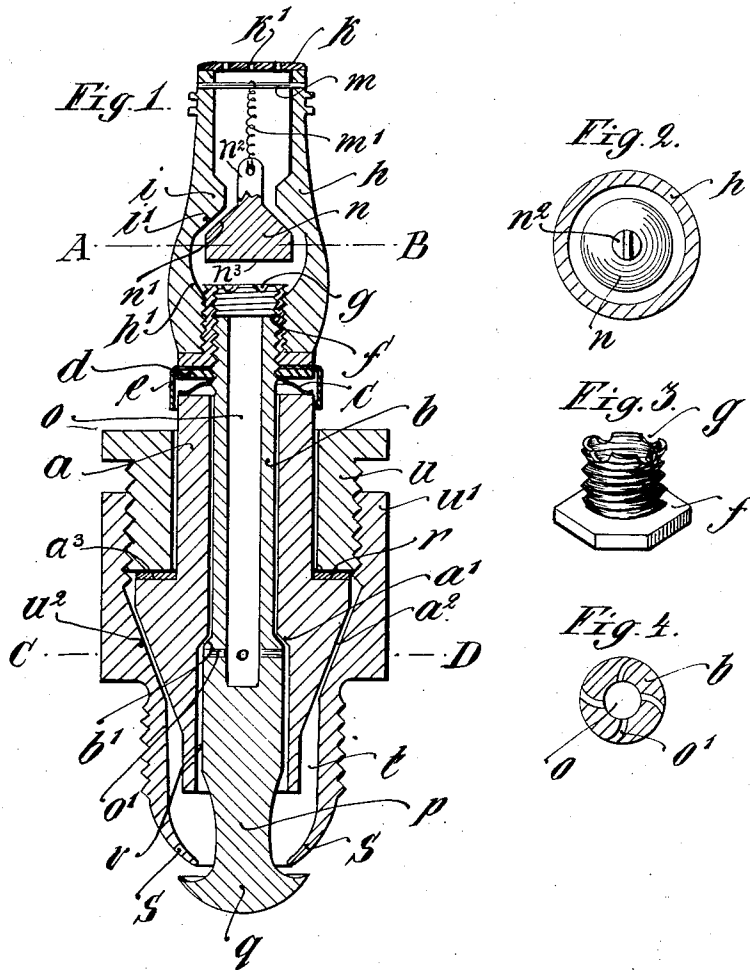


L. PODSZUS.
ELECTRIC SPARK PLUG FOR COMBUSTION ENGINES.
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1,017,459.

Patented Feb. 13, 1912.



Witnesses:

E. W. Moore.

L. E. Clark.

Inventor:

Leopold Podszus,

by Frank A. Hunsday.

UNITED STATES PATENT OFFICE.

LEOPOLD PODSZUS, OF CHARLOTTENBURG, GERMANY.

ELECTRIC SPARK-PLUG FOR COMBUSTION-ENGINES.

1,017,459.

Specification of Letters Patent.

Patented Feb. 13, 1912.

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To all whom it may concern:

Be it known that I, LEOPOLD PODSZUS, subject of the Emperor of Germany, residing at 45 Potsdamerstrasse, Charlottenburg, near Berlin, Germany, have invented certain new and useful Improvements in Electric Spark-Plugs for Combustion-Engines, of which the following is a specification.

The customary sparking plugs used in combustion engines through which air is drawn for the purpose of cooling and cleaning them, have the great drawback, that frequently during use short-circuiting will occur or the ignition will fail, owing to carbon or oil being deposited on the inside of the plug, which substances form a conductive layer on the insulating body. Furthermore the valves do not close immediately on completion of the suction stroke of the piston, so that explosive gases can enter into the sparking plug. Lastly they will not close tightly, particularly when they become heated.

By the present invention all these drawbacks are obviated, and an uninterrupted ignition is assured.

In the accompanying drawing the invention is exemplified:

Figure 1 is a longitudinal section, Fig. 2 is a section along A—B, Fig. 3 is a detail, Fig. 4 is a section along C—D.

Through the insulating body *a* extends the hollow electrode *b*, and secured by means of a nut *d*, a spring *c* is interposed. Over the nut *d* is fitted a cap *e*, and a member *f* is screwed on the electrode. The member *f* is provided with a screw thread on its outside and has a flange with a plurality of recesses *g* in its upper end. On this member *f* is secured the valve cap *h*. In the interior of said valve cap is provided a chamber *h'* into which extends the recessed end of the member *f*. Above and contiguous to the said chamber *h'* is an inclined wedge-shaped surface *i'*, comprising a valve seat, on a lug *i*. The mouth of the valve cap *h* is closed by means of a cap *k* provided with a plurality of holes *k'*, or provided with a close-meshed screen. Immediately beneath this cap is arranged a pin *m* to which a spiral spring *m'* is secured, said spring carrying a vertically reciprocable closure member *n*. The latter consists of a conical member, the beveled edges of which conform to the valve seat *i'*, its upper member *n²* being guided within the wall of the valve cap, be-

tween the lugs *i*, and is flattened on two sides for allowing air to pass; and the under surface *n³* thereof comprising a reciprocable closure which is adapted to coact with the adjusting member *f* for partially sealing the hollow *o*. The lower part of the electrode *b* is considerably reduced at *p* and terminates in an ignition dish *q* concaved upward, and a shoulder *b'* is provided intermediate its length, and under this shoulder is a plurality of air passages, the direction of which do not coincide with the radii of the electrode *b*; but each diverges from a radiant of the hollow electrode on a curved line as shown in the line Fig. 4. An insulating member *a*, made of soapstone, porcelain or the like, surrounds the inner electrode *b*, and is fitted with a shoulder *a³* and a conical surface *a²* on which the outer, stationary electrode, consisting of two parts *u* and *u'*, is secured. The shoulder serves as a bearing for a copper ring *r*, whereas the conical beveled surface *a²* bears against the correspondingly conical surface *u²* of the lower member *u'* of the outer electrode and insures a tight and secure union of the outer electrode and the insulating member. Beneath the outlets of the air passages *o²* a very narrow gap *v* remains between the inner electrode and the insulator, whereas there is a wide gap *t* between said insulator and the outer electrode *u'* below its bearing surface. The end *s* of the outer electrode converges into proximity with the reduced portion *p* of the electrode *b*, immediately above the ignition dish *q*. The members *u* and *u'* are united by screw threads as shown.

The action of the spark plug is as follows: When the piston performs its suction stroke, the closing member *n* is carried downward against the action of the spring *m'* and strikes the contact member, thereby partially closing the hollow *o*. Air can enter freely, in consequence of the flat sides *u²*, and pass through the recesses *g* into the electrode *b*. At the moment in which the piston reaches the dead center and the suction ceases, the closing member *n* is drawn upward by the spring *m'* and enters the valve seat *i'*, whereby a safe and tight joint is produced so that no gases can pass from the combustion chamber through the spark plug when the stroke of the piston is reversed.

In consequence of the provision of the screen *k*, no solid matter can be sucked in,

so that it is impossible for the valve to be clogged, and thereby become leaky. At the same time, the hissing noise caused by the escape of air is avoided. By this arrangement heating of the valve is avoided in a very practical manner, because the cool air will always first strike the valve and cool it. Moreover, the spring m' is kept cool, so that it will not lose its resiliency because of excessive heat. The air enters freely through the bore o in the electrode and escapes therefrom through the holes o' and because of the inclined direction of the holes, a circulating or rotary movement is imparted to the air. If these holes were disposed in a direct radial direction the air would not have the rotary direction as stated. In the present arrangement, however, the air is caused to circulate at a high velocity within the narrow space v and remove the carbon which tends to settle on the insulator, so that the insulator will remain clean, and in consequence, short-circuiting is completely avoided. The circulating movement of the current of air proceeds as far as the point of ignition, so that here also the total upper surface of the ignition dish q and the electrode s will be cleaned, and in consequence the whole upper surface of the ignition disk is available for producing sparks, so that the number of sparks, passing across, will be considerably increased.

What I claim as my invention and desire to secure by United States Letters Patent is:—

1. In a spark plug, an electrode having an opening therein, non-radial holes in communication with said opening, and means for admitting air through said opening and said holes for causing a rotary circulation of air around the electrode.

2. In a spark plug, an electrode having a hollow therein and having a valve closure thereon and having non-radial holes therein communicating with said hollow, and means for admitting air through said holes for

causing a rotary circulation of air around the electrode.

3. In a spark plug, an electrode having a concaved ignition dish and having a conical shoulder thereon, an annular electrode surrounding the first said electrode and co-operatively connected therewith by means of an insulating member having a seat for receiving the said shoulder, and means for causing a rotary circulation of air between said electrodes.

4. In a spark plug, a hollow electrode having holes communicating with the hollow therein, a spring for retaining said electrode in its normal position, a reciprocable closure member adjacent to the end of said hollow electrode for partially sealing the hollow therein, and an annular electrode coöperatively connected with said hollow electrode.

5. In a spark plug, a hollow electrode having holes communicating with the hollow thereof, a valve cap secured on an end of said electrode by means of an adjusting nut having recesses in an end thereof, a reciprocable closure member held in its normal position in the valve cap by resilient means and adapted to be moved by air pressure against the resistance of said resilient means, and means for admitting air forcefully through said valve cap in one direction and for preventing the passage of air or gas therethrough in the opposite direction.

6. In a spark plug, the combination of an outer electrode, a hollow inner electrode, an insulator intervening the electrodes, said inner electrode having curved air passages in direct communication with the hollow thereof, means for admitting air forcefully through said curved passage for cleaning the electrodes.

In testimony whereof, I affix my signature in the presence of two witnesses.

LEOPOLD PODSZUS.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.