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1,929,748

SPARK PLUG

Filed Aug. 15, 1932

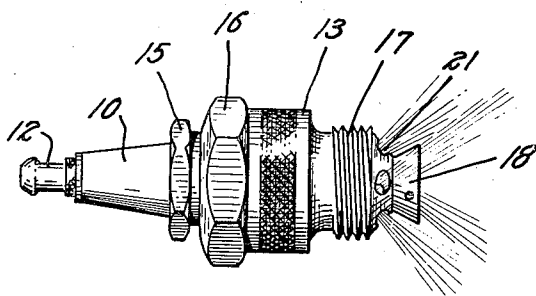


Fig 1

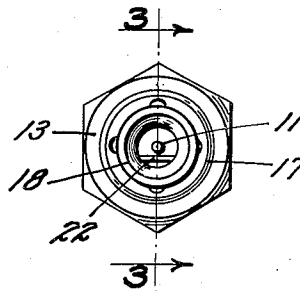


Fig 2

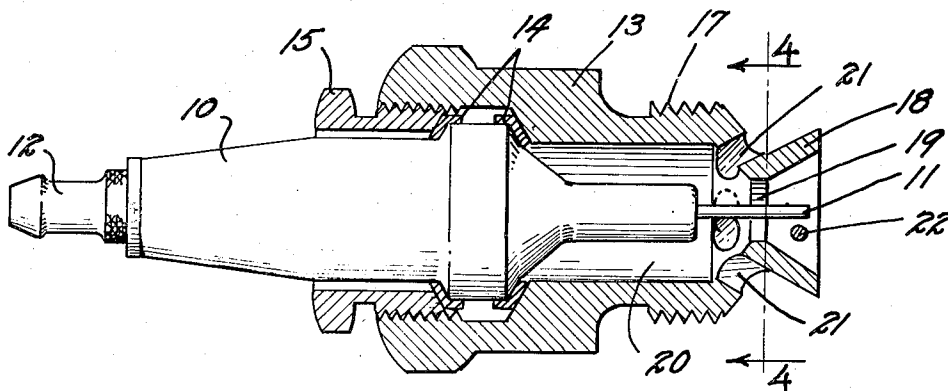


Fig 3

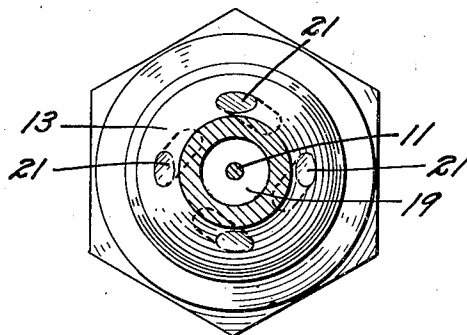


Fig 4

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SPARK PLUG

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2 Claims. (Cl. 123—169)

This invention relates to a spark plug for internal combustion engines, and has for its principal object the provision of a plug which will be self cleaning and which will not become fouled with oil or carbon.

Another object of the invention is to provide a plug which will project blasts of fire into the combustion chamber so as to cause a more instantaneous and complete combustion.

Another object is to so construct the plug that the heat will be rapidly drawn from the electrodes so as to prevent burning out of the latter.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a side elevation of the improved plug.

Fig. 2 is an end elevation thereof, looking toward the firing end.

Fig. 3 is an enlarged longitudinal section through the plug.

Fig. 4 is an enlarged cross section, taken on the line 4—4, Fig. 3.

The plug comprises an insulating core 10 of porcelain or similar insulating material. The core 10 carries a center electrode 11 which projects from the inner extremity thereof, and which is provided with a suitable connecting nut 12 at its outer extremity. The core 10 may be clamped in an outer shell 13, between suitable sealing gaskets 14, by means of a clamping nut 15 as is usual in spark plug design, or it may be secured therein in any other desired manner as the manner of securing the component parts together is not important to the present invention. The principal advantages of the present spark plug result from the unique construction of the outer shell 13.

The outer shell 13 is formed with the usual wrench receiving faces 16 and the usual engine threads 17. Here the resemblance to the usual shell ceases. The inner extremity of the shell 13 terminates in an outwardly flared, funnel-like extremity 18 which opens to the interior of the shell through a relatively narrow, restricted neck 19. A ground electrode 22 is carried in the flared extremity 18. It is formed by securing a cross rod or wire entirely across the extremity and

securing it in the flared walls of the extremity. The ground electrode 22 is positioned in close proximity to the center electrode 11 to form a spark gap.

The interior of the shell is widely spaced from the core 10 to form a gas chamber 20. A series of spirally inclined gas passages 21 open to the gas chamber 20 about the flared extremity 18. The axes of the passages incline inwardly toward the core 10 and also incline on spiral lines about the core 10.

In use, the compressing gas in the engine cylinder is received in the flared extremity 18 and the gas is forced through the restricted neck 20 at rapid velocity into the gas chamber 20. This rapidly moving gas acts to scour the center electrode 11 and its surrounding core. This scouring action is assisted by the gas compressed through the spiral passages 21 which act to swirl the incoming gas about the center electrode 11 and about the core 10 so as to scour and clean it of adhering oil or carbon.

At the time, the spark occurs between the electrodes 11 and 22, the gas chamber 20 is filled with a rich gaseous mixture which explodes and throws four spiraling tongues of flame from the passages 21 and from the flared extremity 18. These tongues of flame are spread by the flared extremity 18 so that they will come in contact with and simultaneously ignite a large area of gas in the engine cylinder. This flaring of the flames is assisted by the spiral position of the openings 21 which, at the time of explosion, cause the flames to whirl and enlarge in the cylinder.

It will be noted that since both extremities of the ground electrode 22 are imbedded in the metal of the shell, the heat thereof will be quickly conveyed to the shell and from thence to the engine jacket. This prevents the electrode from ever reaching a burning temperature even though it is exposed to the direct flame. This cooling action is assisted by the incoming blast of fresh gas.

It is desired to call attention to the fact that there are no narrow pockets about the core 10 into which carbon particles and oil may pack. Any carbon particles which may enter the gas chamber 20 cannot become lodged therein and are blown out on the next explosion.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims,

without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:—

1. A spark plug comprising: an outer shell; a center electrode; an insulating core surrounding said center electrode and positioned within said outer shell; a flared extremity on said outer shell about the extremity of said center electrode; a ground electrode in said flared extremity in close proximity to said center electrode; a gas chamber about said insulating core within said shell; and gas passages communicating with said gas chamber about said flared extremity; the axis of each of said gas passages being on a spiral about the axis of said housing.

2. A spark plug comprising: a hollow cylindrical outer shell; a central electrode passing through said shell; an insulating core supporting said central electrode in said shell and closing one end thereof; a relatively long projecting portion on said core surrounding said central elec-

trode where it passes through said hollow shell, said projecting portion being cylindrical and relatively small so as to leave a relatively wide opened space between said portion and said shell of uniform cross section throughout its length, said electrode projecting upon the extremity of said portion; and inwardly extending inclined end wall in said shell terminating in spaced relation to said projecting beyond portion of said electrode; and an outwardly extending funnel-shaped flared extremity projecting from the termination of said end wall and surrounding the extremity of said central electrode; a ground electrode anchored at both ends in said flared extremity and crossing the latter in close proximity to said central electrode, there being passages formed through said end wall, said passages being inclined inwardly toward the extremity of the projecting portion of said core and also inclined spirally, the outer wall of said flared extremity being inclined outwardly so as to spread gases discharging through said passages.

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