

No. 858,196.

PATENTED JUNE 25, 1907.

W. MARSHALL.

APPARATUS FOR PRODUCING ELECTRIC SPARKS.

APPLICATION FILED OCT. 29, 1906.

Fig. 1.

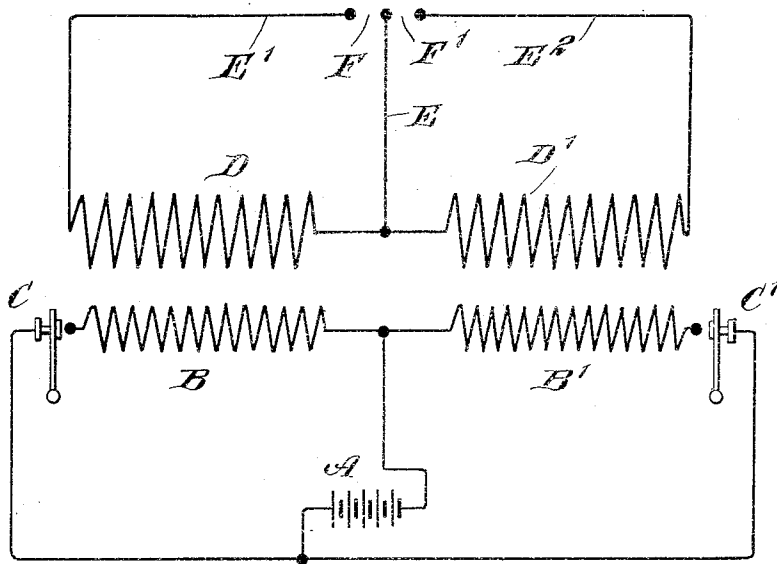


Fig. 2.

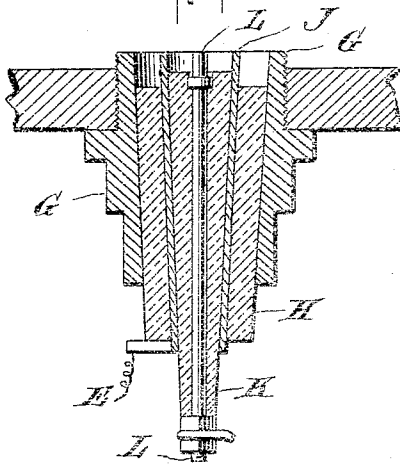
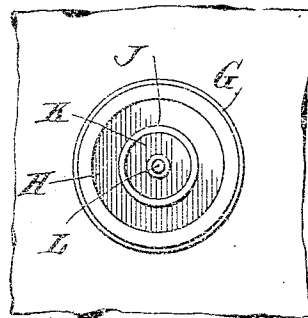


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PRODUCING ELECTRIC SPARKS.

No. 858,196.

Specification of Letters Patent.

Patented June 25, 1907.

Original application filed May 2, 1906, Serial No. 314,765. Divided and this application filed October 29, 1906. Serial No. 340,966.

To all whom it may concern:

Be it known that I, WILLIAM MARSHALL, a citizen of the United States, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Producing Electric Sparks, of which the following is a specification.

My invention relates to apparatus for producing oscillating electric discharges or sparks for various purposes where such discharges may be utilized, as for the ignition of the explosive mixture in internal combustion engines, for lighting gas burners, and for producing electric or similar waves for wireless telegraphy.

The object of my invention is to provide an oscillator of this character which will be very efficient or powerful with a comparatively weak source of electricity.

To this end, my invention consists in a certain novel arrangement and electrical connection of parts constituting the oscillator circuit.

Reference is to be had to the accompanying drawings, in which

Figure 1 is a diagrammatic view of an apparatus embodying my invention; Fig. 2 is a sectional view of a spark-plug which may be used in connection therewith; and Fig. 3 is an end-view of such spark-plug.

I may employ any suitable source of electricity, such as a battery A, and with the poles thereof are connected, in parallel, the primary coils B, B', like poles of the battery being connected with like terminals of the coils, at least this is the connection I believe to be preferable. Of course, the same result could be obtained by having a separate battery for each coil, but the arrangement shown is preferred. Each of the primary coil circuits includes an interrupter of any approved character, the well-known electric vibrator being indicated at C, C'. Wound in inductive relation to the primary coils B, B', are the secondary coils D, D' respectively. With the terminals of these secondary coils are connected three wires, E, E¹, E², one of which, E, is connected with like terminals of both coils D, D', while each of the other wires is connected with one of the remaining terminals of the secondary coils. Two spark gaps F, F', are thus formed, the ends of the three wires being placed together

close enough for sparks to pass from the wire E to both wires, E', E², when induced currents are produced in the secondary coils D, D' by the closing and interruption of the primary coil circuits. The best results are produced, apparently, when the interrupters work synchronously, and this can be ascertained with fair accuracy, when the ordinary vibrators are employed, by adjusting them until both emit a sound of the same pitch.

The sparks produced with my arrangement as specified in the claims are longer and particularly more frequent, brighter and "fatter" than could be obtained otherwise from the same coils and the same battery. The circuit arrangement is therefore very valuable for the electric ignition of gas engines, gasoline engines and the like, but may be employed wherever electric sparks or oscillating discharges are to be produced, as for lighting gas burners and in wireless telegraphy.

When applying my invention to internal combustion engines, I may give the spark-plug the particular construction shown in Fig. 2. G is the metal body screw-threaded to fit the customary opening in the cylinder or cylinder-head. Into this is fitted a sleeve H of insulating material, such as porcelain or mica, which surrounds a metal sleeve J adapted to form the second electrode. Within this electrode is another insulator K through which extends the central electrode L. The inner edges of the body G and of the sleeve J should preferably be in about the same plane with the end of the central electrode L. The sleeve electrode J would be connected with the wire E, the central electrode L either with the wire E' or the wire E², and the frame of the machine, and therefore the body G, with the third wire. This spark-plug is very efficient not only on account of the superior character of the spark, but owing to the fact that the sparks will be distributed over a much larger area, thus igniting the mixture at various points. The two spark gaps are of the same width, or substantially so.

Various modifications may be made without departing from the nature of my invention as set forth in the appended claims. Thus it obviously is immaterial whether the secondary coils, D, D', are really two separate coils, or whether they simply constitute the halves of a single secondary coil, the wire

E being connected with the central portion of such coil.

This application is a division of another application filed by me in the United States Patent Office on May 2, 1906, Serial No. 314,765, in which the spark plug herein-described is claimed.

I claim:

1. An electric oscillator comprising a source of electricity, two primary coils connected therewith in parallel, an interrupter in the circuit of each coil, a secondary coil in inductive relation to each primary, a conductor connected with like terminals of both secondaries, and two additional conductors each connected with one of the remaining terminals, said conductors having portions arranged adjacent to each other to produce spark gaps.
2. An electric oscillator comprising a source of electricity, two primary coils connected therewith in parallel, an interrupter in the circuit of each coil, a secondary coil in inductive relation to each primary, a conductor connected with one terminal of each secondary, and two additional conductors each connected with one of the remaining terminals, said conductors having portions

arranged adjacent to each other to produce spark gaps.

3. An electric oscillator comprising two primary coils, means for interrupting the current, two secondary coils in inductive relation to said primary coils, a conductor connected with like terminals of both secondaries, and two additional conductors connected with the remaining terminals, said conductors having portions arranged adjacent to each other to produce spark gaps.

4. An electric oscillator comprising two primary coils, means for interrupting the current, two secondary coils in inductive relation to said primary coils, a conductor connected with one terminal of each secondary, and two additional conductors each connected with one of the remaining terminals, said conductors having portion arranged adjacent to each other to produce spark gaps.

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

WILLIAM MARSHALL.

Witnesses:

OTTO V. SCHRENK,
JOHN A. KEHLENBECK.