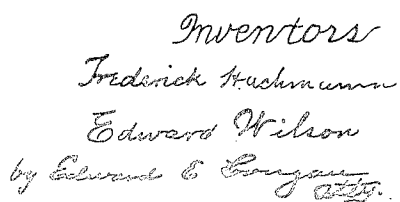


SPARK PLUG.

1,361,328.

Patented Dec. 7, 1920.



UNITED STATES PATENT OFFICE.

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SPARK-PLUG.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, FREDERICK HACHMANN and EDWARD WILSON, citizens of the United States, and residents of St. Louis, State of Missouri, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to spark plugs and has for its primary object a spark plug, the primary electrode of which is constructed of two separate sections or parts, the one part having a condenser so as to give an intensified spark.

A further object is to construct a spark plug provided with a condenser so that the entire primary electrode together with the condenser may be removed for cleaning purposes, or in other words, to remove accumulated carbon which fouls the spark plugs.

In the drawings:

Figure 1 is a side elevation of our complete device.

Fig. 2 is a vertical cross section of the same.

Fig. 3 is a bottom plan view of the plug.

Fig. 4 is an enlarged fragmental section of the two sections of the primary electrode made use of.

In the construction of our device, we provide a casing 5 which is preferably constructed of steel and which serves as the grounded electrode. This casing is provided with screw threads 6 by means of which the casing is secured within the explosion chamber of an internal combustion engine. Formed integral with the casing 5 and above the screw threaded portion 6, we form the wrench surface 7 which is preferably hexagonal in form so that the casing may be secured to the explosion chamber of an internal combustion engine. The casing 5 is further provided with a bore 8 and a screw threaded bore 9, the bore 8 being of less diameter than the bore 9 so as to provide a shoulder 10. Upon this shoulder 10 is placed a gasket 11 which is constructed of material which is both resilient and heat resisting, asbestos being preferably used.

Secured within the screw threaded bore 9 is placed a packing nut 12, this packing nut being provided on its exterior with the screw threads 13 and a smooth inner bore 14, the upper end of this packing nut being provided with wrench engaging surfaces 15 so that the same may be secured within the casing 5.

Within the casing 10 is a porcelain insulator 15 within which the electrode 16 is securely cemented and baked so that there will be no leakage of compression along the joining surfaces of the electrode 16 and the porcelain insulator 15. This electrode 16 projects above the top surface of the porcelain insulator 15 as indicated by the numeral 17 and is in the shape of a truncated cone so as to fit tightly within the recess 18 formed in the primary electrode 19 which is likewise secured in a porcelain insulator 20. This porcelain insulator is secured in the packing or binding nut 12.

Between the packing or binding nut 12 and the porcelain insulator 20 is placed a washer or a gasket 21 which is also composed of heat resisting and compressible material so as to prevent the leakage of gas between the insulator and the nut 12.

Within the porcelain insulator 20 is secured the primary electrode 19 which is cemented and baked therein in a manner well known to the art of spark plug construction, and having its ends 23^a extending beyond the insulator 20. The lower portion 23^a of this electrode 19 is provided with a conical recess 18 to receive the end 17 of the electrode 16 thereby making a continuous electric connection.

Surrounding the primary electrode 19 are placed a series of insulating washers 22 which separate the condenser disks 23 and gathering disks 24 of the condenser. The disks or washers 22 are also formed of insulating material as is fully illustrated in Fig. 2. Over these disks are placed the condenser disks 23 and gathering disks 24, they being separated from each other, and around these disks and the insulator disks 22 is poured the molded mica 25.

After the condenser has been assembled and the molded mica poured around, the entire mass is turned and bored so that the

bore 26 will fit snugly around the electrode 19 and the outer or turned circumference 27 will fit within the bore 14 of the packing nut 12. Both of these fits, that is the fit 5 around the primary electrode 19 and within the bore of the packing nut, are termed driving or force fits, so that there will be no tendency of dropping out, and it will be necessary to destroy the condenser in order 10 to remove the same from the packing or binding nut. It is to be understood, of course, that the molded mica which is forced into the binding nut is of slightly larger diameter than the bore therein, and that 15 portion which surrounds the primary electrode is of slightly less diameter than the electrode, so as to form a perfect electric connection and leave no gap between the electrode and the gathering plates, or the 20 grounded electrode and the condenser plates.

In the grounded electrode is seated a wire or electrode 27 which is brought in close proximity with the wire or electrode 16, the wires 16 and 27, however, not touching, so 25 that when the electric current is passed through the plug, the spark will pass between the wires 16 and 27 causing an explosion in the ignition chamber.

When it is desired to clean the spark 30 plug, it is only necessary to remove the nut 12 together with the condenser, and the porcelain insulator and its electrode can be lifted out without removing the casing from the engine cylinder, or in case the primary 35 conductor 16 becomes burnt out, it is only necessary to insert a new lower porcelain member or if the electrode 27 becomes worn out, a new casing can be supplied.

The upper end of the electrode is provided with screw threads 28 which project 40 beyond the porcelain insulator 20 thus allowing the nut 29 to be securely seated on the insulator and the binding nut 30 to secure the electrical conductor between it and

the nut 29, thus forming an electrical con- 45 nection between the source of energy and the primary electrode.

Having fully described our invention, what we claim is:

1. A spark plug comprising a casing 50 adapted to be attached to an engine cylinder, said casing answering as a grounded electrode, a primary electrode, and a series of insulated metallic plates forming an electric condenser in electrical contact alter- 55 nately with said primary electrode and the grounded electrode.

2. A spark plug comprising a screw threaded casing adapted to be inserted in an engine cylinder, an electrode secured to 60 said casing, a separable primary electrode mounted in said casing and insulated therefrom, and a series of conducting plates insulated from each other forming a condenser in alternate electrical contact with 65 the primary electrode and first mentioned electrode, said condenser being detachably mounted in the casing.

3. A spark plug comprising a screw threaded casing adapted to be attached to 70 an engine cylinder, an electrode carried thereby, a porcelain insulator removably mounted in said casing, an electrode carried by said porcelain insulator, a second porcelain insulator, an electrode secured therein, 75 a condenser in electrical contact with said last mentioned electrode, and a packing nut for securing the casing, the porcelain insulators and the electrodes carried by said insulators together. 80

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses.

FREDERICK HACHMANN.
EDWARD WILSON.

Witnesses:

ELIZABETH CARTALL,
WILTER C. STEIN.