

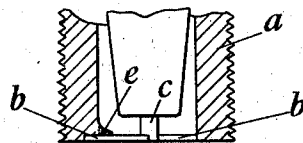
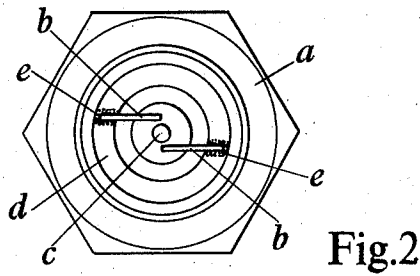
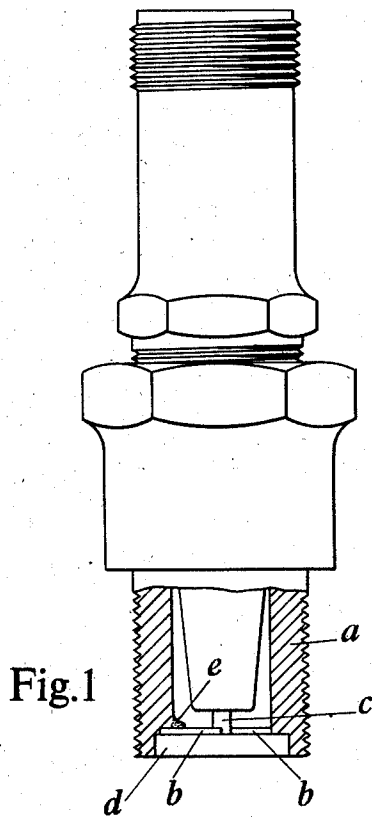
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SPARKING PLUG FOR INTERNAL COMBUSTION ENGINES

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## UNITED STATES PATENT OFFICE

2,292,974

SPARKING PLUG FOR INTERNAL  
COMBUSTION ENGINESColin James Smithells, Rugby, England, assignor  
to Lodge Plugs Limited, Rugby, EnglandApplication May 27, 1941, Serial No. 395,477  
In Great Britain June 22, 1940

## 1 Claim. (Cl. 123—169)

This invention relates to sparking plugs for internal combustion engines. It is desirable in such a plug to effect between the earthed electrode (or each such electrode) and the body, a connection of good thermal conductivity in order that when the plug is in use heat may be conducted rapidly from the electrode to the body and so minimise risk of overheating of the electrode, especially when the electrode is made from wire of high melting point and small diameter. The object of the invention is to provide a plug in which this condition is met in a more satisfactory manner than heretofore.

The invention comprises a plug in which the earthed electrode or each such electrode is made from metal having a considerably higher melting point than that of the body, and in which the said electrode is electrically welded to the body under pressure by fusion of the body only.

In the accompanying sheet of explanatory drawings:

Figure 1 is a part sectional elevation, and Figure 2 an inverted plan, of a sparking plug embodying the invention.

Figure 3 is a fragmentary sectional elevation illustrating a modification of the invention.

In the drawing the body of the plug is indicated by *a*, the earthed electrodes by *b*, and the central or insulated electrode by *c*. As shown a pair of earthed electrodes *b* are provided and are arranged so that their free ends lie at opposite sides of the central electrode *c*, but it is to be understood that only one earthed electrode may be provided if desired.

In carrying the invention into effect as shown the body *a* is made from mild steel, and the earthed electrode or each of the earthed electrodes *b* is made from a convenient short length of wire of about .025" square cross section, the wire being made from a platinum-iridium alloy which has a composition of approximately 80% platinum and 20% iridium, and which has a melting point considerably higher than that of the body. At its end remote from the central electrode *c* the earthed electrode or each

such electrode *b* is electrically welded either to a shoulder *d* formed on the interior of the body *a* at a position adjacent to its inner end as shown in Figures 1 and 2, or to the inner end of the body as shown in Figure 3. In connecting the earthed electrode or each earthed electrode *b* to the body *a*, the latter is gripped by a copper electrode as close as possible to the point at which the connection is required, and another copper electrode is arranged to press on the adjacent end of the wire forming the earthed electrode under a pressure of about 20 pounds. The welding current is supplied from a transformer giving a secondary voltage of about 12 volts. The steel body *a* melts at the point of contact with the wire and the latter sinks into it under the applied pressure, the steel displaced by the wire being indicated by *e* in the drawing. The wire is not deformed by this process but is pressed sufficiently into the body to effect the required connection of good thermal conductivity between the wire and body. It will be seen therefore that the earthed electrode or each such electrode is electrically welded to the body under pressure by fusion of the body only.

The invention is not limited to the example above described as subordinate details as regards the composition of the body and earthed electrode or electrodes, the shape and dimensions of either of the parts, or the mode of effecting the electrical welding of the parts together under pressure may be varied to suit different requirements.

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

A sparking plug having in combination with a hollow metal body, at least one earthed electrode which is made from metal having a considerably higher melting point than that of the body, and which is welded to and partly embedded in the body, the latter having projecting from its inner peripheral surface metal displaced by the embedded part of the electrode.

COLIN JAMES SMITHELLS.