

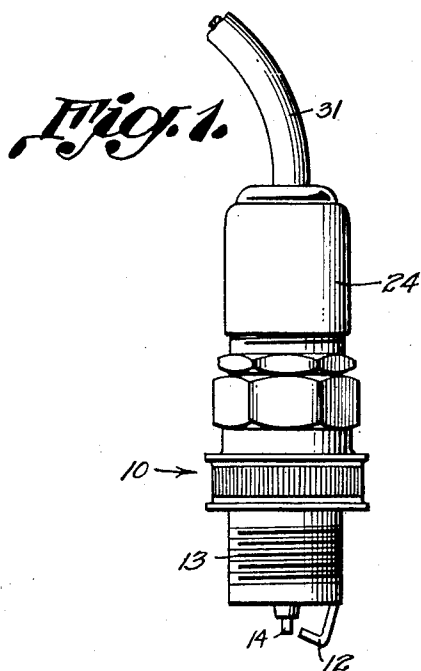
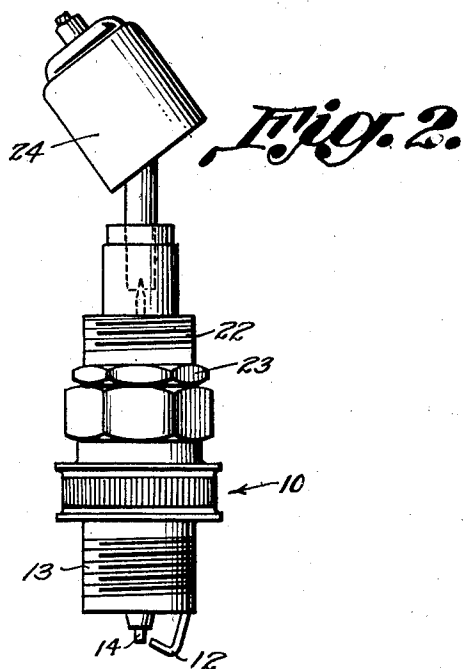
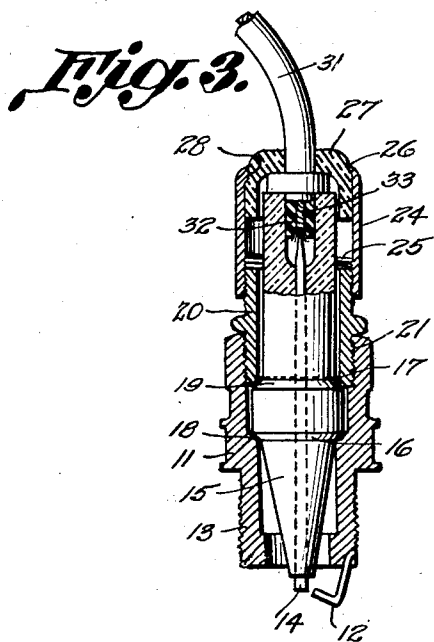
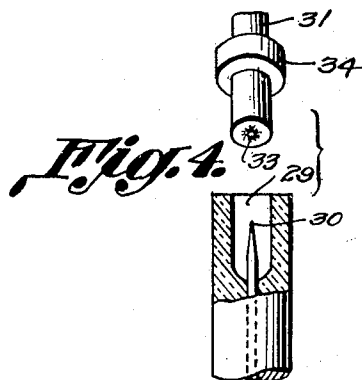
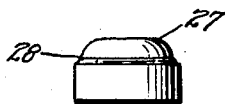
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W. H. RUTHER

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SPARK PLUG

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Inventor

W.H. Ruther

By *Miller + Miller*
Attorneys

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SPARK PLUG

Walter H. Ruther, Springfield, Ill.

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6 Claims. (Cl. 123—169)

This invention relates to a spark plug and has for an object to provide an improved spark plug having many advantages over the conventional spark plug.

5 A further object of this invention is to provide a spark plug wherein the porcelain or any other suitable insulating electrode holder is protected from being broken either by wrench blows or by the splashing of water on it while it is hot.

10 A further object of this invention is to provide a combination porcelain protector and high tension ignition cable connector.

Yet an additional object of this invention is to provide a connecting means for the high tension ignition cable and the electrode passing through the porcelain insulator, which connector serves not only to protect the porcelain insulator, but to make a positive connection between the ignition cable and the electrode and to positively protect 20 the same against short circuiting even though the outside of the plug may be completely covered with water.

Yet an additional object of this invention is to provide a cable connector and porcelain protector which will act as a heat equalizer causing the whole insulation to heat and cool uniformly.

Yet an additional object of this invention is to substitute a double threaded bushing for a conventional single threaded bushing of the ordinary spark plug, one end of the double threaded bushing serving to cooperate with the spark plug body and hold the porcelain electrode holder in place and the other end of the double threaded bushing serving to receive the ignition cable holder and protector and hold it in position.

With the foregoing and other objects in view, as will hereinafter become apparent, this invention comprises the constructions, combinations and arrangements of parts hereinafter set forth, disclosed and shown on the accompanying drawing. In this drawing,

Figure 1 is a side elevation of the spark plug,

Figure 2 is a side elevation of the plug with cover removed showing connection to center electrode,

Figure 3 is a vertical section through the plug,

Figure 4 is a fragmentary view of the center electrode showing clearly how the pointed end contacts wire,

Figure 5 is a side elevation of the insulated cap or plug that fits in the cover, and

Figure 6 is a sectional view of the rubber washer that fits under cap.

There is shown at 10 the spark plug made up according to this invention. The spark plug 10

has a spark plug body 11 having a conventional grounding electrode 12. The plug body 11 is threaded as at 13 in order that it may be screwed into the spark plug opening in an internal combustion engine in the usual manner.

An electrode 14, which with 12 forms the spark gap, passes through the porcelain or any other suitable insulating body 15, the insulating body 15 being provided with shoulders 16 and 17, which shoulders 16 and 17 have compression washers 18 and 19 placed thereagainst in the usual manner. A bushing 20 is threaded into the spark plug body 11 in the usual manner and holds the electrode porcelain body 15 in position within the spark plug 10.

In addition to the threads 21 provided on the bushing 20 for threading the bushing to the spark plug body 11, a similar screw thread 22 is provided extending in the opposite direction from the wrench flange 23, the threads 22 and 21 being preferably of the same pitch and hence interchangeable. A cover 24 internally threaded as at 25 to correspond with the threads 22 has an opening flanged at 26 to receive and hold therein an insulating cap 27, the cap 27 being provided with a complementary shoulder 28 to fit against the flange 26.

The porcelain body 15 has a recess 29 in which the other end of the electrode 14 is sharply pointed as at 30. The recess 29 has an internal diameter corresponding to the diameter of the high tension ignition cable 31. The high tension ignition cable 31 is made as usual of an insulating portion 32 and a conducting wire 33. An insulating rubber washer 34 is provided with an opening therethrough at 35 corresponding in diameter with the diameter of the cable 31, so that it may pass thereover.

In operation, the bushing 20 is threaded into the spark plug body 11 to hold the porcelain body 15 and electrode 14 therein in the usual manner. The cover 24 has the insulating cap 27 placed therein and then the cable 31 is passed through the opening in the cap 27, whereupon the rubber insulating washer 34 is passed over the end of the high tension ignition cable 31, the washer 34 being spaced an appropriate distance from the end of the cable 31, as shown in Figure 4.

The end of cable 31 is then pressed into the recess 29 whereupon the point 30 of electrode 14 presses into the conducting member 33 of the ignition cable 31. The insulating cap 27 is drawn down to compress the insulating washer 34 onto the end of the porcelain body 15 holding the ignition cable 31 securely in position with direct con-

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tact between the conducting element 33 and the pointed end 30 of the electrode 14.

As a result of this construction the conducting element 33 in the ignition cable 31 and the electrode 14 are absolutely insulated against any leaking of electric current to the outside of the plug. The cover 24 being of metal prevents any possibility of a blow from the wrench shattering the porcelain body 15. The insulating rubber washer 34, insulating cap 27 and the insulation 32, as well as porcelain body 15, all serve to absolutely seal off the electric current passing through the spark plug between electrodes 14 and 12, and prevent any possibility of leakage of current.

It has been found in actual use that a spark plug made according to this invention as just described will perform properly even though the upper end thereof is entirely submerged in water, and that thus a spark plug protector and connection is provided which protects the plug against accidental injury and at the same time securely holds and seals the high tension ignition cable to the electrode. In the ordinary plug the upper end of the porcelain body is usually exposed and in service it has often been found that water falls or condenses on this outer surface and forms a conducting path from the exposed end of the high ignition cable to the outside of the internal combustion engine, thus short circuiting the spark plug, but in this improved spark plug this defect is absolutely impossible, no water can drop on any exposed porcelain body to cause the same to crack, as to whole porcelain body is caused to heat and cool more uniformly, thus avoiding internal strain due to said uniform heating of the porcelain body.

The washer 34 being squeezed between the cap 27 and the top end of the porcelain body 15, serves in turn to squeeze the end of the high ignition cable 31 and thus grip it very securely.

The novel features and the operation of this device will be apparent from the foregoing description. While the device has been shown and the structure described in detail, it is obvious that this is not to be considered limited to the exact form disclosed, and that changes may be made therein within the scope of what is claimed without departing from the spirit of the invention.

Although body 15 has been designated in the specification and claims as porcelain, it will be understood that the body 15 may be made of any suitable insulating material whether porcelain or otherwise, and that the term porcelain in both the specification and claims is intended to cover not only similar bodies made of porcelain, but also any other insulating electrode holder which may be substituted for the porcelain in the porcelain body 15 and that the claims are to be interpreted as not being limited to an actual porcelain composition.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. In a spark plug having a spark plug body, a porcelain electrode holder in said spark plug body, a double externally threaded bushing, one threaded end of said bushing holding said porcelain electrode holder in said spark plug body, a recess formed in the end of the porcelain holder adapted to receive the end of an ignition cable therein, a pointed end on the electrode extending through the porcelain holder exposed within said recess, and means adapted to be threaded on the other threaded end of the double threaded bushing for pressing the ignition cable into said recess against said pointed end of said electrode.

2. In a spark plug having a spark plug body,

a porcelain electrode holder in said spark plug body, a double externally threaded bushing holding said porcelain electrode holder in said spark plug body, a recess formed in the end of the porcelain holder adapted to receive the end of an ignition cable therein, a pointed end on the electrode extending through the porcelain holder exposed within said recess, and means adapted to be threaded on the end of the double threaded bushing for pressing the ignition cable into said recess against said pointed end of said electrode, said means comprising an internally threaded metal cover cooperating with one end of said threaded bushing, an insulating cap secured within said cover and having an opening therethrough to receive the ignition cable therethrough and adapted to press the ignition cable against the electrode end.

3. In a spark plug having a spark plug body, a porcelain electrode holder in said spark plug body, a double externally threaded bushing holding said porcelain electrode holder in said spark plug body, a recess formed in the end of the porcelain holder adapted to receive the end of an ignition cable therein, a pointed end on the electrode extending through the porcelain holder exposed within said recess, means adapted to be threaded on the end of the double threaded bushing for pressing the ignition cable into said recess against said pointed end of said electrode, said means comprising an internally threaded metal cover cooperating with one threaded end of said bushing, an insulating cap secured within said cover and having an opening therethrough to receive the ignition cable therethrough and adapted to press the ignition cable against the electrode end, and a rubber washer on said ignition cable between said cap and said porcelain body.

4. In a spark plug having a porcelain body acting as an electrode holder therethrough, a double externally threaded bushing, either end of said bushing cooperating with the spark plug to hold said porcelain body in said spark plug, and wrench flanging on said bushing, said wrench flanging separating both threaded portions.

5. In a spark plug having a double externally threaded porcelain body holding bushing, an ignition cable holder and porcelain body protector comprising a metal cap internally threaded to be securable to either threaded end of the double threaded bushing, and insulating means in said cap holding the ignition cable thereto in contact with the electrode extending through the porcelain body.

6. A spark plug comprising a spark plug body, a porcelain electrode holder in said spark plug body, a pointed electrode end, said porcelain body extending beyond said pointed electrode end and having a recess therein formed about the electrode end, said recess being of a diameter corresponding to the diameter of an ignition cable, a double externally threaded bushing holding said porcelain electrode holder in said spark plug body, one end of said bushing cooperating with said spark plug body, an internally threaded metal cover cooperating with the other end of said threaded bushing, a flanged opening in said metal cover, an insulating cap in said flanged opening and having an opening therethrough to receive the ignition cable therethrough and adapted to press the ignition cable against the electrode end within the recess and a rubber washer on said ignition cable between said insulating cap and said porcelain body.

WALTER H. RUTHER.