

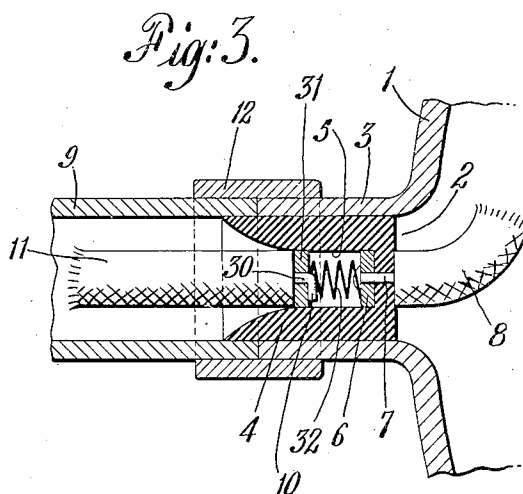
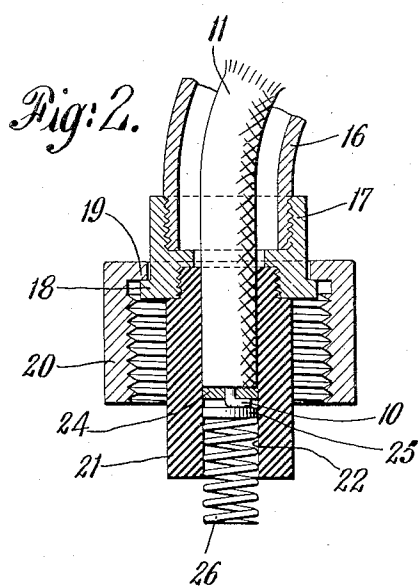
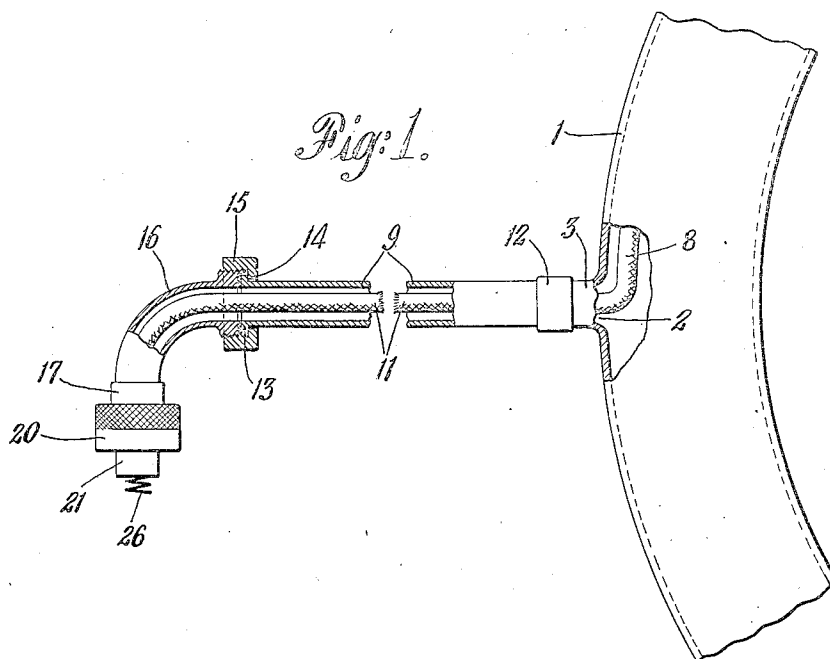
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RADIO SHIELDED SPARK PLUG LEAD

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RADIO SHIELDED SPARK PLUG LEAD

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10 Claims. (Cl. 123-148)

This invention relates to an improved structure of radio shielded spark plug lead for internal combustion engines.

As is well known, a shielded ignition system for an internal combustion engine has comprised an arc shaped structure embracing the engine shaft, through which pass all the ignition conductors leading from the magneto to the spark plugs. Such arc shaped structure serves, especially in connection with radial engines such as commonly used on aeroplanes, to guide and support the conductors about the engine shaft and also constitutes a radio shield about them, and is commonly known as a manifold. At suitable points on the manifold, conduits and conductors extend to the magneto and also extending from the manifold at certain suitable points are spark plug leads to the various spark plugs, each of said spark plug leads comprising a suitable conductor and a radio shielding conduit therefor.

The main object of the present invention is to provide an efficient and simple construction of spark plug lead.

The conductors of spark plug leads are often injured by heat of the engine or otherwise so as to require renewal.

It is a further object of the invention to provide a spark plug lead whereof the conductor can be removed or replaced with minimum trouble, delay and expense.

The renewal or replacement of a radio shielded spark plug lead has heretofore involved a joint permitting the disassembly of its conduit from the manifold. This detachability however involves the insecurity of connection of such structures and affords a joint at which water leakage may occur. Moisture within the conduit cannot be tolerated for obvious reasons.

It is therefore a further object of the invention to provide a spark plug lead wherein the conduit may be permanently connected with the manifold and the conductor nevertheless be removed or replaced.

Other and ancillary objects of the invention will appear hereinafter.

In the accompanying drawing which illustrates the invention—

Fig. 1 is a view, partly in side elevation and partly in axial section, of a spark plug lead and manifold embodying the invention, a fragment only being shown of the manifold, sufficient to show the application of the lead thereto, the remainder of the manifold being broken away, and a portion of the lead being broken away;

Fig. 2 is an enlarged axial section of the spark

plug end of the lead of Fig. 1, the remainder being broken away;

Fig. 3 is an axial section to the same scale as Fig. 2 of the manifold end of the spark plug lead, the remainder being broken away.

Referring to the drawing, the conductor-encasing longitudinally arc-shaped manifold 1 of metal, has at suitable intervals outlet openings 2, one for each spark plug. Each of such openings has a nipple 3 integral with the manifold and surrounding the opening. Mounted in the nipple 3 is a contact support 4 of suitable insulation having a central socket like opening 5 in the bottom of which is the metal terminal plate 6 for the manifold conductor 7 which extends through the end of the support 4 and the contact plate 6 and has its end riveted or peened over tightly against the plate 6, the plate 6 and peened over end of the conductor constituting the terminal. The parts are so joined and fitted at the nipple that a fluid tight barrier is formed between the conduit for the spark plug lead and the interior of the manifold. The conductor 7 is connected through the manifold and suitable leads, with the magneto as is well understood. Within the manifold the conductor 7 has a suitable insulating covering 8.

The shielded spark plug lead comprises the metal tube 9 constituting the radio shielding conduit for the conductor 10 from the manifold to the spark plug, such conductor being bare adjacent its ends but otherwise having an insulating covering 11. At the manifold end of the lead the bare end 30 of the conductor has the metal washer 31 threaded upon it, the washer bearing against the end of the insulation 11 and secured in position by bending over the end of the conductor and soldering or not as may be desired. Soldered to the washer 31 is a spiral metal spring 32 adapted to press against and have firm electrical contact with the terminal of the conductor 7 when the conductor 10 is in operative position in the lead.

One end of the tube 9 is permanently and securely joined with the nipple 3 by abutting its end against the nipple, placing a metal band 12 about the nipple and tube to bridge the joint and securely, tightly and fixedly welding or soldering the whole together.

The other end of the tube 9 has a flange 13 engaged by a flange 14 of a nut 15 screw-threaded upon the end of the "elbow" 16, such nut serving to draw the ends of the tube 9 and "elbow" 16 tightly and firmly together, a gasket being interposed between the tube and "elbow" if desired,

to insure fluid tightness. This "elbow" commonly so called, is the curved portion of the metal shielding conduit connecting with the spark plug.

The spark plug end of the "elbow" has screwed upon it the metal member 17 having the flange 18 engaged by the flange 19 on the threaded nut 20 adapted to be screwed onto the spark plug shield to secure the elbow tightly and securely thereto as is well understood.

Screwed into the member 17 is a tubular mounting 21 of insulation into the bore 22 of which extends the insulation covered conductor 10, and also in the bore 22 is the metal contact washer 24 threaded on the conductor and bearing against the end of the insulation 11. The washer is held in position by bending over the end of the conductor on the outside and soldering or not as desired. Also in the bore 22 is the disk 25 bearing at one side against the end of the conductor 10 and to the other side is soldered one end of a metal spring 26 adapted to bear at its other end against the central electrode of the spark plug. The spring thus acts to connect the conductor 10 with the electrode of the spark plug and is of such dimensions and resilience as to tightly press the conductor 10, disk 25 and spark plug contact together so that there will be good and firm electrical connection between them. The other end (that adjacent the manifold) of the conductor 10 bears through the spring 32 against the contact plate 6 or the riveted end of the conductor 7 so that firm electrical connection is established from the conductor 7 to the spark plug electrode.

If now it be desired to remove the conductor because of injury, or for any reason, the "elbow" may be separated from the tube 9 by unscrewing the nut 15 when the conductor being unsecured to the contacts at its ends may be withdrawn from the tube and "elbow" by simply pulling it out, or the "elbow" may be separated from the spark plug shield by unscrewing the nut 20 and then the conductor can be pulled out through the spark plug end of the "elbow."

A new conductor may be inserted, where the "elbow" and tube 9 are separated by pushing one end of the conductor endwise into the tube until the spring at its manifold end is compressed and bears firmly against the terminal of the manifold conductor and pushing the other end of the inserted conductor into the "elbow" and securing the "elbow" in position when the spring 26 will be compressed and securely connect the conductor 10 with the spark plug electrode. Preferably the conductor is solid rather than stranded but any type may be used having the desired characteristics as indicated.

When the parts are disassembled at the nut 20 instead of at the nut 15, the new conductor may be pushed endwise inwardly from the spark plug end of the "elbow", through the "elbow" and conduit tube 9 so that its inserted end bears against the terminal contact of the manifold conductor and the parts then assembled as described.

While the invention has been illustrated in what is considered its best application 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 an engine ignition system, the combination with a manifold having an opening, of a radio shielding conduit permanently secured at one end to said manifold adjacent said opening, means at the other end of said conduit for connecting it with the spark plug radio shield and providing a radio

shielded passage from said conduit to said spark plug shield, a conductor in said manifold, a terminal for said conductor mounted adjacent said opening and a conductor in said conduit insulated from the metal thereof and adapted at one end to be connected with the electrode of a spark plug and at the other end bearing against said terminal but being unsecured thereto against a pull tending to withdraw said conductor from said conduit.

2. In an engine ignition system, the combination with a manifold having an opening, of a radio shielding conduit permanently secured to said manifold adjacent said opening, a conductor in said manifold, terminals for said conductor adjacent said opening and a conductor in said conduit bearing against said terminal in conducting engagement therewith and adapted to be connected and disconnected therefrom by the insertion in and withdrawal of the last mentioned conductor from said conduit.

3. In an engine ignition system, the combination with a manifold having an opening, of a radio shielding conduit permanently secured at one end to said manifold adjacent said opening, a radio shielding elbow at the other end of said conduit, means for connecting said elbow with the spark plug radio shield, a conductor in said manifold, a terminal for said conductor mounted adjacent said opening and a conductor in said conduit insulated from the metal thereof and adapted at one end to be connected with the electrode of a spark plug and at the other end bearing against said terminal, but being unsecured thereto against a pull tending to withdraw said conductor from said conduit.

4. In an engine ignition system, the combination with a manifold having an opening, of a radio shielding conduit permanently secured at one end to said manifold adjacent said opening, means at the other end of said conduit for connecting it with the spark plug radio shield and providing a radio shielded passage from said conduit to said spark plug shield, a conductor in said manifold, a terminal for said conductor mounted adjacent said opening and an insulated covered conductor in said conduit and adapted at one end to be connected with the electrode of a spark plug and at the other end bearing against said terminal but being unsecured thereto against a pull tending to withdraw said conductor from said conduit.

5. In an engine ignition system, the combination with a manifold having an opening, of a radio shielding conduit permanently secured at one end to said manifold adjacent said opening, means at the other end of said conduit for connecting it with the spark plug radio shield and providing a radio shielded passage from said conduit to said spark plug shield, a conductor in said manifold, a terminal for said conductor mounted adjacent said opening and a conductor in said conduit insulated from the metal thereof and adapted at one end to be connected with the electrode of a spark plug and at the other end bearing against said terminal but being unsecured thereto against a pull tending to withdraw said conductor from said conduit, there being at the spark plug end of the conductor in the conduit a spring-pressed terminal against which the last mentioned conductor detachably bears.

6. In an engine ignition system, the combination with a manifold having an opening, of a conductor therein, a radio shielding conduit per-

manently secured to said manifold adjacent said opening, a terminal for the manifold conductor adjacent said opening and a conductor in said conduit separate from but electrically connected with said terminal.

7. In an engine ignition system, the combination with a manifold having an opening, of a conductor therein, a radio shielding conduit permanently secured to said manifold adjacent said opening, a terminal for the manifold conductor adjacent said opening and a conductor in said conduit detachably connected with said terminal and means forming a fluid-tight barrier between said conduit and said manifold.

8. In an engine ignition system, the combination with a manifold having an opening, of a conductor therein, a radio shielding conduit permanently secured to said manifold adjacent said opening, a terminal for the manifold conductor adjacent said opening and a conductor in said conduit detachably connected with said terminal and means forming a fluid-tight barrier between said conduit and said manifold, the said terminal being mounted in said barrier.

9. In an engine ignition system, the combination with a manifold having an opening, of a radio shielding conduit permanently secured to said manifold adjacent said opening, a conductor

in said manifold, terminals for said conductor adjacent said opening and a conductor in said conduit bearing against said terminal in conducting engagement therewith and adapted to be connected and disconnected therefrom by the insertion in and withdrawal of the last mentioned conductor from said conduit, the last mentioned conductor having at its end a spring secured to it and compressed against said terminal.

10. In an engine ignition system, the combination with a manifold having an opening, of a radio shielding conduit permanently secured to said manifold adjacent said opening, a conductor in said manifold, terminals for said conductor adjacent said opening and a conductor in said conduit bearing against said terminal in conducting engagement therewith and adapted to be connected and disconnected therefrom by the insertion in and withdrawal of the last mentioned conductor from said conduit, the last mentioned conductor having at its end a spring secured to it and compressed against said terminal and a spring at the spark plug end of the conductor adapted to be compressed against a spark plug electrode.

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