

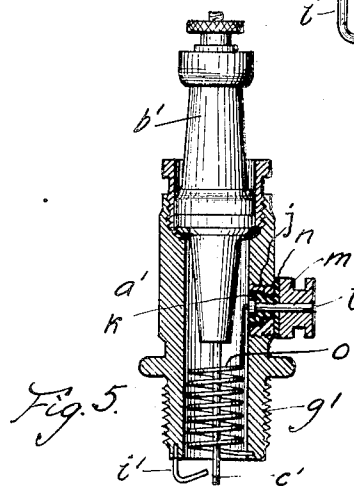
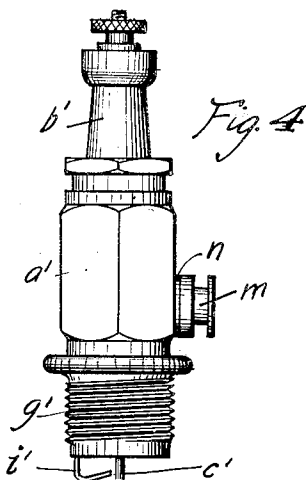
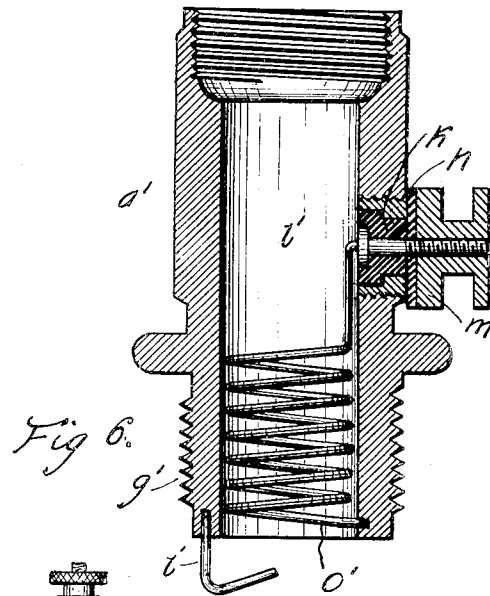
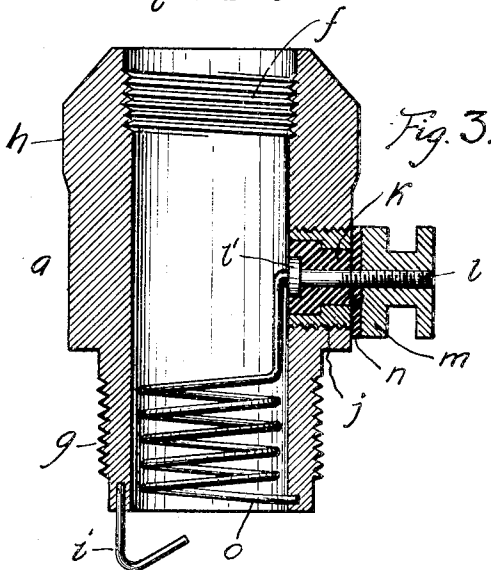
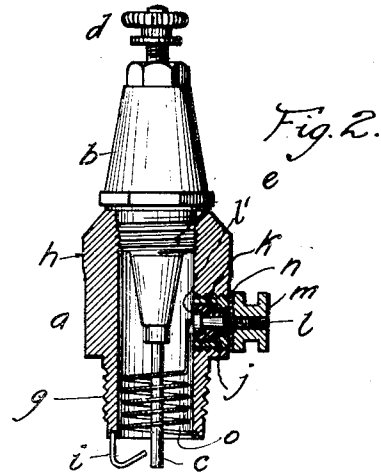
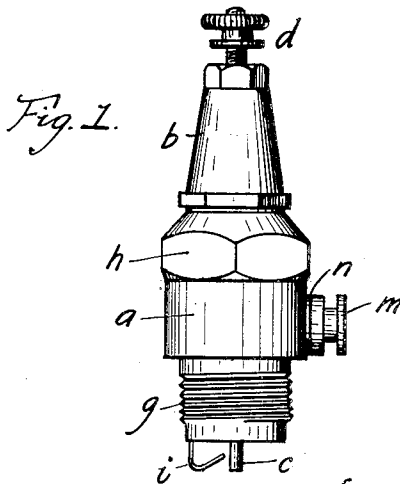
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S. J. MASON

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SPARK PLUG

Filed May 31, 1921



Inventor:
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UNITED STATES PATENT OFFICE.

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SPARK PLUG.

Application filed May 31, 1921. Serial No. 473,731.

To all whom it may concern:

Be it known that I, STEWART J. MASON, a citizen of the United States, and a resident of the city of Portland, county of Multnomah, and State of Oregon, have invented a certain new and useful Improvement in Spark Plugs, of which the following is a specification.

My invention relates generally to spark plugs used in gas engines.

My invention relates particularly to spark-plugs provided with a heat coil for pre-heating the portion of the hydrocarbon vapors entering the spark plug, and thus producing the necessary gasification, suitable for being ignited by the spark of the spark plug. The heating coil is considered a very desirable provision, but in any construction where the heating coil has contact with a porcelain core, the latter is apt to be cracked by sudden changes in temperature, with the result that the spark plug as a whole is no longer fit for use.

My invention has for its object to provide a spark plug including a heating coil so arranged as to be entirely free and independent of the core, thus only transmitting the heat thru a jacket of heated air surrounding the core, hence tending to uniformly heat the latter.

It is further the object of my invention to provide simplicity of construction and accessibility to the parts. To this end I so arrange the parts of my spark-plug that the core may be readily removed and replaced without touching the coil. Hence, in case of injury to the core all required is the putting in of a core in my spark-plug, without touching any other part of the latter.

The above specified and other features are hereinafter fully described with reference to the accompanying drawings, in which:

Fig. 1 is a side elevation of a spark plug embodying my invention;

Fig. 2 is a similar view with the shell of my spark plug shown in vertical section so as to disclose the interior parts;

Fig. 3 is a larger scaled vertical section of the shell of my spark plug shown in Figs. 1 and 2 with the core omitted;

Fig. 4 is a side elevation of different type of spark plug showing my invention applied thereto;

Fig. 5 is a vertical section of the shell

of the spark plug shown in Fig. 4; and

Fig. 6 is a larger scaled vertical section of the spark-plug shown in Figs. 4 and 5, with the core omitted.

Referring first to Figs. 1 to 3, these represent a spark-plug of approved type, in which *a* is the shell and *b* the core. The core shows a type of standard construction, being made with a porcelain or other insulating body, and an electrode *c*, the upper terminal connection of which is indicated by *d*. Said core is adapted to be securely affixed in the shell by the threaded portion *e*.

The shell *a* is metal and comprises an interior thread *f* adapted to receive the core, and an exterior thread *g* adapted to screw into the cylinder block. A hexagon portion *h* is adapted to accommodate a wrench. The shell is hollow or chambered, and in its lower end has a ground electrode *i*. A hole is tapped in the side of the shell and a shouldered bushing *j* is screwed into same.

An insulating plug *k* is inserted in the bushing *j*, the insulating plug having a shoulder opposed to the shoulder of the bushing. A binding post *l* extends thru said insulating plug, the head *l'* of said post being counter sunk in the inner face of the insulating plug *k*. The outer end of said binding post is threaded, and a terminal connection or nut *m* fitted thereon. A washer *n* of insulating material is preferably inserted between the terminal connection and the plug *k*. A resistance or heating coil *o*, is arranged within the open end of the chamber of the shell *a*, one of said coils being connected to the binding post *l* in any convenient way, and the other end of such coil being grounded to the lower end of the shell *a*. By referring to Figs. 3 and 5, it will be observed that the coil encircles the electrode *d*, but is spaced therefrom.

When the engine is being operated the sparking arrangement operates in the usual way.

Electrical current is supplied to the resistance coil *o* as usual by a separate battery connection, not shown, by which the coil is heated to a high degree; and the coil functions as usual to vaporize the gas drawn into the cylinder, as is frequently required when first starting the engine.

In the event that the porcelain of the spark-plug is cracked it is not necessary to discard the entire plug as is usually done now, but instead it is only necessary to put

5 in a new core.

Figs. 1 to 3 inclusive represent the so called "Splitdorf" spark-plug. As ordinarily made, this type of spark-plug has no heating coil as *o*, and my invention consists

10 in providing a shell of this type of spark-plug with the heating coil constructed and arranged as above specified, and so as to be entirely free and independent of the core and electrode carried by the latter.

15 In Figs. 4 to 6 inclusive the type of spark-plug here shown represents the standard "Champion priming spark-plug". This spark-plug likewise is not ordinarily made with a heating coil, and my invention consists

20 in providing this type of spark-plug with a heating coil; and in doing so using substantially the same construction as shown in the preceding figures; the same parts added by invention being lettered in Figs.

25 4 to 6 inclusive by the same letters as employed for like parts in Figs. 1 to 3 inclusive. In the other parts as apparent, *a'* represents the shell, *b'* the core, *g'* the exterior thread of the shell, *i'* the ground electrode,

30 and *e'* the electrode carried by the core.

The mode of securing the ends of the heating coil and the binding post and the shell is left to the mechanic. The details of

35 construction shown in the drawings are merely those preferred by me.

I claim:

1. In a spark-plug of the character described, a shell, a core removably secured in one end of the shell, such core provided

40 with one of the electrodes, the shell being provided with a hole located approximately midway between its ends, a bushing inserted in said hole, an insulating plug inserted in

45 said bushing, a binding post secured in said insulating plug, and extending therethru into the interior of the shell, a heating coil having one end fastened to said binding

50 post, and its opposite end grounded in the open end of the shell, said heat coil encircling the electrode carried by the core but being spaced from said core and its said electrode.

2. In a spark-plug of the character described, a shell, a core removably secured in

55 one end of the shell, such core provided with one of the electrodes, the shell being provided with a hole located approximately midway between its ends, a bushing inserted in

60 said hole, an insulating plug inserted in said bushing, a binding post secured in said insulating plug, and extending therethru

into the interior of the shell, the exteriorly projecting end of the binding post being adapted to have one of the electric circuit

65 wires attached thereto, and a heating coil

having one end fastened to said binding post, and its opposite end grounded in the open end of the shell, said heat coil encircling the electrode carried by the core but being spaced from said core and its said electrode.

3. In a spark-plug of the character described, a shell, a core removably secured in one end of the shell, such core provided with one of the electrodes, the shell being provided with a hole located approximately

70 midway between its ends, a shouldered bushing inserted in said hole, an insulating shouldered plug inserted in said bushing, a binding post secured in said insulating plug, and extending therethru into the exterior

75 of the shell, and a heating coil having one end fastened to said binding post, and its opposite end grounded in the open end of the shell, said heat coil encircling the electrode carried by the core but being spaced from said core and its said electrode,

4. In a spark-plug of the character described, a shell, a core removably secured in one end of the shell, such core provided with one of the electrodes, the shell being provided with a hole located approximately

80 midway between its ends, a shouldered bushing inserted in said hole, an insulating shouldered plug inserted in said bushing, a binding post secured in said insulating plug, and extending therethru into the interior of the shell, the exteriorly projecting end of the binding post being adapted to have one of the electric circuit wires attached thereto, and a heating coil having one end fastened to said binding post, and its opposite end grounded in the open end of the shell, said heat coil encircling the electrode carried by the core but being spaced from said core and its said electrode.

5. In a spark plug, a shell, a porcelain within said shell and having its lower end spaced inwardly for a substantial distance from the lower end thereof, a main electrode extending vertically of said porcelain and having its lower end terminating at a point slightly below the lower end of said shell, a second electrode extending radially inward from the lower end of said shell and having its free end terminating in proximity to the lower end of said main electrode to form a spark gap therewith, an insulated binding post extending radially through the wall of the lower portion of said shell below the lower end of said porcelain, and a heating coil within the lower end of said shell and surrounding said main electrode in spaced relation thereto and to the lower end of said porcelain, said heating coil having one of its ends grounded to said shell and the other of its ends connecting said insulated binding post.

6. In a spark plug, a shell, a porcelain body within said shell having its lower end

spaced substantially midway the length of the shell, an electrode carried by the porcelain body and having its end projecting through the space in said shell and beyond the lower end thereof, a heating coil disposed wholly within the space between the lower end of said shell and the adjacent end of said porcelain body, said heating coil including a resistance wire around and spaced from the said electrode, one end of said coil being attached to said shell, and a contact member carried by said shell and connected to the opposite end of said coil. 10

STEWART J. MASON.