

[72] Inventor **Otto Beesch**
Stuttgart-Sonnenberg, Germany
 [21] Appl. No. **766,177**
 [22] Filed **Oct. 9, 1968**
 [45] Patented **Mar. 2, 1971**
 [73] Assignee **Robert Bosch GmbH**
Stuttgart, Germany
 [32] Priority **Oct. 18, 1967**
 [33] **Germany**
 [31] **B73123**

[56]

References Cited

UNITED STATES PATENTS

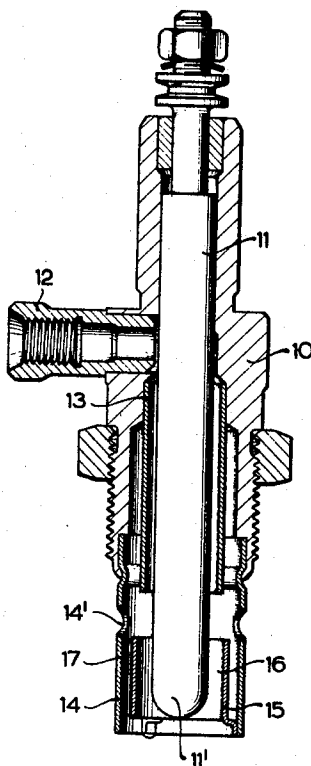
1,641,421	9/1927	French	123/145A
3,234,928	2/1966	Smith	123/142.5A
3,407,794	10/1968	Nagai et al.	123/145A
2,594,681	4/1952	Ricardo et al.	123/32
3,107,658	10/1963	Meurer	123/32
3,353,520	11/1967	Haag	123/179

Primary Examiner—Laurence M. Goodridge
 Attorney—Michael S. Striker

[54] GLOW PLUG CONSTRUCTION 2 Claims, 1 Drawing Fig.

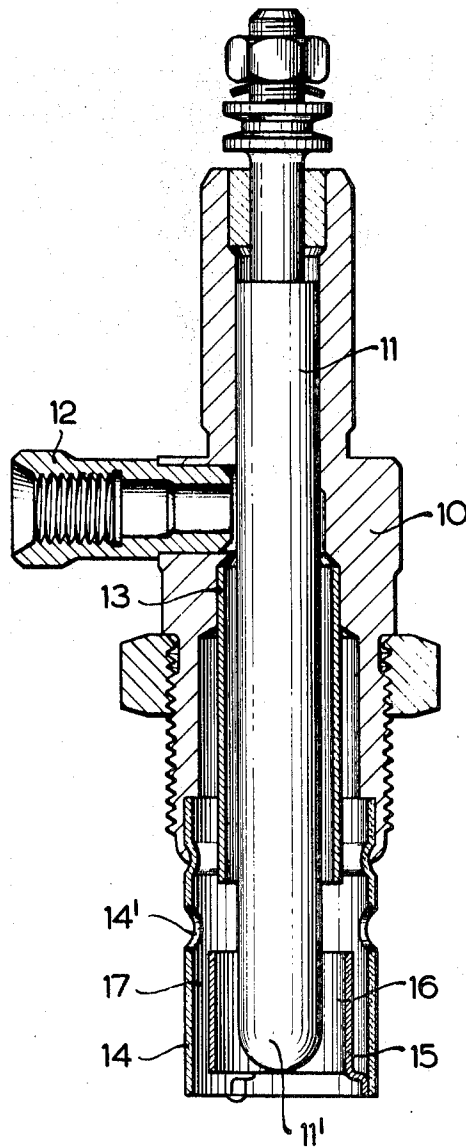
[52] U.S. Cl. **123/145,**
123/30, 123/32, 123/179
 [51] Int. Cl. **F02p 19/02**
 [50] Field of Search. **123/30.1,**
32 (SPJ), 32 (SPA), 142.5, 143, 145, 145 (A),
146.5, 179 (A); 60/39.82

ABSTRACT: A glow plug has a housing provided with an internal passage which is bounded by an inner circumferential surface and has an open front end. An elongated glow pin is carried by the housing rigid therewith and extends with radial clearance through the passage. A forward portion of the pin is located inwardly adjacent the open front end of the passage and ignition of the fuel takes place in the region of this forward front end portion. An annular insert is mounted in the passage concentrically surrounding the forward end portion of the pin and defining annular clearances with the same and with the inner circumferential surface bounding the passage.



PATENTED MAR 2 1971

3,566,850



INVENTOR
Otto BEESCH
By

Michael J. Sklar

his ATTORNEY

GLOW PLUG CONSTRUCTION

BACKGROUND OF THE INVENTION

The present invention relates to ignition devices, and more particularly to a glow plug construction.

Ignition devices of the specific type here in question, namely glow plugs, are used for various purposes, such as in effecting the ignition of a combustible fluid in diesel engines to thereby in turn heat the aspirated combustible mixture on which the diesel engine runs. Thus, glow plugs aid in startup of diesel engines as well as in after burning or after ignition at higher revolutions; their use assures that the diesel engine will rapidly achieve smooth operation after startup and will operate without smoking.

Glow plugs of this type are not new. They are known in the art and consist of a housing provided with a passage through which a glow pin extends axially. Fuel is supplied radially to the clearance between the pin and the inner circumferential surface bounding the passage and advances through this clearance to the front end portion of the glow pin, that is to the ignition region or chamber, where it is ignited. Conventionally, the housing includes a tubular sleeve portion which surrounds the forward end portion of the glow pin and limits and defines the ignition region or chamber. This tubular sleeve portion is provided with one or more apertures.

Observations have shown that the operation of these conventional glow plugs is not entirely satisfactory. Specifically, and especially during afterburning, that is at increased gas speed and high number of revolutions of the engine, the flame frequently will be extinguished because there is a significant air flow in the interior of the protective tubular sleeve portion. This causes the glow pin to be cooled and makes ignition difficult. This problem is aggravated by the fact that the vaporizing tube for the fuel, which surrounds the glow pin with small spacing and through which the fuel passes to the ignition chamber, forces the fuel into intimate contact with the glow pin so that the latter undergoes further cooling by this contact with the fuel.

All of this is, of course, undesirable and it is therefore an object of the invention to overcome these disadvantages.

More particularly it is an object of the invention to provide an improved glow plug wherein extinguishing of the flame is prevented.

SUMMARY OF THE INVENTION

In accordance with the above objects, and with others which will become apparent hereafter, one feature of my invention resides in providing a glow plug, particularly a glow plug suitable for use in diesel engines but also for other applications, wherein a housing is provided with an internal passage having an open front end. The passage is bounded by an inner circumferential surface. An elongated glow pin is rigid with the housing and extends with radial clearance through the passage. A forward end portion of the glow pin is located inwardly adjacent the open front end of the passage and ignition of fuel which is admitted through the radial clearance takes place in the region of this forward end portion. Finally, an annular insert is mounted in the passage concentrically surrounding the forward end portion and defining annular clearances both with the forward end portion and with the inner circumferential surface.

It is the provision of this annular insert which assures that during operation of my improved glow plug a ring of hot gas develops which, in conjunction with the presence of the annular insert, assures that in the annular clearance existing between the annular insert and the inner circumferential surface bounding the passage there is little turbulence in the fuel mixture. This reliably prevents extinguishing of the flame at different conditions of air flow outside the open front end of the passage.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended

claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

The single FIG. is an axial section through a glow plug incorporating my novel invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail it will be seen that my novel glow plug comprises a housing consisting of several parts. The main housing part or section is identified with reference numeral 10 and carries rigid therewith the tubular housing part or section 14. The sections 10 and 14 respectively are provided with a rear part and a front part of the passage in which the glow pin 11 is located. Over part of its length the glow pin is surrounded by the tube 13 which is an atomizer or evaporator tube of known construction and function and which may be considered a part or section of the housing so that the latter consists of the sections 10, 13 and 14.

The glow pin 11 defines with the inner circumferential surface bounding the passage, including the inner surface of the section 13, an annular conduit the rear part of which communicates with a fuel-inlet nipple 12 so that fuel entering through this nipple will enter into this annular conduit and will flow to the open front end of the section 14. The forward end portion of the glow pin 11 is identified with reference numeral 11' and is located inwardly adjacent the open front end of the section 14, as illustrated. It is in the region of the forward end portion 11', that is within the confines of the section 14, that ignition of the fuel occurs. The circumferential wall of the section 14 is provided with one or more apertures 14'.

In accordance with my present invention an annular insert 15 is located within the open front end of the section 14 concentrically surrounding the forward end portion 11' of the glow pin 11 and defining with the same an inner annular clearance 16, and with the inner circumferential surface of the passage in the housing, that is here with the inner circumferential surface of the section 14, an outer annular clearance 17.

In operation of my novel glow plug the annular insert 15 becomes heated and contact of the fuel with the hot surface of the insert 15 results in better evaporation of the fuel on afterburning, thereby preventing extinction of the flame. In the clearance 17, on the other hand, a ring of hot gas will develop which prevents turbulence of the ambient air from reaching and extinguishing the flame and which also prevents undesired and undue cooling-down of the glow pin, particularly the forward end portion 11' thereof.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

I claim:

1. A glow plug for use in diesel engines, comprising in combination, an elongated glow pin having a rear portion and a front portion having a free terminal end; connecting means for connecting said rear portion with a source of electrical energy for heating said glow pin; wall means having a first section surrounding and supportingly engaging said rear portion, and a tubular second section forming about said front portion an annular gap having a front opening forwardly of but adjacent to said terminal end; fuel-admitting means communicating with said annular gap in the region of a rear end thereof for feeding an annular stream of liquid fuel through said gap towards said front opening, whereby the fuel becomes vaporized by contact with the heated front portion of said glow pin; air admitting means for admitting air into the vaporized fuel for ignition of

3

the resulting fuel-air mixture at said terminal end of said glow pin; and an annular metal insert mounted within said gap inwardly of said front opening rigid with and supported by said tubular second section, said annular metal insert surrounding said terminal end of said glow pin concentrically and defining annular clearances with said terminal end and with said tubu-

4

lar second section.
2. A glow plug as defined in claim 1, said air-admitting means comprising aperture means provided in said tubular second section intermediate said annular metal insert and said fuel admitting means.

10

15

20

25

30

35

40

45

50

55

60

65

70

75