Dec. 19, 1939. O. C. ROHDE 2,183,696

RADIO SHIELDED SPARK PLUG

Filed Sept. 23, 1938

FIG. 1.

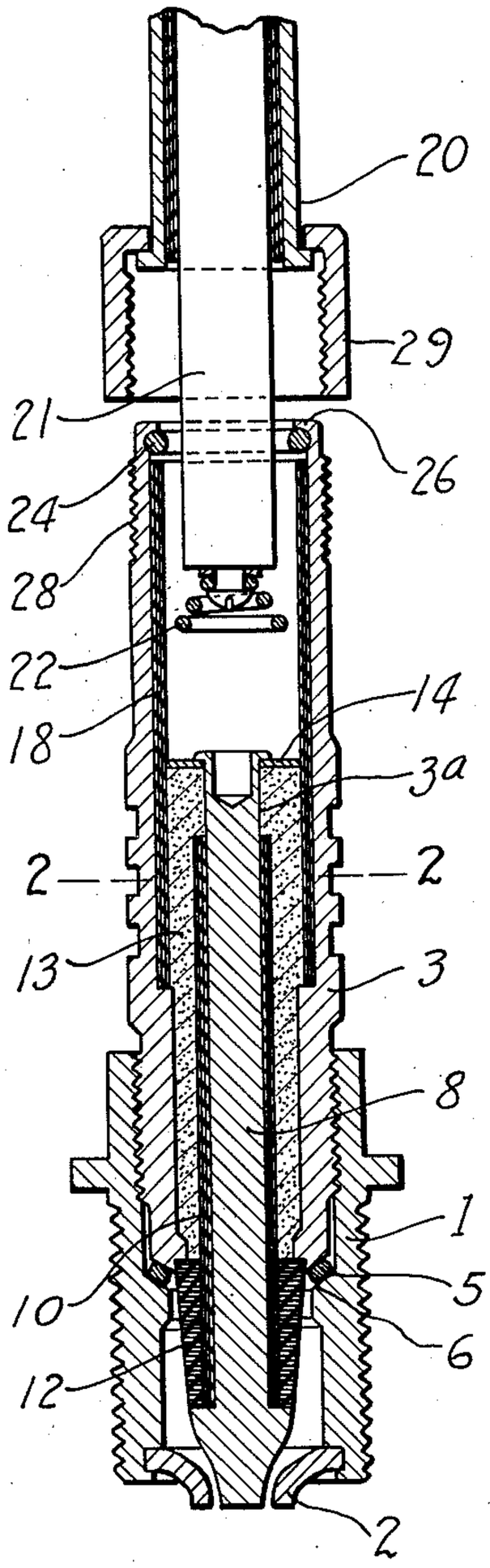
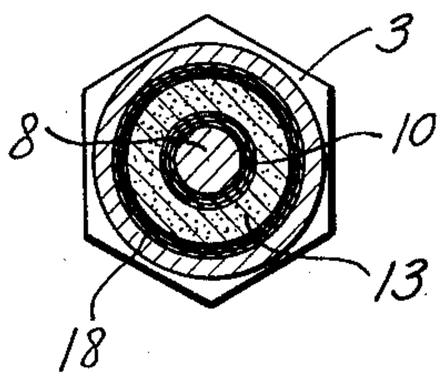


FIG. 2.



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RADIO SHIELDED SPARK PLUG

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Application September 23, 1938, Serial No. 231,410

2 Claims. (Cl. 123—169)

This invention relates to radio shielded spark plugs, and is particularly directed to improved features of construction of such spark plugs.

The primary object of the invention is the provision of a radio shielded spark plug which is easily assembled in a manner to provide against leakage and in which the parts subject to wear are amply protected.

Another object of the invention is the provision of a radio shielded spark plug in which the center electrode is held in place by a compactible insulating material having a high heat conductivity so that a gas-tight seal is provided around the center electrode and at the same time heat from the electrode is dissipated to the atmosphere.

Other objects and advantages of the invention will become apparent as the description proceeds, reference being had to the accompanying drawing, in which—

Figure 1 is a longitudinal section of a radio shielded spark plug embodying the features of the present invention, and Fig. 2 is a section on line 2—2 of Fig. 1.

Referring to the drawing, 1 designates a shell having the usual external threads for engagement in a cylinder head of an internal combustion engine, and carrying an outer electrode 2 at its lower end. An elongated, tubular metallic jacket 3 is received in threaded engagement with the upper end of the shell 1 and the joint between the two parts is sealed by a gasket 5 compressed between the lower end of the jacket and a cooperating shoulder 6 formed on the interior of the shell 1. It will be seen that the shell and the tubular jacket are functionally integral after being assembled.

A center electrode 8 is held within the jacket 3 and extends below this member into cooperative relationship with the outer electrode 2. A mica sleeve 10 surrounds the center electrode for a portion of its length, and, adjacent the lower end of the electrode, is in turn surrounded by a stack of graduated mica washers 12 or other suitable insulating body. It is, of course, necessary that the spark plug be sealed against leakage around the center electrode. This requires that a gas-tight seal be provided around this element and that the sleeve 10 be forced against the surface of the electrode under considerable pressure, and that this pressure be maintained. To this end, the present invention contemplates the use of powdered insulating material 13 tamped in the space surrounding the center electrode, the powder being of such nature that the particles interlock with each other to maintain the positions to which they are forced by the high tamping pressure. Thus, if the powder is tamped in place under a high pressure, the mica sleeve 10 is forced against the center electrode and, since the powder maintains its tamped position by interlocking of its particles, the sleeve is held tightly in place. For a portion of the length of the center electrode, as at 3a, the tamped powder is in direct contact with the metal. The powder used may consist principally of talc and a borate of an alkaline earth metal as described and claimed in the copending application Serial No. 138,397. Although the borate may be omitted where other insulation is arranged so that current can pass through the powder only by a long path. This powder, when compacted, has a heat conductivity comparable to that of cold rolled steel, so that heat drawn from the combustion chamber of the engine through the center electrode flows very rapidly through the compacted insulating material to the jacket 3 where it is dissipated to the atmosphere.

A contact plate 14 is placed over the mass of powdered insulating material and is maintained in electrical contact with the center electrode in any suitable manner as by upsetting the end of the electrode over the plate.

The upper portion of the jacket 3, above the center electrode, is lined with any suitable insulating body such as a mica sleeve 18. This sleeve must extend below washer 14, and should extend below the top of sleeve 10 if powder 13 is not borated. Mica or other mechanically relatively insubstantial insulating material used in this connection must be protected against fraying and abrasion at the exposed upper end by repeated insertions of the ignition lead assembly, which latter is designated 20. The ignition wire 21 carries a suitable contact at its inner end, which includes a spring 22 designed to bear against contact plate 14 when the parts are in assembled position. The ignition lead assembly forms no part of the present invention, and is shown entirely by way of illustration. Since the ignition lead or conductor is housed within a metal chamber and hence subjected to unusually high temperatures some means must be found to protect the end of the conductor against heat flowing from the combustion chamber through the center electrode. By using the compacted powder having a very high heat conductivity this heat is dissipated before it reaches the point of connection between the conductor and center electrode. In

this way, the possibility of burning the tip of the conductor 21 is practically obviated.

To protect the sleeve 18, the present invention provides an extremely simple and expedient means in the form of a snap ring 24 which is received in a suitable annular recess in the upper end of the jacket 3. The snap ring has an internal diameter smaller than the inner diameter of the sleeve 18. The ring 24 is held against any outward displacement by rolling the extreme end of the jacket inwardly as at 26 to overlie the ring, or by otherwise pounding a groove in the inner surface of jacket 3. It will be seen that the sleeve 18 terminates slightly short of the snap ring 24 so that any force exerted on the latter will not be communicated to the relatively insubstantial insulating material, but will be transmitted directly to and absorbed by the jacket 3.

Screw threads 28 are formed on the upper end of the jacket for engagement with the coupling 29 of the ignition lead assembly 20. Obviously, any suitable type of harness for the ignition wire may be used.

While the invention has been disclosed in connection with a spark plug having a particular form and disposition of the parts, it will be readily appreciated that numerous changes will suggest themselves to those skilled in the art. It should be expressly understood that such changes may be made without departing from the spirit of the invention as defined in the appended claims.

The invention claimed is:

1. In a radio shielded spark plug having a metallic shell and a jacket functionally integral with said shell, a center electrode, a mica sleeve surrounding said center electrode for a portion of its length, and means to fix said center electrode in said jacket comprising a body of compacted powder surrounding said sleeve and electrode, said powder being of a nature such that the particles interlock when subjected to pressure and remain interlocked when the pressure is released, whereby said mica sleeve is held in tight engagement with said center electrode.

2. In a radio shielded spark plug having a metallic shell and a tubular metallic jacket functionally integral with said shell adapted to receive an ignition lead and contact, a center electrode, and a body of compacted powder occupying at least the major portion of the space between said electrode and jacket, said powder being of a nature such that the particles interlock when subjected to pressure and remain interlocked when the pressure is released and the powder having a heat conductivity in the order of that of cold rolled steel whereby heat from the center electrode is dissipated through said metallic jacket.

EDITH E. ROHDE.
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