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C. MICHEL

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SPARK PLUG PROVIDED WITH AN IONIZING CATALYTIC ELEMENT

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FIG. 1

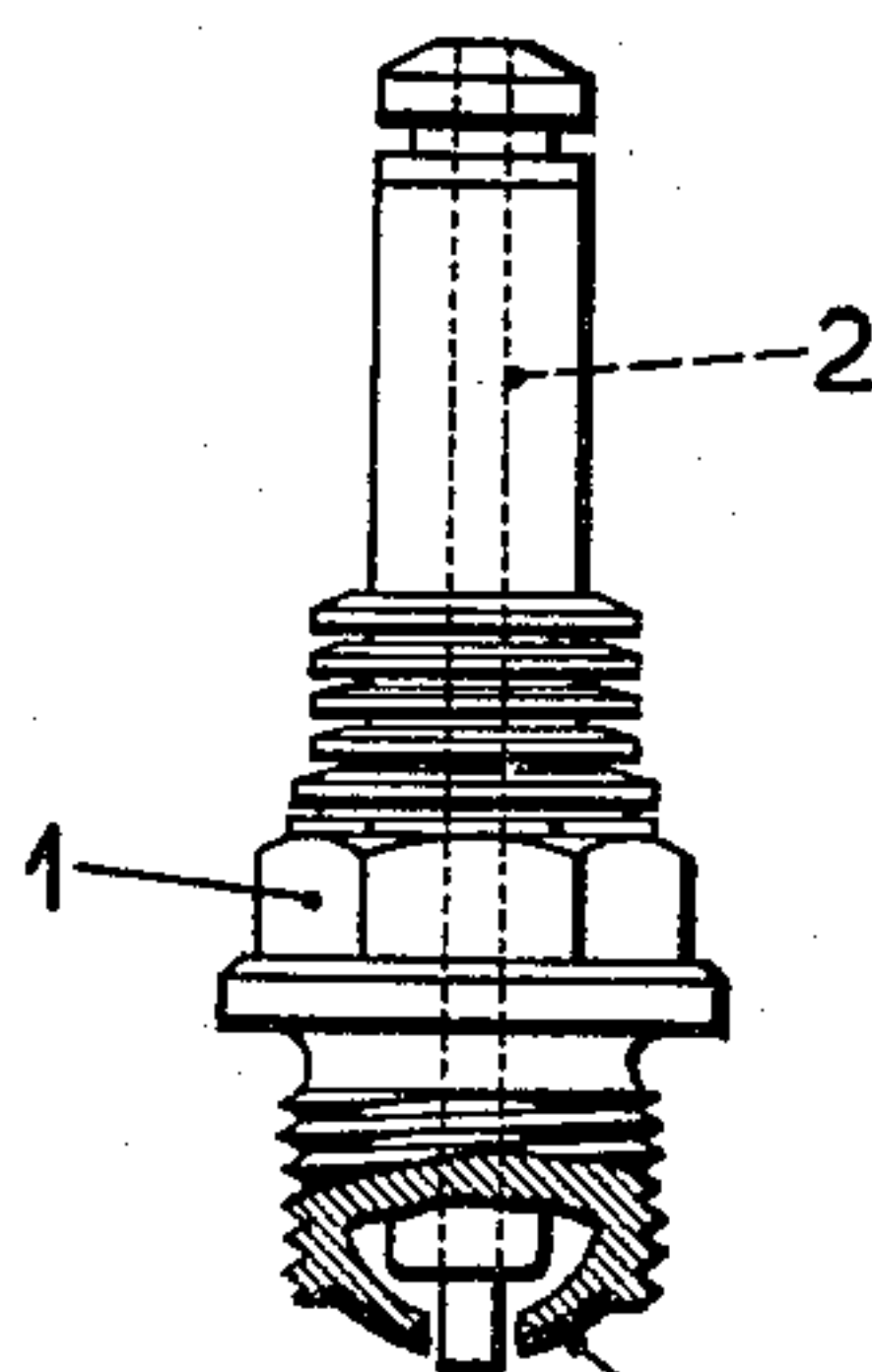
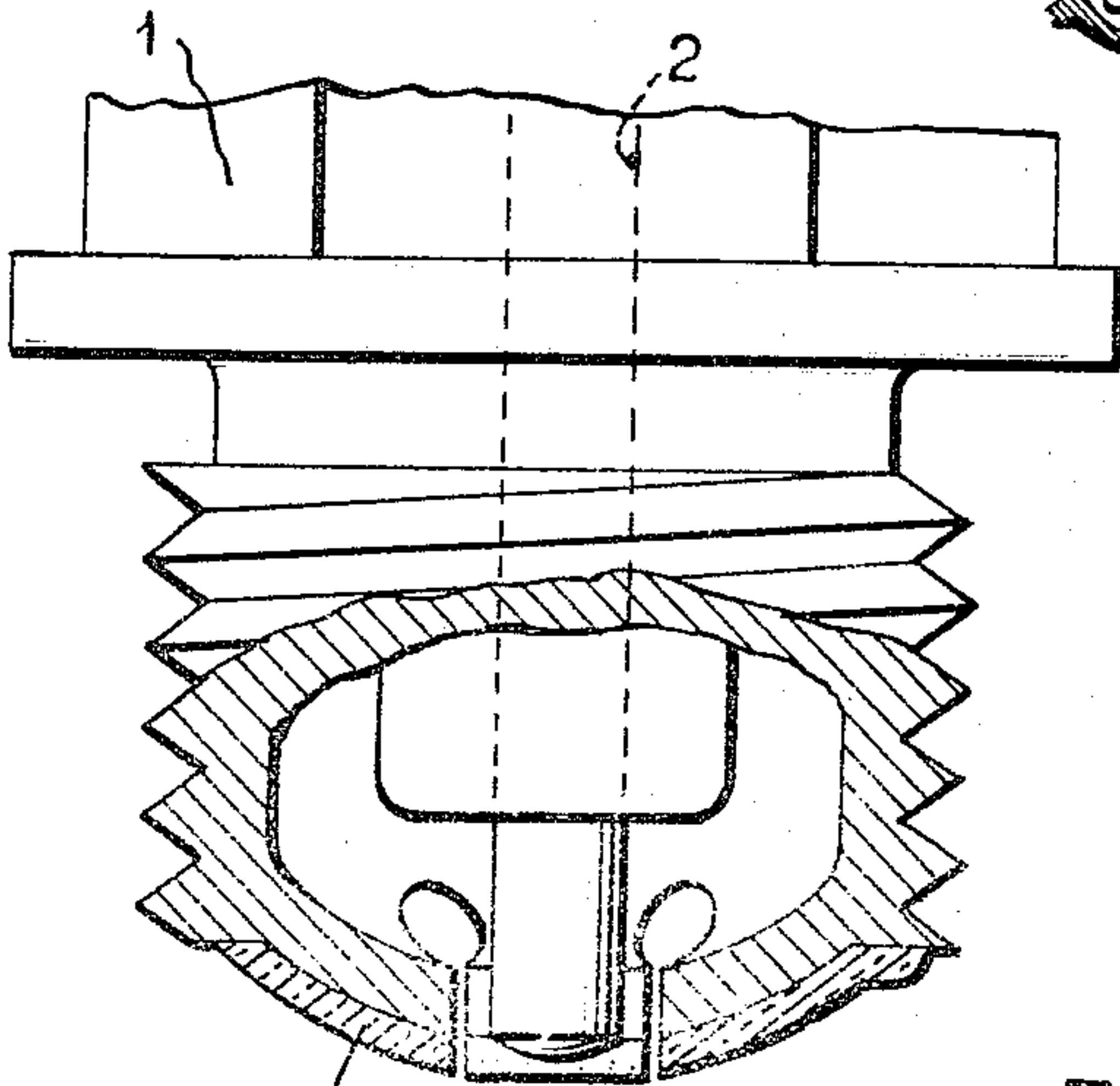
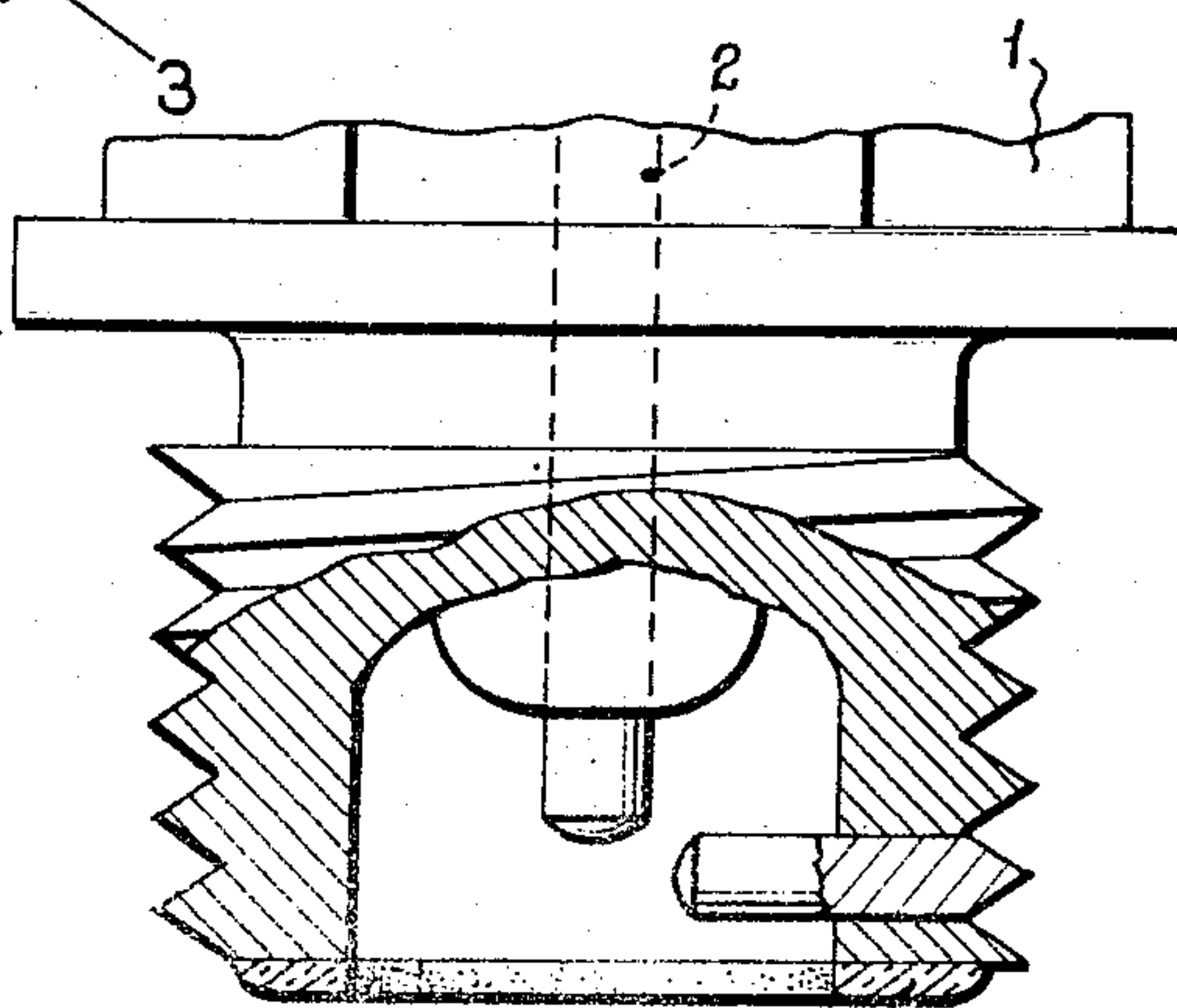


FIG. 3.



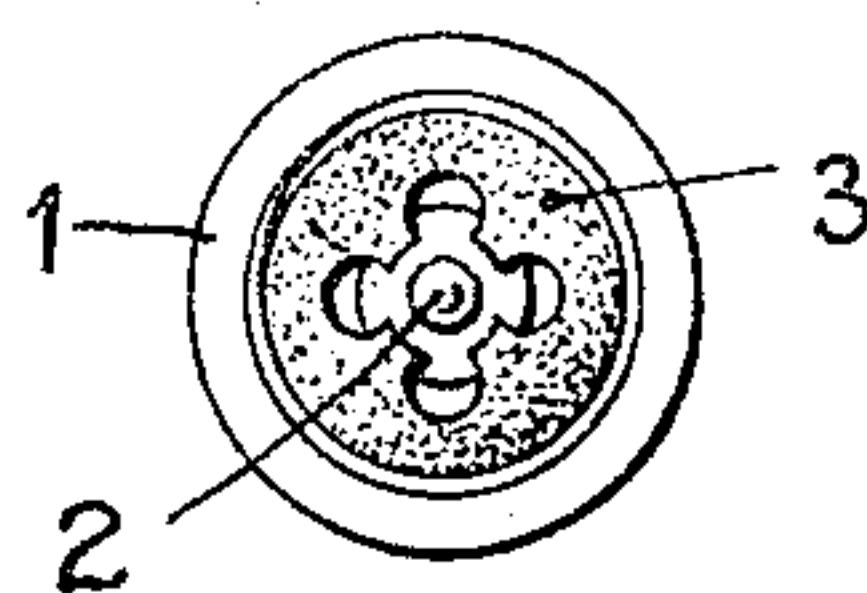
3 Coating of enamel impregnated with radium bromide and barium sulphate

FIG. 4.



3 Coating of enamel impregnated with radium bromide and barium sulphate

FIG. 2



Inventor:  
Charles Michel  
By E. F. Kendrick  
Att'y



## UNITED STATES PATENT OFFICE

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SPARK PLUG PROVIDED WITH AN IONIZING  
CATALYTIC ELEMENT

Charles Michel, Paris, France

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In France September 29, 1934

3 Claims. (Cl. 123—169)

The object of the present invention is improvements to ignition plugs, such as employed in internal combustion engines, provided with a radio-active substance with a view to ionizing the mass of explosive gases thus considerably increasing the efficiency of the engine.

Said improvements consist:

1. In the titration of the constituent parts of the radio-active mixture (for instance radium bromide and barium sulphate) employed respectively in the proportion of 1 to 1000, the quantity of radium salts not exceeding five micrograms.

2. In the incorporation of said mixture into a porous enamel possessed of a high melting point, said enamel not being liable to deterioration under the action of intense heat or contact with gases.

3. In the application of said enamel, preferably on to the body of the sparking plug in order adequately to ionize the gassy mass, and

4. In the magnetizing of the center electrode of the spark plug.

Attempts have already been made to incorporate radium, or a similar substance, in the insulating sleeve of the spark plug, by covering said sleeve with insulating varnish.

Now, experience has proved that said insulating varnish had the effect of preventing the ionizing emanations and that, in order to overcome this disadvantage, it was necessary to have recourse to massive amounts of radio-active substance, which is liable to increase the cost price of an ionizing spark plug considerably. Indeed, a spark plug made of radio-active substance under such conditions would cost several hundred francs.

In order to cope with these disadvantages, the process which forms the subject matter of the invention consists in incorporating a suitably titrated radio-active mixture into an enamel possessed of a high fusion point, suitably porous and sufficiently heat-proof. According to the invention, an enamel of this description is applied, not to the center electrode, the area of which would be too small, but to the shell or earthed electrode, the area of which is much greater. In this manner ionization is not limited to the sparking zone or gap between the two electrodes but extends throughout the gassy mass contained within the explosion chamber. As to the ionizing member itself, it is constituted, according to the invention, by a mixture, in suitable proportions, of a radio-active salt such as radium bromide and barium sulphate. Experience has proved to the applicant that the respective proportions of said salts should preferably be as 1 to 1,000 in order to obtain the desired effect to a maximum degree. Experience

has further proved that by employing an ionizing mixture containing .002 milligram of radium bromide and 2 milligrams of barium sulphate for each spark plug in an internal combustion engine there was a resulting economy of 14% of gasoline while, with .005 milligram of radium bromide and 5 milligrams of barium sulphate, the economy in gasoline obtained, in the same engine, rose to 20%.

For proportions very much lower than these values only a reduction of the explosive potential of the electrodes is obtained whereas, with greater proportions, the gassy medium becomes such a high conductor of electricity that leakage circuits are set up along the walls of the insulator, said circuits being liable to interrupt the jumping of the spark across the gap of the electrodes.

The invention also provides for the addition to the means above described of any other secondary means capable of intensifying the phenomenon of ionization and, in particular, means consisting in magnetizing the center electrode of the spark plug.

The annexed drawing shows as an example a sparking plug embodying the features of invention hereinabove described.

Fig. 1 shows an elevation with parts broken away, of said sparking plug.

Fig. 2 is a bottom view of the same plug.

Fig. 3 is a fragmentary view, partly in section and partly in elevation, through the bottom part of the plug of Figs. 1 and 2; while

Fig. 4 is a view similar to Fig. 3, of a modified construction.

Referring to the drawing, 1 is the body of the plug, the body being grounded, and 2 is the central electrode of said plug. As shown in the drawing, the bottom of the plug is covered with a layer 3 of radio-active mixture incorporated into an enamel having a high fusion point suitably porous and sufficiently heat proof by which the central plug is surrounded by said substance and the ionization is produced in the best of conditions.

In Fig. 4 the second electrode extends inwardly through the wall of the plug, rather than being constituted by the wall itself.

It is to be understood that the invention is not limited to the features disclosed in this specification and annexed drawing but may be variously modified within the scope of appended claims.

What I claim is:

1. A spark plug comprising a central electrode and a grounded body the bottom of which surrounds the bottom end of said central electrode and is covered with a layer of radio-active substance comprising an ionizing, catalytic radio-ac-

tive mixture incorporated into porous enamel having a high melting point.

2. A spark plug according to claim 1 in which the radio active mixture comprises radium bromide and barium sulphate in the proportion of one part of the former to one thousand parts of the latter.

3. A spark plug according to claim 1 in which the radio-active mixture comprises radium bromide and barium sulphate in the proportion of one part of the former to one thousand of the latter, the amount of radium bromide not exceeding five micrograms.

CHARLES MICHEL.