J. R. AYOTTE.

SPARK PLUG.

APPLICATION FILED MAR. 4, 1918.

1,295,099. Patented Feb. 25, 1919.

Fig. 1.

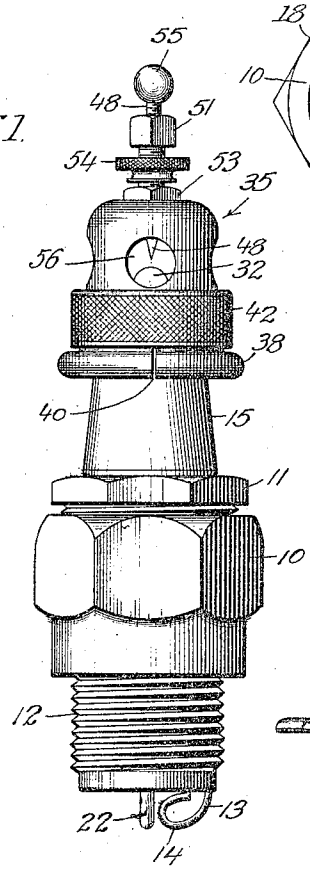


Fig. 4.

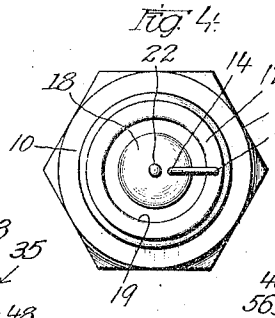


Fig. 2.

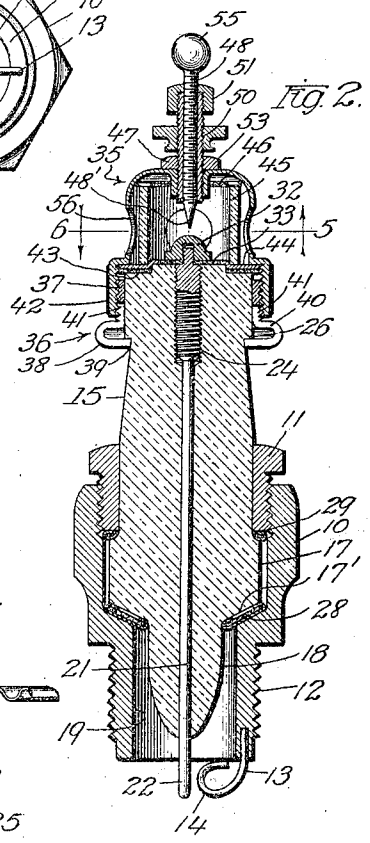


Fig. 7.



Fig. 3.

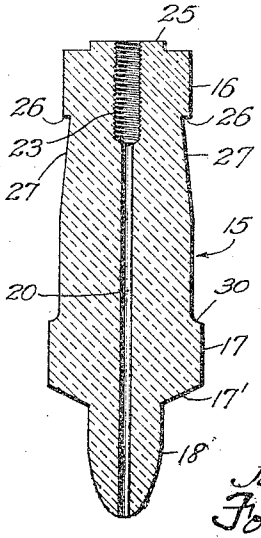


Fig. 5.

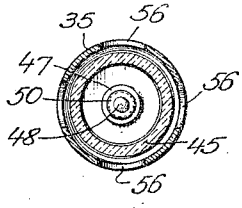
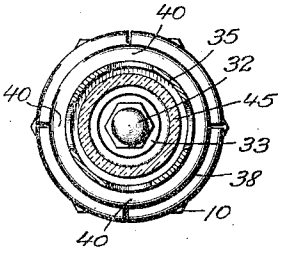


Fig. 6.



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SPARK-PLUG.

1,295,099. Specification of Letters Patent. Patented Feb. 25, 1919.

Application filed March 4, 1918. Serial No. 220,155.

To all whom it may concern:

Be it known that I, JOSEPH RENÉ AYOTTE, a subject of the King of Great Britain, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification.

My invention relates to spark plugs for internal combustion engines.

One of the objects of my invention is to generally improve spark plugs, whereby to raise the standard of excellence, in efficiency, appearance and certainty of operation.

Another object is to so construct the plug that the parts thereof may readily be separated for cleansing or replacement and as readily assembled.

Other, further and more specific objects will readily appear to persons skilled in the art, from a consideration of the following description when taken in conjunction with the drawings, wherein—

Figure 1 is an elevation of my improved plug.

Fig. 2 is a central vertical section thereof.

Fig. 3 is a central vertical section of the refractory insulating core.

Fig. 4 is a bottom plan view.

Fig. 5 is a transverse section taken on line 5 of Fig. 2.

Fig. 6 is a similar section taken on line 6 of Fig. 2.

Fig. 7 is a sectional view of a spring gasket to hold the glass cylinder in the observation cap.

In all the views the same references are used to indicate similar parts.

The screw threaded plug or fitting 10, for insertion in the cylinder of a gas engine, may be made on an automatic lathe of hexagon bar or may be cast. It is provided with an exteriorly threaded bushing 11 and on its smaller threaded end 12, projecting from the salient end thereof, is an electric terminal 13, in the form of a loop providing an eye 14. This terminal will be again referred to when describing its functions.

A core 15 of relatively refractory insulating substance, such as porcelain, lava, or the like, is provided on its outer end with a relatively small head 16 and near its inner end, with a relatively larger head 17. Near this end is a teat-like projection 18 to be located within the larger petticoat 19 afforded by the interior of the plug 10. The core is centrally bored, as at 20, for the axial conductor 21, the inner end 22 of which affords a sparking terminal for cooperation with a similar terminal 14.

The outer end of the bore 20 in the core 15 is enlarged and threaded, as at 23, to receive the enlarged threaded end 24 of the central stem or conductor 21. The core is also provided with an axial projection 25, the use of which will be disclosed farther on.

A shoulder 26 is formed around the annular head 16 by the reduced portion 27 of the shank or body of the core.

In assembling the core 15 in the plug 10 a gasket 28 is first placed in the hollow plug. The core is then inserted with the teat 18 within the opening 19 and spaced away therefrom to form a petticoat. Another gasket 29 is threaded over the smaller end of the core until it is in contact with the shoulder 30. The bushing 11 may now be placed over the core and screwed home in the plug 10 to force the gasket in contact with the shoulder 30, and to force the shoulder 17′ in contact with the washer or gasket 28. This holds the core firmly in the fitting 10. The central stem or conductor 21 may be put in place, first having its enlarged threaded end 24 coated with a suitable cement, leaving the smaller part 21 therebelow, free to expand and contract its linear dimensions by temperature changes.

The extreme upper end of the stem is reduced and threaded, as at 31, to receive a threaded terminal nut 32, a washer 33 having first been placed over the reduced end 31 to prevent contact of the nut with the bare surface of the core's end.

Means for securing the hood 35 in place on the upper end of the core 15 is supplied by the spring ring 36 which consists of the exteriorly threaded ring portion 37 and the annular bead part 38. The salient inner edge 39 of the bead is smaller in diameter than the head 16 of the core, but is of the same diameter as the shank 27 behind the shoulder 26. Therefore the bead 38 is divided on a plurality of radial lines by a saw cut, as at 40, which cut may extend partway through the ring 37, as at 41. When the bead end of the ring is forced over the head 16, the edges 39 will snap behind the shoulder 26, so that when the nut 42, which is a part of the hood 35, is screwed on the ring 37, as shown in Fig. 2, the ring 36 cannot be removed.

Before the hood 35 and nut 42 are placed

in position, a cushion gasket 43 is placed around the projection 25 of the core and over this is placed a washer 44 to receive the glass cylinder 45 in the hood 35. On top of the glass cylinder is placed a corrugated spring washer 46 to yieldingly bear upon the upper end of the cylinder to hold the latter in place and prevent rattling, and to ventilate the cylinder.

The upper end of the hood is inturned and interiorly threaded, as at 47, to receive the adjustable threaded stem 48, the lower end of which 49, provides a sparking electrode in coöperation with the nut 32. Surrounding the stem 48 is an interiorly threaded sleeve 50 to receive the stem 48 and exteriorly threaded for the hub 47. The sleeve bears a head 51 by which it and the stem may be rotated and whereby to lock it to the stem to hold the latter in adjusted position. A check nut 53 holds the sleeve to the hood 35 in adjusted position. A clamping nut 54 surrounds the sleeve 50 and serves as a means for clamping a conducting wire to the plug between it and the nut 53. On the top of the stem 48 is an enlargement 55 over and to which the spring wire terminals, when used, may be connected.

The hood 35 has observation openings 56 through which the spark between the terminals 32 and 48 may be observed. Within the hood an auxiliary spark gap is provided to intensify the effect of the spark through the gap between the electrodes 13 and 22.

The terminals 13 and 22 present rounding surfaces to each other, whereby a more intense and abrupt discharge will ensue, there being no sharp edges to fringe and reduce the potential before the discharge occurs.

The eye 14 may very easily and conveniently be bent toward or from the stem 22, on the shank 13, to decrease or increase the extent of the gap.

The terminal 48′ is pointed and the terminal 32 is blunt. This I have found contributes largely to the effect of the spark between the terminals 14 and 22.

While I have herein shown a preferred embodiment of my invention, it is manifest that changes in the configuration and disposition may be made in some of the parts within the scope and intendment of the appended claims.

Having described my invention, what I claim is:—

1. A spark plug having a central core provided on its upper end with an annular enlarged head forming an abrupt shoulder; a threaded ring engaging said enlarged head having an inturned beaded edge part to fit into said shoulder, said beaded edge part being split in a plurality of places to render it diametrically expansible so that it may snap over said head and shoulder to hold the ring in place.

2. A spark plug having a central core provided on its upper end with an annular enlarged head forming an abrupt shoulder, a threaded ring having an inturned edge to engage said head, said edge part being provided with a plurality of splits to render said ring diametrically expansible so that it may be snapped over said head to hold the ring in place, and a nut member threaded over the top end of said core and said ring covering the slots therein to rigidly hold the ring in place.

3. A spark plug having a central core provided with a head and shoulder at one end; an exteriorly threaded ring member fitting said head and having a beaded edge part provided with a plurality of splits and adapted to fit under and engage said shoulder, a hood member having an interiorly threaded part to screw onto the ring member, a central conductor extending through the core and having its upper end within said hood and a rod threaded into said hood to coact with the upper end of said central conductor to form an auxiliary spark gap.

4. A spark plug comprising a central core having an annularly enlarged head; an axially disposed conductor therein; an exteriorly threaded spring ring having a part to engage the core below the head to retain it on the core; a hood having a threaded part to engage the threaded ring; said hood having observation openings in its side wall; a transparent cylinder in said hood; a spring washer to resiliently engage said cylinder to prevent shocks from being imparted thereto, and spark gap terminals within said glass cylinder.

5. A spark plug having a centrally disposed core, a windowed hood mounted on the top of the core; a glass cylinder within the hood, and a corrugated spring washer overlying said cylinder and providing means for ventilating the interior of the cylinder and for yieldingly holding it in place.

In testimony whereof I hereunto set my hand.

JOSEPH RENÉ AYOTTE.