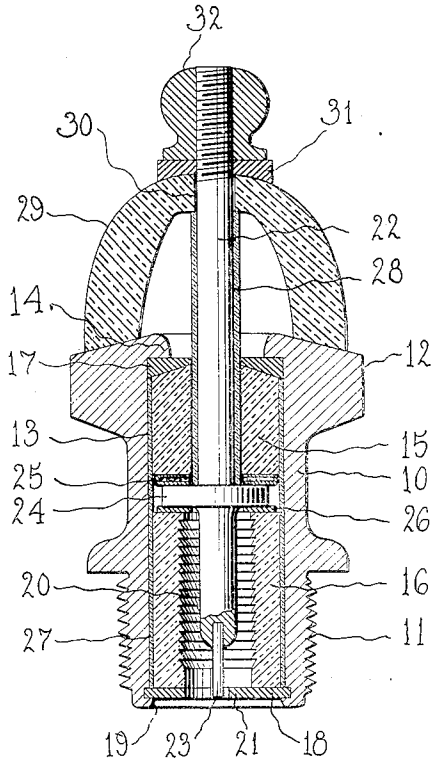
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A. SCHMIDT

SPARK PLUG

Filed Sept. 25, 1918



WITNESS:
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UNITED STATES PATENT OFFICE.

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SPARK PLUG.

Application filed September 25, 1918. Serial No. 255,578.

To all whom it may concern:

Be it known that I, ALBERT SCHMIDT, a citizen of the United States, and resident of Flint, Genesee County, State of Michigan, have invented certain new and useful Improvements in Spark Plugs, of which the following is a specification.

The invention relates to improvements in spark plugs as described in the present specification and illustrated in the accompanying drawing that forms part thereof.

One of the objects of the invention is to devise a spark plug of simple and durable construction capable of withstanding intense heat.

Another object of the invention is to form the insulator elements of the plug whereby they will be of simple and regular form of substantially tubular shape.

Another object of the invention is to arrange the insulator members within the shell of a spark plug whereby a maximum clamping pressure may be used to assemble the various parts within the shell without likelihood of fracturing the insulator elements.

Another object of the invention is to provide a spark plug having an insulator element about the sparking electrode which will remain clear of carbon deposits.

Another object of the invention is to devise a spark plug in which the several parts contained in the interior thereof will be securely held in place by metal end plates and will be effective as insulators and properly retained in position even though parts thereof may become cracked through excessive heat or shock.

These and other objects will more clearly appear from the following description taken in connection with the accompanying drawing, which forms a part of this specification.

The accompanying drawing is a vertical sectional view of the spark plug.

Referring to the drawing, 10 is the shell of the spark plug which may be made with any desired exterior surface finish and having the customary threaded lower end 11 and the enlarged upper end 12 formed to receive a suitable wrench. The shell 10 has the center bore 13 of even diameter from end to end and the inturned upper portion 14 extending around the interior periphery of said center bore 13 at the upper end thereof.

The bore of the shell 10 is fitted with the tubular insulator elements 15 and 16, the tubular element 15 having the end plate 17 next the inturned flange 14 of the shell and the tubular member 16 having the end plate 18 at the lower end thereof and next the inturned circumferential flange 19 of the shell whereby the insulators are clamped within the shell and support the central electrode as hereinafter described.

It must be noted that the lower insulator 16 has a somewhat larger interior bore than the insulator 15, and is further circumferentially ridged as at 20 throughout the length thereof. It must also be noted that the end plate 18 has one portion thereof, as at 21, extending inwardly of the center orifice to adjacent the center of the spark plug, forming one sparking terminal of the plug.

A central sparking electrode 22 is arranged within the shell, said electrode having the reduced lower end 23 forming a sparking terminal to co-act with the sparking terminal 21, and the circumferential flange portion 24 fitting between the adjacent ends of the insulators 15 and 16, suitable washers or gaskets 25 and 26 being arranged on either side of the flange 24 and the ends of the insulators 15 and 16, whereby the insulators, as hereinbefore referred to, with the central electrode 22, are all firmly clamped within the shell of the spark plug.

A lining is provided in the shell about the insulators, the same comprising the tube of mica 27 extending throughout the length of the center bore of the shell between the end clamping plates 17 and 18, and a further tube of mica 28 is arranged about the central electrode and extends from the flange 24 thereof upwardly through the insulator 15 and some distance beyond the upper end of the shell.

A dome member 29 of insulating material is arranged over the top of the shell, said dome member having a central orifice 30 through which the central electrode extends, the electrode having a washer 31 arranged on the end thereof and bearing against the dome member 29 and a terminal nut 32 threaded on the extreme end thereof and forcing the washer 31 firmly against the dome member, whereby said dome member is securely held in position on the shell, and further, whereby the upper end of the cen-

tral electrode is firmly supported and protected.

It will be understood from the foregoing description that the tubular mica lining of the shell and the tubular covering of the central electrode will form an effective insulation between the electrode and the shell, and further, that the mica where used is not exposed to the hot gases of the motor which are about and may enter the open lower sparking end of the spark plug, but are protected, the tube 27 being protected by the tubular insulator 16, preferably made of porcelain, and the tube 28 being of course beyond the reach of the heated gases.

It must also be noted that the upper insulating element 15, as also the lower insulating element 16, are so formed and arranged within the shell that they will stand a maximum clamping pressure when the plug is being assembled, and though the plug shell has been described as having inturned flanged ends, it must be understood that any threaded end piece such as commonly used in what is termed two-piece plugs may be used for the purpose of clamping the several elements of the spark plug together without departing from the spirit of my invention, one of the features of which is the arrangement of insulator element whereby the extreme clamping pressure can be applied thereto for assembly purposes without liability of fracture of the parts, as the mica lining members are practically the important insulating elements and the porcelain elements 15 and 16 are practically filler and protective elements. The element 16 further being internally ribbed or ridged as described, not only forms a facing for the mica lining 27, whereby the intense heat of the combustion gases is prevented from in any manner affecting and therefore deteriorating the mica lining, but the said ridges will become so heated that any carbon deposit thereon will be burnt off, thus preventing the plug from short-circuiting.

The dome member 29 may be of any desired construction, and is used in combination with the upwardly extending mica tube 28 to protect the same where it forms an insulation about the upper part of the central electrode.

In general, it may be stated that the plug has efficiently arranged the mica tubes which are easily made and placed in position in the straight bore and around the straight portion of the central electrode, and are most effective as insulators, always providing they are not subjected to the deteriorating effects of the heated gases, and this is accomplished by the arrangement of porcelain insulator elements as described.

It will also be understood that if by any chance the lower insulator element should become fractured or cracked and broken to quite a degree, the parts will still be held in proper position within the shell, not only to protect the mica sleeve 27 but to obviate the trouble incidental to the motor operation should any parts of the insulator become broken off and fall into the combustion chamber of the motor.

It will be obvious to those skilled in the art that many modifications and changes may be made without departing from the scope of the invention.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. A spark plug comprising an external shell or casing, tubular insulators located within said shell and permanently secured in place therein, a central electrode supported between the inner adjacent ends of said tubular insulators and extending above the upper end of said shell, an insulator surrounding the upper end of said electrode, a dome surrounding the upper end of said electrode and said last mentioned insulator and the lower end of which abuts against the upper end of said shell or casing, and which dome is provided with a central hole through which said electrode extends, and a nut in engagement with the upper end of said electrode and which nut acts to hold said dome in place.

2. A spark plug comprising an external shell or casing, two tubular insulators located within said shell and permanently secured in place therein, a central electrode having a flange intermediate its ends and which flange lies between said tubular insulators, and the upper end of which electrode extends beyond the upper end of said shell, a dome surrounding the upper end of said electrode, and the lower end of which abuts against the upper end of said shell and is provided with a hole through which said electrode extends, and a nut upon the upper end of said electrode whereby said dome is held in place.

3. A spark plug comprising an external shell or casing, two tubular insulators located within said shell or casing, a central electrode having a flange intermediate its ends and which flange is located between said tubular insulators, and which electrode extends above the upper end of said shell or casing, an insulator surrounding the upper end of said electrode, a dome located above the upper end of said shell or casing and surrounding said last mentioned insulator, and means for holding said dome in assembled relation with said external shell or casing.

4. A spark plug comprising a shell, a pair of tubular insulator elements lining said shell, end plates for said insulators and against which parts of said shell abut to

clamp said plates and insulators, and an electrode having a flange intermediate the length thereof clamped between said insulators.

5. A spark plug comprising a shell, a pair of tubular insulator elements lining said shell, end plates for said insulators and against which parts of said shell abut to clamp said plates and insulators, an electrode having a flange intermediate the length thereof clamped between said insulators, and mica tubes fitting said electrode and the interior of said shell.

6. A spark plug comprising a shell, a mica lining, a tubular insulator, an electrode centrally supported in said insulator and projecting thereabove beyond one end of said shell, and a mica tube about the upper end of said electrode.

7. A spark plug comprising a shell, a mica lining, a tubular insulator, an electrode centrally supported in said insulator and projecting thereabove beyond one end of said shell, a mica tube about the upper end of said electrode, a dome member fitting the upper end of said shell and having a central orifice through which said electrode extends, and a terminal member on said electrode and contacting with said dome member.

8. A spark plug comprising a shell, a tubular insulating member lining said shell and having a ridged inner periphery, and an electrode centrally supported in said shell and spaced from the inner periphery of said insulator.

9. A spark plug comprising a shell, a tubular insulating member lining said shell and having the inner periphery thereof formed with annular ridges with a comparatively sharp edge, and an electrode centrally supported in said shell and spaced from the inner periphery of said insulator.

10. A spark plug comprising a shell having inturned upper and lower ends, a pair of tubular insulators having metal end plates clamped between the inturned ends of said shell, a central electrode having a flange formed intermediate the length thereof and clamped between said insulators, a tube of mica between said insulators and said shell and a tube of mica around the upper end of said electrode.

11. A spark plug comprising a shell having a cylindrical central bore of even diameter throughout, a mica tube lining said shell, two tubular porcelain insulators the peripheral surface of which contacts with said mica on the interior thereof, and an electrode centrally supported in said shell and extending through said porcelain insulators, and which electrode is provided with a centrally located projecting flange which lies between the inner ends of said porcelain insulators.

12. A spark plug comprising a shell having a central bore extending therethrough, and a tubular mica lining in said bore, an electrode centrally supported in said shell, and an insulator element surrounding and spaced apart from the inner end of said electrode and the periphery of which contacts with the interior of said mica to thereby protect the same from the heat gases about the lower sparking end of the plug.

13. A spark plug comprising a shell having a tubular insulating lining, an electrode centrally supported in said shell, and an insulator between said electrode and said tubular insulator lining and in contact with said lining throughout the entire length of said insulator.

14. In a spark plug, an insulation of high insulating quality and relatively low heat resisting qualities, and a facing for said insulator of high heat resisting qualities and comparatively low insulating qualities.

15. In a spark plug a tubular insulating member of relatively high heat insulating and relatively low heat resisting qualities, and a second insulating member of relatively high heat resisting and relatively low insulating qualities located within and acting to protect the inner surface of said first mentioned insulating member.

In testimony whereof I affix my signature.

ALBERT SCHMIDT.