R. W. MOORE.

SPARK PLUG AND METHOD OF MAKING SAME.

APPLICATION FILED SEPT. 6, 1919.

1,371,924. Patented Mar. 15, 1921.

Fig. 1.

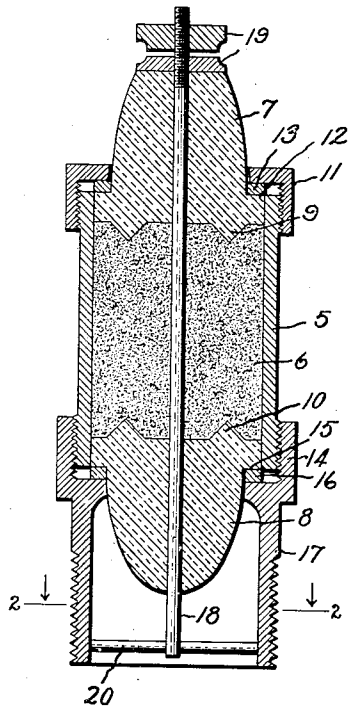
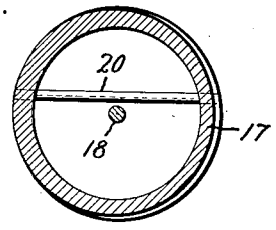


Fig. 2.



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UNITED STATES PATENT OFFICE.

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SPARK-PLUG AND METHOD OF MAKING SAME.

1,271,924. Specification of Letters Patent. Patented Mar. 15, 1921.

Application filed September 6, 1919. Serial No. 322,120.

To all whom it may concern:

Be it known that I, ROY W. MOORE, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Spark-Plugs and Methods of Making Same, of which the following is a specification.

The present invention relates to spark plugs such as are used in connection with internal combustion engines and has for its object to provide an improved spark plug and an improved method of making same.

For a consideration of what I believe to be novel and my invention, attention is directed to the accompanying specification and appended claims.

In the drawing, Figure 1 is a vertical sectional view of a spark plug embodying my invention, and Fig. 2 is a section taken on line 2—2, Fig. 1.

Referring to the drawing, 5 indicates the shell of the spark plug, within which is contained a mass of powdered insulating material 6. The powdered insulating material 6, due to the method employed in manufacture as hereinafter described, is very compact and hard, so that it forms in substance practically a solid body. The powdered insulating material may comprise any suitable substance such as fused magnesia, quartz, mica, alumina or the like. The ends of shell 5 project beyond the ends of material 6 to form recesses which receive the inner ends of porcelain heads 7 and 8, both heads being provided with annular projections 9 and 10, respectively, which are embedded in material 6 to lengthen the dividing lines between the porcelain heads and the material 6. Porcelain head 7 forms the outer end of the plug and is held in place by a flanged ring 11, which threads on to the end of shell 5 and engages shoulder 12 on head 7. Between ring 11 and shoulder 12 is a suitable gasket 13, such as a copper asbestos gasket, which serves as a cushion between the ring and the porcelain head.

Porcelain head 8 is held in place by flanged ring 14, which threads on to the inner end of shell 5 and engages with shoulder 15 on head 8, there being a gasket 16 between ring 14 and shoulder 15 to make a gas tight connection. Formed integral with ring 14 is a threaded tube 17, which screws into the opening of the engine cylinder as is well understood.

Extending through the center of the plug is a rod 18, which forms one electrode. The outer end of electrode 18 is threaded to receive nuts 19 to be used to clamp a connecting wire. The inner end of rod 18 terminates adjacent to a rod 20, which extends crosswise of tube 17 and forms the other electrode which is grounded on the engine frame. The purpose of lengthening the dividing lines between the porcelain heads and material 6 as referred to above is to lengthen the path from electrode rod 18 to shell 5.

In making a spark plug as just described, I take a section of tube from which shell 5 is to be formed, hold electrode rod 18 in the correct position inside it and extending longitudinally of it, and then pack the powdered insulating material 6 around the rod inside the shell. I then swage the shell, insulating material and rod together, the shell being drawn down until the insulating material is packed into a very hard, solid mass. This gives a structure in which the central electrode is firmly embedded in the insulating material so there is no possibility of leakage around it. In carrying out the method I may take a section of tube 5 long enough for one spark plug only; or I may take a section long enough for a number of spark plugs and after it has been swaged with the rod and insulating material therein it may be cut into suitable lengths for spark plugs. Preferably I employ the latter method. The ends of shell 5 may then be threaded and the assembly of the plug completed by putting heads 7 and 8 into position in the obvious manner. Heads 7 and 8 need not make a gas tight fit with electrode 18 since leakage along the rod is prevented by the mass 6. The holes in heads 7 and 8, through which the ends of electrode 18 extend, may accordingly be made to give only a nice fit with the electrode.

A spark plug made according to the foregoing method and embodying my invention, is strong and not easily broken. The main body of insulating material 6 being a powder, as distinguished from a solid piece, can-

not crack, and being swaged in it will be very solid and leak proof. The porcelain heads 7 and 8 serve to protect the ends of the powdered material to keep them from crumbling slowly and falling off. Porcelain heads 7 and 8 also serve to lengthen the air gaps at the ends of the plug. Since porcelain heads 7 and 8 are comparatively small and also since they will remain at a substantially uniform temperature and are not subjected to any great strain, they are not likely to crack or give trouble otherwise.

It will also be noted that the spark plug is simple in structure and composed of few parts, so it may be easily manufactured and assembled. It can also be very easily taken apart for cleaning or repairs.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In the manufacture of spark plugs, the method which comprises taking a tube, placing a rod through it longitudinally, packing a powdered insulating material around the rod in the tube, and swaging them together.

2. In the manufacture of spark plugs, the method which comprises taking a tube within which is a rod and powdered insulating material, and swaging them together until the powdered insulating material is compressed into a hard, solid mass.

3. In the manufacture of spark plugs, the method which comprises taking a length of tube within which is a rod and powdered insulating material, swaging them together until the powdered insulating material is compressed into a hard, solid mass, and then cutting the tube into lengths suitable for spark plugs.

4. In a spark plug, a shell, a mass of powdered insulating material therein, and an electrode passing through said mass, said shell, mass and electrode being swaged together.

5. In a spark plug, a shell, a mass of powdered insulating material therein, an electrode passing through said mass, said shell, mass and electrode being swaged together, and insulating heads fastened in the ends of said shell.

In witness whereof, I have hereunto set my hand this 5th day of September, 1919.

ROY W. MOORE.