March 8, 1927. 1,619,969

A. CHAMPION

SPARK PLUG

Filed March 30, 1925

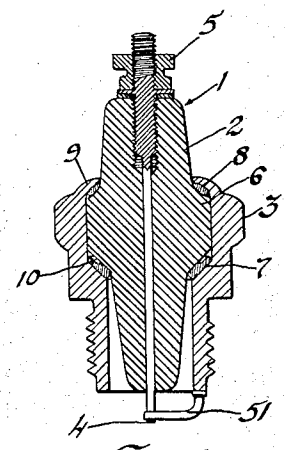


Fig. 1

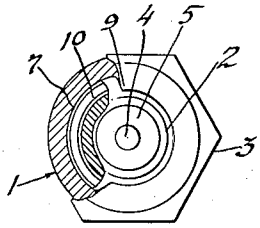


Fig. 2

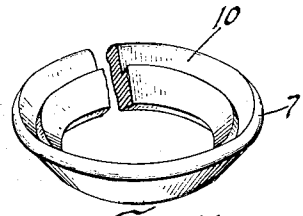


Fig. 3

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UNITED STATES PATENT OFFICE.

ALBERT CHAMPION, OF FLINT, MICHIGAN, ASSIGNOR TO A. C. SPARK PLUG COMPANY, OF FLINT, MICHIGAN, A CORPORATION OF MICHIGAN.

SPARK PLUG.

Application filed March 30, 1925. Serial No. 19,345.

This invention relates to improvements in spark plugs.

The object of the invention is to provide a sealing means for interposition between the insulator and the shell which will be simple in construction and highly effective in use. It is also an object of this invention to provide such a sealing means which will afford an effective path for the flow of heat away from the hottest portion of the insulator to to the shell for the purpose of maintaining the insulator at a sufficiently low temperature to insure long life to the plug.

These objects I have attained by the provision of a gasket of novel construction which is placed between the said insulator and shell, said gasket having a portion of reduced thickness out of contact with the insulator but contacting with the shell, thereby reducing the contact area between the insulator and gasket and, with a given pressure, increasing the pressure per unit area between these parts, thus insuring that the material of the gasket, which is preferably relatively easily deformed, is forced into intimate contact with the somewhat irregular surface of the insulator. By arranging the thickened portion of the said gasket at the side nearest the electrode end of the insulator, I have avoided any increase in the length of the thermal path between the hottest portion of the insulator and the shell, which latter through its engagement with the cylinder block provides a ready means for the diffusion of the heat of the insulator.

Other objects and advantages of my invention will be apparent from the following description taken in connection with the drawings, in which:

Figure 1 is a vertical sectional view showing my improved construction of spark plug;

Figure 2 is a top plan view of the said plug with portions broken away to better show the construction; and

Figure 3 is a perspective view partly in section of my improved gasket.

The reference character 1 indicates generally a spark plug of conventional type in which my improvement has been incorporated. The insulator is indicated by the reference character 2 while the shell is indicated by the reference character 3. Through the center of the insulator 2 passes the customary electrode 4, which projects into the combustion chamber and at its upper end is provided with a terminal 5 of any desired character for cooperation with the usual lead. The electrode 4 cooperates with the customary electrode 51, which is secured to the shell, to provide the desired spark. All these parts are of customary construction and form no part of my invention.

The insulator 2 is provided with the usual enlargement 6 which is received in the enlarged portion of the shell, gaskets 7 and 8 being interposed between the shell and the said insulator above and below said enlarged portion, the upper edge of the shell 3 being formed over as at 9 to clamp the parts in assembled relation.

My invention resides in the novel construction of the gasket 7. This gasket, which is made of material that is comparatively easily deformed,—I have found copper to be particularly adapted for the purpose,—is undercut on its upper surface as at 10, thus providing a portion of normal thickness which lies nearest the hot or electrode end of the insulator and a portion of reduced thickness. By this construction I have reduced the area of contact between the insulator and the gasket and, with a given pressure, have consequently increased the pressure per unit of contact area. By the provision of this increased pressure the material of which the gasket is composed is more effectively forced into intimate contact with the relatively rough surface of the insulator, thus effectively sealing this joint against the escape of gas. Attention has already been called to the fact that the thickened portion of the gasket lies nearest the hot or electrode end of the insulator, thus affording the shortest possible path for the conduction of heat away from the hottest portion of the insulator so that this portion may be maintained at a temperature which will insure long life to the plug.

It will be observed that the gasket has contact with the shell throughout the width of the seat, there being no undercutting on this side of the gasket. This construction is essential so that the gasket may be practically self centering and require no adjustment upon its seat.

Having described one embodiment of my invention for the purposes of illustration

only, what I desire to claim and secure by Letters Patent is:

1. A spark plug comprising an insulator and a shell, a one-piece gasket of deformable material interposed between the insulator and the shell comprising a portion of normal thickness adjacent the working end of the plug, and a portion of reduced thickness more remote from the working end of the plug and having contact with the interior of the shell but spaced from the insulator, means for clamping the insulator in the shell, the cross section of said gasket being substantially unaffected by the said clamping operation.

2. In a spark plug, the combination of an insulator having a shoulder, a shell having a seat for receiving the shoulder of the insulator, a one-piece gasket of deformable material interposed between the shoulder and the seat, said gasket substantially spanning the cross section of the shell so as to center the plug with reference to the shell, said gasket comprising a portion of normal thickness adjacent the working end of the plug and a portion of reduced thickness more remote from the working end of the plug and having contact with the interior of the shell but spaced from the insulator, means for clamping the insulator in the shell, the cross section of said gasket being substantially unaffected by the said clamping operation.

3. In the combination as defined in claim 2, the engaging surfaces of said seat, gasket, and shoulder being substantially frusto-conical.

In testimony whereof I affix my signature.

ALBERT CHAMPION.