May 19, 1925. 1,538,580

W. B. O'BRIEN

SPARK PLUG

Filed Oct. 15, 1919

Fig. 1

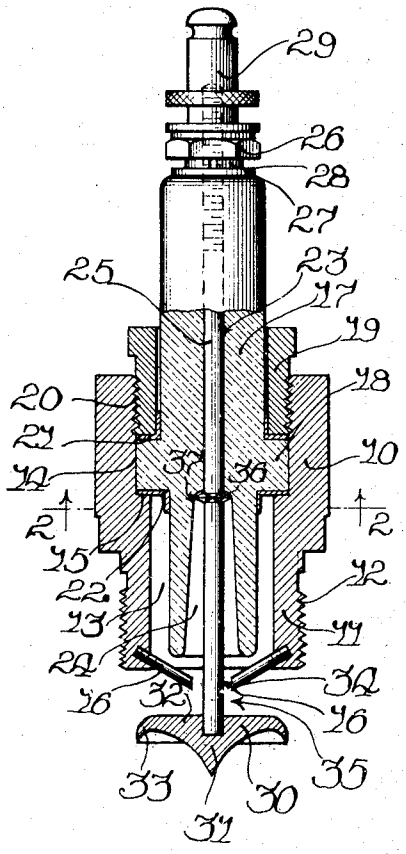


Fig. 2

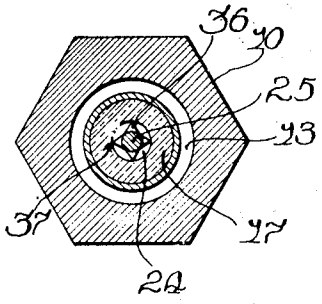
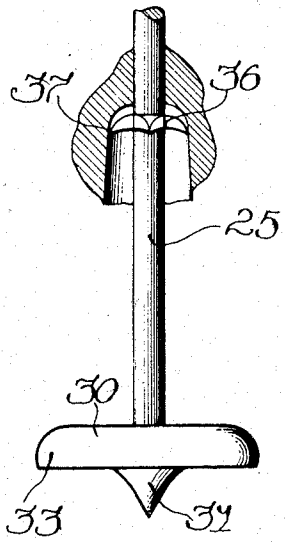


Fig. 3



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Patented May 19, 1925. 1,538,580

UNITED STATES PATENT OFFICE.

WILLIAM B. O'BRIEN, OF CHICAGO, ILLINOIS.

SPARK PLUG.

Application filed October 15, 1919. Serial No. 330,684.

To all whom it may concern:

Be it known that I, WILLIAM B. O'BRIEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Spark Plugs, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The present invention relates to improvements in spark plugs for internal combustion engines, and contemplates as its principal object the elimination of carbonizing or other fouling of the sparking terminals of a plug.

Another object of my invention is to provide a shield for the sparking terminals, directly carried by the plug, the support therefor forming one sparking terminal of the plug, the shield being carried on one or the other terminal at a sufficient distance from the other terminal to prevent sparking between the terminals and the shield. This construction affords a simple, economic and efficient spark plug, the shield preventing any oil from coming in direct contact with the sparking terminal and thereby eliminating carbonization of the same.

In the preferred form of my invention I mount the shield on the free end of the removable terminal, the same being carried thereon as an integral part thereof. However, of course, I do not limit myself to this particular mounting of the shield, but have found the same to possess the most advantageous features and to give the best results.

Another object of my invention is to provide means for preventing the shield from coming into too close proximity with one of the sparking terminals so as to prevent sparking between that terminal and the shield, or short circuit of the sparking terminal terminals.

A still further object of my invention is to provide a shield of the character described which will not only keep oil from coming in contact with the sparking terminals and porcelain insulating support, but which will also deflect the oil downwardly and away from the spark plug terminals, and said support.

Other objects and advantages will appear from the following specification and the appended claims, taken in connection with the accompanying drawings, in which:

Figure 1 is a vertical sectional view of a spark plug embodying the improvements of my invention;

Figure 2 is a cross section on the line 2—2 of Figure 1; and

Figure 3 is an elevational view of the invention as applied to one sparking terminal.

Referring more particularly to the drawing, I provide a spark plug comprising the metallic body portion 10 provided with a concentric extension 11 threaded exteriorly as at 12 to engage in the usual opening provided in the head of an internal combustion engine, not shown. The body 10 thus forms the grounded side of the ignition circuit.

The body 10 is provided with a concentric cylindrical opening 13 passing through the extension 11 and enlarged as at 14 to provide an annular shoulder 15. A pair of sparking terminals 16 are fastened into the inner wall of the extension 11 and directed toward the center of the opening 13.

An insulating body 17 is concentrically mounted in the opening 14 and is provided with an annular flange 18 for reception substantially snugly within the enlargement 14 of the opening 13. A threaded nut 19 engaging with the plug 10, as at 20, serves to retain the body 17 rigidly in position in the plug. As the insulating body 17 is in general practice usually constructed of porcelain or similar fractious material, gaskets 21 and 22 are mounted between the nut 19, shoulder 15, and the annular flange 18, and thereby prevent fracture of the porcelain when the nut 19 is screwed home. The insulating body 17 is provided with a concentric opening 23 enlarged at its lower end as at 24, the cylindrical side walls of the enlarged opening 24 tapering inwardly. The body 17 extends downwardly through the plug to a point just above the lower annular face of the extension 11 and is adapted to receive the other sparking terminal of the plug comprising the extensions 16. The upper end of the rod 25 is threaded to receive a retaining nut 26, a soft washer 27 and a locking washer 28 being disposed between the nut 26 and the upper end of the porcelain body 17. A binding post nut 29 is carried by the upper end of the rod to clamp one terminal of the ignition circuit to the plug.

On the lower end of the rod or terminal member 25 is carried a shield 30, the shield

being connected to the rod in any suitable manner. This shield is preferably of the configuration best outlined in Figure 1, the same consisting of a conical central portion 31 and base portion 32. The peripheral edge of the base portion 32 is bent outwardly away from the plug to form an annular flange 33, the curvature of the face of the conical projection 31 and the curvature of the inner face of the flange 33 serving to deflect away from the plug any lubricating oil or the like which may be thrown in the direction of the plug when the piston reciprocates.

The distance between the rod 25 and the terminal members 16 is designated by the space 34 through which the spark is intended to jump. The distance 35 between said terminal members 16 and the inner face of the shield 30 is preferably twice the distance 34. The shield is maintained in this position by a plurality of radial sharpened prongs 36 carried by the rod 25 and adapted to impinge, as at 37 in Figure 1 and in Figure 2, upon the inner surface of the enlarged portion 24 of the opening 23 in said body 17, thereby limiting the movement of the rod upwardly into said body. As the nut 26 is screwed home normally the prongs 36 will be bent as shown in Figure 3 and will maintain the rod against turning and the shield at a safe distance from the terminals 16, and thus prevent any sparking between the terminals 16 and the shield 30. The shield is preferably of a diameter not less than the diameter of the opening 13 in the body 10, the outwardly curved outer surface of the annular flange 33 preventing any accumulation of carbon between the shield and the peripheral edge of the opening 13 in said extension 11.

In use the plug is inserted in the head of the cylinder of an internal combustion engine exactly in the manner in which the ordinary spark plug is inserted. While in use any oil which may gather in the cylinder and be thrown upwardly by the action of the piston or other force toward the spark plug will be caught and deflected downwardly by the shield 30, thereby preventing any oil from coming in direct contact with the sparking terminals and being carbonized thereon. Thus the invention eliminates one of the greatest disadvantages of the majority of spark plugs now on the market and as disclosed in the prior art.

While I have shown and described a particular form of mounting the shield I do not limit myself to the details of construction shown, but reserve the right to modify the mounting of the shield to meet the conditions resultant upon the use of the shield in conjunction with various types of spark plugs.

I claim:

1. In a spark plug, the combination with a supporting body, an insulating body, and extensions on said first mentioned body forming a sparking terminal, of a rod extending thru said insulating body and between and proximate to said extensions to form the other sparking terminal, a shield carried by one end of the rod and provided with an outwardly extending annular flange, a plurality of prongs on said rod to prevent inward movement of the same beyond a predetermined position, means for securing the rod, said prongs maintaining said shield out of sparking distance with said extensions and preventing rotation of said rod.

2. In a spark plug, the combination with a supporting body, an insulating body, and extensions on said first mentioned body forming a sparking terminal, said insulating body being provided with a concentric opening, enlarged throughout a portion of its length from the lower end of said body, of a rod extending thru said insulating body and disposed between said extensions, a shield carried by the end of said rod beyond said extensions, said shield having an outwardly extending annular flange, means for securing the rod, and a plurality of prongs on said rod to engage in the upper end of the enlarged portion of the opening in said insulating body to prevent said rod from turning and said shield coming into closer proximity with said extensions than said rod, and thereby eliminate sparking between the extensions and the shield.

3. A shield for spark plugs having an integral conical axial portion merging at its base into a peripheral annular flange.

In witness whereof I hereunto subscribe my name this 11th day of October, 1919.

WILLIAM B. O'BRIEN.