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SHIELD FOR SPARK PLUGS

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FIG. 1

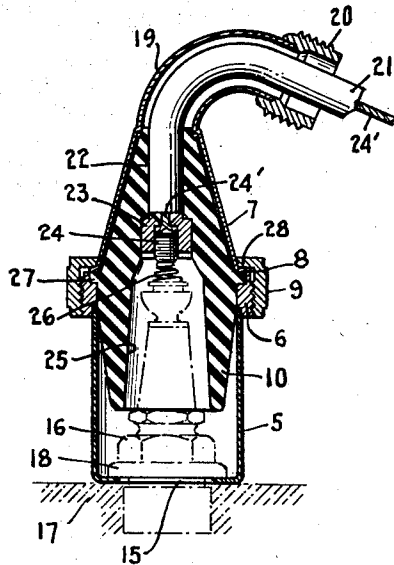


FIG. 2

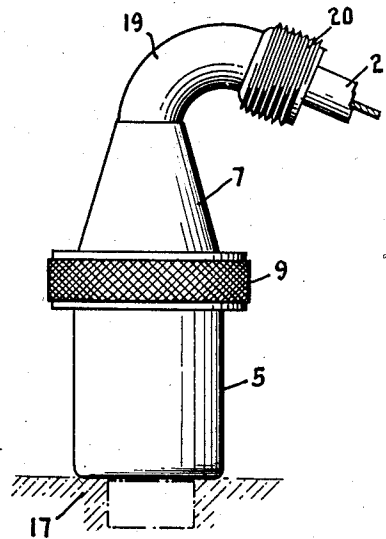


FIG. 3

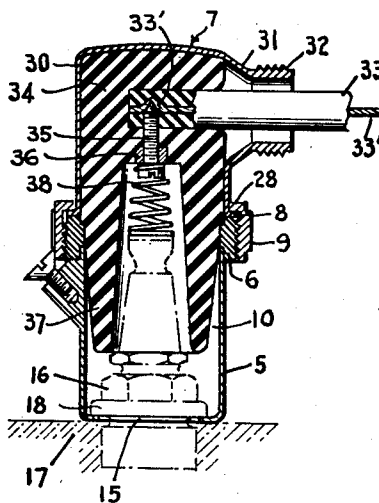
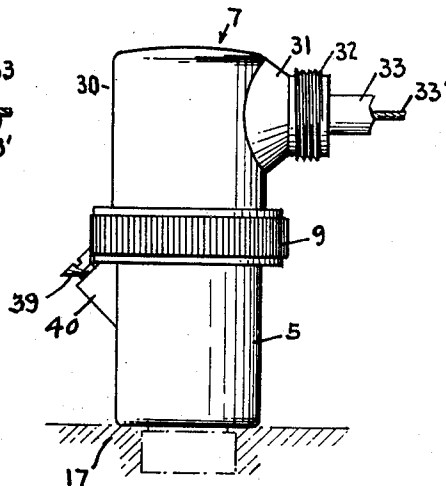


FIG. 4



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SHIELD FOR SPARK PLUGS

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5 Claims. (Cl. 123—169)

This invention relates to radio shielding of spark plugs and is particularly applicable in conjunction with aviation engines. Spark plugs are desirably shielded and provided with a metal housing whenever they are used on engines which are located in the vicinity of radio apparatus to prevent interference by the variable ignition currents with such apparatus.

Heretofore spark plugs have been provided with shields, in which the insulating material, required for the incoming conductor cables, was poured or cast into the metal casing which formed a part or a whole of the spark plug shield. This not alone resulted in a cumbersome moulding process, but it also manifested certain disadvantages in that it made the shield less flexible in its application.

The casting or moulding of the insulating material, such as Bakelite, within the metal casing or shield has been such that the moulded insulating member could not be removed from the metal casing. It was therefore impossible to inspect the moulded insulation to ascertain whether or not there were blow holes in it (which may seriously impair the insulation) or it was in other respects suitable for the most efficient use. Furthermore, the moulded insulating member being not removable from the metal casing if any of the parts of the insulator should become broken, which was not unusual, the only remedy was to throw away the whole shield and substitute a new one.

One of the objects of the invention, therefore, is to provide for the insertion and removal of the insulating member in and from the shield whereby the insulating member can be replaced if it is injured or broken without throwing away the entire shield.

A further object of the invention is to form the insulator in its final molded condition outside the casing, when it may be properly inspected, and rejected if unfit, which insulator may then be inserted in the casing.

Other and ancillary objects of the invention will appear hereinafter.

In the accompanying drawing which illustrates the invention:

Fig. 1 is a vertical sectional side view of one type of spark plug shield;

Fig. 2 is a full side view of Fig. 1;

Fig. 3 is a vertical sectional side view of a modified form of the shield shown in Fig. 1; and

Fig. 4 is a full side view of Fig. 3.

The spark plug shields of Figs. 1 to 4 comprise each three principal parts or elements. These

are: the lower metal casing 5 provided with a threaded upper end part 6; the upper metal casing 7, having at its lower end a flange 8, against which rests a threaded nut 9; and an insulator element 10 of molded Bakelite or other suitable material, insertable into both casings 5 and 7.

Referring to Figs. 1 and 2, the bottom of the lower casing 5 is provided with a circular mounting hole 15, large enough to receive the threaded part of spark plug 16. The lower casing may thus be mounted to the frame 17 of the engine by means of the spark plug and securely held thereto by the spark plug flange 18. The lower casing 5 is preferably made cylindrical and may be provided on its outer surface with conventional cooling webs, if so desired.

The upper metal casing 7 is of conical shape and has at its top a metal goose-neck shaped conductor outlet 19, provided with a thread 20 for securing the insulated casing with the metal conduit or shield for the ignition lead from the manifold by means of a conventional nut.

The insulating element or insulator 10 is made to fit the inside of casing 7, and has at its top part a bore 22, wherein the end part of insulated conductor 21 is made to enter. A metallic connector block 23,—which may be molded into the insulator,—is provided with a thread and a screw 24, for the purpose of securing the bare wire 24' of the insulated wire to this block. Below block 23, the insulator is provided with an enlarged bore or cavity 25, to give sufficient air space, as well as a massive insulation for the spark plug, which is thus fully surrounded by the insulator. The lower part of the insulator extends to substantially the lower metal parts of the spark plug, so as to provide a good insulation against the high tension current.

At the top of the spark plug is located a helical metal spring 26, which is secured to the screw 24, and presses against the central electrode of the spark plug, to provide an electric connection between conductor 24' and the spark plug electrode.

At the outer surface of the insulator and at substantially its middle part, as seen in a longitudinal direction, this insulator is provided with a flange 27. The lower surface of this flange rests on the threaded part 6, thus locating the insulator relative to the height of lower casing 5. The upper surface of flange 27 is opposed by the flange 8 of the upper casing 7. Nut 9 is provided with an inner flange 28, which serves the purpose to press the flanges of the upper casing and the

insulator against the lower casing when the nut has been tightened.

In the modification shown in Figs. 3 and 4, the lower casing 5 has the same form as that of Fig. 1, being fastened to the engine 17 in the same manner, that is, by means of spark plug 16. The upper casing 7 is, however, shown different and in form of a cylinder 30, having an outlet 31 with a threaded part 32 to the side thereof. Insulated conductor 33, passing through this outlet, enters a recess in the cylinder 34 of the insulator 10 to somewhat beyond its centre section, where a screw 35, screw threaded in a metal block 36 secured in the insulator 10, and piercing the insulation thereon contacts the conductor wire 33', to make electric connection. The lower part 37 of the insulator is also provided with a bore or cavity. A helical spring 38 secured to the screw 36 provides a means of making electrical connection between the block 36 and spark plug 16. The upper casing of Fig. 3 with its lower flange is also secured to the lower casing by means of a flanged nut 9, which may be knurled as shown. After the casing parts have been clamped together by screwing the nut 9 home, this nut may be secured against unscrewing by a screw 39 which is screwed into a lug 40 on the casing part with the axis of the screw at an angle whereby the under side of the screw head will engage with the nut 9. The threads of the screw are such with relation to those of the nut 9 that any attempt to unscrew the nut will tend to turn the screw in such direction as to force the head inwardly more strongly against the nut 9 and so the more strongly secure it against rotation tending to unscrew it. This will prevent any accidental loosening of the nut 9 whereby the casing parts would be permitted to separate. As stated, the outer surface of the nut 9 may be knurled, and in order to effect a secure engagement of the screw with the knurled surface of the nut the under side of the screw head may be also roughened or knurled.

In either one of the two designs disclosed, it is possible to adjust the position of the conductor outlet radially, by turning the upper casing before tightening same.

The insulator 10 is supported on the part 6, having a shoulder resting thereon as shown.

While the threaded part 6 of the lower casing is shown as a ring, welded or fastened in any other suitable manner to this casing, it is understood that the threaded part and the casing may be made of one piece of metal, if so desired, and that furthermore other changes may be made in the construction of the various parts shown, without however departing from the spirit of this invention.

The improved forms as shown and described, disclose spark plug shields which not alone are simple in construction and cheap to manufacture, but are also shown to possess certain definite advantages relative to their practical application. One of the principal advantages is the separate and self-contained insulator 10, which may be easily inspected relative to blow holes or other defects, before it is assembled. Furthermore an insulator may be quickly exchanged for another, should it become broken. Another advantage of my spark plug shield is its flexibility and the ease in mounting the shield to any standard make engine.

While the invention has been illustrated in what are considered its best applications, it may have other embodiments without departing from

its spirit and is not therefore limited to the structures shown in the drawing.

What we claim is:

1. In a spark plug shield elbow, the combination of a lower cylindrical metal casing retaining a spark plug and adapted to be secured to a motor frame by the conventional screw flange of the spark plug, a substantially inflexible insulating element partly insertable into said lower casing, to cover the spark plug, an upper conical metal casing adapted to cover the remaining part of said insulating element, means to electrically connect the spark plug with a conductor leading into said insulator in an axial direction, said conical metal casing being provided with a tubular extension for the conductor, said tubular extension extending laterally with relation to the spark plug axis and said insulator having a laterally extending channel communicating with the opening in said extension and means to secure said conical casing to said lower casing, said insulator being integrally insertable in and removable from said casings.

2. A spark plug shield elbow comprising two metal casings, one having a channel for the incoming ignition wire, said channel extending laterally with relation to the spark plug axis and an insulator, insertable and removable integrally from the interior of said metal casings, said insulator being substantially inflexible and having a cavity to cover a spark plug and having a protruding shoulder part on the outside at substantially its middle section to provide a means whereby to locate and secure said insulator in said metal casings, said insulator also having a laterally extending channel communicating with the aforesaid channel in the metal casing.

3. A spark plug shield elbow comprising two detachable metal casings, one having a channel for the incoming ignition wire, said channel extending laterally with relation to the spark plug axis and an insulator insertable and removable integrally from the interior of both said metal casings, said insulator being substantially inflexible and having a cavity to house a spark plug, an electrical connector device in said cavity, for the conduction of electric currents from an inserted conductor in said insulator, to the spark plug, said insulator having a shoulder on its outer circumference, to provide a means whereby to locate and secure said insulator in said metal casings, said insulator having a laterally extending channel communicating with the aforesaid channel in the metal casing.

4. A spark plug shield elbow comprising two detachable metal casings, one having a channel for the incoming ignition wire, said channel extending laterally with relation to the spark plug axis and an insulator insertable and removable integrally from the interior of both said metal casings, said insulator being substantially inflexible and having a cavity at one of its end parts, whereby to cover part of a spark plug, and an axially directed opening at its other end part, for the insertion of a conductor cable, an electrical connector device in said insulator for the electric connection of the conductor cable and the spark plug and means to securely maintain said insulator within said metal casings, said insulator having a laterally extending channel communicating with the aforesaid channel in the metal casing.

5. A spark plug shield elbow comprising in combination two metal casings, one having a channel for the incoming ignition wire, said

channel extending laterally with relation to the spark plug axis and an insulator, said insulator being integrally insertable in and removable from the interior of said metal casings, and said insulator being substantially inflexible and having a cavity to receive a spark plug and means for securing said metal casings together, said insulator having a laterally extending channel communicating with the aforesaid channel in the metal casing.

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