April 12, 1938. J. J. MASCUCH 2,113,735

RADIO SHIELDING FOR SPARK PLUGS

Original Filed June 12, 1935

Fig. 1.

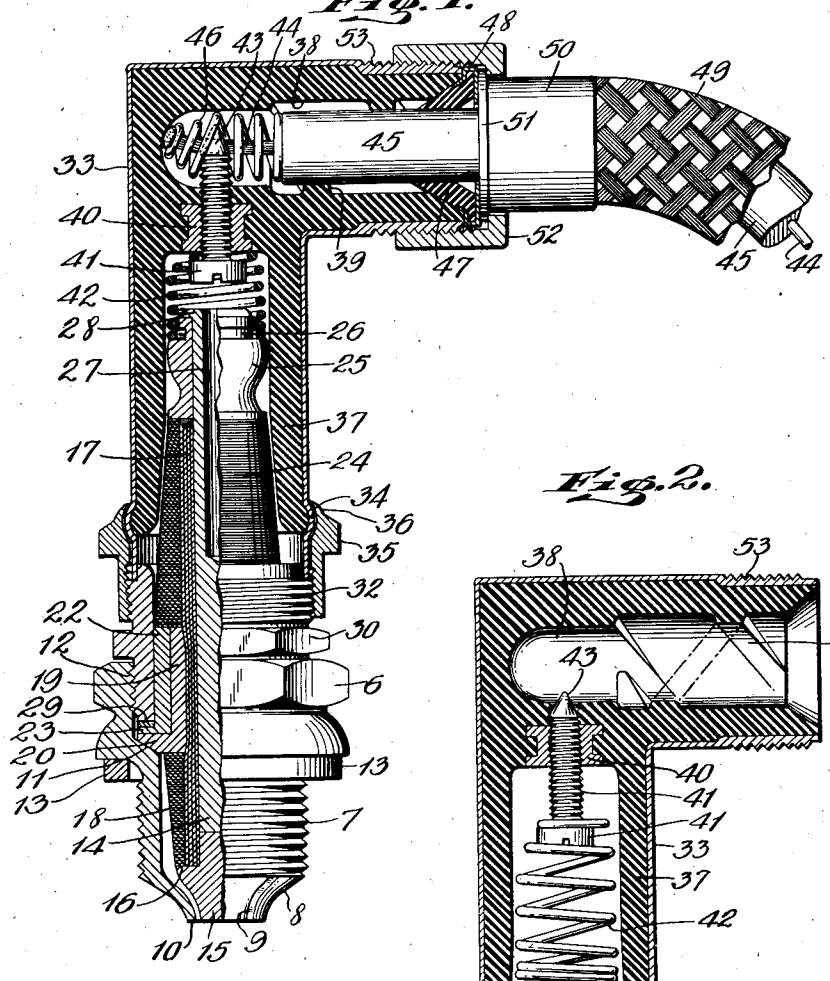
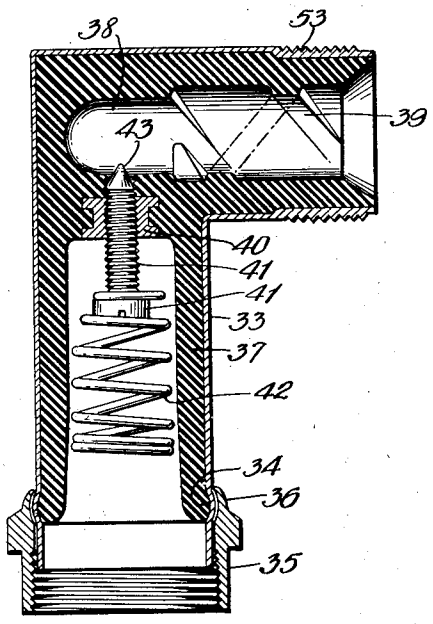


Fig. 2.



INVENTOR
JOSEPH J. MASCUCH

BY C. C. Cousins
ATTORNEY

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RADIO SHIELDING FOR SPARK PLUGS

Joseph J. Mascuch, Maplewood, N. J., assignor to Breeze Corporations, Inc., Newark, N. J., a corporation of New Jersey

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4 Claims. (Cl. 123—169)

This invention relates to spark plugs and particularly to radio shielding for spark plugs. This application is a division of application Serial No. 26,096, filed June 12, 1935, now Patent No. 2,083,916, issued June 15, 1937.

Where radio receiving apparatus is used in proximity to internal combustion engines it is necessary to shield the ignition of the engine including the spark plugs to prevent interference with radio reception. It is common practice to provide radio shielding by enclosing the spark plug in a grounded metallic casing and providing proper insulating means to space the shielding from the spark plugs.

Where a spark plug is thus shielded the heat generated during use of the plug cannot be readily dissipated. Such heat may be transmitted to the shielding cap and the insulated conductor supplying current to the spark plug with deleterious effects. The broad object of the present invention is to provide a radio shielding means for spark plugs so constructed that the excess heat from the spark plug will have no immediate effect on the dielectric portion of the shield and on the insulation of the conductor supplying current to the plug.

Where the insulated conductor is inserted in a radio shielding means it has been observed that the heat to which the parts are subjected will cause the insulation of the conductor to adhere to the dielectric of the shielding cap and, in effect, become vulcanized thereto. This has not been desirable since it is necessary to remove the insulated conductor from the shielding cap from time to time for the purpose of inspection and service. Therefore, a specific object of this invention is to provide a radio shielding cap so constructed as to minimize the danger of the insulated conductor adhering to the dielectric of the shielding means by reason of the heat to which the parts are subjected.

A further specific object of the invention is to provide a radio shielding means so constructed that an air space will be permitted between the insulated conductor and the dielectric of the shielding means.

The invention consists of the construction, combination and arrangement of parts as herein illustrated, described and claimed.

In the accompanying drawing, forming part hereof, is illustrated one form of embodiment of the invention, in which drawing similar reference characters designate corresponding parts, and in which:

Figure 1 is a vertical section, partly in elevation, showing the spark plug and the radio shielding cap together with the ignition conductor; and,

Figure 2 is a vertical section through the radio shielding cap.

Referring to the drawing, the outer part of the spark plug comprises a shell 6 provided with external screw-threads 7 for engagement in an appropriate opening in a cylinder head. The lower part of the shell 6 is formed with an inwardly curved base 8 having formed therein a plurality of slots 9 to provide a plurality of sparking points or areas 10. The shell 6 is provided with an internal shelf or shoulder 11 and the upper part of the shell 6 is provided with internal threads 12 to receive a retaining means as hereinafter described. A washer 13 may be disposed adjacent the threads 7 to insure a gas-tight seal between the shell 6 and the cylinder head of the engine which receives the spark plug.

Disposed in the shell 6 is a center electrode 14 having a tip 15 formed with a shoulder 16. Disposed around the electrode 14 is a mica tube 17. On the outside of the tube 17 near the lower portion thereof is a stack of mica washers 18, and a complementary stack of washers 24 are disposed around the upper portion of the tube 17. Centrally of the tube 17 is disposed a bushing 19 having a flange 20 and a sealing hoop 22 having a flange 23. The upper end of the spark plug is provided with a metal head 25 formed with a recess 26 to receive a contact, as hereinafter described.

The upper end of the electrode 14 is provided with a bore 27 and the extremity 28 of the electrode 14 is turned over to seal the parts of the plug together. A washer 29 is disposed on the flange 23 and the parts of the spark plug are held in the shell 6 by means of a cap nut 30 having a threaded portion 32 to receive the radio shielding means, hereinafter described. The structure of the spark plug per se forms no part of the present invention, but is claimed in the parent application Serial No. 26,096.

The radio shielding means comprises a metallic cap 33 which is adapted to be placed over the upper end of the spark plug. The cap 33 may be in the form of an elbow as shown, or may have a different shape. The lower edge of the cap 33 is formed with a bead 34 which is adapted to be engaged by a coupling nut 35 formed with a flange 36 which is turned over the bead 34. The nut 35 is free to rotate on the cap 33 and is adapted to engage the threads 32 on the upper part of the retaining member 30 while the lower skirt of the cap 33 contacts the member 30. In this way a good electric contact is made and the cap 33 may

be readily removed for the purpose of inspecting or servicing the spark plug.

The cap 33 is provided with a dielectric lining 37 having a thickness sufficient to effectively insulate the terminal 25 and the contact means hereinafter described from the cap 33. The upper portion of the lining 37 is formed with a bore 38 to receive a conductor with its insulation. In order to prevent the insulation of the conductor from being vulcanized to the walls of the bore 38 by reason of the high temperatures encountered, the walls of the bore 38 are formed with ribs 39 which space the insulation of the conductor from the walls and provide a passage for the circulation of air.

Carried by the lining 37 is a threaded bushing 40 in which is threaded a contact screw 41 to the lower end of which is connected a spring 42 adapted to make contact with the terminal 25 of the spark plug. The upper end of the screw 41 is provided with a point 43 adapted to make contact with the conductor.

A conductor 44 surrounded by insulation 45 is provided to supply current to the spark plug. In the past, it has been the practice to extend the insulation 45 to the left hand end of the bore 38 and the point 43 of the screw 41 was used to pierce the insulation 45 to make contact with the conductor 44. This practice causes burning of the insulation 45, which is undesirable. In order to avoid this condition the conductor 44 is extended to the end of the bore 38 but the insulation thereof 45 is removed for an appreciable distance, as shown in Figure 1. A coil spring 46 is connected to the conductor 44 and surrounds the conductor. The contact screw 41 extends partially through the coil spring 46 to make an effective electrical contact by reason of the resiliency of the spring 46, and at the same time the danger of burning the insulation 45 is eliminated.

At the point where the conductor 44 with its insulation 45 leaves the cap 33, a conical packing 47 provided with a copper or other metallic reinforcing means 48 is disposed. The packing 47 may be of the type shown in co-pending application, Serial No. 731,833, filed June 22, 1934, and not only provides a waterproof joint, but the metallic portion 48 serves to improve the electrical contact between the cap 33 and a radio shielding conduit 49 which surrounds the conductor 44 with its insulation 45. The conduit 49 is provided on its end with a ferrule 50 formed with a flange 51, and a coupling nut 52 serves to hold the conduit 49 against the cap 33 by reason of engagement with threads 53 formed on the cap 33. The pressure of the ferrule 50 against the packing 47 has a tendency to force the packing 47 inwardly against the insulation 45, thereby holding the conductor 44 firmly in place and removing any strain from the end of the conductor, which eliminates the possibility of breakage of the conductor 44 at the point of contact with the screw 41.

The general structure of the shielding cap and contact means may be the same as shown in co-pending applications Serial No. 481,766, filed September 13, 1930, and Serial No. 657,166, filed February 17, 1933. The structure of the conduit may be the same as shown in co-pending application Serial No. 657,167, filed February 17, 1933.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In combination with a spark plug and an insulated cable therefor, a radio shielding cap to cover the upper end of the plug, said cap being formed with a bore to receive the insulated cable and the wall of said bore being provided with ribs to space the insulation of the cable from the wall throughout the portion of the bore adjacent the cable.

2. In combination with a spark plug and an insulated cable therefor, a radio shielding cap to cover the upper end of the plug, said cap being formed with a bore to receive the insulated cable and the wall of said bore being provided with ribs extending substantially the entire length of the bore to space the cable from the wall to prevent adherence of the insulation to the wall of the bore.

3. In combination with a spark plug and an insulated cable therefor, a radio shielding cap to cover the upper end of the plug, said cap being formed with a bore to receive the insulated cable and the wall of said bore being provided with a helical rib to space the cable from the wall.

4. In combination with a spark plug and an insulated cable therefor, a radio shielding cap to cover the upper end of the plug, said cap being formed with a bore to receive the insulated cable and the wall of said bore being provided with a continuous helical rib to space the cable from the wall.

JOSEPH J. MASCUCH.