

W. H. TIDMARSH.

SPARK PLUG.

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1,008,219.

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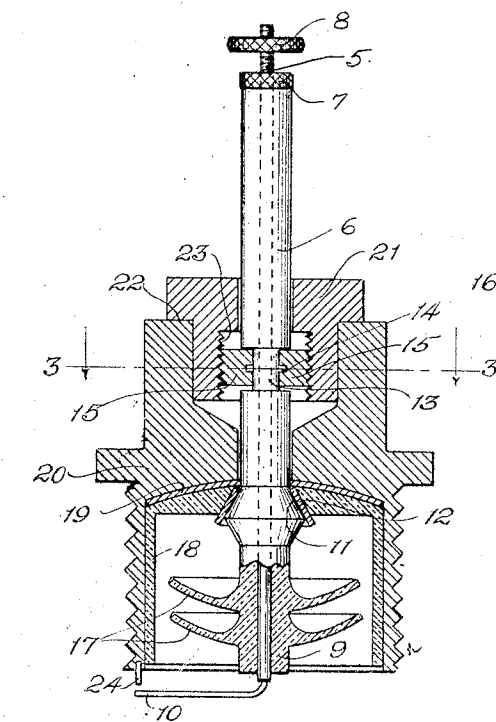


Fig. 2.

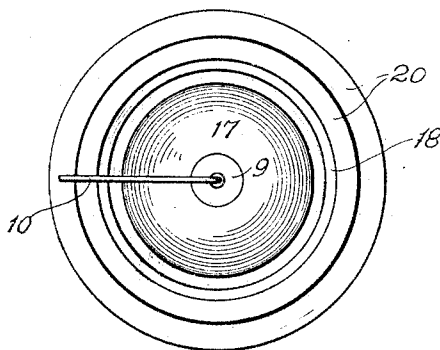


Fig. 4.

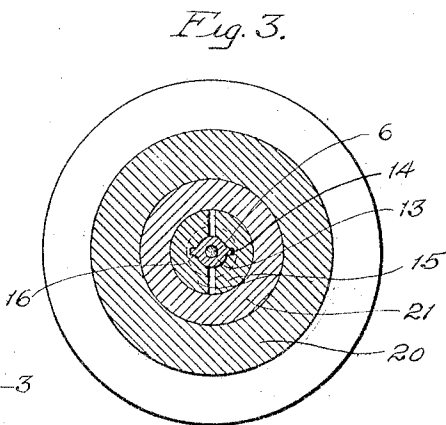


Fig. 3.

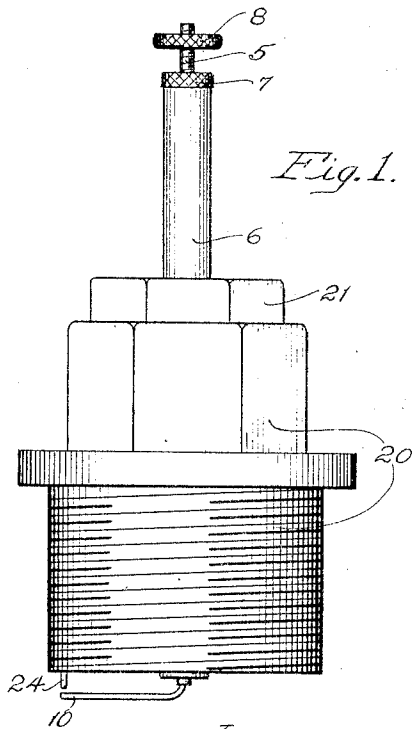


Fig. 1.

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UNITED STATES PATENT OFFICE.

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SPARK-PLUG.

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To all whom it may concern:

Be it known that I, WILLIAM H. TIDMARSH, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification.

This invention relates to spark plugs such as are commonly used in the head of a cylinder of an internal combustion engine to ignite the compressed gases therein.

The objects of the present invention are: to provide a spark plug which will be proof against short-circuiting, and which will also be thoroughly gas-tight; to form in said plug shield members which will protect the exposed connections against fouling by dirt, oil, etc.; to provide a plug that may be easily assembled or disassembled, and one simple and inexpensive of construction; and to provide a plug in which the tightening of the nut thereon will serve to bind every part in tight connection.

The invention further relates to the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is an elevation of the spark plug; Fig. 2 is a longitudinal section therethrough; Fig. 3 is a cross section, taken on line 3—3 of Fig. 2; and Fig. 4 is a plan view looking into the bottom thereof.

My invention comprises a conductor 5 secured within an insulating stem 6, of porcelain or other suitable material, and held therein by means of a cap 7 in engagement with the screw-threaded surface on the outer end thereof, which conductor has revolubly mounted thereon a thumb nut 8;—the nut, cap, and threaded stem constituting a binding post for the attachment of the high tension wire. The inner end of said conductor terminates in a bent portion 10, the end of which constitutes one of the sparking points for the ignition of the gases. A portion of the stem 6 near its inner end is made to taper outwardly, to provide a conical surface 11 over which a gasket 12, preferably of soft metal, fits snugly. Near the middle of the stem 6, a reduced portion 13 is formed, of smaller diameter than the stem, with projecting lugs 14 thereon, as shown in Figs. 2 and 3, and said recessed portion is adapted to be surrounded by a threaded split bushing 15, having holes 16 therein in which the lugs 14 may rest. The stem 6 is further pro-

vided near its lower end with a plurality of dish-shaped members 17, presenting shield-like surfaces when viewed from the bottom, as illustrated in Fig. 4. A shell 18, of porcelain or other insulating substance, is made to bear against the gasket 12 and surround the lower portion of the stem. Another gasket 19 of soft metal is positioned on the upper side of said shell between it and the body portion 20 of the plug which extends downwardly outside of said shell. Connection between the body portion 20 and the stem 6, over which the gasket 12, the shell 18, and the gasket 19, are placed, is maintained by a nut 21 formed with shoulders 22 which bear against the body portion 20, and which nut engages, along its interior threaded surface 23, the threaded split bushing 15. A short wire 24, constituting one of the ignition points, is made to extend from the lower portion of the body 20 close to the bent portion 10 of the stem 6.

It will be seen that the forces which maintain the plug in assembled position tend also to render it thoroughly gas-tight and foul-proof. The nut 21 bearing down on the body portion 20 draws the bushing 15 tightly against the upper surface of the recessed portion 13 of the stem 6, tending to draw said stem upward. At the same time, however, the advance of said stem is checked by the conical surface 11 carrying the gasket 12, the shell 18, and the gasket 19, the latter of said gaskets bearing against the body portion and directly opposing further movement of the stem in the direction of the nut. It is apparent that as the nut is tightened upon the bushings a wedging action takes place. The gasket 12 is tightly compressed between the conical surface 11 and the shell 18, and being formed of a soft metal it readily conforms to the surfaces engaging it, to effect a tight joint therebetween. The gasket 19 also undergoes a similar compression and effectually closes any passage that might otherwise exist between the body portion 20 and the shell 18. It should also be noted that since both of the gaskets are of soft material there will be a resulting tendency to diminish the liability of cracking or breaking of the porcelain stem when the nut is advanced, since the materials composing the gaskets will yield and give as pressure is applied.

It is very essential that all connections in a spark plug should be absolutely tight and

proof against short-circuiting. In my invention, the use of the gaskets, which are maintained in position by a wedging action, has produced a plug effectually gas-tight.

5 When an internal combustion engine is operated for any length of time, it is always the case that oil, grease, dirt, etc., comes in contact with the end of the spark plug inserted into the cylinder. This tends in

10 time to foul the insulating parts, and causes short-circuiting. The plug of the present invention has eliminated, as far as possible, all exposed portions which might be fouled. As a further protection, however,

15 to any exposed connections, I have provided the dish-shaped members mounted on the insulating stem, which members serve as shields against particles of oil, dirt, etc. It is to be understood that my invention is not

20 limited to the use of two shield members, as shown in the drawing, but a greater or less number may be employed, as desired. It is intended that the diameter of said shield members should be nearly as great

25 as the inside diameter of the porcelain shell, so that when the plug is assembled there will be practically no space left around the shield members. Should any matter be forced around the shields, however, it will

30 be mostly lodged within the hollow portions thereof and be prevented from dropping into the cylinder, to be thrown again and again at the exposed parts of the plug. In case the hollow portions of the shield mem-

35 bers should ever collect any appreciable amount of oil and matter, the same could be readily removed by taking the plug off the cylinder and cleaning the parts. It is thus seen that in my invention an effectual pro-

40 tection has been designed to prevent the fouling of the exposed parts of the spark plug, and that means have been provided to render it gas-tight.

It should be borne in mind that the shield members which have been described as

45 formed integral with the stem need not necessarily be so formed but may be made a separate part to be mounted on the stem. It would also serve the purpose of the present

50 invention fully as well to form said shield members as part of the shell 18, or forming them separately to have the same carried by said shell.

I claim:

55 1. A spark plug, comprising a body provided with a terminal at one end, the inner end of said body being hollowed to form a chamber therein, an insulating stem within said body provided with a bore, a conductor

60 within said bore, having its terminal end in close proximity to the aforesaid terminal, a shield-like member formed integral with said stem near the inner end thereof, an outwardly tapering portion on said stem, a

65 frusto-conical gasket adapted to lie over

said outwardly tapering portion, an insulating shell within the chamber formed in said body, adapted to bear against the outer surface of said frusto-conical gasket, a dish-shaped gasket between the body and said insulating shell, adapted to encircle said stem at the point where its outwardly tapering portion begins, and means for advancing the stem within the body to compress both of said gaskets, substantially as described. 70 75

2. A spark plug, comprising a body provided with a terminal at one end, the inner end of said body being hollowed to form a chamber therein, an insulating stem within said body provided with a bore, a conductor within said bore, having its terminal in close proximity to the aforesaid terminal, a shield-like member formed integral with said stem near the inner end thereof, a reduced portion in said stem, an outwardly tapering portion on said stem, a frusto-conical gasket adapted to lie over said outwardly tapering portion, an insulating shell within the chamber formed in said body, adapted to bear against the outer surface of said frusto-conical gasket, a dish-shaped gasket between the body and said insulating shell, adapted to encircle said stem at the point where its outwardly tapering portion begins, and means for advancing the stem within the body to compress both of said gaskets, said means comprising a locking member adapted to bear against the outer end of said body, and a sleeve member adapted to embrace the reduced portion of said stem, the said locking member also being in engagement with said sleeve member and adapted to move the same, whereby the stem is advanced within the body to compress both of said gaskets, substantially as described. 80 85 90 95 100 105

3. An insulating stem for a spark plug, having a concave shield-like member of insulating material adjacent the inner end thereof, the concave surface of said member facing the body of the plug, substantially as described. 110

4. A spark plug comprising a hollow body provided with a terminal at one end, an insulating stem within the body provided with a bore, a conductor within said bore having its terminal end in close proximity to the aforesaid terminal, and a concave shield-like member of insulating material adjacent the inner end of said plug, the concave surface of said member facing the body of the plug, substantially as described. 115 120

5. A spark plug comprising a hollow body provided with a terminal at one end, an insulating stem within the body provided with a bore, a conductor within said bore having its terminal end in close proximity to the aforesaid terminal, and a concave shield-like member of insulating material carried by said stem adjacent the inner end of said plug, the concave surface of said 125 130

member facing the body of the plug, substantially as described.

6. A spark plug comprising a hollow body provided with a terminal at one end, an insulating stem within the body provided with a bore, a conductor within said bore having its terminal end in close proximity to the aforesaid terminal, and a concave shield-like member formed integral with said stem near the inner end thereof, the concave surface of said member facing the body of the plug, substantially as described.

7. A spark plug comprising a hollow body portion provided with a terminal at one end, an insulating stem within the body provided with a bore, a conductor within said bore having its terminal end in close proximity to the aforesaid terminal, a concave shield-like member of insulating material adjacent the inner end of said plug, the concave surface of said member facing the body of the plug, a gasket between said stem and the body portion, and means for compressing said gasket therebetween to form a gas-tight connection, substantially as described.

8. A spark plug comprising a hollow body provided with a terminal at one end, an insulating stem within the body provided with a bore, a conductor within said bore having its terminal end in close proximity

to the aforesaid terminal, a concave shield-like member of insulating material carried by said stem adjacent the inner end of said plug, the concave surface of said member facing the body of the plug, a gasket between said stem and the body portion, and means for compressing said gasket therebetween to form a gas-tight connection, substantially as described.

9. In a spark plug, the combination with a body portion, an insulating stem provided with a reduced portion intermediate its ends, and packing adapted to form a tight connection between said body and stem, of means for placing said packing under compression, said means consisting of a fixed member secured to the stem in the reduced portion thereof, and held against longitudinal movement therealong, and a rotatable member in engagement therewith, the said rotatable member being adapted to bear against the body of the plug, and when rotated upon the said fixed member to advance the body of the plug with respect to the stem, whereby the packing therebetween is compressed, substantially as described.

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Witnesses:

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