Nov. 15, 1938. M. J. FINNEGAN ET AL 2,136,497

SPARK PLUG

Filed Jan. 6, 1936

Fig. 1

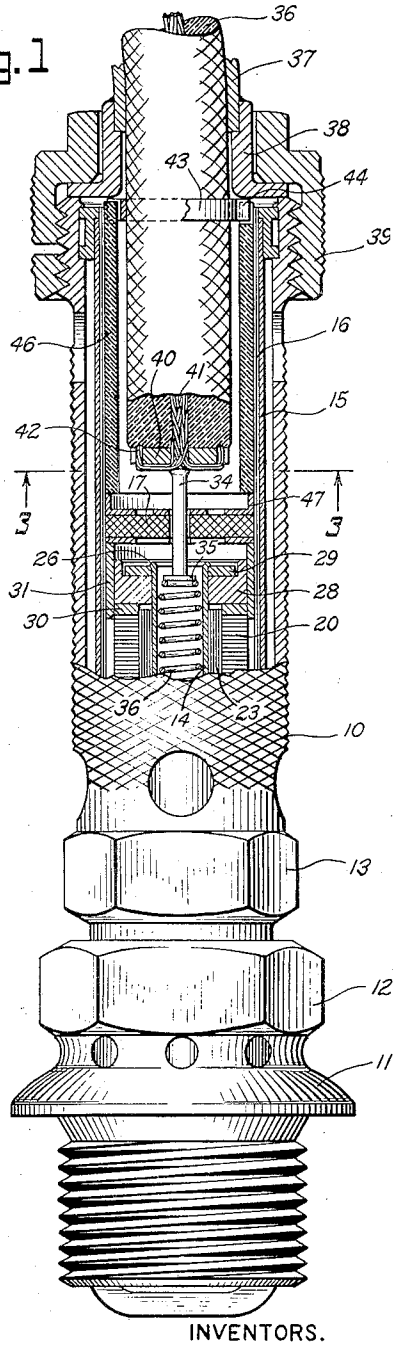


Fig. 2

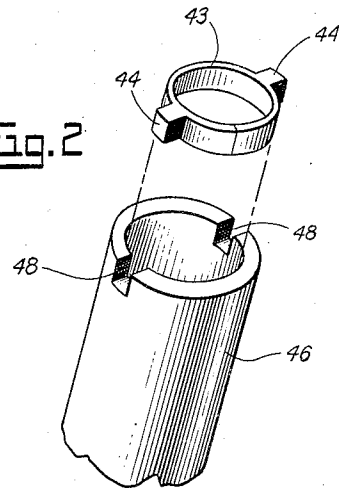
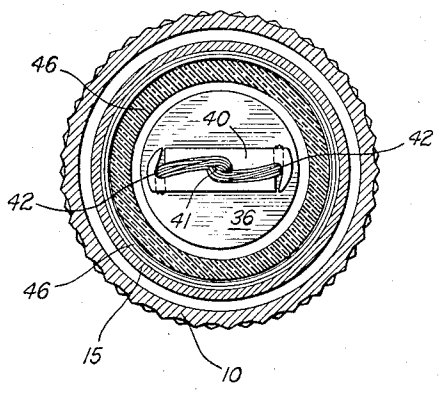


Fig. 3



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SPARK PLUG

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Application January 6, 1936, Serial No. 57,816

7 Claims. (Cl. 123—169)

This invention relates to spark plugs, and more particularly to spark plugs of the type wherein the high tension circuit is not only insulated but also "shielded" or screened to prevent interference with the reception of signals in adjacent radio equipment.

Objects of the invention are to provide improved shielding and insulation for the high tension circuit of a spark plug, as well as a novel structural combination of parts adapted to cooperate in the attainment of improved shielding and insulating properties.

For example, we provide, for application to a shielding element of the mica sleeve lined type, an improved method of protecting the mica lining, as well as a novel construction of adjacent parts to eliminate the possibility of fraying at the edges of the mica, notwithstanding repeated withdrawals and re-insertions of the connecting cable.

Another object is to secure the cable against the possibility of accidental withdrawal.

Further purposes will appear in the specification and claims.

In the drawing we have illustrated the invention as applied to a structure which we regard as conventional but representative of other forms which may be employed, and to which the invention may be applied without departure from the principles of the said invention, as disclosed herein.

Fig. 1 is a longitudinal sectional view of a device embodying the invention;

Fig. 2 is a perspective view of a detail; and

Fig. 3 is a transverse sectional view along line 3—3 of Fig. 1, on a slightly enlarged scale.

Referring principally to Fig. 1 the apertured shielding element 10 is shown as an upward extension of the cylinder engaging base or shell 11, there being an intermediate polygonal portion 12 which receives the wrench or other tool for insertion of the plug in the cylinder wall. The lower portion of the element 10 is also shown as provided with a polygonal section 13 facilitating its attachment to the shell 11, but it is to be understood that the two members 10 and 11 may be integral if preferred.

In the space between the element 10 and the center electrode spindle 14, there is a cooling and ventilating chamber surrounding a long thin metallic sleeve 15 lined with a tube 16 of rolled mica constituting the wall of a second annular chamber closed at its upper end by heat resisting disc or washer 17 resting upon an assembly of seal maintaining parts of brass or other compressible metallic material, adapted to exert pressure upon a second insulating body 20 composed of a plurality of compressed mica washers, the lower of which are concealed in the drawing, but correspond in structural arrangement to the conventional mica washer assembly as illustrated, for example, in Hyland Patent Number 1,950,408. Between the mica stack 20 and the center electrode 14 there is the usual rolled mica wrapper 23 which extends upwardly for almost the complete length of the spindle 14, the upper portion thereof being confined with the mica stack 20 by the pressure exerted thereon when the upper hollow end 26 of the spindle is turned downwardly or upset upon the compressible metallic elements 28, 29 and 30 the latter of which press outwardly as well as downwardly to effect a firm hold (through the instrumentality of the cooperating metallic ring 31) upon the mica lining 16 of the metallic tube 15.

Within the hollow upper portion of the spindle 14 there is provided a connecting pin 34 having an enlarged lower part 35 against which the upper end of coil spring 36 engages to urge the pin constantly against the cable core 41.

As shown, the insulated cable 36 is passed through the metal elbow 37, the latter having a terminal thimble 38, soldered to its lower end, the said thimble having a swivel, detachable connection with the barrel in the usual manner. Before attaching the thimble 38 a spacer tube 46 of Bakelite, or other rigid insulating construction, is inserted to rest on the up-standing rim of metallic disc 47 which is associated with the asbestos disc 17, the tube 46 being of sufficient length to overlie the upper edges of mica lining 16, and thus protect the mica lining against fraying or bending out of position.

After passing the cable through the elbow 37, but before inserting it into the Bakelite tube 46, a metal clip or bracelet 43 is pressed tightly about the rubber coating of the cable, at a point which is a pre-measured distance from the anchor plate 40 representing any suitable type of cable terminal—the one shown being similar to that of U. S. Patent No. 2,108,504 granted to Edward B. Nowosielski on February 15, 1938. Such a terminal has notches, as shown at 42, to receive and hold the stranded wire core 41 of the cable, the lower end of the rubber insulation of the cable being cut away to allow for installation of said terminal.

The pre-measured distance, above referred to, is such as to bring radially projecting fingers or lugs 44 of the bracelet into registry with slots 48

of tube 46. Thimble 38 is then secured in place against the upper end of the barrel. Thus the thimble 38 cooperates with lugs 44 to prevent the cable from being pulled out of the assembly (as well as to hold tube 46 is place) unless the coupling nut 39 is first unscrewed from the barrel, and the thimble itself withdrawn (with the elbow 37). In other words, the bracelet 43 prevents any relative longitudinal movement as between the cable 36 and metal elbow 37; and without such relative movement there can be no breaking of the circuit at the points 41 and 34.

What is claimed is:

1. An ignition shielding structure including a body assembled in a manner to provide a socket for the insertion of an insulated high-tension cable, a metal conduit surrounding the cable and having a metal fitting at its end for detachable engagement with the body, a spacer tube of insulating material freely movable within the socket portion of the body, and mechanically free of the insulated cable so that the latter may be withdrawn without disturbing the spacer tube, and means attached to said cable to hold said spacer tube in position pending withdrawal of the cable.

2. An ignition shielding structure including a body assembled in a manner to provide a socket for the insertion of an insulated high-tension cable, a metal conduit surrounding the cable, a spacer tube of insulating material freely movable within the socket portion of the body, but mechanically free of the insulated cable so that the latter may be withdrawn without disturbing the spacer tube, and means engageable with one end of said spacer tube to hold said spacer tube in position pending withdrawal of the cable.

3. An ignition shielding structure including a body assembled in a manner to provide a socket for the insertion of an insulated high-tension cable, a metal conduit surrounding the cable and having current conducting association with the body, a spacer tube of insulating material within the socket portion of the body, but mechanically free of the insulated cable so that the latter may be withdrawn without disturbing the spacer tube, and a cable bracelet engageable with said spacer tube, to prevent axial motion of either the spacer tube or the cable independently of the metal conduit.

4. An ignition shielding structure including a body assembled in a manner to provide a socket for the insertion of an insulated high-tension cable, a metal conduit surrounding the cable, a spacer tube of insulating material within the socket portion of the body, but mechanically free of the insulated cable so that the latter may be withdrawn without disturbing the spacer tube, a cable bracelet engageable with said spacer tube to limit axial movement of the cable in one direction, and bracelet engaging means associated with said metal conduit to limit axial movement of the cable in the other direction.

5. An ignition shielding structure including a body assembled in a manner to provide a socket for the insertion of an insulated high-tension cable, a metal conduit surrounding the cable and having a metal fitting at its end for engagement with the body, a spacer tube of insulating material within the socket, but mechanically free of the insulated cable so that the latter may be withdrawn independently of the spacer tube, and a narrow spacing bracelet fixed to said cable to be withdrawn therewith, said metal fitting being in the path of said bracelet to hold said cable against withdrawal.

6. An ignition shielding structure including a body assembled in a manner to provide a socket for the insertion of an insulated high-tension cable, a spacer tube of insulating material within the socket portion of the body, but mechanically free of the insulated cable so that the latter may be withdrawn without disturbing the spacer tube, and a mica lining for the outer wall of the socket, the relation between said mica lining and spacer tube being such that the latter serves as a protecting element with respect to the former during withdrawal of the cable and subsequent re-insertion thereof.

7. An ignition shielding structure including a central electrode spindle and a body assembled in a manner to prvoide a socket above said spindle for the insertion of an insulated high-tension cable, a member fixedly disposed transversely of the body to define the lower limit of said socket, a spacer tube of insulating material within said socket but mechanically free of the cable so that the latter may be withdrawn without disturbing the spacer tube, the lower end of said spacer tube resting upon said transversely disposed member, and current conducting means extending through said transversely disposed member to complete the electrical circuit between said cable and said central electrode spindle.

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