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METHOD OF ASSEMBLING SPARK PLUGS

Filed March 19, 1928

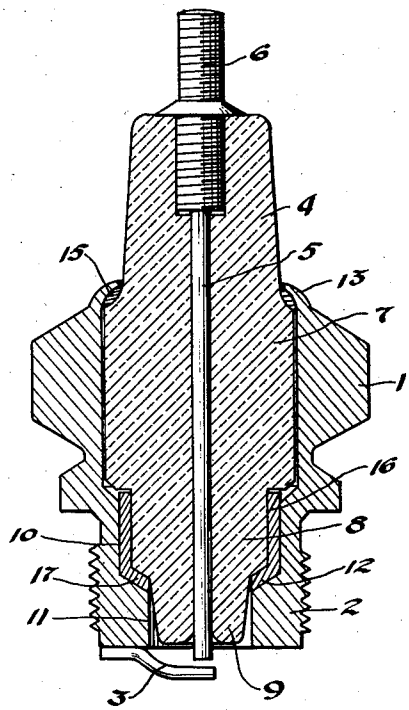


Fig. 1

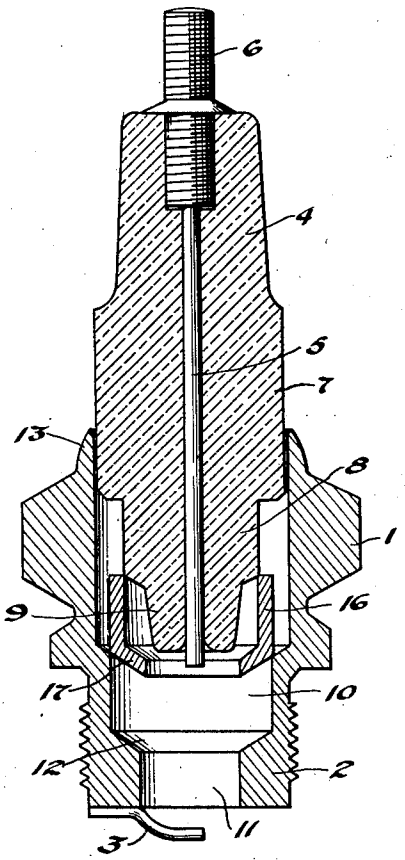


Fig. 2

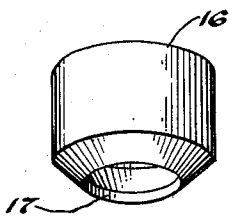


Fig. 3

Inventor

Hector Rabezzana

By Blackmore, Spencer & Fleischer

Attorneys

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HECTOR RABEZZANA, OF FLINT, MICHIGAN, ASSIGNOR TO A C SPARK PLUG COMPANY, OF FLINT, MICHIGAN, A COMPANY OF MICHIGAN

METHOD OF ASSEMBLING SPARK PLUGS

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This invention relates to spark plugs for internal combustion engines, and has for one of its objects to provide an improved gasket for sealing the space between the insulator core and shell against compression leakage.

A further object of the invention is to provide a spark plug gasket formed from material that is more or less ductile and which is adapted to be compressed between the adjacent portions of the core and shell in order that it may flow or spread to completely fill the intervening space and particularly that resulting from inequalities in manufacture.

A still further object of the invention is to provide a gasket of comparatively large surface area and one having high heat conductivity so as to assist in maintaining the insulator core cool by the rapid dissipation of the heat of combustion.

Other objects and advantages will be apparent from the following specification taken in connection with the accompanying drawings in which

Fig. 1 is a vertical sectional view of a spark plug embodying the present invention;

Fig. 2 is a vertical sectional view of the spark plug prior to the final assembling operation; and

Fig. 3 is a detail perspective view of the gasket.

Referring to the drawings, the numeral 1 indicates a shell of steel or other similar material having a screw threaded extension 2 for engagement within an opening in the cylinder head of an internal combustion engine and which carries at its lower end a wire or electrode 3. Located within an opening through the shell 1 is a cylindrical insulator core 4 of porcelain, quartz, or the like, having an electrode or conductor wire 5 extending through a central bore and terminating in spaced relation with the electrode 3 to form a spark gap. At the upper end of the electrode 5 there is provided a screw threaded stud 6 forming with a suitable nut a binding post for the attachment of a current conducting wire. The insulator core in the present instance is provided with an enlarged portion 7 and an extension 8 of reduced diameter terminating in a tapered end portion or tip 9. In a similar manner the opening through the shell 1 below that part in which is located the enlarged portion 7 of the core is of reduced diameter, as at 10, to receive the extension 8 and is of further reduced diameter at the lower end, as at 11, through which portion of the opening the tip 9 extends. A beveled or tapered shoulder 12 between the reduced portions 10 and 11 forms a seat or abutment for the insulator core, the core being held on its seat by the annular flange 13 at the upper end of the shell which is swaged over upon a gasket 15 after the assembly of the core in the shell. To seal the space between the core and shell against gas leakage there is provided a cupped gasket or bushing comprising an annular collar or band 16 having an inwardly and downwardly extending flange 17. By referring to Fig. 2 of the drawings, it will be noted that the interior diameter of the gasket is slightly less than the outside diameter of the extension 8 of the core, and that the exterior diameter of the gasket is slightly greater than the internal diameter of the opening through the shell at 10. In other words, the width of the gasket wall is somewhat greater than the space in which the gasket is to be positioned. It will be obvious therefore that when the core is forced down upon the seat 12 the fit of the gasket will be a tight one on both sides and the material thereof will be placed under compression completely filling the intervening space and affording a very tight seal.

By making the gasket of a ductile material, such as copper, the parts adjust themselves upon assembly and the compression of the gasket will permit the material to move or flow into the uneven or irregular spots that may occur in the surfaces of the core and shell, thus eliminating the necessity for extreme care and accuracy in manufacture. The use of copper has another advantage in that its coefficient of expansion is greater than would be the materials of either the core or shell, whereby under the heat of combustion the effectiveness of the seal is materially increased by the expansion of the gasket. The particular shape of the gasket affords a large surface for the dissipation of heat, which,

coupled with the fact that the heat conductivity of copper is high, insures a rapid cooling of the core, not only in its seat but also in the cylindrical portion.

It will be readily understood that the band 10 and in-turned flange 17 may be formed separate if desired. It will also be obvious that the outside diameter of the collar need not necessarily be greater than the inside diameter of the bore, for so long as the width of the wall of the collar is greater than the space between the core and shell the material of the collar will flow, and the outside diameter of the collar will grow so as to effect a tight seal. For the same reason the internal diameter of the band need not be smaller than the outside diameter of the core extension 8.

While only one specific embodiment of the invention has been illustrated and described, it is to be understood that the invention is not limited to the exact details, but that such modifications may be made as come within the scope of the appended claims.

I claim:

1. The method of assembling spark plugs consisting in providing a shell with an interior cylindrical bore, inserting in the bore a gasket of ductile metal whose outside diameter is initially greater than the diameter of the bore, and inserting in the gasket a cylindrical portion of an insulator core, whose diameter is greater than the initial inside diameter of the gasket, whereby the ductile metal is placed under pressure to tightly seal the space between adjacent surfaces of the shell and core.

2. The method of assembling a spark plug consisting in providing a shell with a cylindrical bore and concurrently inserting in the bore a cylindrical portion of an insulator core of smaller diameter than the bore to afford clearance space between adjacent surfaces of the shell and core, and a gasket of ductile metal whose initial wall thickness is greater than said space, whereby the ductile metal is deformed and molecularly compacted to tightly fit in the space to seal the same against leakage.

In testimony whereof I affix my signature.

HECTOR RABEZZANA.