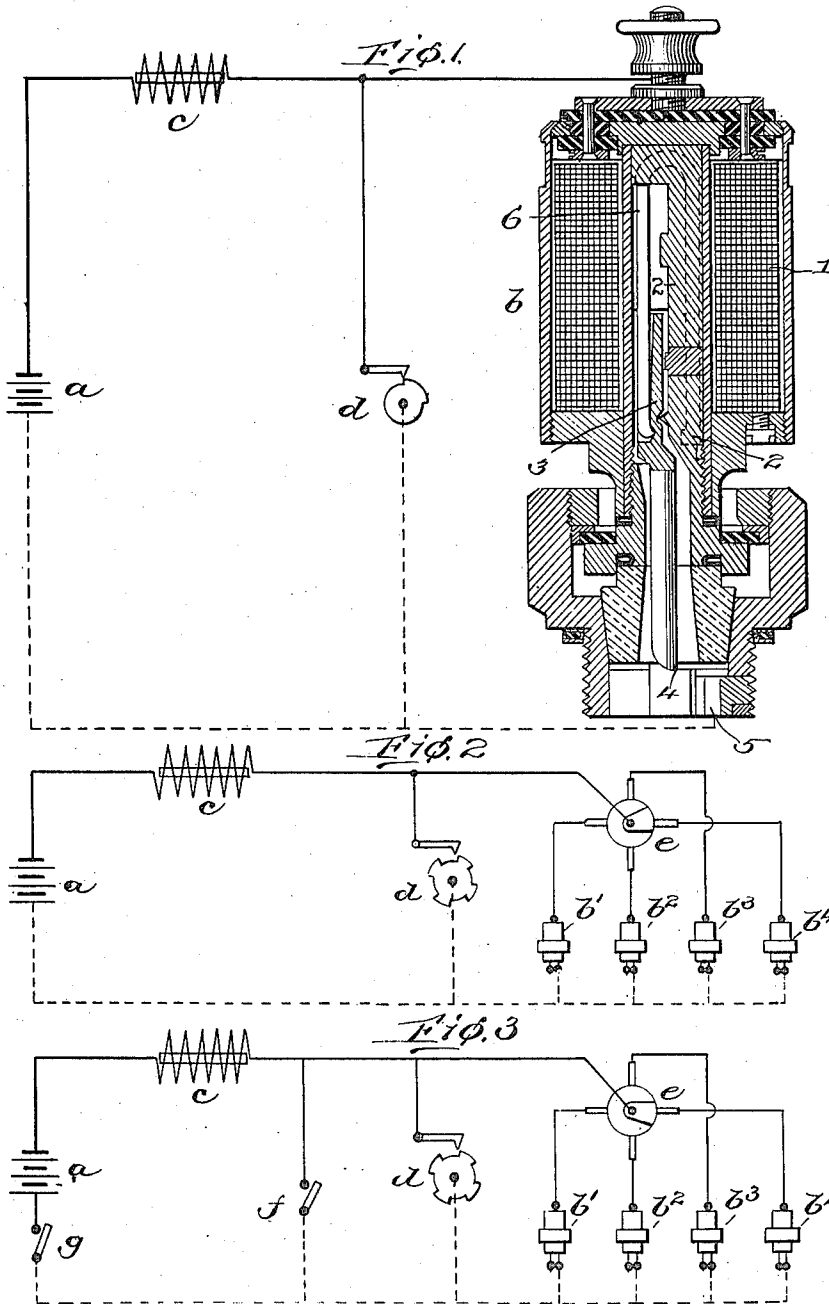
G. HONOLD.

ELECTRICAL IGNITION APPARATUS FOR INTERNAL COMBUSTION ENGINES.

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1,041,477.

Patented Oct. 15, 1912.



Inventor.

Witnesses

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ELECTRICAL IGNITION APPARATUS FOR INTERNAL-COMBUSTION ENGINES.

1,041,477.

Specification of Letters Patent.

Patented Oct. 15, 1912.

Application filed December 18, 1907. Serial No. 407,048.

To all whom it may concern:

Be it known that I, GOTTLÖB HONOLD, engineer, a subject of the German Emperor, residing at 11 Hoppenlaustrasse, Stuttgart, Germany, have invented certain new and useful Improvements in Electrical Ignition Apparatus for Internal-Combustion Engines; and I 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.

This invention relates to the ignition of internal combustion engines and has special reference to ignition systems in which an electromagnetic sparking plug is employed.

In the accompanying drawings, Figure 1 is a diagrammatic view of the invention applied to a single cylinder engine, the sparking plug being shown in longitudinal section; Fig. 2 is a diagrammatic view showing the invention applied to a four cylinder engine; and Fig. 3 is a view similar to Fig. 2 showing a cut-out for stopping the motor and a switch arranged so as to start the motor without the use of a mechanical or manually operated starter.

Referring to Fig. 1 of the drawing, *a* denotes a battery or source of electrical energy, *b* a sparking plug, *c* an inductive resistance coil, and *d* an interrupter, the coil being connected up in series with the battery and the plug while the interrupter is connected up in parallel with the plug and arranged between the coil and the plug, as clearly shown. The result of this arrangement of parts is to short-circuit the coil when the interrupter is closed and to cause the full strength of the current to pass through the plug when the interrupter is opened. The interrupter is so adjusted that it will be opened and will break the short circuit at the instant the spark is desired in the plug. The construction and operation of the plug are fully disclosed in my copending applications No. 329570, filed August 7, 1906, and No. 415482, filed February 12, 1908.

In applying the invention to a multi-cylinder engine, a distributor, *e*, is arranged between the interrupter and the plugs to distribute or direct the current to the various plugs in the usual manner. In Fig. 2, I have shown a distributor controlling four plugs, *b'*, *b''*, *b'''*, *b''''*, and the interrupter, of course, is formed so as to make and break

the short circuit four times during each revolution. The relative adjustment of the interrupter and the distributor must be such that the short circuit will exist when the plug is switched into circuit and will be broken before the plug circuit is broken. The drawing indicates the position of the parts just as the short circuit has been broken and ignition is about to occur in the plug *b''''*.

In Fig. 3, I have indicated a switch or push button, *f*, arranged in parallel with the interrupter. With this arrangement, it is possible to start a multi-cylinder engine by closing the said switch *f*, then opening the interrupter and then again opening and closing the switch *f*. The plug in the cylinder under compression will thus receive a direct impulse and ignition will take place therein. A cut-out switch, *g*, may be placed in the circuit as also indicated in Fig. 3, so that by opening said switch the motor may be stopped, as will be readily understood.

Having thus fully described my invention, what I claim as new is:—

1. An ignition system for internal combustion engines comprising a primary source of electrical energy, a make and break sparking plug, a self-induction coil connected in series with the plug and the source of energy, and an interrupter connected in parallel with the plug between the plug and the coil.

2. An ignition system for internal combustion engines, comprising a primary source of electrical energy, a make and break igniter, an interrupter, and a self-induction coil connected in series with the igniter and with the interrupter, the igniter and interrupter connected in parallel with each other.

3. An ignition system for internal combustion engines, comprising a primary source of electrical energy, a make and break igniter, an interrupter and a self-induction coil, the igniter and interrupter connected in parallel with each other and the coil connected in series with both the igniter and the interrupter.

4. An ignition system for internal combustion engines, comprising a primary source of electrical energy, a make and break sparking plug having a winding, a self-induction coil connected in series with the igniter points and winding of the plug, and an interrupter connected in parallel with the

igniter points and plug winding and in series with the coil.

5. An ignition system for internal combustion engines, comprising a battery, an electromagnetic sparking plug, a self-induction coil connected in series with the plug, and an interrupter connected in parallel with the plug and in series with the coil.

6. An ignition system for multicylinder internal combustion engines, comprising a primary source of electrical energy, a plurality of electromagnetic igniters, a self-induction coil connected in series with the igniters, a distributor in the circuit between the coil and the several igniters, and an interrupter connected in parallel with the igniters.

7. An ignition system for multicylinder internal combustion engines, comprising a source of electrical energy, a plurality of electromagnetic igniters, a coil connected in series with the igniters, a distributor in the circuit between the coil and the several igniters, an interrupter connected in parallel with the igniters, and a switch arranged in parallel with the interrupter and with the igniters.

8. An ignition system for multicylinder internal combustion engines, comprising a source of electrical energy, a plurality of electromagnetic igniters, a coil connected in series with the igniters, a distributor in the circuit between the coil and the several igniters, an interrupter connected in parallel with the igniters, a switch arranged in parallel with the interrupter and with the igniters, and a second switch arranged in the circuit of the igniters.

9. An ignition system for multicylinder internal combustion engines, comprising a primary source of electrical energy, a plurality of electromagnetic spark plugs, a self-induction coil connected in series with the plugs, a distributor arranged in the circuit between the coil and the plugs, and an interrupter connected in parallel with the plugs and in series with the coil.

10. An ignition system for multicylinder internal combustion engines, comprising a source of electrical energy, a plurality of electromagnetic spark plugs, a self-induc-

tion coil connected in series with the plugs, a distributor arranged in the circuit between the coil and the plugs, an interrupter connected in parallel with the plugs and in series with the coil, and a switch arranged in parallel with the interrupter and with the plugs.

11. An ignition system for multicylinder internal combustion engines, comprising a source of electrical energy, a plurality of electromagnetic spark plugs, a self-induction coil connected in series with the plugs, a distributor arranged in the circuit between the coil and the plugs, an interrupter connected in parallel with the plugs and in series with the coil, a switch arranged in parallel with the interrupter and with the plugs, and a second switch arranged in the circuit of the plugs.

12. An ignition system for internal combustion engines comprising a primary source of electrical energy, a plurality of sparking plugs, a self-induction coil connected in series with the plugs and the source of energy, an interrupter connected in parallel with the plugs between the same and the coil, and a distributor disposed in the circuit of the plugs and arranged to direct the current to the several plugs successively, the interrupter being arranged to open prior to the breaking of a plug circuit by the distributor.

13. An ignition system for multicylinder internal combustion engines, comprising a primary source of electrical energy, a plurality of electromagnetic spark plugs, a self-induction coil connected in series with the plugs, a distributor arranged in the circuit between the coil and the plugs, and an interrupter connected in parallel with the plugs and in series with the coil, the interrupter being timed to open prior to the breaking of a plug circuit by the distributor.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

GOTTLOB HONOLD.

Witnesses:

RUDOLF KLEIN,
ERNST ULMER.