H. Z. WHITE.

SPARK PLUG.

APPLICATION FILED OCT. 3, 1914.

1,233,630. Patented July 17, 1917.

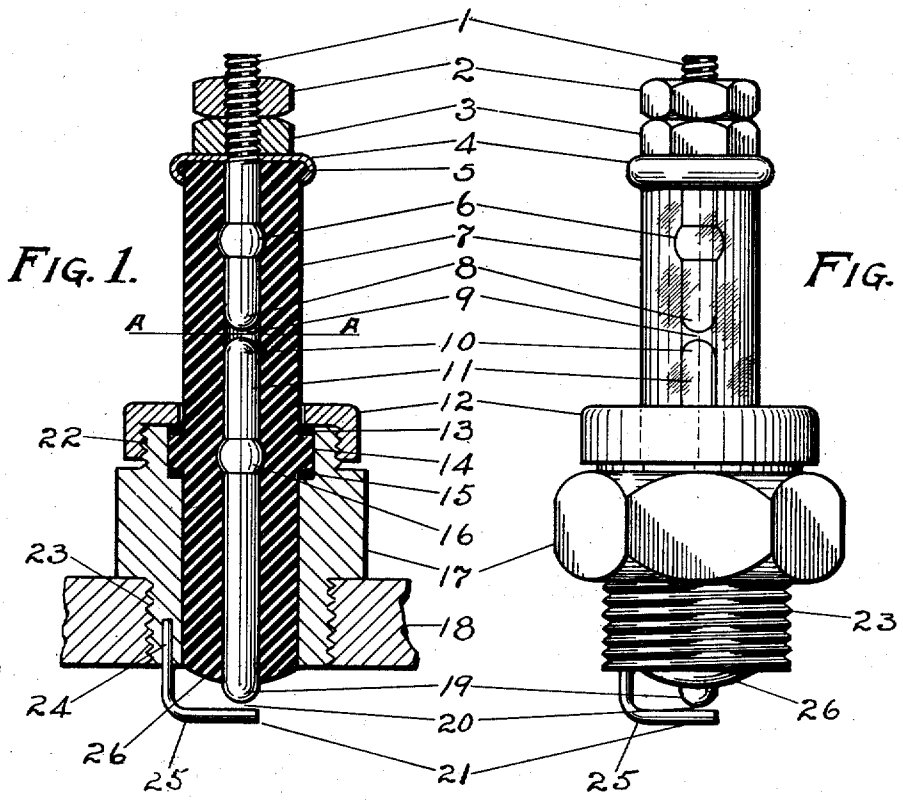


FIG. 1.

FIG. 2.

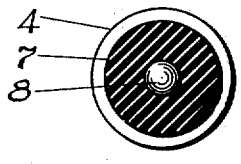


FIG. 3.

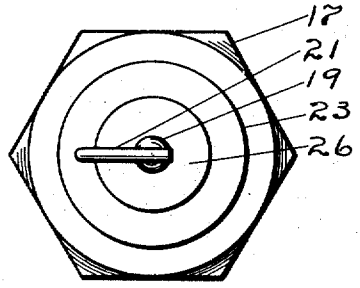


FIG. 4.

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SPARK-PLUG.

1,233,630. Specification of Letters Patent. Patented July 17, 1917.

Application filed October 3, 1914. Serial No. 864,821.

To all whom it may concern:

Be it known that I, HARRY Z. WHITE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification.

This invention relates to an improved spark plug for use in an internal combustion engine as an igniter and it consists in the novel features and combinations of parts hereinafter described, and particularly pointed out in the claims.

The objects of the invention are, generally speaking, to provide a spark plug of simplified construction and which will be efficient, durable and reliable in use.

A further object of the invention is to provide a spark plug having a central electrode made in sections to form a spark gap and which is permanently molded into a substantial one-piece insulation of porcelain, glass or other similar substance, which is transparent to such an extent as to render the spark gap visible, so that it forms an index as to the functioning of the ignition spark without removing the plug from the engine cylinder.

The plug is designed especially for use in locating trouble in a motor having a number of cylinders, wherein the spark gap shows at a glance if the ignition circuit is at fault, and if so, the location of the faulty cylinder. The spark gap is also employed in determining the volume of spark obtained and in adjusting the vibrators regulating the spark to obtain the best results with the minimum consumption of current.

For a full understanding of the invention reference is to be had to the following description and accompanying drawing, in which:—

Figure 1 is a central vertical section through my improved spark plug.

Fig. 2 is a side elevation of the same.

Fig. 3 is a transverse section on the line A—A of Fig. 1.

Fig. 4 is a bottom view of Fig. 2.

17 is the metallic body of the spark plug and having screw threads 23 for fastening the plug into the wall of the engine cylinder 18 in the usual manner. 7 is the porcelain, glass or like insulating material which is inserted centrally into 17 and having a flange 14. The upper part of the body 17 is recessed to take the flange 14 and gaskets 13 and 15 which are located above and below said flange 14. Gaskets 13 and 15, for making a tight joint between 17 and 7 and a more or less elastic connection between them, may be of asbestos or copper or other material as a combination of the two. 12 is a cap fastened to body 17 by means of screw threads 22 and clamps the washers 13 and 15 and flange 14 in the recess in body 17 thereby holding insulator 7 firmly in place.

1 and 11 are the two sections of a central electrode and molded into a longitudinal bore so as to leave a spark gap 9 between the ends 8 and 10. The spark gap 9 between the ends 8 and 10 of the electrode sections 1 and 11 is preferably a vacuum. 6 and 16 are enlargements on the electrodes 1 and 11 respectively for the purpose of holding them solidly in place in the insulator 7. 4 is a terminal cap which is beaded over the upper end 5 of the insulator 7. 3 and 2 are nuts threaded on to the upper end of electrode 1. A suitable electrical connection can be made to a source of electricity by clamping the wire or other connection between cap 4 and nut 3 while nut 2 then forms a lock nut.

The lower end 19 of electrode 11 projects below the bottom surface 26 of insulator 7 and forms one of two sparking points, the other of which is 21 across the working gap 20. The spark point 21 is on the horizontal end of the sparking terminal 25, the upper end 24 of which is inserted vertically into the body 17. The surface 26 is rounded and smoothly connected with the inside of the engine cylinder to prevent accumulations of soot or carbon. The spark points 19 and 21 are also smooth and rounded so an accumulation of soot or carbon will be less liable to occur and the more easily prevented by the dissipating effect of the spark across the working gap 20.

It will be understood that sparking points 19 and 21 are inside of the cylinder wall 18 and the spark plug body 17 and all above it are exposed to view outside of the cylinder wall 18.

In the operation of the plug the current passes through the electrode 1 bridging the gap 9 between the points 8 and 10 and passing through electrode 11 bridges the working gap 20 between the points 19 and 21, igniting the charge in the engine cylinder. From spark point 21 the current passes

through the plug body 17 and engine cylinder 18 to form a complete circuit with the current source.

The size of the spark at the working gap 20, its timing or its interruption can be detected by observing the spark through the insulator 7 at the gap 9.

Having thus described my invention what I claim as new is:

1. In a spark plug, a plug body having a central bore, a recess in the upper portion of said body concentric with said bore, an insulator composed of a single piece of transparent material in said bore and having a flange fitting into said recess, said insulator being held in said body by means of a cap screwed over the upper and outer portion of said plug body, an electrode in two sections imbedded in said insulator, said sections being semi-circular and separated to form a spark gap and a terminal cap beaded over a semi-circular shoulder on the upper portion of said insulator, through which the upper section of said electrode projects.

2. An electric sparking device comprising a plug body, a recess in the upper portion of said plug body, an insulator composed of a single piece of transparent material and having a flange fitting into said recess, said insulator being held in said body by means of a cap screwed over the upper portion of said plug body, an electrode in two sections each of which is immovably held in said insulator and separated to form a spark gap, the upper section of said electrode projecting through a terminal cap beaded over a shoulder on the upper end of said insulator, the lower section of said electrode extending through said insulator and a sparking terminal mounted in the base of said plug body to form with the lower section of said electrode a working spark gap.

3. In a spark plug, a plug body having a central bore, a recess in the upper portion of said body concentric with said bore, an insulator composed of a single piece of transparent material in said bore and having a flange fitting into said recess, gaskets in said recess above and below said flange, said insulator being held in said body by means of a cap screwed over the upper portion of said plug body, whereby a tight joint is formed between said insulator and said body, an electrode in two sections each of which is held in said insulator by ball shaped enlargements the inner ends of said sections being semi-circular and separated to form a spark gap, the upper section of said electrode being threaded to form a binding post and projecting through a terminal cap beaded over a semi-circular shoulder on the upper end of said insulator, the lower section of said electrode projecting through the bottom of said insulator and being rounded and smoothly connected with the bottom surface of said insulator, the bottom surface of said insulator also being rounded and smoothly connected with the lower portion of said plug body, and a cylindrical sparking terminal mounted in the base portion of said plug body and having a horizontal portion extending across the end of the lower section of said electrode and separated therefrom to form a working gap.

4. In a spark plug, a plug body, an insulator composed of a one piece transparent material in said body. an electrode in two sections, the inner ends of said sections being semi-circular and separated to form a spark gap, the upper section of said electrode being threaded to form a binding post and projecting through a terminal cap beaded over a semi-circular shoulder on the upper end of said insulator, the lower section of said electrode projecting through the bottom of said insulator and being semi-circular and a cylindrical sparking terminal mounted in the base portion of said plug body and having a horizontal portion extending across the semi-circular end of the lower section of said electrode and separated to form a spark gap.

In witness whereof, I have hereunto set my hand and seal.

HARRY Z. WHITE. [L. S.]

In the presence of—
HAROLD V. COOK,
ZITA V. MCBRIDE.