Sept. 18, 1928. 1,685,059

C. B. BAILEY

SPARK PLUG GASKET

Filed Aug. 25, 1926

Fig. 5.

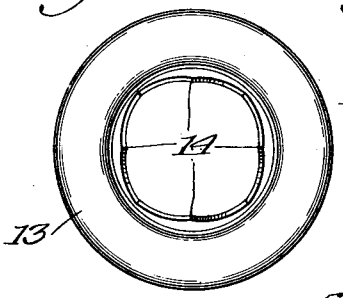


Fig. 1.

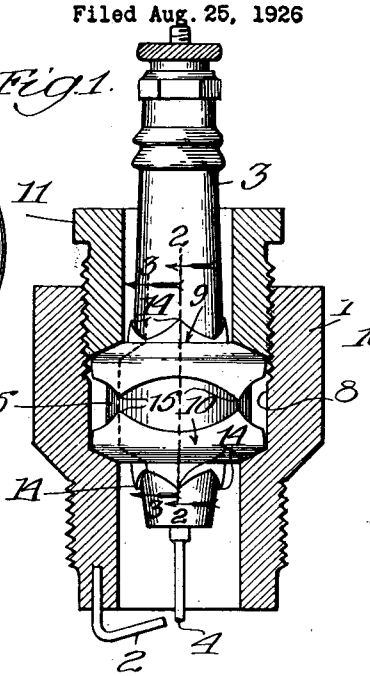


Fig. 6.

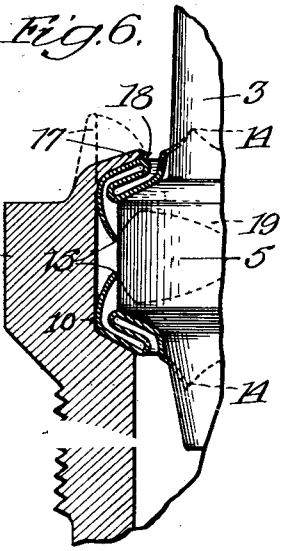


Fig. 2.

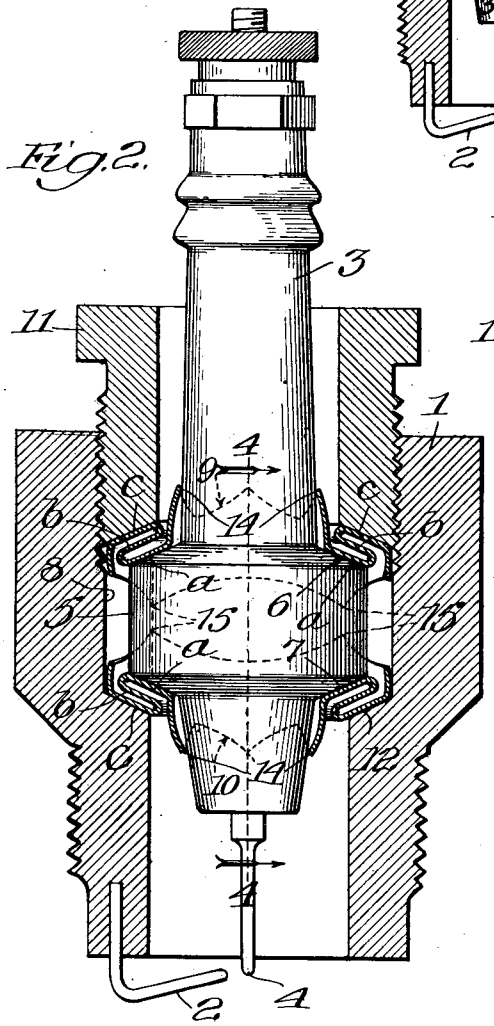


Fig. 3.

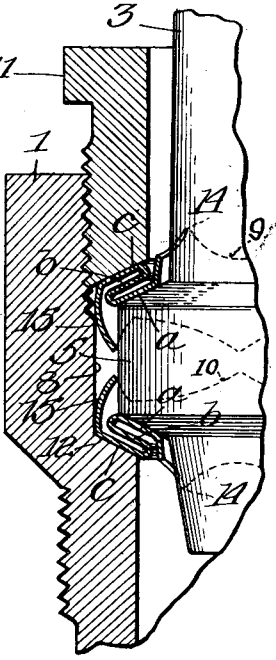
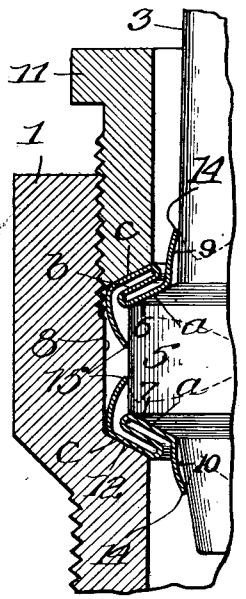


Fig. 4.



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UNITED STATES PATENT OFFICE.

CLAUDE B. BAILEY, OF WYANDOTTE, MICHIGAN.

SPARK-PLUG GASKET.

Application filed August 25, 1926. Serial No. 131,409.

This invention relates to spark plug gaskets such as are used inside the plug between the co-operating shoulders with which the core and bore of the shell are provided.

The main object of my invention is to make gaskets of this kind with sheet metal prongs so that the latter will adjust themselves to the portions of the core and shell bore which they resiliently engage irrespective of the varying diameters given to such parts during the course of manufacture, thereby enabling the gaskets to center themselves on the core and to center the cores in the shell bores with their axes coincident so that the clamping pressures on the cores will be evenly distributed all around to avoid breaking or cracking the cores on clamping them in the shell bores.

The invention consists further in the matters hereinafter described and claimed.

In the accompanying drawings—

Fig. 1 is a vertical sectional view through a spark plug equipped with top and bottom gaskets constructed in accordance with my invention, the core of the plug and the gaskets being shown in elevation.

Figs. 2 and 3 are enlarged vertical sectional views taken through the plug at the gaskets on lines 2—2 and 3—3 respectively, of Fig. 1;

Fig. 4 is a similar sectional view taken on the indirect line 4—4 of Fig. 2;

Fig. 5 is a top plane view of one of my improved gaskets; and

Fig. 6 is a vertical sectional view showing the form of the top gasket when used with a plug without a follower nut.

In Fig. 1 a spark plug of conventional design is shown. The plug has the usual outside metal body or shell 1 with a threaded lower end for screwing into the spark plug opening in a cylinder block. The shell carries an electrode 2 at its lower end. A porcelain or like core 3 is inserted in the shell through its upper end and carries a centrally disposed electrode 4, as customary. The core has an enlargement 5 between its ends, forming upper and lower shoulders 6, 7, respectively. The upper portion 8 of the bore of the shell 1 is enlarged to accommodate the enlargement 5 of the core.

Gaskets 9 and 10 encircle the core about the shoulders 6, 7, and these gasket are made in accordance with my invention. The top gasket 9 receives the thrust of the follower nut 11, and the bottom gasket 10 rests on the internal shoulder 12 at the lower end of the enlarged portion 8 of the shell bore to receive the thrust of the lower shoulder 7 of the core.

The gaskets 9 and 10 are shown in section in Figs. 2 and 3, and are similar in shape and construction. Each gasket is made entirely of sheet metal and from a single piece of that material, copper being preferred. Each gasket has an annular pressure receiving portion 13 entirely surrounding the gasket and disposed generally transverse to the longitudinal axis of the gasket so as to be clamped between the parts with which the gasket is used to make a gas tight joint. The blank from which the gasket is made is bent or folded to provide the pressure receiving portion 13 with a plurality of superimposed layers *a*, *b*, and *c*, integrally joined by the folds in the metal between them. These layers are slightly spaced apart and under tension so as to yield under clamping pressure and thus provide the resiliency required as a cushion for a gasket of this kind. Being entirely of sheet metal, the asbestos or like cushions in conjunction with the metal as heretofore generally employed are avoided, and gas-tight joints are provided by metal alone when under clamping pressure.

Each gasket has two sets of prongs 14, 15 at the inner and outer edges, respectively, of its pressure receiving portion 13 and formed integral therewith. The prongs extend axially of the gasket on opposite sides of its portion 13 and are spaced apart circumferentially about the same, as shown. The spacing of both sets of prongs may be the same, or one set may be in staggered or offset relation with respect to the other set as shown. In the particular gaskets shown, the prongs 14 are formed integral with the innermost layer *a* of the portion 13, while the prongs 15 are integral with the outermost layer *c* of said portion.

The prongs 14 are designed to engage the core 3 at or adjacent their outer or tip ends only, said tip ends being bent inward so as to have a normal diameter slightly less than the diameter of the portion of the core to be engaged thereby and thus causing the prongs to be flexed slightly outward on being forced over the core so as to be under tension and have a spring grip on the core. The remaining portions of the prongs follow the general taper of the core at the same but are out of contact therewith so that the prongs may

yield to grip the core at their outer or tip ends.

The prongs 15 are bowed outwardly in the direction of their lengths so that portions of these prongs between their ends may have a normal diameter slightly greater than the diameter of the enlarged portion 8 of the shell bore. The outer or tip ends of the prongs 15 have a diameter slightly greater than the diameter of the enlarged part 5 of the core so as to readily slip over the same on assembly.

When assembled, the annular portion 13 of the top gasket 9 is clamped by the follower nut 11 between the lower end of the nut and the upper shoulder 6 of the core 3, while the similar portion 13 of the bottom gasket 10 is clamped through the medium of said nut between the lower shoulder 7 of the core and the shoulder 12 in the shell bore. The prongs 14 of both gaskets grip the core on opposite sides of its enlarged part 5 and center the gaskets on the core while the prongs 15 of both gaskets are in the enlarged portion 8 of the shell bore and engage the wall of the same at points between the ends of said prongs as shown in Figs. 2 to 4. As such portions of the prongs 15 are normally slightly larger in diameter than the portion 8 of the shell bore, the prongs will be contracted slightly on being inserted in the shell bore and be under tension to resiliently engage the shell bore for centering the core therein with its longitudinal axis coinciding with that of the shell bore. Thus, the clamping pressure of the follower nut 11 on the core through its shoulders 6, 7 will be evenly distributed all around and breaking or cracking of the fragile core 3 when clamped in the shell bore prevented which is not the case with the gaskets heretofore generally employed.

The outer ends of the prongs 15 have a normal diameter less than that of the enlarged portion 8 of the shell bore. This permits the prongs 15 to be inserted into the shell bore without their outer ends striking or catching in the screw threads in the bore, the bowed or rounded portions of the prongs readily slipping over said threads. With the crowned portions of the prongs 15 contracting on being inserted into the part 8 of the bore, the outer ends of the prongs will be forced into engagement with the core to aid in centering it in the shell bore.

With the prongs 14, 15 resilient or flexible and having the diameters stated they will grip the core and shell bore, respectively, irrespective of the variations in diameters of these parts in plugs of the sizes for which the gaskets are made. Thus, while the diameters of the cores and shell bores may vary during the process of manufacture, the resilient prongs on the gaskets will make up or adjust themselves to these differences and center each core in its shell bore regardless of what the variations may be from the standard dimensions. Moreover, with the prongs 14 gripping the cores irrespective of variations in diameters, the gaskets may be applied to the cores and the latter handled without fear of the gaskets dropping off.

While I have heretofore stated that the top and bottom gaskets 9 and 10 are the same in shape and construction, it does not follow that they must be the same in size. One may be larger than the other if the type of plug for which they are made requires gaskets of different sizes.

In Fig. 6 I have shown a plug of the type that does not employ a follower nut. It will be observed that the shell 16 has a flange 17 surrounding its upper end. This flange is spun over against the top gasket 18 to clamp it against the upper shoulder of the core 19. The top gasket may be devoid of the prongs 14 so as not to interfere with the clamping action of the flange 17 if necessary. The bottom gasket is clamped between the lower shoulder of the core and the lower shoulder within the shell bore as before, such parts being shown in Fig. 6. In both forms of plugs, the core and the shell bore having cooperating upper and lower shoulders. In Figs. 1 to 4, the upper shoulder of the shell bore is formed by the lower end of the follower nut 11. In Fig. 6, the upper shoulder of the shell is formed by the flange 17 when turned inward. To strengthen the prongs 14, 15 they may be relatively long across their bases and at such points extend from one to the other, as shown.

The details of structure shown and described may be variously changed and modified without departing from the spirit and scope of my invention.

I claim as my invention:—

1. A spark plug gasket made of sheet metal and having an annular pressure receiving portion and a plurality of resilient prongs connected with and spaced apart about said pressure receiving portion, said prongs projecting axially of the gasket on opposite sides thereof from the inner and outer edges, respectively, of said pressure receiving portion.

2. A spark plug gasket made from a single piece of sheet metal folded to provide a pressure receiving portion of a plurality of superposed layers and a plurality of resilient prongs connected with and projecting axially of the gasket from one side of said pressure receiving portion.

3. A spark plug gasket made from a single piece of sheet metal folded to provide an annular pressure receiving portion of a plurality of superposed layers and a plurality of resilient prongs connected with and extending axially of the gasket on opposite sides of said pressure receiving portion from the respective inner and outer edges thereof.

4. In a spark plug, the combination with a

core and a shell having upper and lower co-operating shoulders, of sheet metal gaskets surrounding the core at said shoulders and having annular pressure receiving portions to be clamped therebetween, said gaskets having a plurality of resilient prongs projecting axially of the core from their respective pressure receiving portions and disposed to resiliently engage the core and the wall of the shell bore, respectively, for centering the gaskets on the core and the latter in the shell bore with their axes coincident.

5. A spark plug gasket made of sheet metal and having an annular pressure receiving portion disposed at an angle to the axis of the gasket, and a plurality of resilient prongs directly connected with and spaced apart about said pressure receiving portion, said prongs projecting axially of the gasket from at least one of the edges of said pressure receiving portion.

6. In a spark plug, the combination with a core and a shell having co-operating shoulders, of a sheet metal gasket surrounding the core and having an annular pressure receiving portion to be clamped between said shoulders, and a plurality of resilient prongs directly connected with and spaced apart about said pressure receiving portion, said prongs projecting axially of the gasket from the inner edge of its pressure receiving portion with the outer ends of the prongs resiliently gripping the core for centering the gasket thereon, said prongs having their outer ends bent inward so as to have a normal diameter slightly less than the portion of the core to be engaged thereby.

7. In a spark plug, the combination with a core and a shell having co-operating shoulders, of a sheet metal gasket surrounding the core and having an annular pressure receiving portion to be clamped between said shoulders, and a plurality of resilient prongs directly connected with and spaced apart about said pressure receiving portion, said prongs projecting axially of the gasket from the outer edge of said pressure receiving portion and bowed outward so as to engage the shell for centering the core therein.

8. In a spark plug, the combination with a core and a shell having co-operating shoulders, of a sheet metal gasket surrounding the core and having an annular pressure receiving portion to be clamped between said shoulders, and a plurality of resilient prongs connected with and spaced apart about said pressure receiving portion, said prongs projecting axially of the gasket on opposite sides of said pressure receiving portion from the inner and outer edges thereof and resiliently engaging the core and interior of the shell, respectively, for centering the gasket on the core and the latter in the shell.

In testimony whereof I affix my signature this 12 day of Aug., 1926.

CLAUDE B. BAILEY.