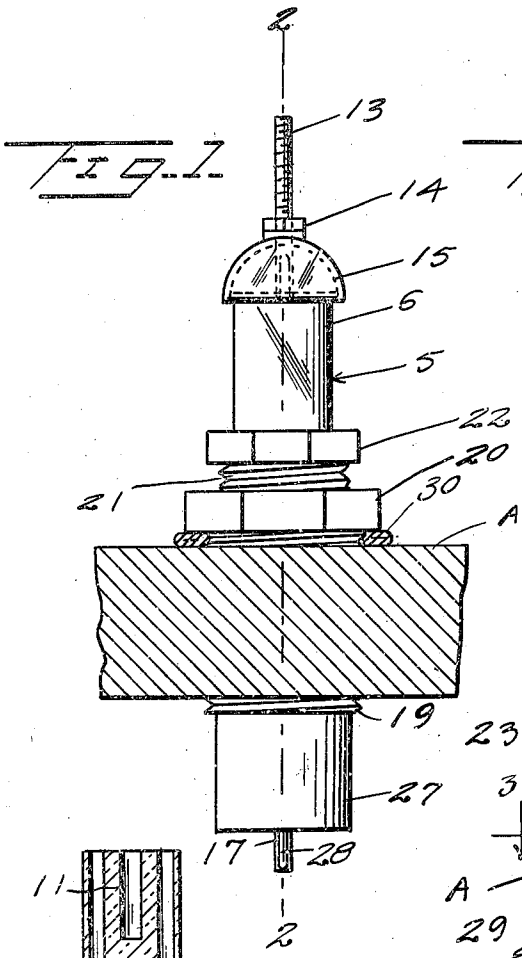
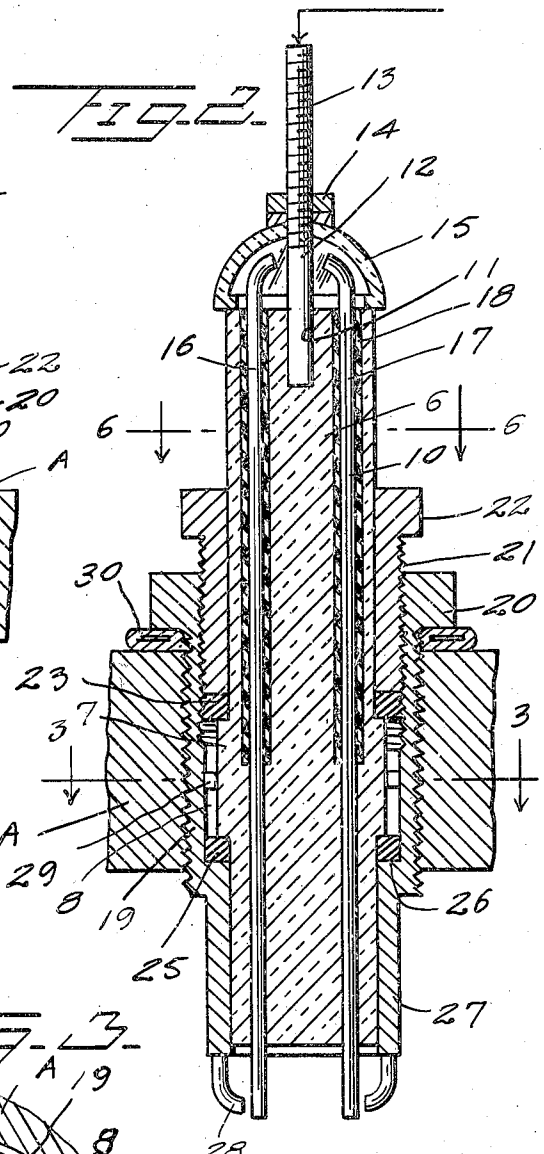
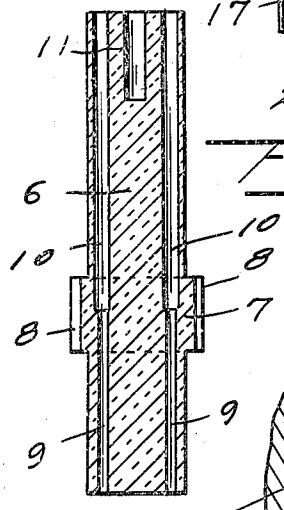
Nov. 8, 1949 W. ELLIS, JR 2,487,319

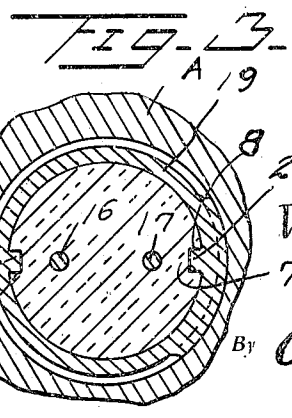
INTENSIFIED SPARK PLUG

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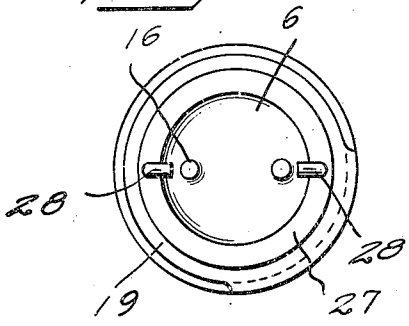
Attorneys

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INTENSIFIED SPARK PLUG

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Fig. 5.



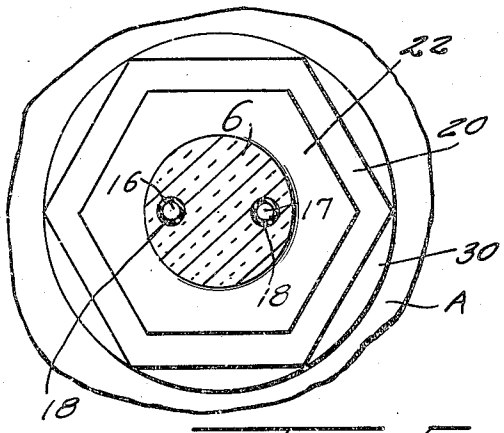


Fig. 6.

Fig. 7.

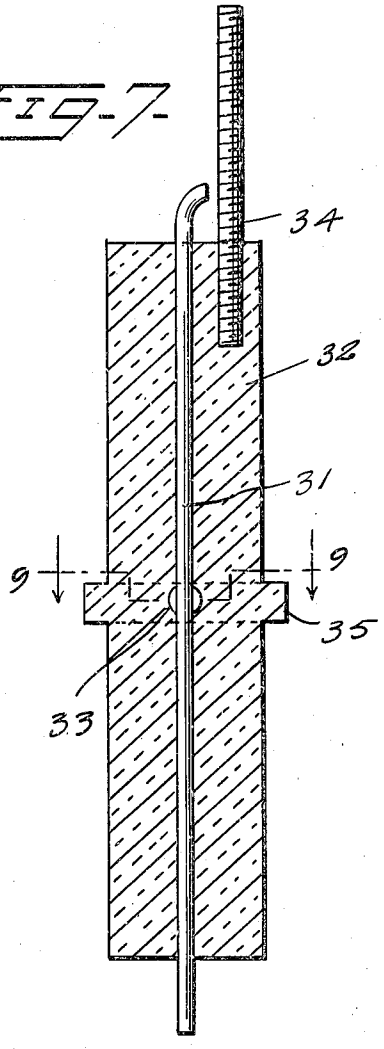


Fig. 8.

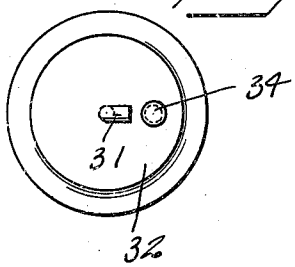
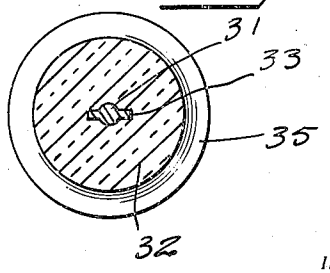


Fig. 9.



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INTENSIFIED SPARK PLUG

William Ellis, Jr., Tiffin, Ohio

Application October 11, 1946, Serial No. 702,701

1 Claim. (Cl. 123—169)

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The present invention appertains to spark plugs, such as are used in the ignition system of an internal combustion engine.

An important object of the invention is to provide a specially constructed spark plug wherein a gap or gaps are provided between the binding post end of the plug and the ignition end, so as to produce a strong and hot spark at said ignition end of the plug.

Another object of the invention is to provide a spark plug of the type having a spark intensifying gap wherein the gap is visible so that an observer can tell without removing the plug, whether it is operating properly.

Still another object of the invention is to provide a spark plug provided with means for intensifying the spark at the usual gap, to not only promote combustion, but also to maintain the ignition end of the plug constantly decarbonized.

A further object of the invention is to provide a spark plug, the various elements of which can be readily assembled, and further wherein the parts can be readily disassembled for the purpose of repairs or replacements.

These and other objects and advantages of the invention will become apparent to the reader of the following description.

In the drawings:

Figure 1 is a fragmentary sectional view, showing the plug in side elevation;

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 1;

Figure 3 is a cross section taken on line 3—3 of Figure 2;

Figure 4 is a longitudinal sectional view through the porcelain body;

Figure 5 is an elevational view looking at the ignition end of the plug;

Figure 6 is a cross section taken on line 6—6 of Figure 2;

Figure 7 is a longitudinal sectional view through a single electrode type plug;

Figure 8 is a top plan view of the plug shown in Figure 7;

Figure 9 is a cross section taken on line 9—9 of Figure 7.

Referring to the drawings, reference character A denotes a cylinder head or wall of an engine, through which the improved plug, generally referred to by numeral 5 is disposed, with its ignition end depending into the corresponding combustion chamber.

As shown in Figure 4, the plug includes a porcelain body 6 of elongated form and preferably cylindrical, the same having a thickened medial

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portion 7 formed with vertical grooves 8 at a pair of diametrically opposite points.

Extending upwardly from the lower end of the body 6 is a pair of passageways 9, 9 which merge into elongated openings 10 of larger diameter, these opening through the upper end of the body 6. A recess 11 extends downwardly from the center of the top of the body 6, and in this is anchored the lower portion of a binding post 12, which extends substantially above the top of the body 6 and the upper portion has threads 13 to accommodate binding nuts or the like, as well as a jam nut 14 for holding a transparent dome 15 against the top of the body 6 when the plug has been assembled.

A pair of elongated electrodes 16, 17 are disposed downwardly through the openings 10 and passageways 9, the portions of the electrodes extending through the openings 10 having sheathings 18 of suitable insulation, this obviously to prevent shorting of the plug in the event the upper portion of the porcelain 6 cracks.

The lower ends of the electrodes 16, 17 depend substantially below the lower end of the body 6, while the upper ends of the electrodes curve inwardly and terminate in spaced relation with respect to the lower smooth portion of the binding post 12, that is within sparking distance.

Numeral 19 denotes a cylindrical body of metal having external threads, whereby the same can be screwed into the usual spark plug opening of an engine. The upper portion of the shell 19 has a polygonal formation 20 which can be grasped by a wrench or other tool when tightening or untightening with respect to the engine wall A. The upper portion of the case 19 is internally threaded to receive an externally threaded sleeve 21, which also has a polygonal shaped head portion 22, capable of being engaged by a wrench when screwing the sleeve into the shell 19, and against a packing ring 23, this packing ring under the force of the sleeve 21 being expanded and pressed snugly against the upper shoulder of the enlarged medial portion 7 of the body 6. This action of the sleeve 21 also forces the body 6 downwardly to compress a second packing ring 25 between the lower shoulder of the enlarged medial portion 7 of the body 6 and a shoulder 26 in the lower portion of the shell 19 and from this point, a cylindrical skirt 27 depends to embrace the lower portion of the body 6. The lower end of the skirt 27 has a pair of inwardly curved electrode elements 28 which terminate in arcing distance of the lower ends of the electrodes 16, 17.

Small lugs 29 project inwardly from the medial portion of the shell 19 and into the vertical grooves 8 of the enlarged intermediate portion of the body 6 to prevent any tendency of the body 6 to rotate within the shell 19.

A suitable packing gasket 30 is interposed between the outside of the wall A and the polygonal head portion 20 of the shell 19.

When the spark plug is energized, arcs occur across the gaps between the binding post 12 and the upper curved ends of the electrodes 16, 17, this intensifying the flow of current, so that a much intensified and very hot spark occurs between the lower ends of the electrodes 16, 17 and the short curved electrodes 28, the more intensified spark serving to promote better combustion, while at the same time, and due to its greater temperature, maintains the lower portion of the plug constantly decarbonized.

The transparent hood 15 allows for visibility of the arcs across the gaps between the binding post 12 and the electrodes 16, 17, so that the observer can always tell whether there is anything defective about the ability of the plug, as regards the sparking action at the ignition end thereof.

A modified form of the invention is shown in Figures 7, 8 and 9, this form allowing for only a single electrode.

In the modified form of the invention, an electrode 31 is disposed longitudinally and axially through a porcelain body 32. The porcelain body may be molded around the electrode 31, in which instance, the medial portion of the electrode will have anchoring lugs of fins 33.

The upper end of the electrode 31 is curved laterally and terminates in close spaced relation to a binding post 34, the upper end of which is threaded to receive a transparent cover or the like, similar to the hood 15. The lower end of the binding post 34 is anchored in the upper portion of the body 32. The medial portion of the body 32 may be enlarged as at 35, and the lower portion of the electrode 31 depends below the lower end of the body 32. The same type of shell 19, as represented in Figure 2, may be used with this single electrode type plug, which produces a single intensifying spark at its upper end.

While the foregoing description sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to, without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention, what is claimed as new is:

A spark plug comprising a shell, an elongated body of insulation extending longitudinally through said shell and projecting upwardly therefrom, said body being formed with longitudinally extending openings having upper portions of increased diameter, sleeves of insulation fitting snugly in the enlarged portions of the openings, a binding post carried by and extending upwardly from said body between the openings, electrodes passing longitudinally through the openings and the sleeves and having upper and lower end portions projecting from the body, the upper end portions of the electrodes being curved inwardly towards the post and terminating in spaced relation thereto, said body being formed with an annular shoulder formed with longitudinally extending grooves, packing means in the shell gripping upper and lower ends of said shoulder, lugs extending inwardly of the shell from side portions of its wall and engaged in the grooves to prevent turning of the body in the shell, a hemispherical hood fitting about said post and enclosing the protruding upper portions of the electrodes and having its peripheral portion resting upon the upper end of the body about the periphery thereof, and short electrodes projecting downwardly from the lower end of the shell and bent inwardly with their ends terminating in spaced relation to lower ends of the first mentioned electrodes.

WILLIAM ELLIS, JR.

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