

V. M. PETERSON.
SPARK PLUG.
APPLICATION FILED AUG. 27, 1920.

1,409,400.

Patented Mar. 14, 1922.

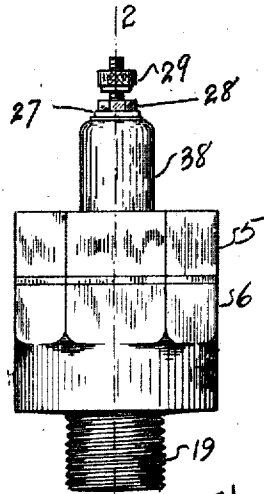


Fig. 1.

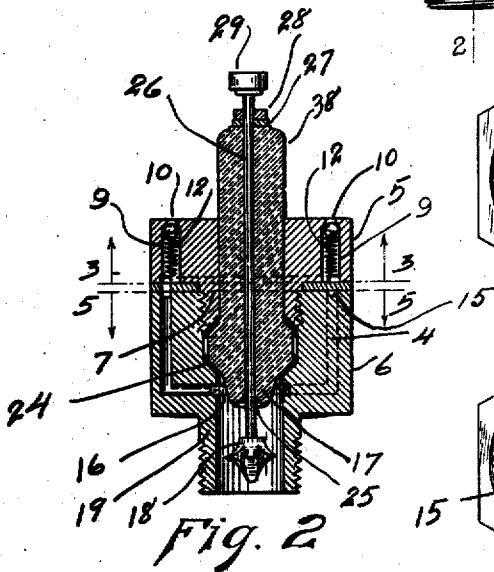


Fig. 2.

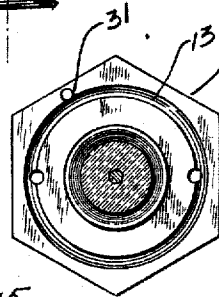


Fig. 3.

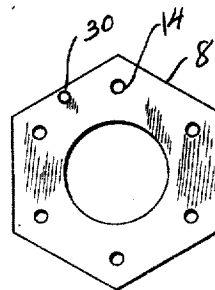


Fig. 4.

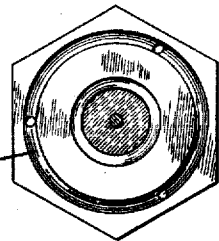


Fig. 5.

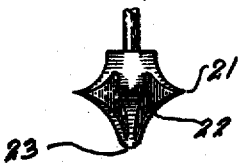


Fig. 6.

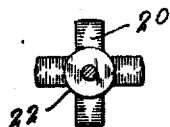


Fig. 7.

Inventor

V. M. Peterson.

By *A. J. [Signature]*
Attorney

UNITED STATES PATENT OFFICE.

VALDIMAR M. PETERSON, OF DENVER, COLORADO, ASSIGNOR OF ONE-HALF TO
CARROLL HAIR, OF DENVER, COLORADO.

SPARK PLUG.

1,409,400.

Specification of Letters Patent. Patented Mar. 14, 1922.

Application filed August 27, 1920. Serial No. 406,516.

To all whom it may concern:

Be it known that I, VALDIMAR M. PETERSON, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Spark Plugs; and I do 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, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in spark plugs, my object being to provide a device of this class which is constructed to provide for automatic cooling and cleaning by virtue of air, which is introduced into the body of the plug by means of suitable passages and delivered at the inner extremity of the porcelain insulator, which is so shaped as to direct the air currents downwardly into contact with the lower extremity of the central electrode, which is of cruciform shape, the sparking points of the electrode being arranged in suitable proximity to the inner and surrounding extremity of the shell or body of the plug, whereby the arcs are produced between these points and the adjacent surface of the surrounding shell.

The points are spaced by means of suitable grooves permitting any oil or other material which might have a tendency to foul the electrode, to pass downwardly between the points or arms and escape at the lower end thereof. In addition to the cleaning function performed by air, it also supplies the necessary oxygen to insure proper ignition for arcing and explosion purposes and insure practically perfect combustion within the explosion chambers of the cylinders; thus resulting also in the saving of fuel, or gasoline.

Hence, my improved construction possesses the features of air cooling, self cleaning, positive firing, and gas saving.

Having briefly outlined the invention, I will proceed to describe the same in detail, reference being made to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing:

Fig. 1 is a side elevation of my improved spark plug.

Fig. 2 is a vertical central longitudinal section taken on line 2—2 Fig. 1.

Fig. 3 is a section taken on line 3—3, Fig. 2, viewed in the direction of the arrows.

Fig. 4 is a top plan view of a gasket arranged between the two members of the spark plug body.

Fig. 5 is a section taken on the line 5—5, Fig. 2, viewed in the direction of the arrows.

Figs. 6 and 7 are side and end views respectively of the sparking extremity of the central electrode, shown on a larger scale than in Fig. 2.

The same reference characters indicate the same parts in all of the views.

Let the numerals 5 and 6, respectively, designate the two members of the spark plug body, which are shouldered and connected by screw threads in the usual manner, the member 5 having an exteriorly threaded part 7, which enters a counterpart socket formed in the member 6. Between the shoulders of the two members 5 and 6 is arranged a gasket 8, preferably composed of soft metal, as copper. The member 5 is provided with oppositely disposed perforations 9, whose outer extremities communicate with the atmosphere, and are provided with interior seats which are normally engaged by ball valves 10, which are held in the seated position by spiral springs 12. The opposite extremities of these perforations communicate with a circular groove 13, formed in the inner face of the member, whereby the air when the ball valves open, is allowed to enter this groove. The gasket 8 is provided with a number of perforations 14, which communicate at one extremity with the groove 13, and at their opposite extremity a similar groove 15 formed in the upper surface of the shouldered part of the member 6, whereby the air when the ball valves are open, is allowed to enter the groove 15. The part 6 is provided with a number of angular perforations 4, three being shown (see Fig. 5), whose upper extremities are in communication with the circular groove 15 and whose inner extremities communicate with an opening 16 surrounding the inner extremity 17 of the insulating or porcelain core 28, its inner extremity being curved or cone shaped to direct the air downwardly to the spark terminal 18 of the central electrode, which is located within

the lower portion of the space 16 of the reduced threaded part 19 of the member 6. The spark terminal 18 is of cruciform shape, its arms 20 having pointed extremities 21, which are arranged in such proximity to the adjacent surface of the part 19 as to insure proper arcing between the said extremity and the said parts when the spark plug is in use. The arms 20 are spaced by grooves 22, which form channels to allow any oil or other material which might have a tendency to foul the spark terminal, to pass downwardly between the said arms and escape at the lower extremity 23 of the said terminal.

The porcelain core or insulating member 38 is enlarged near its inner extremity, as shown at 24, forming upper and lower beveled shoulders, which are opposed by adjacent shoulders formed on the body of the plug, a suitable packing material being interposed. The inner extremity of the said core is provided with a central recess 25, which is surrounded by a rather sharp edge, which facilitates the cleaning of the inner extremity of the core, as the air currents enter through the aforesaid perforations and pass downwardly to the spark terminal.

The body portion of the central electrode consists of a rod 26, which passes through a central opening formed in the core and is held in place by means of a washer 27, and a lock nut 28, the outer extremity of the electrode being provided with a nut 29 to facilitate the connection of one of the conductors with the electrode.

In assembling the parts, a pin 30, with which the gasket 8 is provided, enters a corresponding perforation 31, formed in the member 5 of the spark plug body, thus insuring the proper positioning of the perforations 4 of the gasket with reference to the grooves 13 and 15 of the members 5 and 6 of the body of the plug.

From the foregoing description the use of my improved spark plug will be readily understood. Assuming that the plug is in use and properly mounted in the cylinder through the medium of the exterior threads of the part 19 of the body member 6, it will be understood that the ball valves 10 are normally seated to cut off communication between the interior of the cylinder and the atmosphere. However, as the piston of the cylinder moves inwardly whereby the charge of explosive mixture is drawn into the cylinder, the ball valves 10 will be unseated and permit currents of air to enter the cylinder through the perforations 9, 14, and 4, and the grooves 13 and 15; the said perforations and grooves being formed in

the body of the plug and the gasket, as heretofore explained. As these currents of air enter the upper extremity of the opening 16 around the inner extremity of the insulating core, they are directed downwardly into contact with the spark terminal 18, where they perform both a cooling and cleaning function, and prevent the fouling of the spark terminal. They also supply the necessary oxygen to insure positive firing, as heretofore explained. The air currents also cooperate with the grooves 22 of the spark terminal to prevent any oil or other fouling substance from accumulating on the spark terminal.

Attention is called to the fact that by reason of the location of the spark terminal 18 within the chamber at the inner extremity of the shell, the said terminal is surrounded and protected from the oil or other fouling substance, to which the spark terminals of ordinary plugs are usually exposed. This is an important advantage of my improved construction. Further the positioning of the terminal within the said chamber enhances the cleansing action of the air currents, which enter said chamber from the atmosphere through the perforations of the plug, as heretofore explained.

I claim:

1. A spark plug electrode whose spark terminal is of cruciform shape and whose lower end is pointed for dripping of oil therefrom.

2. A spark plug whose terminal is provided with a plurality of points arranged within a chamber at the inner extremity of the plug, the said points being positioned in arcing proximity to the surrounding wall of the shell, said points being separated by grooves which extend downwardly to the bottom of the terminal, said bottom of which is pointed to facilitate the escape of oil or other substance which might have a tendency to foul the terminal.

3. A spark plug whose shell is composed of two shouldered members, and an interposed gasket, the opposing shoulders of the members having circular grooves, the two members and the gasket having perforations communicating with these grooves, the perforations communicating with the atmosphere at one extremity and having normally closed inwardly opening check valves, the opposite extremity of the perforations communicating with a chamber formed at the inner extremity of the shell, and surrounding and protecting the spark terminal of the plug.

In testimony whereof I affix my signature.
VALDIMAR M. PETERSON.