Feb. 28, 1939. F. G. GARDNER 2,149,137

TERMINAL CONNECTOR

Original Filed June 12, 1935

Fig. 1.

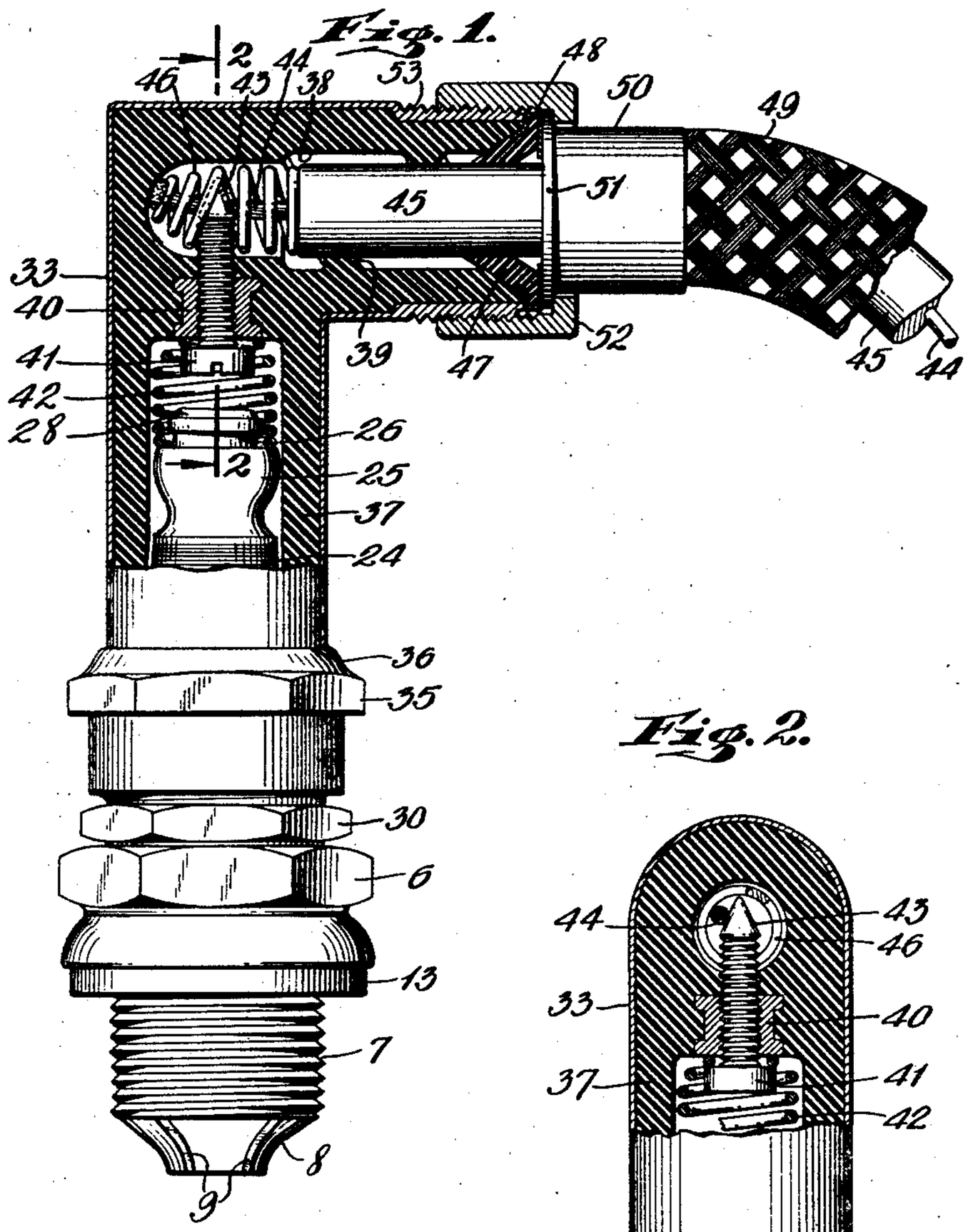

Fig. 2.

INVENTOR
FRANK G. GARDNER
BY C. C. Cousins
ATTORNEY

Patented Feb. 28, 1939 2,149,137

UNITED STATES PATENT OFFICE

2,149,137

TERMINAL CONNECTOR

Frank G. Gardner, Maplewood, N. J., assignor to Breeze Corporationc, Inc., Newark, N. J., a corporation of New Jersey

Original application June 12, 1935, Serial No. 26,096. Divided and this application June 10, 1937, Serial No. 147,457

1 Claim. (Cl. 123—169)

This invention relates to a terminal connector, and particularly a connector for making contact between an ignition conductor and a spark plug. This application is a division of application, Serial No. 26,096, filed June 12, 1935, now Patent 2,083,916, issued June 15, 1937.

Where radio receiving apparatus is used in proximity to an internal combustion engine it is desirable to shield the spark plugs of the engine to prevent interference with radio reception. It is common practice to enclose the exposed portions of a spark plug in a radio shield. The radio shield normally encloses a portion of the ignition cable adjacent the spark plug, and the remainder of the cable is shielded by means of a flexible metallic conduit or similar structure. Under these conditions the heat generated by the use of the spark plug in service cannot be readily dissipated. The excessive heat is transmitted to the insulation of the ignition cable and tends to cause a rapid deterioration of the insulation of the ignition cable.

The heat causes a charring of the insulation of the ignition conductor and eventually a breakdown of the insulation, which is undesirable. The effect of the heat is most noticeable at the end of the ignition conductor immediately adjacent the spark plug. It has been the practice to insert the insulation conductor into a shielding means and use a pointed contact element to pierce the insulation and making contact with the ignition conductor. This has permitted a direct transfer of heat from the upper end of the spark plug to the insulation of the ignition conductor with the deleterious effects above pointed out.

Therefore, the broad object of the present invention is to provide a connection in which the electrical contact may be made with the ignition conductor without damage to the insulation surrounding the conductor. A specific object of the invention is to provide an insulated ignition conductor in which the conductor will extend past the insulation and on which a helical member may be supported to insure a proper electrical connection.

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 through a shielding cap, the spark plug, ignition cable and contact means being shown in elevation; and,

Figure 2 is a fragmentary detail in vertical section, taken approximately on line 2—2 of Figure 1, looking in the direction indicated by the arrows.

Referring to the drawing, the spark plug comprises a shell 6 having a threaded portion 7 to enter the cylinder head of an engine. The lower portion of the spark plug is provided with a curved base 8 and a plurality of slots 9 to provide a plurality of sparking areas. A washer 13 is provided to make a seal between the spark plug and engine cylinder. The upper dielectric portion of the spark plug 24 is provided with a metallic cap 25 formed with a recess 26 to receive a contact hereinafter described. The parts of the spark plug are held in the shell 6 by means of a cap 30 to which is secured a radio shielding cap 33 by means of a coupling nut 35 having an inturned portion 36. The structure of the spark plug per se forms no part of the present invention.

The cap 33 is removable from the spark plug upon rotation of the coupling nut 35. 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 insula-

tion 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 spring 46 may be soldered to the extreme end of the conductor 44 and the right hand end of the spring 46, as shown in Figure 1, will abut the insulation 45 of the conductor 44.

As shown in Figure 1, the screw 41 will separate the turns of the spring 46 to make a contact. As shown in Figure 2, the point 43 of the screw 41 will force the conductor 44 to one side and thereby make contact not only with the spring 46 but also with the conductor 44.

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, now Patent No. 2,087,920, July 27, 1937 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, now Patent No. 2,080,827, May 18, 1937. The structure of the conduit may be the same as shown in co-pending application Serial No. 657,167, filed February 17, 1933, now Patent No. 2,028,793, January 28, 1936.

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

In combination with a sparkplug, a radio shielding cap therefor and a contact means carried by the cap to make contact between the electrode of the sparkplug and a supply cable, a supply cable comprising a stranded conductor, a dielectric covering on the conductor terminating an appreciable distance from the end thereof, a coil spring having its outer end permanently secured to the outer end of the conductor and its inner end abutting the insulation on the conductor, said spring surrounding the uninsulated portion of the conductor and being spaced therefrom, the turns of the coil spring being separated from one another so that the contact means carried by the cap enters the coil spring to make contact therewith and with the stranded conductor.

FRANK G. GARDNER.