July 24, 1962 M. O. CAMPBELL 3,046,435

SPARK PLUG

Filed March 30, 1960

Fig. 1

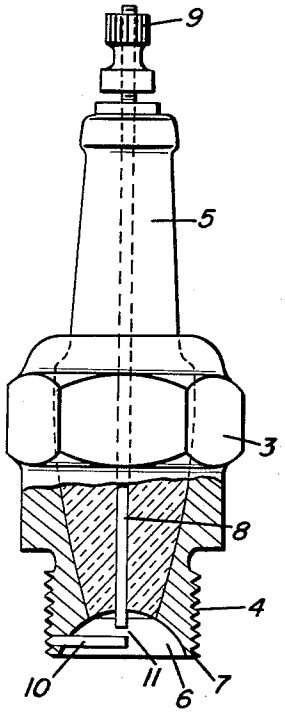
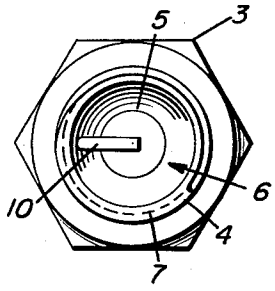


Fig. 2



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SPARK PLUG

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This invention relates to new and useful improvements in spark plugs particularly, although not necessarily, for high compression and heavy duty internal combustion engines and has for its primary object to provide, in a manner as hereinafter set forth, a device of this character comprising a true parabolic indentation or chamber with the gap at the focus thereof whereby substantially all of the exploding gas will be reflected directly outwardly into the firing chamber for positively and instantly igniting the charge.

Another important object of the present invention is to provide an improved spark plug of the character described wherein the electrodes are closely adjacent to the engine coolant for insuring relatively cool operation at all times.

Still another important object of the invention is to provide a spark plug of the aforementioned character comprising a smooth parabolic chamber which will remain clean and from which carbon particles will be swept with each explosion, thus preventing fouling and insuring long, trouble-free life.

Other objects of the invention are to provide an improved spark plug of the character set forth which will be comparatively simple in construction, strong, durable, compact and which may be manufactured at low cost.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a view in elevation of an improved spark plug constructed in accordance with the present invention with the lower portion thereof broken away in section; and

FIGURE 2 is a bottom plan view of the spark plug.

Referring now to the drawing in detail, it will be seen that the embodiment of the invention which has been illustrated comprises a casing or shell **3** of steel or other suitable metal. The shell **3** includes an externally threaded lower or forward end portion **4** for screwing the plug into an engine in the usual manner. Fixed and seated in the shell **3** in direct contact therewith is a core **5** of porcelain or other suitable electricity insulating material.

The lower end portion **4** of the shell **3** and the core **5** have formed therein a true, smooth parabolic indentation, recess or chamber **6**. The chamber **6** extends closely adjacent to the threaded periphery **4** of the shell **3** for leaving only a relatively thin or narrow lip **7** at this point.

Extending centrally through the core **5** and projecting therefrom into the chamber **6** is an inner electrode **8**. The inner electrode **8** is provided on its upper end portion with suitable means **9** for connecting an ignition wire to the plug. Fixed in the lower portion **4** of the shell **3**, adjacent the lower end or lip **7** thereof and projecting radially into the chamber **6** is an outer or ground electrode **10**. The inner end portion of the electrode **10** traverses the adjacent end of the electrode **8** in spaced relation thereto for providing a spark gap **11**.

It is thought that the manner in which the plug functions will be readily apparent from a consideration of the foregoing. As shown in FIGURE 1 of the drawing, the gap **11** is at the focus of the parabolic chamber **6**. Thus, when ignition occurs substantially all of the exploding gas will be focused directly into the chamber for insuring complete, instant combustion. The smooth, uniform surface of the chamber **6** resists the accumulation of carbon and consequent fouling. The construction and arrangement is such that the plug stays relatively cool. However, the adjacent end portions or points of the electrodes **8** and **10**, being at the focal point of the parabola **6**, become and remain hot thus further insuring maximum efficiency.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A spark plug comprising an externally threaded metallic shell, an insulating core mounted in said shell, said core and said shell having in one end thereof registering recesses shaped to provide a single smooth, true parabolic chamber having a continuous, unbroken, self-cleaning reflecting surface and further having its periphery closely adjacent the periphery of the shell for resisting the accumulation of carbon on said one end of said shell and for the rapid dissipation of heat therefrom, an inner electrode mounted in the core, and an outer electrode mounted in the shell, said electrodes projecting into the parabolic chamber, the free end portion of the outer electrode traversing the free end of the inner electrode in spaced relation thereto and providing a spark gap therebetween within the confines of and at the focal point of the parabolic chamber for receiving substantially continuous reflected heat therefrom for heating the points of said electrodes for improved firing efficiency.

2. A spark plug comprising an externally threaded metallic shell, an insulating core mounted in said shell, said core and said shell having in one end thereof registering recesses shaped to provide a single smooth, true parabolic chamber having a continuous, unbroken, self-cleaning reflecting surface and further having its periphery closely adjacent the periphery of the shell for resisting the accumulation of carbon on said one end of said shell and for the rapid dissipation of heat therefrom, an inner electrode mounted in the core, and an outer electrode mounted in the shell, said electrodes projecting into the parabolic chamber, the free end portion of the outer electrode traversing the free end of the inner electrode in spaced relation thereto and providing a spark gap therebetween within the confines of and at the focal point of the parabolic chamber for receiving substantially continuous reflected heat therefrom for heating the points of said electrodes for improving firing efficiency, said insulating core being seatingly engaged in the shell in positive contact therewith for the direct transmission of heat thereto and for preventing the entrance of carbon from the chamber therebetween.

3. A spark plug in accordance with claim 2, said inner electrode being embedded in the core for preventing the entrance of carbon therebetween.

References Cited in the file of this patent

UNITED STATES PATENTS

893,955	Van Woert	July 21, 1908
1,291,122	Plunkett	Jan. 14, 1919
1,512,319	Stuver	Oct. 21, 1924
1,526,054	Curran	Feb. 10, 1925
2,687,713	Wright et al.	Aug. 31, 1954