

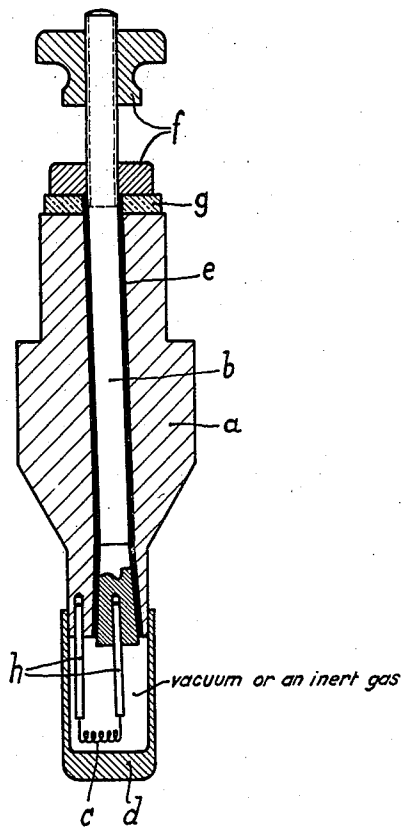
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INCANDESCENT IGNITER

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INCANDESCENT IGNITER

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7 Claims. (Cl. 123—145)

This invention relates to an igniter for internal combustion engines, and more particularly to an incandescent igniter for an engine which employs a heavy oil as fuel. In accordance with the present invention the igniter is of the indirectly heated cathode type, and the heating element is enclosed either in a vacuum chamber or one which is filled with inert gas. The former practice in such igniters has been to operate the heating element in an air filled chamber. The temperature limit of the heater has accordingly been restricted, and it has been necessary to provide a large heating element in order to obtain sufficient heat on the outer surface of the cathode. Likewise, the cathode has been large. In the present invention, the heater may be operated at a much higher temperature, the cathode may be much smaller than formerly, and a high degree of heat is concentrated in a relatively small cathode area.

An object of the invention is to provide an igniter which is more efficient and compact.

Another object is to provide an indirectly heated igniter in which the heater element may operate at a higher temperature.

Still another object is to provide an indirectly heated igniter in which the heater element operates in a substantially oxygen-free atmosphere.

A further object is to provide an igniter in which a high degree of heat is maintained on a small cathode area.

Other objects and advantages will be in part specifically set forth and in part will be obvious when the following specification is read in connection with the drawing which shows in cross section an igniter in accordance with the present invention.

Referring in more detail to the drawing, the letter *a* represents the tapered metallic body of the igniter, which has a longitudinal bore carrying a tubular insulating sleeve *e*. This sleeve forms a gas-tight joint between body *a* and an axially extending inner electrode *b*, which carries at its upper end electrical terminal fastenings *f* insulated from body *a* by sleeve *e* and washer *g*. The lower ends of electrode *b* and body *a* are bored to receive pins *h*, which carry a heater element *c*. This element is designed to operate at incandescence and is made of a high melting point material such as tungsten, molybdenum or the like. The cathode comprises a hollow cap *d* placed over the lower end of the body *a* and the end wall thereof is in close proximity to the heater element *c*. The chamber thus formed may be evacuated or filled with an inert gas such

as argon, and a gas tight seal is made at the junction of the body *a* and cathode cap *d*. Any material having a high affinity for oxygen, such as tungsten powder, may be placed inside the cap and any remaining oxygen is bound without forming compounds harmful to the incandescent element *c*. The cathode cap *c* is made with a thick end wall in order to retain heat, and the side walls are relatively thin to obtain a low heat conductivity to body *a* and so retain as much heat as possible on the end wall. A metal of low heat conducting property is preferably employed in forming the cap.

The placement of the heating element in a vacuum or an atmosphere of inert gas allows extremely high temperatures to be attained without harm to the element. Since the end wall of the cap is positioned as closely adjacent the heating element as is practicable in order to secure an efficient transfer of radiant heat, the end wall is maintained at a high temperature with respect to the igniter body.

Many modifications and changes may be made by any one skilled in the art without departing from the spirit and scope of the invention as defined in the following claims.

What is claimed is:

1. In an incandescent igniter for internal combustion engines, an indirectly heated cathode, a vacuum chamber adjacent said cathode, and a heating element positioned in said chamber.

2. In an incandescent igniter for internal combustion engines, an indirectly heated cathode, a chamber filled with an inert gas, said chamber being positioned adjacent said cathode, and a heating element positioned in said chamber.

3. In an incandescent igniter for internal combustion engines, a metallic body portion, an electrode extending through said body portion, a heating element connected between said electrode and body portion, a hollow cathode secured to said body portion and forming a chamber for said heating element, a substantially oxygen-free atmosphere in said chamber, said hollow cathode having thin side walls and a relatively thick end wall and being formed of a substance having a lower heat conductivity than iron.

4. In an incandescent igniter for internal combustion engines, a heating element, a cathode spaced from said heating element and receiving radiant heat therefrom, and means for maintaining the atmosphere between said heating element and said cathode at a substantially lower oxygen content than normal air.

5. In an incandescent igniter for internal com-

bustion engines, a heating element, a cathode spaced from said heating element, said cathode forming a closed chamber around said heating element and receiving radiant heat therefrom, and a substantially oxygen-free atmosphere enclosed in said chamber.

6. In an incandescent igniter for internal combustion engines, a heating element, a cathode spaced from said heating element, said cathode forming a closed chamber around said heating element and receiving radiant heat therefrom, and a material of high oxygen affinity contained in said chamber, whereby said heating element

operates in an atmosphere of reduced oxygen content.

7. In an incandescent igniter for internal combustion engines, a heating element, a cathode spaced from said heating element, said cathode forming a closed chamber around said heating element and receiving radiant heat therefrom, and a powdered tungsten contained in said chamber, whereby the original oxygen content of said chamber is reduced and the oxygen held in the form of a compound.

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