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GLOW PLUG

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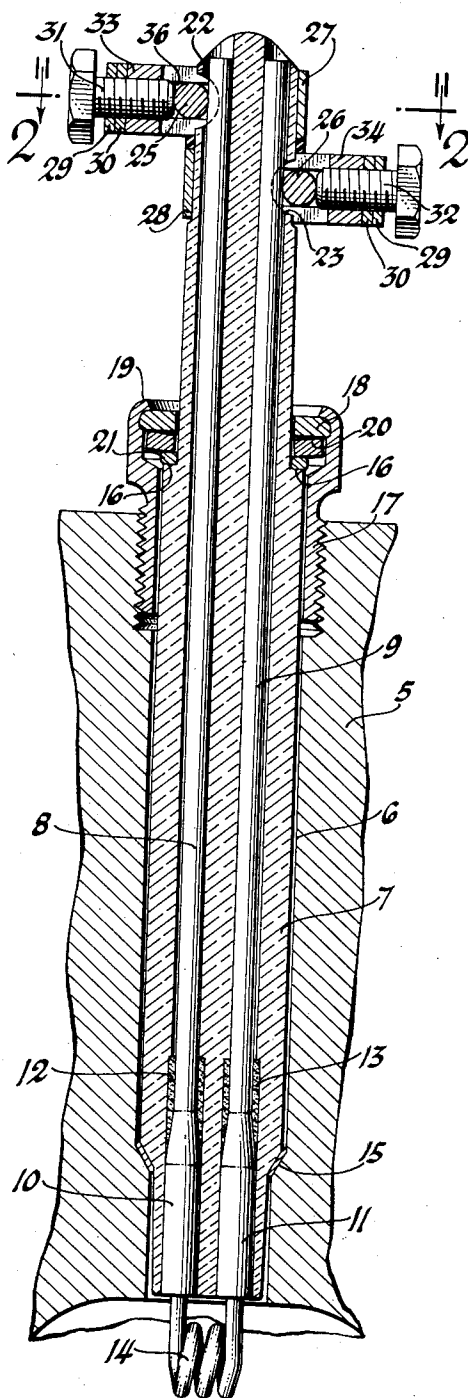


Fig. 1

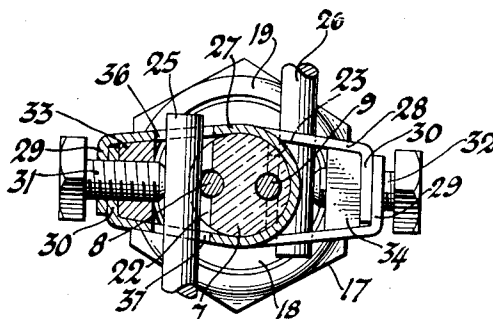


Fig. 2

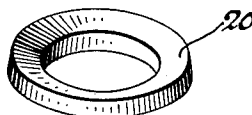


Fig. 3

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GLOW PLUG

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5 Claims. (Cl. 123—145)

My invention relates to igniting devices, commonly referred to as "glow plugs", for use with internal combustion engines to ignite the combustible mixture within the engine cylinder; such plugs being commonly used in heavy oil and the like engines at the starting thereof.

Glow plugs of the type to which my invention relates include an igniting element of high resistance which is heated to incandescence by a current of electricity of low voltage, for example from a source supplying current at about two volts or thereabout, and the combustible mixture comes into direct contact with said igniting element. As stated, such plugs are for use when starting the engine and the heating current is ordinarily discontinued after the engine is in operation and has become heated, after which ignition occurs automatically as in Diesel or semi-Diesel engines.

My invention relates particularly to glow plugs wherein current is supplied to the igniting element through two electrodes which extend through passages in an insulating member, which is secured in place within an opening or passage in a cylinder head or equivalent cylinder wall; and in which no metallic shell or casing is made use of for supporting the insulating member whereby the current supply electrodes are insulated from one another. That is neither of the electrodes is grounded to the engine structure, and both are supported and insulated from one another by an insulating member which has merely to be secured in place within a passage in the cylinder wall in installing the plug for its intended use.

The preferred form of my invention is illustrated in the drawing which accompanies and forms a part of this specification, and the features wherein the same consists are particularly pointed out in the concluding claims.

In the drawing:

Figure 1 is a view showing a section upon a central axial plane extending longitudinally of a glow plug made in accordance with my invention, and illustrating the same in place in a passage in a cylinder head.

Figure 2 is a view showing a section upon a transverse plane indicated by the line 2—2, Figure 1, looking down.

Figure 3 is a perspective view showing a dished washer whereby the plug is secured in place, by a suitable gland nut as illustrated in Figure 1.

Referring to the drawing, the numeral 5 designates a cylinder head having a passage 6 leading to inside the cylinder, and 7 is a cylindrical insulating member made of a ceramic or equivalent insulating material. This member has two

passages extending throughout its length, and within which passages the electrodes 8, 9 of the plug are permanently assembled as shown. These electrodes are commonly made of copper or like good conducting material.

The electrodes are preferably enlarged at their lower or inner ends, as at 10, 11, which enlarged ends fit within enlarged lower ends of said passages as shown; and gas-tight joints between them and the passages along which they extend are secured by suitable cement as at 12, 13 which surrounds the electrodes at the points where the enlarged lower ends merge with the smaller upper parts thereof; a cement partaking of the nature of a glass being preferably used. The numeral 14 designates the incandescent igniting element of the plug, the same being preferably in the form of a coil the ends of which are fastened, as by welding, to the inner ends of the electrodes. This coil is made from a material of high resistance so that it will be heated to incandescence by a current of electricity supplied thereto through the electrodes 8, 9.

The passage 6 is formed with an internal ledge, at 15, and the insulating member 7 has a lower shoulder which overlies this ledge and whereby said member is supported inside said passage. Said insulating member is reduced in diameter at its upper or outer end, whereby an upper shoulder is provided at 16; and 17 designates a gland nut which screws into the upper end of the passage 6 and holds the plug in place therein. This gland nut has a metallic holding ring 18 shown as secured within its upper end by an interned flange 19 and through which the upper end of the insulating member 7 extends, so that said holding ring remains permanently assembled with the gland nut; and this holding ring bears upon a slightly dished washer 20 which presses against a soft copper gasket 21 resting upon the ledge 16, whereby the insulating member 7 is held in place by slightly yieldable securing means as will be understood.

The insulating member 7 is provided near its upper end with oppositely disposed recesses 22, 23 whereby short lengths of the electrodes 8, 9 are exposed, so that supply conductors 25, 26 extending transverse to the axis of the plug may contact with the sides of said electrodes adjacent their upper ends, as shown particularly in Figure 1; and clamping means are provided for forcing said supply conductors against the sides of said electrodes to thereby connect them to the plug and secure good contacts between the conductors and the electrodes.

In the preferred form of my invention illustrated said clamping members comprise U-shaped bands 27, 28 which are supported by and extend about and bear against the sides of the upper end of the insulating member, whereby said member serves as an abutment which restrains sidewise movement of the clamping members which, as will be seen, extend in opposite directions from the axis of the plug. The ends of these bands are 5 turned and brought together, as at 29, 30, Figure 2, and have holes through which screws 31, 32 extend; nuts 33, 34 being arranged between the sides of the bands so as to provide better threads for the screws to cooperate with in forcing the 10 conductors 25, 26 against the sides of the electrodes 8, 9. The inner ends of said screws, which as will be seen extend at right angles to the electrodes, engage with the current supply conductors 25, 26 and force them against the electrodes, and 20 said bands have oppositely arranged side openings 36, 37 through which said conductors extend, as best shown in Figure 2.

Having thus described and explained my invention, I claim and desire to secure by Letters 25 Patent:

1. In a glow plug of the class described, an insulating member adapted to be held in place within a passage in a cylinder wall, and which member has a longitudinally extending passage; an 30 electrode located within said passage and through which current is supplied to an igniting element at the inner end of the plug; a clamping member supported by and located adjacent the upper end of said insulating member and engaging a lateral 35 part thereof, so that the insulating member provides an abutment which restrains sidewise movement of said clamping member; and a screw carried by said clamping member and arranged at right angles to said electrodes; said insulating 40 member having a recess adjacent the inner end of said screw whereby a short length of said electrode is exposed, and whereby a transversely extending supply conductor may be forced into engagement with said electrode by the inner end of 45 said screw.

2. In a glow plug of the class described, an insulating member adapted to be held in place within a passage in a cylinder wall, and which member has a longitudinally extending passage; an electrode located within said passage and through 50 which current is supplied to an igniting element at the inner end of the plug; a U-clamping member extending about and supported by and located adjacent the upper end of said insulating member 55 whereby said upper end provides an abutment which restrains sidewise movement of said clamping member, and which clamping member has oppositely located openings through which a supply conductor may extend; and a screw carried by 60 said clamping member and arranged at right angles to said electrode; said insulating member having a recess adjacent the inner end of said

screw whereby a short length of said electrode is exposed, and whereby a transversely extending supply conductor extending through the oppositely disposed openings aforesaid may be forced into engagement with said electrode by the inner end of said screw.

3. In a glow plug of the class described, an insulating member adapted to be held in place within a passage in a cylinder wall, and which member has two longitudinally extending passages; electrodes located within said passages and whereby current is supplied to an igniting element at the inner end of the plug; clamping members supported by and located adjacent the upper end of said insulating member and whereby 15 said upper end provides an abutment which restrains sidewise movements of said clamping members, and which clamping members extend opposite to one another relative to the axis of the plug; and screws carried by said clamping members and arranged at right angles to said electrodes; said insulating member having oppositely disposed recesses adjacent the inner ends of said screws whereby short lengths of said electrodes are exposed, and whereby parallel trans- 20 versely extending supply conductors may be forced into engagement with said electrodes by the inner ends of said screws.

4. In a glow plug of the class described, a cylindrical insulating member having a lower shoulder 30 for supporting said member within a passage in a cylinder wall, and an upper shoulder for holding said member in place within said passage; two electrodes extending through passages provided in said insulating member; an igniting element 35 connected to the inner ends of said electrodes; a tubular gland nut having a holding ring secured in place within its upper end, and through which the upper end of said insulating member extends; a gasket resting upon the upper one of the shoulders aforesaid; a dished washer arranged between 40 said upper shoulder and said holding ring; and means for connecting supply conductors to the upper ends of said electrodes.

5. In a glow plug of the class described, a cylindrical insulating member; two electrodes extending through passages provided in said member, and which electrodes have enlarged lower ends fitting within enlarged portions thereof adjacent 50 the lower ends of said passages; cement materials disposed at the points where the enlarged lower and the upper portions of said electrodes merge with one another, and whereby gas-tight joints are provided between said electrodes and the passages through which they extend; means for 55 holding said insulating member in place within a passage in a cylinder wall; an igniting element connected to the inner ends of said electrodes; and means for connecting supply conductors to the upper ends of said electrodes. 60

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