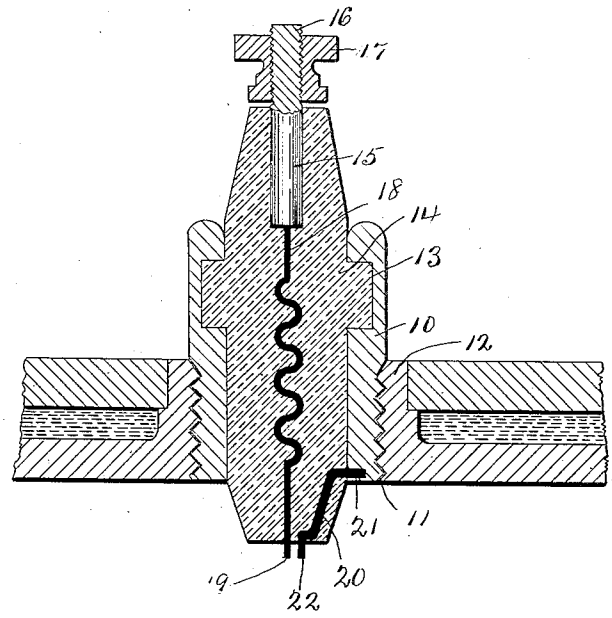
W. H. QUACKENBUSH.

SPARK PLUG.

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1,129,603. Patented Feb. 23, 1915



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UNITED STATES PATENT OFFICE.

WILLIAM H. QUACKENBUSH, OF JAMESBURG, NEW JERSEY.

SPARK-PLUG.

1,129,603. Specification of Letters Patent. Patented Feb. 23, 1915.

Application filed March 7, 1912. Serial No. 682,322.

To all whom it may concern:

Be it known that I, WILLIAM H. QUACKENBUSH, of Jamesburg, Middlesex county, New Jersey, have invented a new and useful Improvement in Spark-Plugs, of which the following is a full, clear, and exact description.

My invention relates to improvements in spark plugs such as are used in explosive or gas engines.

The object of my invention is to produce a cheap simple plug which can be easily applied, and which is absolutely reliable. In consonance with this idea, a special object of my invention is to arrange the electrodes or terminals so that they cannot possibly be displaced, and also in such a manner that there is little danger of short circuiting or other interruption of current except such as is necessary to produce the spark. In many forms of spark plugs used, the terminals are arranged in such a way that the sparking points are held either in a socket, or in such conformation that carbon and oil are likely to collect around the terminals, or carbonize them, so that a short circuit is produced or a ground connection made, or other interruption which will prevent proper sparking. Moreover, the terminals in many forms of plugs are likely to be displaced. My invention is intended to entirely obviate these difficulties. In carrying out this idea I have an outer shell which is adapted to screw into the cylinder head as usual, and which has an interrupted inner surface so that the insulating body or core will fasten itself securely to the shell. The terminals are held within the shell, and the core or body is formed of glass which is poured while hot into the mold formed in part by the shell, so that the terminals are thus securely held, and to provide against any possible movement they are preferably given an irregular contour in order that the core may have a better grip on them. A very important feature of the invention, however, lies in the fact that in the construction of the device I force the glass into the mold and shell and around the terminals under a comparatively heavy pressure, so that the glass is made very dense, thus causing it to snugly fit the outer shell and to firmly grip the embedded terminals. This glass should be of a tough nature, and quartz glass is most suitable, as the coefficient of expansion of this is such that the core is not affected by sudden temperature changes and it readily withstands any temperature which may be occasioned by the explosion or combustion of gases in the cylinder. I believe that this method of forming the plug is new, and I therefore claim the method which I describe as well as the structure of the plug itself.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in the view.

The figure is a longitudinal section of the plug embodying my invention, and shows its application to the head of a cylinder.

The plug is provided with a cylindrical hollow shell 10 which is preferably made of steel tubing, and the lower part of which is exteriorly screw threaded as shown at 11, to enable it to screw readily into the usual threaded orifice in the cylinder head 12. The shell has its inner surface interrupted preferably by the formation of an annular groove 13 therein, and more grooves may be provided if desired, but one is sufficient to insure the stability of the core 14, which is poured into the shell while in a plastic condition and fits into the groove 13, thus forming a shoulder which locks the core in place. A suitable mold is provided above and below the shell so as to taper the core at these points, as the drawing clearly shows, but of course the particular formation of the protruding ends of the core is not necessarily of the style shown, though I prefer this tapering construction, especially at the lower end. The lower end of the core where it protrudes into the cylinder should also be made of a smooth or polished surface so that oil or other matter will not readily adhere to it. In the top of the core is a metal rod 15, preferably of steel, the upper end of which is screw threaded as shown at 16 to receive the nut 17, the rod and nut forming the usual binding post to engage a wire from the source of current supply. The pin at its lower end is rigidly secured to one of the electrodes or terminals 18 which leads downward through the middle portion of the core and protrudes to form one of the sparking points 19. It will be noticed by reference to the drawing, that this terminal wire which should be fine wire, such for instance as the well known meteor wire, is given a wavy conformation

where it is embedded in the core 14, so that it is held in such a manner as to absolutely prohibit slipping or displacement. The second electrode or terminal 20 is also embedded in the lower part of the core, and has one end 21 protruding laterally so as to contact with the lower part of the shell 10, thus making the ground connection, while the sparking point 22 projects opposite the sparking point 19. It will thus be seen that the two electrodes or terminals 18 and 20 are held in an absolutely fixed position, so that there can be no shifting. In fixing the position of these parts, the post or rod 15 and wire 18 are held in the correct longitudinal position in the shell 10 and in the mold which is used in forming the device, while the wire 20 is also held in the desired position, and the molten glass is then forced under pressure into the mold and shell, thus embedding the aforesaid parts and giving to the plug its complete shape.

It will be seen that the terminal points or sparking points 19 and 22 are held in constant relation to each other, that they are thoroughly insulated, and that there is very little liability of any carbon, oil, or other matter interfering with the circuit, because there is no socket for such stuff to collect in, and any carbon lodging between the points protruding as they do, will be immediately burned through by the current.

I claim:—

A spark plug comprising a hollow shell having a lower threaded portion and having an annular groove adjacent the upper end thereof, a core in the shell, said core having a circumferential flange engaging within the annular groove, an electrode embedded in the core, said electrode comprising a rod embedded in the upper portion of the core, and a rod of relatively small diameter forming a continuation of the first mentioned rod, and said rod terminating in a spark point, the intermediate portion of the rod being arranged within the core in an irregular plane, a second electrode having one end thereof embedded in the shell, the opposite end thereof lying in close proximity with the spark point of the opposite electrode and the intermediate portion of the second mentioned electrode being embedded in the core substantially as described.

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