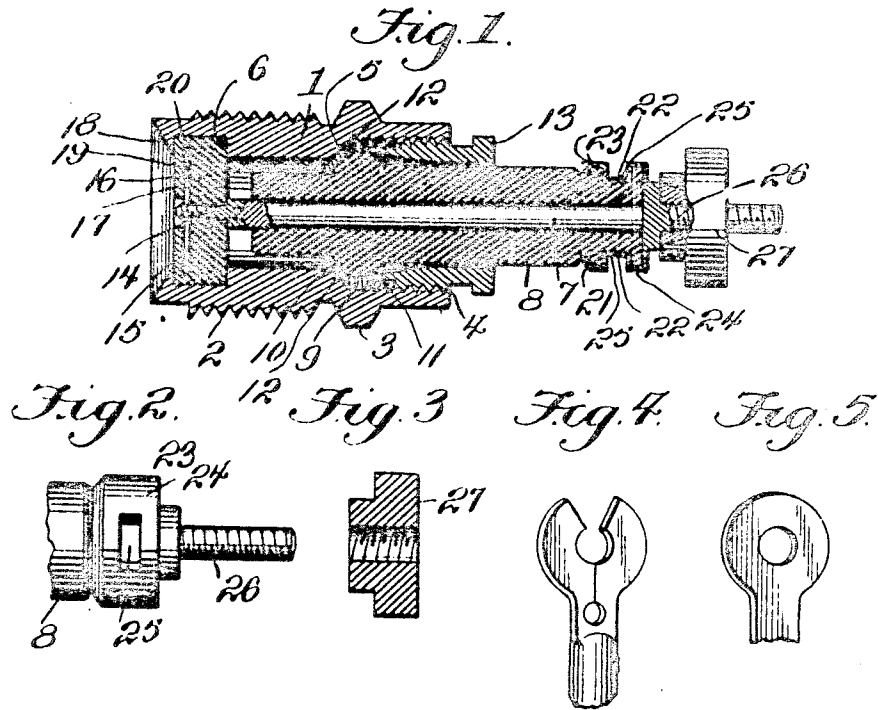


P. M. WILSON.
SPARK PLUG.
APPLICATION FILED SEPT. 24, 1909.

980,723.

Patented Jan. 3, 1911.



Witnesses
J. T. Wright,
K. Allen.

Inventor
Peter M. Wilson,
By Victor J. Evans,
Attorney

UNITED STATES PATENT OFFICE.

PETER M. WILSON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF TO
JAMES M. E. TAYLOR, OF PROVIDENCE, RHODE ISLAND.

SPARK-PLUG.

980,723.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed September 24, 1909. Serial No. 519,338.

To all whom it may concern:

Be it known that I, PETER M. WILSON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Spark-Plugs, of which the following is a specification.

This invention relates to improvements in electric sparking devices particularly spark plugs for use for igniting the explosive gases in the cylinders in internal combustion engines and the said invention consists in the construction, combination and arrangement of devices hereinafter shown and described.

One object of the present invention is to effect improvements in the construction and arrangement of the electrodes or sparking points so as to prevent short-circuiting by the accumulation of soot or carbon around sparking points.

A further object is to prevent the insulator for the central conductor from becoming saturated and injured.

A further object is to effect improvements in means for attaching the electrical connections to the central conductor.

In the accompanying drawings, Figure 1 is a vertical longitudinal central sectional view of a spark plug constructed in accordance with the invention. Figs. 2, 3 4, and 5 are detail views.

In accordance with my invention I provide a shell or casing 1 which is made of iron, steel or other conducting metal and has an exteriorly threaded portion 2 which is adapted to be screwed in a threaded opening in the cylinder head of an engine to secure the shell or casing thereto. Said shell or casing also has an exterior angular portion 3 adapted to be engaged and turned by a wrench and the outer portion of the said shell is provided with interior screw threads 4, the shell having an inclined annular shoulder 5 at the inner end of said interiorly threaded portion 4 and an annular shoulder 6 which is presented toward and spaced from the exposed or inner end of the shell.

The central conductor or inner conductor 7 is incased in and extends longitudinally from end to end of an insulator 8 which insulator is provided with an annular circumferential flange 9 at a suitable distance from its inner end, said flange presenting oppositely inclined or beveled surfaces 10, 11. A collar 12 which may be made of copper or

other suitable material is spaced between the shoulder 5 of the shell and the inclined face 10 of the flange of the insulator 8, a sleeve 13 which is screwed in the threaded portion 4 of the shell bearing at its inner end against the said flange 9 and serving to firmly hold the insulator in place in the shell. The inner end of the said sleeve 13 is flared so that the sleeve presents but a comparatively slight surface which bears against the flange 11 of the insulator 8 and hence excessive pressure on the insulator is prevented when the sleeve expands by the heat to which it is subjected when the device is in use. The inner or central conductor 7 is provided with a sparking point or electrode which is shown as a screw 14 the head of which bears against the inner end of the conductor 7 and is provided with a central recess which receives a stud 15 that projects from said inner conductor.

The exposed end of the shell is closed by an insulator cap 16 which bears against the shoulder 6 and has a threaded central opening engaged by the electrode 14 and through which the latter extends.

On the outer side of the insulator cap is the outer electrode 17 which is a disk of steel or other suitable material and forms a covering for the insulator cap 16 which closes the exposed end of the shell, said electrode disk having a central opening through which the inner electrode extends, said inner electrode being spaced from the wall of said opening, the diameter of said opening exceeding that of the exposed end of the said electrode. This disk is held in place by a flange 18 turned or spun on the exposed end of the shell after the insulator cap or closure 16 and the outer electrode disk have been placed assembled in the shell. The inner side of the electrode disk is hollowed as at 19 so that the inner face of said electrode disk is slightly spaced from the insulator cap or closure 16 except at the periphery of the electrode disk where the same is formed with a flange 20 that bears against the insulator cap or closure.

It will be understood that the electrode disk 17 nearly covers the electrode cap or closure and protects the latter from hot oil or similar substance which may be thrown against the same during the operation of the engine, and it will be also understood that the closure cap or insulator 16 prevents the

possibility of any hot oil or substance being brought in contact with the inner insulator 8 so that the latter is prevented from becoming oil saturated or otherwise injured and hence said insulator 8 may be made of material which is cheaper than the porcelain usually employed for making insulators for devices of this type.

In practice the electrodes 14, 17 become very hot due to the heat of the engine and the heat from between these electrodes prevents short circuiting media from collecting and serves to destroy the short circuiting qualities of residual elements which might tend to collect at this point. Furthermore the spark passing between the electrodes serves to remove or destroy any short circuiting media which may tend to accumulate or collect between them. The spark points do not require adjustment but remain fixed and the space between them is practically unvarying and is not affected by the expansion and contraction of the electrodes since it is obvious that the expansion or contraction of the inner electrode 14 does not affect the distance between the latter and the wall of the opening in the outer electrode disk 17, and since the expansion and contraction of the outer electrode disk is distributed throughout the entire surface of the latter and is minimized at its center where the central electrode is exposed. Vapors or moisture which may condense when the engine is not in operation and settle on the exposed end of the plug would be distributed on the electrode plate in so thin a film as to be prevented from short-circuiting the electrodes and owing to the space 19 between the electrode disk and the closure cap or insulator 16 said disk and closure cap or insulator by capillary action will prevent moisture or vapor from condensing on the inner electrode 14 to such an extent as to render short-circuiting impossible.

The insulator 8 has its outer end reduced in diameter as at 21 and provided in opposite sides with recesses 22. The metallic cap 23 which in practice is preferably made of brass

is formed with a sleeve or shell 24 to fit on the reduced portion 21 of the insulator 8, which sleeve or shell is crimped as at 25 to engage the recesses 22 and thereby secure the cap in place on the outer end of the insulator 8 and in electrical contact with the inner conductor 7. Said cap is formed with a screw threaded stem 26 on which operates a binding nut 27. Either form of the clip or electrical connection shown in Figs. 4 and 5 may be secured between the cap and the binding nut as will be understood.

Having thus described the invention what is claimed as new is:—

1. An electric sparking device having a shell, an inner conductor having an electrode detachable therefrom and presented at the exposed end of the shell, an insulator in the shell on said inner conductor, an insulator for the detachable electrode and forming a closure for the exposed end of the shell, and an electrode in the exposed end of the shell covering the last named insulator and having an opening through which the inner electrode extends, said inner electrode being spaced from the wall of said opening.

2. An electric sparking device having a shell, an inner conductor having an electrode detachable therefrom and presented at the exposed end of the shell, an insulator in the shell on the said inner conductor, an insulator cap in and forming a closure for the exposed end of the shell and having an opening through which the detachable electrode extends, said detachable electrode being secured to the said insulator cap, and an electrode in the exposed end of the shell covering the insulator cap and having an opening through which the inner electrode extends, said inner conductor being spaced from the wall of said opening.

In testimony whereof I affix my signature in presence of two witnesses.

PETER M. WILSON.

Witnesses:

GEO. L. COOKE,

FLORENCE P. EDGERS.