G. S. RIDER.

MEANS FOR AUTOMATICALLY CLEANING AND COOLING SPARK PLUG ELECTRODES.

APPLICATION FILED MAY 17, 1918.

1,322,346. Patented Nov. 18, 1919.

Fig. 1.

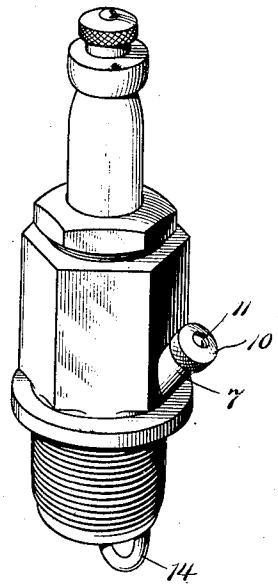
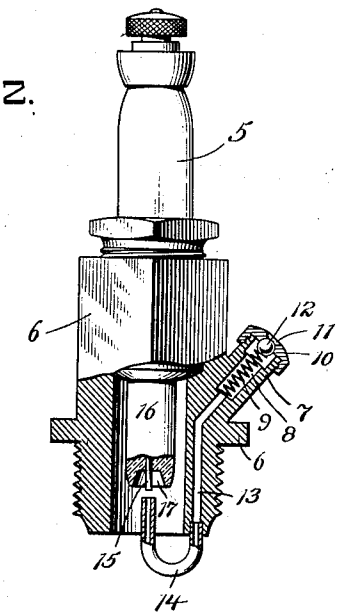


Fig. 2.



WITNESS

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MEANS FOR AUTOMATICALLY CLEANING AND COOLING SPARK-PLUG ELECTRODES.

1,322,346. Specification of Letters Patent. Patented Nov. 18, 1919.

Application filed May 17, 1918. Serial No. 235,129.

To all whom it may concern:

Be it known that I, GRANVILLE S. RIDER, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Means for Automatically Cleaning and Cooling Spark-Plug Electrodes; 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.

My invention relates to improved means for maintaining the electrodes of a spark plug free of carbon, oil or foreign matter which under normal conditions collects upon the electrode and adjacent parts of the plug, and produces short circuiting. It is further contemplated to simultaneously obtain a cooling of the electrodes, and a scavenging of the hollow portion of the plug.

To the accomplishment of the recited objects and others subordinate thereto, the preferred embodiment of my invention resides in the construction and arrangement of parts hereinafter described, shown in the accompanied drawings, and embraced within the scope of the appended claim.

In said drawings Figure 1 is a perspective view of a spark plug showing my improvement incorporated directly therein, and

Fig. 2 is a side elevation of the plug, partly broken away to illustrate in vertical section the precise arrangement and construction of the parts.

Generally speaking, the invention comprises the adaptation of fluid-operated means for dislodging any carbon or other matter which accumulates on the electrode or surrounding parts of a spark plug. For present purposes, I prefer to embody the improvement as a component part of the plug, although it will be understood that the principle of the invention may be carried out in various other ways. As herein disclosed, a relatively small projection, preferably slightly slanted, is disposed at the base of the main plug bushing. This projection is longitudinally bored for the reception of a small coil spring, and a cap with an inlet is removably secured to the free end of the projection, a ball or other suitable valve being located between the outer terminal of the coil spring and the inlet of the cap. A reduced counter-bore extends from the main bore of the projection down through the wall of the body of the plug, and communicates with a tubular electrode. Another electrode is located at the required distance from the tubular electrode, and the porcelain surrounding it is dished out in substantially conoidal form. In normal position on a cylinder of an internal combustion engine, the downstroke of the piston will draw in atmospheric air through the valve, this air passing on through the main bore and the reduced counter-bore and out through the tubular electrode, thereby forcibly removing any carbon which might have accumulated over the opening of the free end of this electrode, cleansing the superposed electrode, and because of the substantial conoidal shape of the porcelain surrounding the superposed electrode, the air is deflected downwardly against the integral edge of the tubular electrode, and obviously serves to also cleanse this particular portion. At the same time, the electrodes are cooled, and the chamber or space within the plug is thoroughly scavenged. This cleansing, cooling, and scavenging occurs upon each downstroke of the piston.

Referring specifically to the drawings, 5 designates a conventional type of spark plug. 6 is the bushing or body of the plug, and preferably at its base is a projection 7. This projection may occupy any convenient position, although for present purposes, I prefer to show it located as substantially an acute angle with respect to the bushing 6. A main longitudinal bore is formed in the projection 7 to receive a small coil spring, as 9, and a cap 10 provided with a medial opening 11 is designed to be screw threaded to the outer extremity of the projection. Between the outer end of the coil spring 9 and the opening 11 in the cap is a valve 12, which seats against the inner side of said cap and is normally retained in this position by the contractile force of the spring. Communicating with the main bore 8 and extending downwardly through the wall of the bushing 6 is a reduced counterbore 13, and at the end of this bore a tubular electrode 14 is connected and terminates at a suitable distance from another electrode 15 in order to provide for the desired spark gap. The base of the porcelain 16, which

supports the electrode 15, is preferably cut away around the latter so as to present a substantially conoidal shaped recess 17.

In operation, assuming that a plug constructed in accordance with my invention, occupies its normal position with respect to a cylinder of an internal combustion engine, upon the downstroke of the piston in said cylinder, the suction produced will cause the valve 12 to open inwardly against the tension of spring 9, and thereby permit air to be drawn in through the bores 8 and 13 and emitted from the free end of the electrode 14 with considerable force. Firstly, this atmospheric air removes all particles which may remain over the opening of the electrode subsequent to the previous explosion in the cylinder. Secondly, the electrode 15, being in direct alinement with the jet of air, is thoroughly cleansed. Thirdly, the air is deflected downwardly by virtue of the conoidal recess 17 against the outer edge of the electrode 14, thereby serving to remove any deposit which was not removed by the initial passage of the air from said tube 14. Fourthly, both electrodes are thoroughly cooled, thus providing against disintegration of the electrodes, which owing to the intense heat produced by the explosion in an internal combustion engine, frequently ensues. Fifthly, the electrodes, as well as the bases within the body of the spark plug are scavenged of all objectionable gases.

It will appear manifest that any desired regulation of the admission of atmospheric air may be secured by a simple manipulation of the cap 10 mounted on the end of projection 7, in other words, by screwing downwardly upon the cap the tension of spring 9 will be increased, while upon screwing upwardly upon the cap, the tension will be lessened.

Having thus described this invention, I claim:

A spark plug having a hollow threaded portion for attachment to an engine, an insulated body portion fitting thereinto and carrying one terminal which projects therefrom, the lower end of said body portion terminating well within the hollow threaded portion and having a cupped recess therein surrounding the projecting terminal, a hollow U-shaped terminal carried by said threaded portion whose free end enters the interior of said hollow portion and terminates adjacent to the first mentioned terminal, and means for feeding air to the interior of said hollow terminal whereby it is played into the cup surrounding the first terminal whereby it is accumulated to cool the first terminal.

In testimony whereof I affix my signature.

GRANVILLE S. RIDER.