A. D. MELANSON.

SPARK PLUG.

APPLICATION FILED APR. 2, 1913.

1,101,137. Patented June 23, 1914.

Fig. 1.

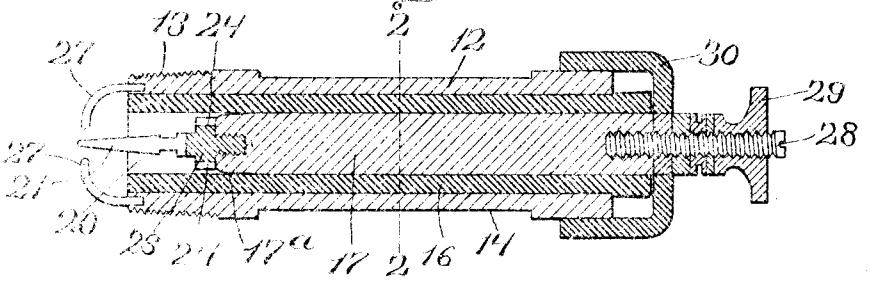


Fig. 2.

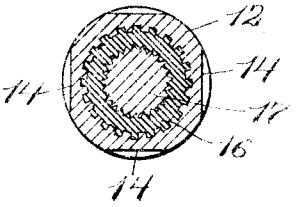


Fig. 3.

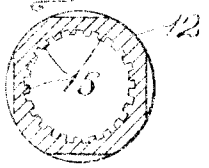


Fig. 4.

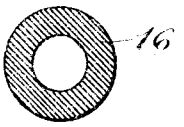


Fig. 5.

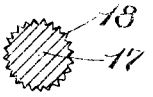
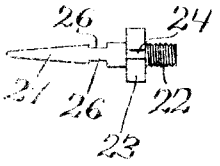


Fig. 6.



Witnesses:

Inventor:
Abel D. Melanson
by Wright Brown Quinby & May
Attys.

UNITED STATES PATENT OFFICE.

ABEL D. MELANSON, OF LYNN, MASSACHUSETTS.

SPARK-PLUG.

1,101,137. Specification of Letters Patent. Patented June 23, 1914.

Application filed April 2, 1913. Serial No. 758,484.

To all whom it may concern:

Be it known that I, ABEL D. MELANSON, a citizen of the Republic of France, and a resident of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification.

This invention relates to spark plugs for internal combustion engines and has for its chief object to provide a simple and durable spark plug adapted to tightly close the opening in the engine cylinder in which it is inserted and prevent the escape of gases through the plug.

Other objects of the invention are more fully set forth hereinafter.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings:—Figure 1 represents a longitudinal section of a spark plug embodying my invention. Fig. 2 represents a section on line 2—2 of Fig. 1. Figs. 3, 4 and 5 represent respectively sectional views of the shell, the insulating mica tube and the core hereinafter referred to. Fig. 6 represents a side view of the removable electrode.

The same reference characters indicate the same parts in all the figures.

In the drawings,—12 represents a tubular shell of conducting metal having at one end an external screw thread 13 whereby the shell is adapted to be screwed into a tapped orifice in an engine cylinder; the perimeter of the shell being preferably provided with flattened faces 14 adapted to engage a wrench. The internal surface of the shell is provided with longitudinal grooves 15 so that said surface is knurled or corrugated.

16 represents an insulating tube composed of mica, the tube being formed by pressing ground mica, with a suitable binder or adhesive, into the form of a tube, heavy pressure being employed to impart sufficient density and strength to the tube. The tube 16 is originally formed with smooth external and internal surfaces as shown by Fig. 4, and is forced under heavy pressure into the shell 12, the external diameter of the tube being such that when driven into the shell its periphery is caused to project into the grooves 15.

17 represents a core of conducting material formed to enter the tube 16, the perimeter of the core being provided with longitudinal grooves 18 imparting a corrugating form thereto. The diameter of the core is somewhat greater than the original internal diameter of the tube 16 so that heavy pressure is required to force the core into the tube, this pressure causing the material of the tube to fill the grooves 18, and also somewhat expanding the tube so that in the completed spark plug, gas-tight joints are formed between the shell 12, the tube 16 and the core 17, the core, insulating tube, and shell being practically permanently locked together as hereinafter described. One end of the core is preferably tapered as indicated at 17^a, Fig. 1, so that it is adapted to readily enter the tube 16 and expand the same, the core acting as a mandrel. The core 17 is shorter than the tube 16 so that when its outer end is flush with the outer end of the tube, its inner end will be within the tube and separated from the outer end thereof by a space or chamber 20.

21 represents an electrode having a screw threaded shank 22 screwed into a tapped socket formed in the inner end of the core 17. Said electrode is provided with an enlargement 23 having slots 24, adapted to engage prongs on a turning device or spanner whereby the electrode may be screwed into and out of the socket in the core. If desired, the electrode may be provided in opposite sides with recesses 26 adapted to engage a differently formed turning device.

The electrode 21, which is shorter than the core and is detachably engaged with a socket in the inner end of the core, constitutes a relatively small and inexpensive part for which a duplicate part may be substituted with the minimum of expense and without deranging and requiring the readjustment of other parts of the plug. The electrode 21 when used in the cylinder of a gasolene engine is coated in a short time with an accumulation of matter from the cylinder which adheres tenaciously to the electrode and prevents the formation of an adequate spark, so that the electrode has to be removed and renewed at more or less frequent intervals.

The shell 12 is provided with the usual electrode or electrodes 27 adapted to cooperate with the electrode 21 in the usual way. The portion of the removable electrode 21 having the above described tool-en-

gaging device is within the chamber 20, which is of sufficient size to permit the introduction of the tool, the electrodes 27 being flexible and adapted to be bent outwardly to permit the manipulation of the tool in applying and removing the removable electrode.

The core is provided at its outer end with suitable means for securing a conducting wire thereto, said means as here shown including a screwthreaded stem 28 engaged with the outer end of the core 17, a clamping nut 29 engaged with said stem and suitable washers interposed between the nut and an insulating cap 30 which covers the outer end of the shell.

The mica of which the insulating tube is made is sufficiently compressible to cause it to fill the longitudinal grooves of the shell and core thus forming strong connections between the shell, tube and core, and preventing the possibility of the blowing out of the insulating tube and the core by gas pressure. The joints thus formed are not only gas tight so that there is no possibility of the passage of gas from the engine cylinder through the core, but also prevent relative rotation of the parts. The heavy pressure employed as above described so compresses or condenses the insulating material, and so forces it into the longitudinal grooves of both the shell and core as to lock the three parts together. Then when the plug has been screwed in place, there is no liability that the manipulation of the nut 29 on the stem 28 of the core, when securing or releasing a conducting wire, will loosen any of the parts of the plug. Nor will any loosening result from replacing worn electrodes with new ones as above described.

The insulating cap 30 has a water tight fit on the stem 28 and on the outer end portion of the shell 12 so that it prevents the access of water to the external surfaces of the outer end of the shell and of the tube 16, and the grounding which is likely to be caused by water on said surfaces. The inner end of the insulating tube 16 extends to the inner end of the shell 12, said inner ends being preferably flush. The inner end portion of the tube forms an insulating wall of the chamber 20 so that carbon accumulating in the chamber 20 cannot form an electrical connection between the electrode 21 and the shell.

It is to be understood that any suitable means may be employed to prevent the core 17 from moving endwise relatively to the tube 16 or shell 12, if the friction resulting from the compression described should be thought insufficient.

What I claim and desire to secure by Letters Patent is:—

1. A spark plug comprising a metallic shell, a metallic core, the internal surface of the shell and the periphery of the core being longitudinally corrugated, and a tube of insulating material compressed between said corrugated surfaces, whereby the shell and core are positively locked against relative rotation.

2. A spark plug comprising a metallic shell, an insulating tube engaged with the shell and extending to the inner end thereof, a metallic core within said tube, said core compressing said tube outwardly into engagement with the interior of said shell, said core, tube and shell being respectively provided with complemental means whereby they are positively locked against relative rotation.

3. A spark plug comprising a metallic shell, an insulating tube engaged with the shell and extending to the inner end thereof, a metallic core within said tube, said core compressing said tube outwardly into engagement with the interior of said shell, said core, tube and shell being each of uniform diameter and respectively provided with complemental means whereby they are positively locked against relative rotation.

4. A spark plug comprising a metallic shell, an insulating tube engaged with the shell and extending to the inner end thereof, a metallic core within said tube, said core compressing said tube outwardly into engagement with the interior of said shell, said core, tube and shell being respectively provided with complemental means whereby they are positively locked against relative rotation, said core terminating short of the inner end of said tube and having a socket in its inner end, and an electrode shorter than the core removably connected with said socket.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ABEL D. MELANSON.

Witnesses:
C. F. Brown,
P. W. Pezzetti.