W. BURMAN.

SPARK PLUG.

APPLICATION FILED OCT. 31, 1917.

1,311,039. Patented July 22, 1919.

Fig. 1.

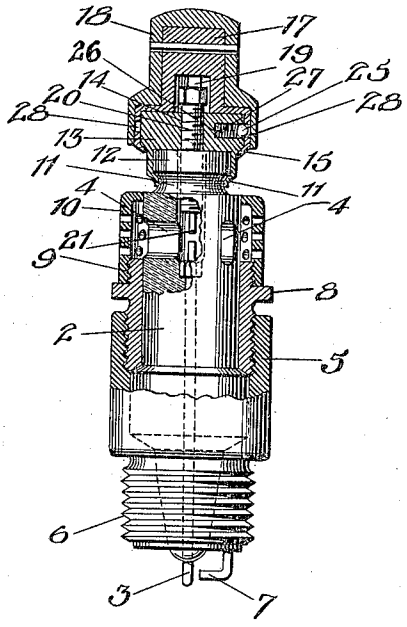


Fig. 2.

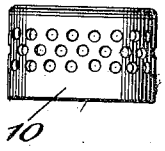


Fig. 3.

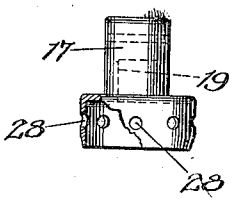
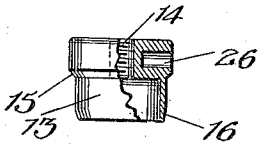


Fig. 4



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SPARK-PLUG.

1,311,039. Specification of Letters Patent. Patented July 22, 1919.

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To all whom it may concern:

Be it known that I, WALFRED BURMAN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Spark-Plugs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention particularly resides in and relates to spark plugs for internal combustion engines, and it is one of the objects of the present invention to provide a variable spark gap and also provide a spark gap which is rendered visible so that it may be readily seen during the operation of the motor upon which the spark plug is mounted.

A further object of the present invention is to provide means permitting the space adjustment and variation of the spark gap forming devices so that the intensity of the spark may be controlled.

It is another object of the present invention to provide a dust guard or a shield disposed adjacent to the exposed spark gap for the purpose of preventing the accumulation of dirt or dust at the exposed gap.

Other objects which are rendered manifest in the following specification and will be readily apparent to those skilled in the art, are contemplated by the present invention, one form of which is illustrated in the accompanying drawing, wherein,

Figure 1 is a side elevation partly in section of the improved spark plug,

Fig. 2 is a side elevation of the detached dust guard,

Fig. 3 is a side elevation partly in section of the rotary cap,

Fig. 4 is a side elevation partly in section of the bushing.

The spark plug may comprise any suitable form of core 2 of insulating material such as porcelain having a central fixed electrode 3 projecting below the bottom end of the spark plug, the upper end of the core 2 being provided with a chamber alining with the fixed electrode 3, the chamber being provided with lateral openings forming windows 4 through which the upper end of the fixed electrode is visible. The core 2 is incased in a suitable shell or plug forming member 5 having screw threads at its lower end at 6 to be screwed into an engine casing, the shell being provided with a lateral electrode 7 having a point directed toward the fixed electrode 3. A suitable lock nut 8 is threaded into the upper end of the shell or plug 5 to hold the core in position, the lock nut 8 also being provided with an outwardly extended threaded portion 9 to be engaged by a cylindrical shield or guard 10 designed to permit observation of sparks formed at the upper end of the fixed electrode 3 at the windows 4. Preferably the guard or shield 10 is of non-conducting material and is shown as being perforated or may be formed of a transparent or other material if desired.

The upper end of the core 2 is provided with a reduced neck 11 and a head 12 upon which there is seated a fixed bushing 13 centrally threaded as at 14, the bushing having a relatively thin flange which is spun or pressed into the neck 11 and thereby held in position on the spark plug. The bushing is shown as provided with a shoulder 15 about which there may be spun down the flange of a cap 16 which latter has an upwardly extending stem portion 17 to receive a knob 18 which preferably is made of non-conducting material such as hard rubber or fiber and may be pinned or otherwise fastened to the cap 16 so that the latter may be rotated as desired about the bushing 13 on which it is mounted.

The cap 16 is provided with a central polygonal or otherwise suitably shaped socket 19 to fit the head or adjacent end of a screw 20 which is threaded in the thread 14 of the bushing 13 and which preferably is provided with a reduced point 21 and which forms a movable electrode section disposed in juxtaposition to the upper end of the fixed electrode 3, adjacent the window or windows 4, in the core 2. Obviously the point 21 of the movable electrode section 20 may be tipped with platinum or other suitable material for purposes well known.

The cap 16 above described is freely rotatable on the bushing 13 and by its engagement at the socket 19 with the head of the electrode section 20, when the cap is rotated, the threaded electrode section is advanced or withdrawn in the bushing 13 thereby varying the distance between the point 21 and the upper end of the fixed electrode 3 and thereby controls the intensity of the spark. It is desirable that suitable means be provided to temporarily

lock or secure the cap 16 with relation to the bushing 13, to hold the spark in respective adjusted position and for this purpose any simple means may be utilized, as for instance, employing a ball 25 which may be mounted in an aperture 26 formed for its reception in the body of the bushing 13 normally pressed outwardly by a spring 27 so that it is adapted to snap into one of a series of apertures suitably formed at 28 in the flange of the cap 16 which surrounds the head of the bushing 13.

From the above it will be seen that I have provided an extremely simple, practicable, substantial and durable device providing an exterior spark gap providing for the observation of the spark, during the operation of the device, and also providing for the safe adjustment of the parts to change the length of the gap during the operation of the engine or current flow through the spark plug. Further there is provided a simple means for preventing the access and the accumulation of dust or dirt around the exterior spark gap by means of the dust guard or shield.

What is claimed is:

1. A spark plug having a windowed core, a threaded bushing fixed to the head of the core, relatively adjustable electrode sections having their adjacent tips visible through windows in the core, one section threaded in said bushing, and an insulated socket member turnably mounted on said bushing for turning said threaded section to vary the spark gap between the electrode tips while the plug is in service.

2. A spark plug having a core with a window in its body, relatively adjustable electrode sections forming a spark gap at the window, and ratchet means for varying the gap while the plug is in service, said means comprising a bushing fixed on the head of the core, one section being threaded in said bushing and having a polygonal head, and insulated cap with an annular series of seats, and a resilient latch mounted in said bushing, the cap non-rotatably but slidably engaging the polygonal head of the adjustable electrode section.

3. A spark plug having an opaque core with radial windows and a central bore, a fixed electrode section in the core and a perforated sleeve surrounding and spaced from the core, a fixed threaded bushing on the upper end of the core, an upper threaded electrode engaging said bushing and adjustable toward or from the lower electrode and forming a spark gap at said windows, a cap having a flange turnably fitting the bushing, and means for interlocking the cap and bushing, said cap operatively engaging the threaded electrode and being jacketed with insulation.

4. A spark plug having a di-electric core with a central chamber which is intersected at its upper end by radial openings; a reduced under cut neck at the upper end of the core; a circumferential flange around the extension of the core; a perforated guard threaded into the core and seating against the flange, and terminating at the shoulder of the core below the neck; an internally threaded bushing fitting over the neck and clenched rigidly into its reduced portion; a threaded electrode section engaging the threads of the bushing and having its lower end extended into the core and having at its upper end a non-circular portion; an insulated cap irremovably and turnably mounted on the bushing and having a recess complementary to the head of the upper or threaded electrode so as to turn the latter, and a lower electrode forming with the upper one a gap in juxtaposition to its window.

In testimony whereof I affix my signature.

WALFRED BURMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."