Dec. 31, 1935. L. J. TETLOW 2,025,914

SPARK PLUG

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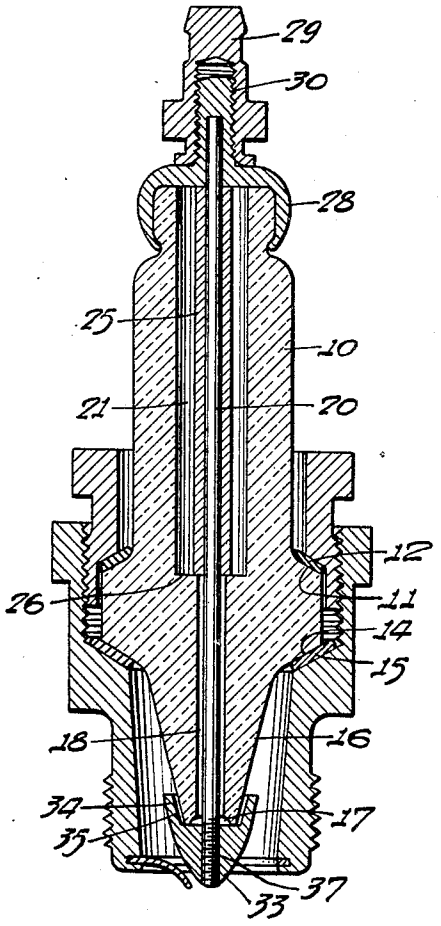



Fig. 1.

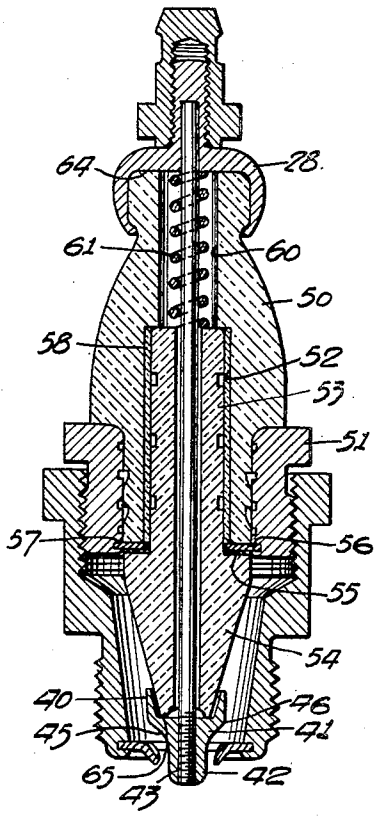



Fig. 2.

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## SPARK PLUG

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8 Claims. (Cl. 123—169)

This invention relates to spark plugs and has for its principal object the provision of a spark plug which shall have increased life.

A feature of the invention lies in the provision of a rather heavy firing tip provided with a skirt projecting upwardly from the firing tip and covering a portion of the conical nose of the central insulating electrode, not only preventing loss of a cracked portion of an electrode but more particularly preventing the formation of the crack. An additional feature in connection with the skirted tip is the use of a helix of copper or other metal capable of carrying heat rapidly wrapped around the central electrode for a portion of its length toward the terminals.

In the drawing:—

Figure 1 is a central section thru a truck plug embodying my invention.

Figure 2 is a modified form.

In the modification shown in Figure 1 the porcelain cylinder or core 10 is of previously known type of body having a conical surface 11 to receive an upper gasket 12 which I preferably make of brass and a similar opposite conical surface 14 which seats firmly on the lower gasket 15 which is of asbestos covered with copper. The central porcelain body 10 has at its lower portion a nose 16 having a flat bottom face preferably slightly cupped as at 17.

Thru the center of the core are two bores, the smaller numbered 18 receiving loosely the central electrode 20 and the larger bore 21 furnishing a well which may extend down as far as the center of the integral enlarged portion of the core and providing ample space to receive a pipe 25 of copper tightly engaging the central electrode 20 but spaced from the cylindrical wall of the bore 21. The pipe 25 may extend to the bottom 26 of the larger bore or it may terminate short of this point but preferably tightly engages the electrode and is permanently secured to the base cap 28 in which the central electrode is firmly embedded and to which the terminal plug 29 is threaded as at 30.

The firing point of the electrode is made fairly large and its outer curve 33 is preferably ogival and extends considerably above the flat end 17 of the nose of the electrode body having a skirt 34 which should be sufficiently large to give an appreciable clearance between its inside surface 35 and the conical wall of the nose portion 16 of the body.

While the sparking point may be secured to the central electrode 20 in any desired manner I find it most efficient to thread the electrode as at 37 and to use a cement on these threads which can be softened in boiling water. Such a cement is readily obtainable and gives a most firm joint as long as the tip is kept dry. Since it is my intention to replace the tip when pitted it is best to use a cement which under extraordinary conditions will be readily releasable. There is no tendency toward moisture in the plug and therefore the placing of the tip in boiling water would be an extraordinary condition. The shape of tip or point shown in Figure 1 is very satisfactory but I also have had excellent results with the somewhat modified form shown in Figure 2. This modified tip has a skirt portion 40, a solid intermediate conical portion 41 and a very heavy tip portion 42, the latter being threaded for a portion of its length as at 43 to receive the central electrode 20.

While I prefer to add a very slight fillet as at 45 to the junction between the nearly cylindrical tip 42 and the conical portion 41 and to round off slightly as at 46 the junction between the skirt and the conical portion, I have nevertheless found in practice that the sharp angles at these points are not detrimental. The smoother curve however is substantially as easy to make and gives a somewhat better appearance.

The modification shown in Figure 2 includes an outer insulating body 50 secured as by cement in a bushing 51 and having a large central bore 52 for receiving a core 53 which core carries the conical end 54 fitting snugly up against the mica washer or washers 55 engaging the metal washer 56 which is preferably spun into a groove 57 in the bottom rim of the bushing 51. Between the core 53 and the body 50 is a sleeve 58 of some tough material such as mica which not only serves to hold the core and body together but also prevents a crack extending from the electrode 20 to the outer surface of the insulator or to the bushing 51. A second bore 60 in the top of the body 50 provides ample space to receive a helix 61 of copper wire tightly wound on the central electrode 20 but spaced from the cylindrical wall of the bore. The helix 61 may rest on the core 53 as shown or it may terminate short of the core but is preferably tightly wrapped on the electrode and is permanently secured to the base cap 28 in which the central electrode is firmly embedded the same as in Figure 1. It will be seen that the electrode is free of the insulator being supported entirely by the tip 41 and cap 28.

The method which I follow in assembling the plug illustrated in Figure 2 is as follows: The washer 56 is spun in place on the bushing or nut

51, the sleeve 58 is cemented in the body 50 and the latter is then cemented to the nut 51, one or more mica washers 55 are placed on the core 53 and after applying a bit of cement to the core it is inserted into the sleeve until the shoulder thereof carries the insulating washer against the ledge 56. A small amount of cement is now applied to the top 64 and bottom 65 of the insulator body, the electrode is then threaded through the body and after putting cement on the threads 43 the cap or tip 42 is screwed into place and the cap 28 is spun on the body. The placing of the helix on the electrode is a separate operation preferably being done at the same time as the electrode is pressed into the cap 28 before the assembling process is started. The final step is the baking of the plug after which it is supplied with a connector 29 and screwed into a bushing of the desired size.

What I claim is:

1. In a spark plug, an insulating member having a nose, an electrode passing thru said member and projecting beyond the nose, and a firing tip on the end of the electrode, said tip having a skirt covering the sides of the end of the nose but slightly spaced therefrom.

2. The device of claim 1 in which the nose has a flat face, the tip covers the flat face and the skirt is conical.

3. The device of claim 1 in which a helix of copper is tightly wound on the tipless end of the electrode.

4. A sparking point for the central electrode of a spark plug consisting of a tip having a bore to receive the central electrode and having an upstanding skirt adapted to protect the nose portion of an insulating body said skirt having an inside diameter greater than the outer diameter of the nose portion.

5. The device of claim 4 in which the skirt and the tip are each cylindrical and the intermediate portion tapers from the smaller tip portion to the larger skirt portion.

6. A spark plug having a central core having a bore therethrough of two diameters, a central electrode in the smaller bore, and a helix tightly wound upon the central electrode and positioned in the larger bore.

7. A spark plug comprising an insulator consisting of a central core having a cylindrical portion and a conical portion, an insulating sleeve entirely surrounding the cylindrical portion of the core, a bushing permanently secured to the sleeve, an electrode thru the core, a cap on the sleeve and a second cap on the conical portion, said electrode being secured to the sleeve cap and having threaded engagement with the second cap, whereby the two core portions are held together and said second cap constitutes one electrode of the spark gap.

8. A sparking point for the central electrode of a spark plug consisting of a tip having a bore to receive the central electrode and having an upstanding skirt adapted to protect the nose portion of an insulating body, the outer contour of the tip and skirt being an ogive curve.

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