June 5, 1934. A. KEGRESSE 1,962,078

SPARK PLUG

Filed Aug. 19, 1930 2 Sheets-Sheet 1

Fig.1

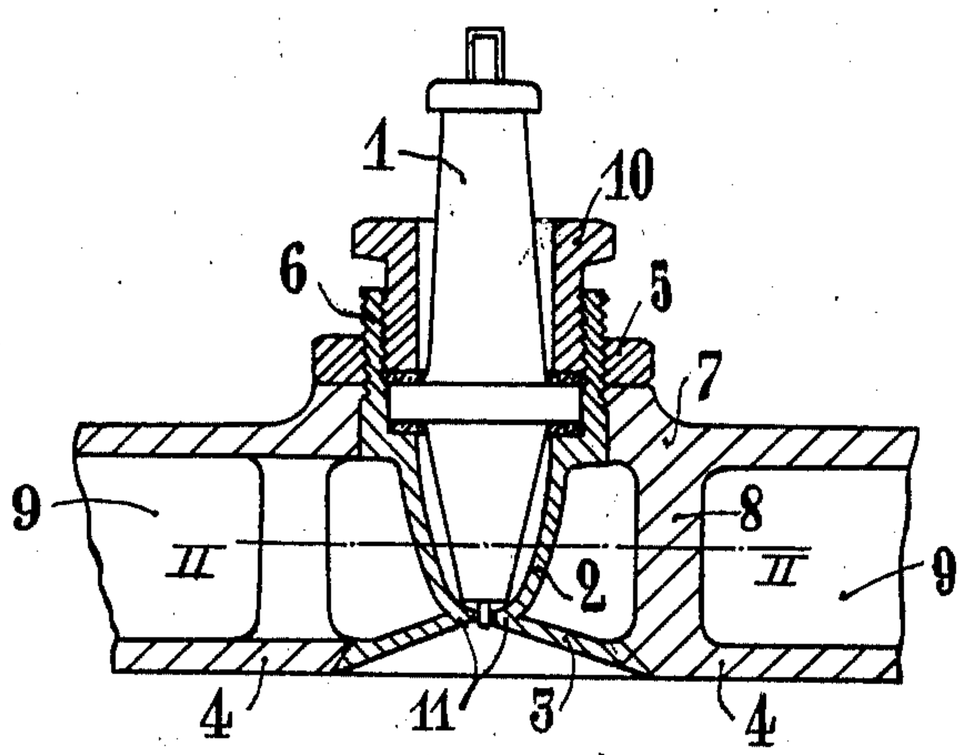
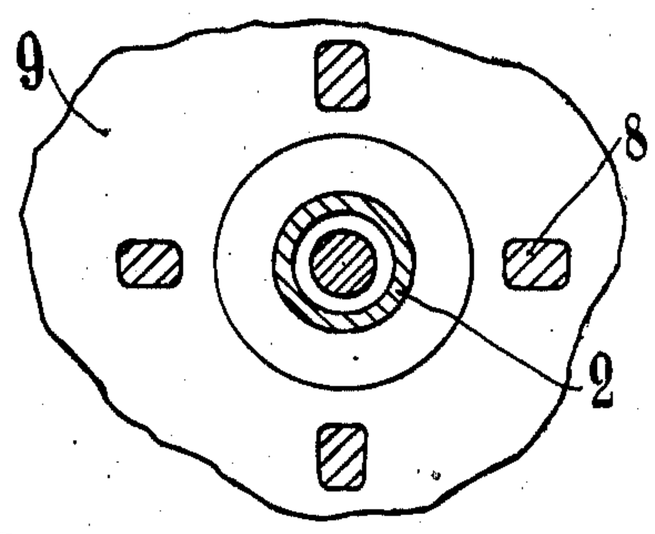


Fig.2



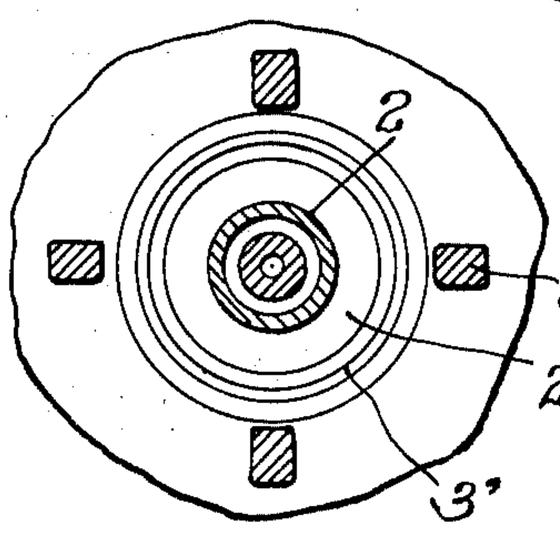


Fig.4.

INVENTOR:
Adolphe Kégresse
BY
ATTORNEY

June 5, 1934.

A. KEGRESSE

1,962,078

SPARK PLUG

Filed Aug. 19, 1930

2 Sheets-Sheet 2

Fig. 5.

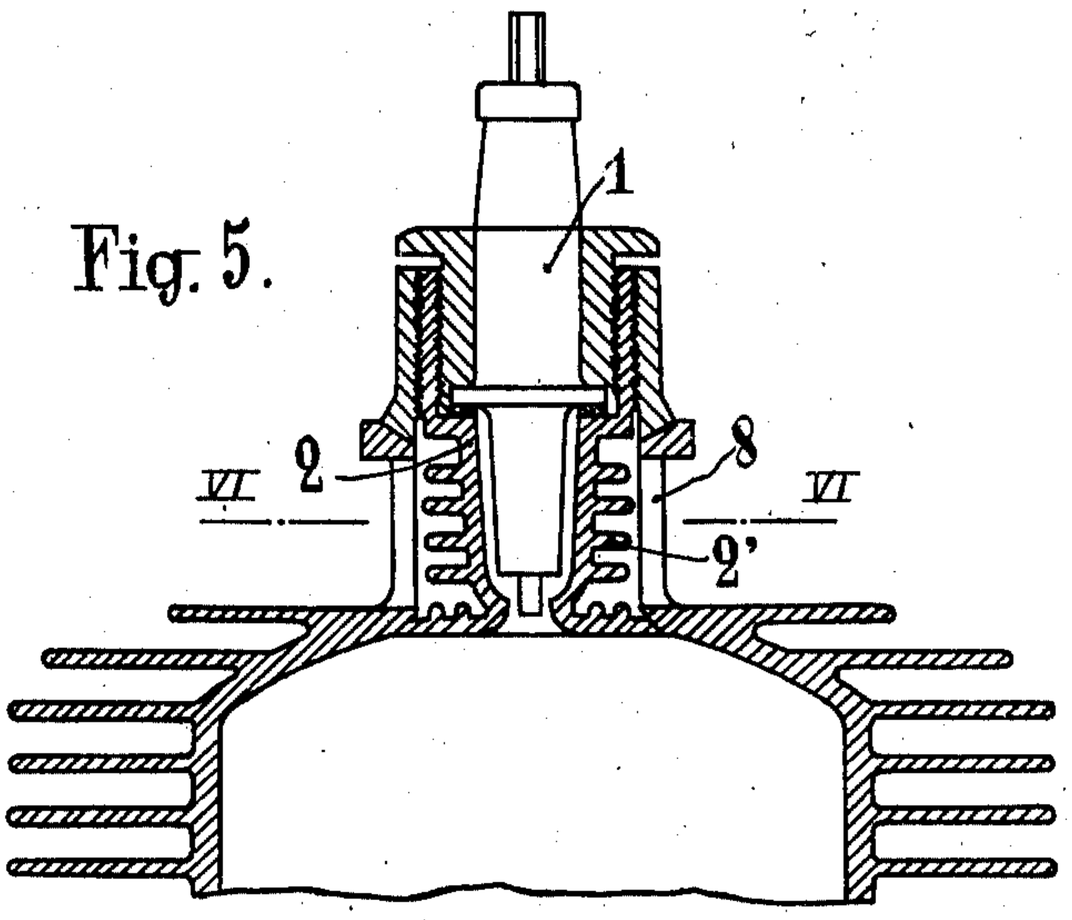
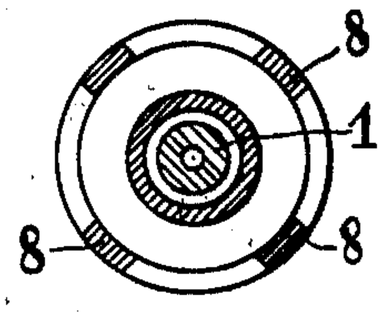


Fig. 6.



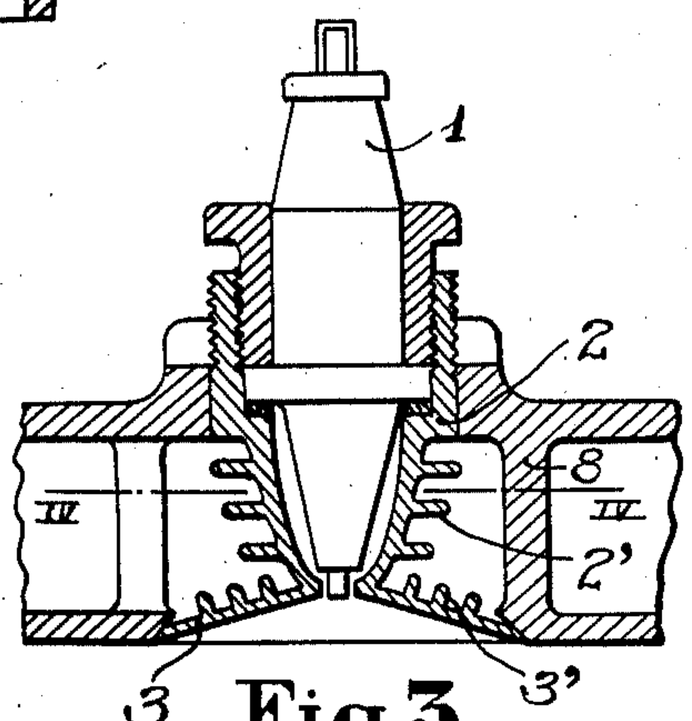
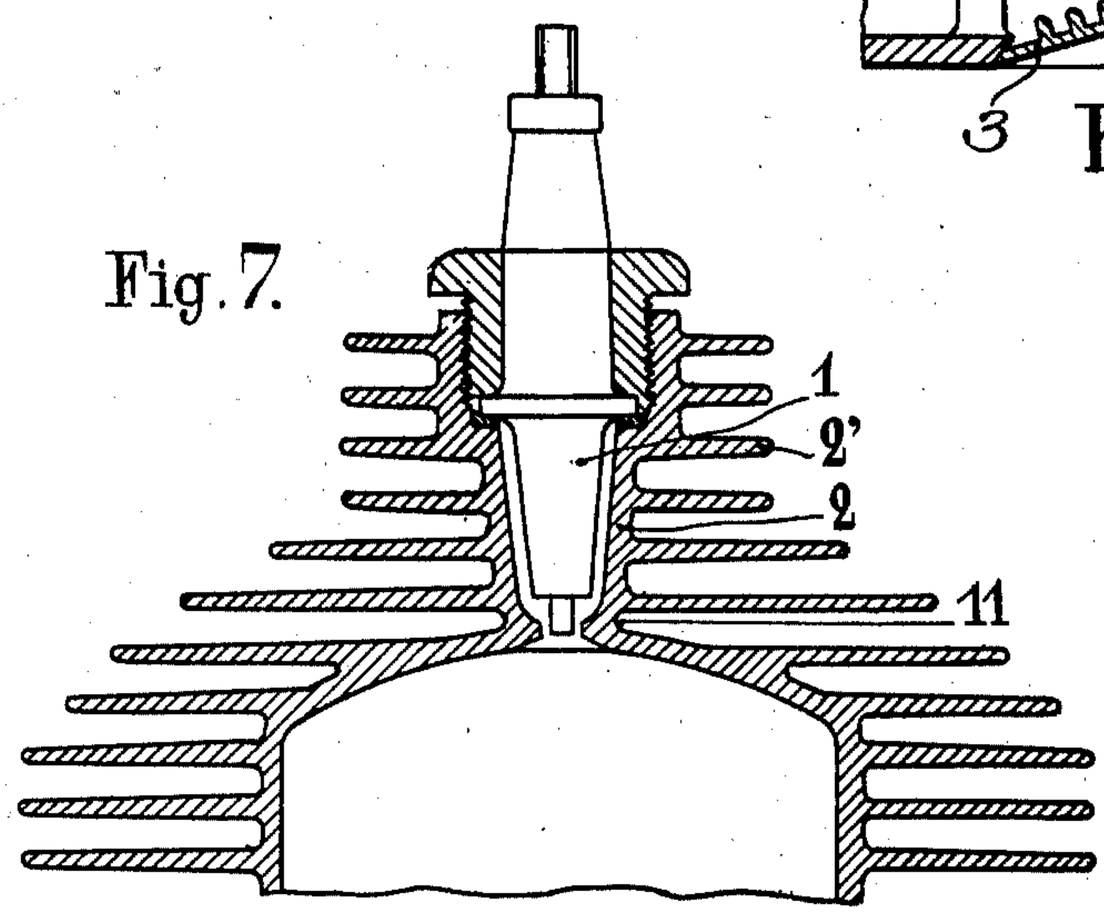


Fig. 3.

Fig. 7.



INVENTOR:
Adolphe Kégresse
BY
ATTORNEY

Patented June 5, 1934 1,962,078

UNITED STATES PATENT OFFICE

1,962,078

SPARK PLUG

Adolphe Kegresse, Courbevoie, France

Application August 19, 1930, Serial No. 476,391
In France September 19, 1929

4 Claims. (Cl. 123—169)

One is aware that the compression ratio in internal combustion engines, particularly those of the four-stroke cycle type, is limited by self-ignition.

This phenomenon is one of the causes by which a limit is set to motor efficiency. It is in most cases due to the spark plugs, the cooling of which is insufficiently provided for.

One is aware also that the plugs in engines of conventional type are screwed in bosses formed on the casing and that consequently the cooling of the spark plug will take place through the walls of the boss and the body of the plug. There is thus provided a double layer of metal, one at least of which is the result of a casting operation.

Now, particularly with steel of the kind prevalently used for the manufacture of cylinder heads, it is not possible to obtain cast walls sufficiently thin and strong to secure the desired maximum cooling effect.

In addition, cast steel is not the best metal as far as heat conductivity is concerned. A distinct advantage would therefore be gained in finding out a more conductive metal to provide for plug-cooling purposes.

This invention has for its object a novel arrangement of the spark plugs according to which the insulation is housed in a special member or plug body having thin heat-conductive walls which are in direct contact with the cooling fluid (water or air depending on the type of engine considered).

An embodiment of the invention is shown by way of example in the accompanying drawings, wherein: Figure 1 is a vertical cross sectional view through a spark plug in accordance with my invention.

Figure 2 is a horizontal cross sectional view taken on line II—II in Fig. 1.

Figure 3 is a vertical cross section of a modification.

Figure 4 is a cross section taken on line IV—IV in Fig. 3.

Figure 5 is a vertical cross sectional view of a modification embodied in an air-cooled engine.

Figure 6 is a cross sectional view taken on line VI—VI in Fig. 5.

Figure 7 is a modification of the embodiment shown in Fig. 5.

The embodiment shown in Fig. 1 will first be described.

The insulation 1 of the plug is housed in a suitably shaped thin-wall body 2. The said body 2 is formed at the base thereof with a seat 3 which tightly fits the wall 4 of the combustion chamber. The seat 3 is held in position by means of a nut 5 screwed on the outside of the upper portion of the body 2 and bearing tightly against the upper wall 7 of the water jacket. The walls 4 and 7 of the water jacket 9 are braced to each other by ribs 8. An additional nut 10 screwed within the upper portion of the body 2 holds the insulation 1 in position. In order to secure a maximum cooling effect for the electrodes where the sparks are set up, the base portion of the body 2 is formed with a circular neck 11.

It will be appreciated that as a result of the considerable thinness of the plug body walls, the shape given thereto and the heat conductiveness of the metal selected, a maximum cooling effect is obtained. Since the body 2 of the plug is independent of the cylinder head, the plug can be machined very easily, and consequently the walls thereof can be made as thin as the toughness of the metal will allow.

It is likewise to be noted that the whole portion adjacent to the spark space is also cooled very greatly inasmuch as this portion is wholly constituted by the circular neck 11, whereby this region is brought as close as possible to the body of cooling water. Heat exchange is thus facilitated.

According to the modification shown in Figs. 3 and 4, the outer walls 2 and the base portion 3 of the plug body, instead of being plain as is the embodiment just described, are provided with ribs 2′ and 3′ intended to increase the surface of contact with the cooling water, thus securing a more intense cooling effect on the plug.

In the case shown in Figs. 5 and 6 in which the engine comprises no cooling water jacket, the head is formed with props 8 corresponding to the bracing ribs in Figs. 1 and 3, the said props allowing the plug to be secured in position. This embodiment is given only by way of indication and may be substituted by any other that will allow the plug body to remain in contact with the surrounding air. The central electrode is separated from the atmosphere only by one single layer of metal, viz., the hollow body 2 with or without its ribs 2′, whereby a maximum cooling effect on the plug is secured as in the case of the water-cooled engine.

In the modification shown in Fig. 7, the body 2 of the plug is integral with the cylinder head. Ribs 2′ are formed on the body for cool-

ing purposes. The insulation 1 of the central electrode is housed within the body 2 as in the arrangement according to Figs. 1, 2, 3, 4, 5 and 6.

The bottom portion of the plug body is formed with a neck 11 the purpose of which is to reduce to a minimum the distance between the centre of production of the sparks and the surrounding air.

The embodiments described hereinbefore are not of limitative character and may lend themselves to all desirable constructional modifications without thereby departing from the scope of the invention.

I claim:

1. In combination with an internal combustion engine, a wall surrounding and spaced from the walls of the combustion chamber to form a water jacket, an opening through the wall of the combustion chamber and the wall of the water jacket, and a spark plug having a casing seated in the opening, the spark plug comprising a hollow body having thin conductive walls, the walls being in direct contact with the cooling water, said casing having an extensive circular neck at its lower end which forms a continuation of the wall of the combustion chamber, the neck having a small opening to receive the point of the spark plug.

2. The combination set forth in claim 1, wherein the circular neck has projecting ribs for the purpose of increasing heat conductivity.

3. In combination with an internal combustion engine, a wall surrounding and spaced from the walls of the combustion chamber to produce a water jacket, openings through the walls of the combustion chamber and the wall of the water jacket to receive a spark plug, the opening through the wall of the water jacket being smaller than that through the wall of the combustion chamber so that the spark plug must be inserted first through the opening in the combusion chamber, a spark plug seated in the openings, and means fastened to the spark plug and adapted to draw it from the combustion chamber toward the water jacket so as to seat the plug tightly, said spark plug comprising a tubular casing element extending through the opening in the jacket wall and having a flared skirt-like flange seated in the opening in the combustion chamber wall and forming a continuation of the combustion chamber wall, said casing having a restricted portion immediately adjacent the flared skirt-like flange, and an insulated electrode positioned in the tubular casing and having a portion extending through the restricted portion of the casing which serves as an electrode, said casing being formed of thin heat conductive metal and being in direct contact with the water in the cooling jacket, whereby the spark plug and the portion of the wall of the combustion chamber surrounding the plug constituted by the flange of the casing will be maintained at a lower temperature than the rest of the cylinder wall.

4. In combination with an internal combustion engine, a casing surrounding and spaced from the walls of the combustion chamber to provide a water jacket, an opening through the wall of the combustion chamber and the outer wall of the water jacket a spark plug seated in the opening, said spark plug comprising a tubular casing element extending through the opening in the jacket wall and having a flared skirt-like flange seated in the opening in the combustion chamber wall and forming a continuation of the combustion chamber wall, said casing having a restricted portion immediately adjacent the flared skirt-like flange, and an insulated electrode positioned in the tubular casing and having an uninsulated portion extending through th restricted portion of the casing which serves as an electrode, said casing being formed of thin heat conductive metal and being in direct contact with the water in the cooling jacket, whereby the spark plug and the portion of the wall of the combustion chamber surrounding the plug constituted by the flange of the casing will be maintained at a lower temperature than the rest of the cylinder wall.

ADOLPHE KEGRESSE.