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2,375,822

SPARK PLUG CONSTRUCTION

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FIG. 1

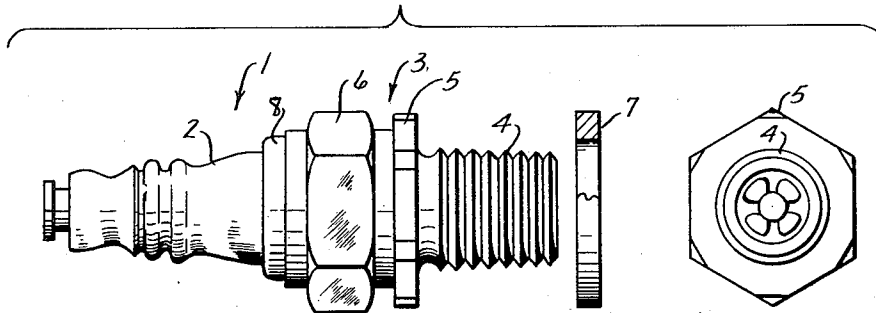


FIG. 2

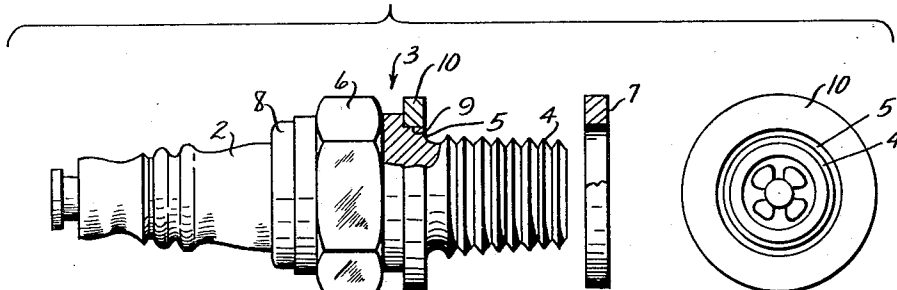


FIG. 3

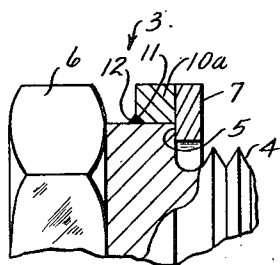
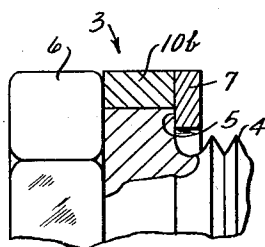


FIG. 4



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SPARK PLUG CONSTRUCTION

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4 Claims. (Cl. 123—169)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to improvements in spark plug construction whereby it becomes possible to modify a standard automotive type spark plug construction to render the same applicable to the construction of shielded or unshielded spark plugs for aircraft engine ignition and thereby effect a considerable saving in cost.

The plug bodies of aircraft type spark plugs differ from those employed in automotive practice mainly in that aircraft plug bodies are formed with a larger diameter gasket seat to effect a proper seal to prevent leakage at the higher compression pressures employed in aircraft engine cylinders. Since it is not possible to form the plug body directly from hexagonal bar stock to give the requisite gasket seat diameter without also increasing the dimensions of the hexagonal portion of the plug body where a wrench is applied beyond standard dimensions, it has been the practice to form the plug bodies of round bar stock and then mill the hexagonal portions of the plug body, which materially increases the cost of manufacture.

In accordance with the present invention and constituting its primary object, the spark plug body is formed from hexagonal bar stock in a manner similar to the formation of an automotive plug body but is so machined that a separate ring may be pressed, shrunk, brazed, or welded thereon to give the necessary gasket seat diameter.

The features of novelty of the invention will be further apparent by reference to the detailed description hereinafter given and to the appended drawing, in which

Figure 1 illustrates a conventional automotive type of spark plug;

Figure 2 illustrates one form of a plug similar to that of Figure 1, modified in accordance with the invention;

Figure 3 is a fragmentary view of a portion of the plug body of Figure 2 showing a further embodiment of the invention;

Figure 4 is a view similar to Figure 3 illustrating another variation of the invention.

In the appended drawing, Figure 1 illustrates a conventional spark plug 1 which may be obtained at low cost, having the insulator 2 mounted in a metal body 3 having a threaded portion 4 which is screwed into the engine spark plug

aperture, and having a hexagonal portion 5 which serves as a gasket seat for a conventional gasket ring of soft copper 7. The body 3 is provided with a hexagonal portion 6 to which a tightening wrench is applied and a crimped over portion 8 which locks the insulator 2 within the body 1. In order to keep the cost of manufacture low, the body 3 is turned from hexagon bar stock which, of course, leaves the gasket seat portion 5 with a hexagonal periphery. When plugs of this type are employed on aircraft engines the clamping pressure exerted by the seat 5 on the soft gasket ring 7 causes indentations at the corners of the hexagonal sides of the seat 5, and after the plug has been removed and replaced a few times the gasket becomes chewed and distorted and will no longer properly seal, requiring renewal of the gasket, which is frequently overlooked by mechanics. If the gasket section 5 were turned to a circular form, the diameter of the gasket would be inadequate to properly distribute the sealing pressure, and the gasket seat would tend to indent the gasket; and if the body of the plug were formed by turning and milling so as to give a circular gasket seat of the requisite diameter, the cost of manufacture would be greatly increased and production would be limited due to increased machining time.

In accordance with the invention, the problem of forming a gasket seat which will not damage the plug gasket and still allow the plug body to be formed from hexagon bar stock on a screw machine is illustrated in one form in Figure 2 in which the hexagonal periphery of the gasket seat portion 5 of the plug body 3 is turned down to form a shoulder 9, onto which is pressed an annular ring or washer 10 which has its front face flush with the face of the remaining portion of the gasket seat 5. This construction gives a larger gasket seat area, and the circular contour of the ring 10 eliminates any damage to the sealing gasket when the plug is placed in an engine, and permits the plug to be removed any number of times without requiring replacement of the sealing gasket.

Figure 3 illustrates to an enlarged scale a modified construction in which the projecting portion of the gasket seat 5 is turned off flush with the plug body and an annular ring 10a placed thereon with a light push fit so that the front face of the ring 10a is flush with the face of the gasket seat 5. The rear face of the annular ring 10a is chamfered as at 11 and this chamfer is filled with brazing metal 12 which may be applied in paste form and melted in a hydrogen atmosphere fur-

nace at the same time the plug body electrodes are brazed in place. This construction has the same advantages as above described with reference to Figure 2.

Figure 4 illustrates a further modification which is similar to the device of Figure 2 except that the projecting portions of the gasket seat 5 are left off and the annular ring 10b is made of a sufficient length to abut the hexagonal portion 6 of the plug body. The ring 10b may be pressed or shrunk on the plug body 3 and also may be brazed in the manner illustrated in Figure 3.

While the invention is shown as applied to unshielded spark plugs, the invention is similarly applicable to shielded spark plugs having a tubular shielding extension formed as an integral part of the plug body and this will allow the shielded plug body to be made from hexagon bar stock as distinct from the present procedure of forming the plug body from round bar stock and milling the hexagon shape for application of the wrench.

While preferred forms of the invention have been illustrated and described, other modifications and variations thereof will become apparent to those skilled in the art as coming within the scope of the invention as defined in the appended claims.

I claim:

1. In a spark plug construction of the character wherein the plug body is made from hexagonal metal bar stock and has a hexagonal portion for the application of a tightening wrench and a portion joining said hexagonal portion having an end face forming a sealing gasket seat: the

improvement which comprises providing a circular shoulder on said gasket seat portion concentric with the axis of the plug body and an annular ring secured on said shoulder and extending radially beyond said gasket seat portion, an end face of said ring forming a continuation of said gasket seat face.

2. In a spark plug construction of the character wherein the hollow plug body is made of hexagonal metal bar stock and provided with a threaded portion for insertion in an engine cylinder, a hexagon portion for application of a wrench and a third portion intermediate said first named portions, said third portion having a radially extending end face forming a gasket seat: the improvement which comprises securing an annular ring on said plug body portion concentric with the longitudinal axis of said plug body, said ring having an outside diameter greater than the diameter of said third portion and having an end face forming a continuation of the gasket seat face of said plug body third portion.

3. The structure as claimed in claim 2, in which the plug body third portion is cylindrical, said ring being seated on the said cylindrical portion of the plug body and an end face of the ring being flush with the gasket seat face of the said third portion of the plug body.

4. The structure as claimed in claim 2, in which said annular ring is secured to the plug body in a manner to form a permanent assembly therewith.

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