May 22, 1923.

1,455,852

D F. PYLE ET AL

SPARK PLUG

Filed Oct. 27, 1921

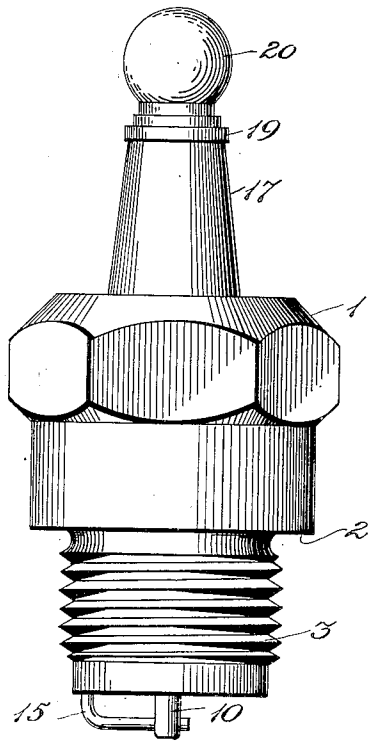


Fig. 1.

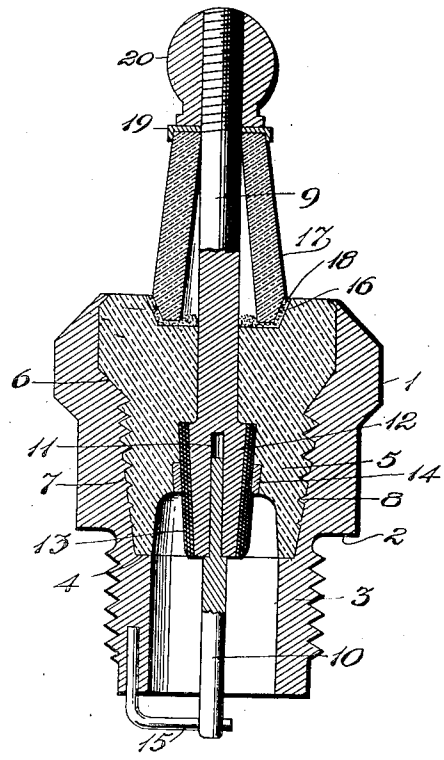


Fig. 2.

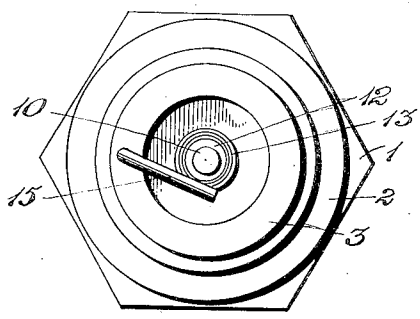


Fig. 3.

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UNITED STATES PATENT OFFICE.

D FRANKLIN PYLE, OF WASHINGTON, DISTRICT OF COLUMBIA, AND JAMES ANDERSON, OF CATONSVILLE, MARYLAND.

SPARK PLUG.

Application filed October 27, 1921. Serial No. 510,752.

To all whom it may concern:

Be it known that we, D FRANKLIN PYLE and JAMES ANDERSON, citizens of the United States, residing at Washington, District of Columbia, and Catonsville, State of Maryland, respectively, have invented certain new and useful Improvements in Spark Plugs, of which the following is a specification.

This invention relates to improvements in spark plugs, and more particularly to that class of plugs in which there is provided a core of glass which fills or partially fills the cavity within the core, and which is fused into lock with the metal of the core.

The object of the invention is to provide a plug of this character wherein the primary or central electrode is so insulated from the shell as to make short circuiting by reason of a deposit of oil or other short circuiting substances, virtually impossible.

In the drawings illustrating the invention:

Fig. 1 is a side elevation of the plug.

Fig. 2 is a central section thereof, and

Fig. 3 is a bottom plan view.

Referring to the drawings, the numeral 1 designates the metallic shell provided with the usual shoulder 2, and reduced threaded hollow extension 3. The inner wall of the shell near the upper end of the extension is provided with a shoulder or ledge 4, which determines the lower limitation of the core 5 which is of glass or other analogous material.

Above the extension, the shell is chambered for the reception of the core, which is fused into the lock with the interior wall of the core, and this chamber is provided with an upper bowl-shaped portion 6, and a lower reduced portion 7, the reduced portion of said chamber or cavity being preferably roughened as indicated at 8 to provide a considerable and ample surface with which the core of insulating material 5 is fused.

The primary or central electrode is formed of two parts, an upper part 9, and a lower part 10 of reduced diameter, and as shown, the upper part is provided with a recess 11 into which the lower part is fitted and permanently held, the recess being within the cone-shaped enlargement 12 of the upper part of the electrode, and surrounding this enlargement and extending partly within the glass core, and partly within the cavity below the core, is a sleeve 13, preferably of mica, or other suitable insulating material, which sleeve as a whole, may be formed of a number of telescoping sleeves, or sleeves which in their final or shown position, are one within the other, and which sleeves are put in place upon the enlargement of the electrode in the molding operations incident to the manufacture of the plug.

There is shown surrounding the sleeve a narrow metallic band 14, which band, while serving no important purpose in the completed spark plug, is a device employed to aid in properly positioning the parts during the molding operation. For instance: in the manufacture of the plug, the shell is placed in a suitable mold, and by the use of a suitable plunger and die, the glass core, after first having been filled into the shell, is pressed or molded therein, in cooperation with a lower cavity-forming die, which forms the cavity in the insulating core, immediately surrounding the lower part of the enlargement on the electrode, and it is into the top of this cavity-forming die that the ring 14 is carried in order to support the insulating sleeves 13 in position to receive the proper part of the electrode, which is joined with the lower part in the molding and manufacturing operation.

The numeral 15 designates the secondary electrode formed with a vertical portion seated in a bore in the lower part of the threaded extension, and a horizontal portion which is extended laterally to and slightly past the lower end of the primary electrode, there being of course, the proper sparking distance intervening between the two electrodes, and it will be observed, that the lower end of the primary electrode extends below the sparking point of the secondary electrode so that any accumulation of oil or other short circuiting substances will pass below the sparking point.

The upper part of the glass core is provided with a depression 16, in which is seated the sleeve 17, of porcelain or other suitable insulating material, which sleeve is held in the depression by a film or layer of cement 18, and there is provided, as is usual, at the top of the sleeve, the usual washers 19 and binding nut 20 for attachment of the plug, as a whole, to the usual terminals.

It will be noted that the entrance into the upper part of the cavity of oil, carbon or other short circuiting substances, will ac-

cumulate between the mica sleeve and the cavity in the lower part of the glass insulating core where, in view of the construction shown, it is harmless as a short circuiting medium, and the formation of the plug is such that when such accumulations occur, they can be very readily removed.

Claims:

1. A spark plug comprising a shell adapted for attachment to the cylinder of an explosive engine, an insulating core of glass or other analogous material in the upper part of said shell, and having a cavity in the lower part thereof, a primary electrode part of which is embedded in the glass core, said electrode having a portion extending into the cavity in the lower end of said core, the portion of said electrode within the cavity being surrounded by a sleeve of insulating material of different character from the core, said sleeve also surrounding a portion of the electrode which is embedded in the core, a secondary electrode secured to the lower part of the shell and extending into sparking proximity with the lower end of the central, or first mentioned electrode.

2. A spark plug comprising a shell formed for attachment to the explosion chamber of an explosive engine, said shell having in its upper portion a filling or core of glass or other analogous material, said material having a cavity formed in the lower part thereof, a primary electrode partly embedded in said core, said electrode having a cone-shaped enlargement intermediate of its ends, and said enlargement lying partly embedded in the core and partly within the cavity in the lower part thereof, and a sleeve of insulating material surrounding said enlargement and of a character different from the insulating material of the core.

3. A spark plug comprising a shell formed for attachment to the explosion chamber of an explosive engine, said shell having in its upper portion a filling or core of insulating material, said material having a cavity formed in the lower part thereof and in communication with the opening at the lower part of the shell, a primary electrode in said core, said electrode being surrounded by an insulating element of a character different from the insulating material of the core, said element being partly embedded in the insulating core with its remaining part extending into the cavity in the lower part of said core.

In testimony whereof we affix our signatures in presence of two witnesses.

D FRANKLIN PYLE.
JAMES ANDERSON.

Witnesses:
JAMES L. CRAWFORD,
M. A. AHERN.