

June 12, 1923.

1,458,690

F. H. ELWELL

SPARK PLUG CLEANER

Filed Aug. 21 . 1920

Fig. 1.

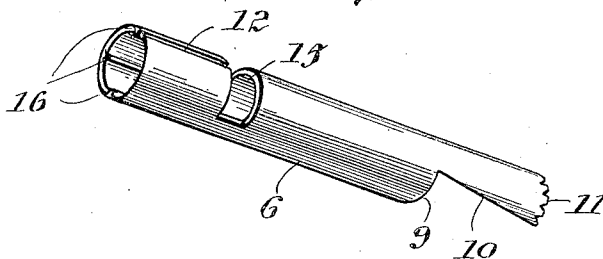


Fig. 2.

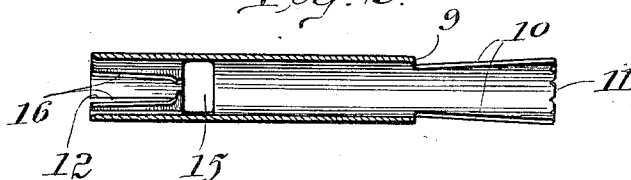


Fig. 3.

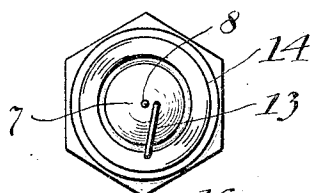


Fig. 4.

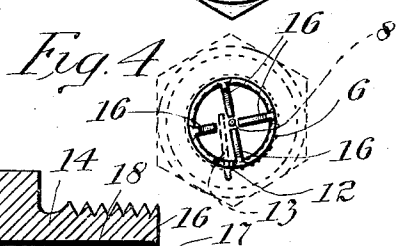
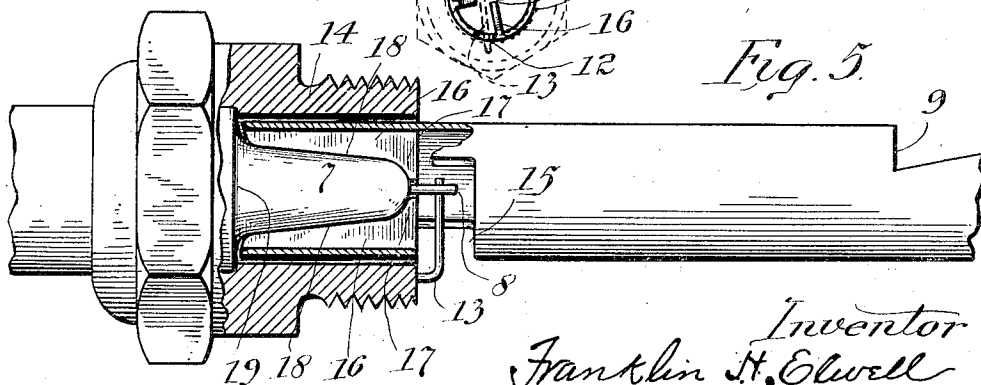


Fig. 5.



Inventor
Franklin H. Elwell
By Jno. G. Elliott
Atty.

UNITED STATES PATENT OFFICE.

FRANKLIN H. ELWELL, OF CHICAGO, ILLINOIS.

SPARK-PLUG CLEANER.

Application filed August 21, 1920. Serial No. 405,184.

To all whom it may concern:

Be it known that I, FRANKLIN H. ELWELL, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Spark-Plug Cleaners, of which the following is a full, clear, and exact specification.

This invention relates to improvements in spark plug cleaners, the cleansing devices for which have heretofore been limited to the use of wire brushes and to the removal of carbon and other foreign matter deposited upon the ground terminal and central electrode.

The prime object of my invention broadly stated, is a spark plug cleaner primarily adapted for removing carbon and other foreign matter deposited on the surface of the insulator for the central electrode and, incidentally, for cleaning the central electrode from such deposits.

More specifically stated, the object of my invention is a spark plug cleaner, the cleansing devices of which are rigid and which, on being bodily rotated about the axis of the insulator, are adapted to remove the carbon and other foreign substances deposited on the surface and also at the base of the insulator by a direct scraping and cutting action.

A further object of my invention is a spark plug cleaning implement, the several parts of which are rigidly connected in one piece surrounding the base of the insulator, and at its other end with blades provided at one end with teeth adapted to cut and scrape carbon deposits surrounding the base of the insulator, and at its other end with blades for cutting deposits of carbon and other foreign substances from and cleaning the surface of the insulator, by a scraping action.

A further object of my invention is a spark plug cleaner, provided with a tubular shell having a longitudinal slot for enabling the shell to be projected against the base of the insulator and supporting a plurality of cutting blades substantially conforming to the contour of the insulator, which said slot and the edge of one of said blades are so arranged that the surface of the insulator, in its entirety, may be exposed to their operation in the absence of the necessary contact of any part of the cleaner, with either of the terminals, with sufficient force to bend or

otherwise injure them, and particularly the ground terminal.

With these ends in view, my invention finds embodiment in certain features of novelty in the construction, combination and arrangement of parts by which the said objects are attained, all as hereinafter fully described with reference to the accompanying drawings and more particularly pointed out in the claims.

In said drawings,—

Fig. 1 is a perspective view of a spark plug cleaner in which my invention finds its embodiment.

Fig. 2 is a longitudinal section through the cleaner at one side of the transverse slot in the shell therefor.

Fig. 3 is a plan view of the spark plug, looking from the righthand end of Fig. 5.

Fig. 4 is an end view of the cleaner, looking from the left end of Fig. 5, with dotted lines indicating the position of the spark plug relative thereto.

Fig. 5 is an enlarged side elevation of the cleaner and spark plug, parts of both of which are shown in longitudinal section.

Similar characters of reference indicate the same parts in the several figures of the drawings.

The tubular shell 6 of the spark plug cleaner in which my invention finds its embodiment is provided, towards one end, with a shoulder 9 which may be formed by cutting through a tube transversely for more than half of its diameter and thence longitudinally on diverging cutting edges 10—10 to provide a means by which these longitudinal cutting edges, for at least a portion of their length, and the serrations or teeth 11 at the outer end thereof, may be rotated in both directions more than half way around the base of the insulator 7 for the cutting and removal of carbon deposits surrounding the base of the insulator and as would not otherwise be possible.

The opposite end of the shell is provided with a slot 12 adapted to straddle and pass the ground terminal 13 of the spark plug for projecting the end of the shell into the housing 14, for and surrounding the insulator 7, to contact with the curved base of the insulator.

In practice, the diameter of that portion of the shell projected into the housing should so closely fit that the shell meets with fric-

tional resistance for its insertion and removal therefrom, and, in any event, closely enough to the housing to prevent a rocking movement of the shell in the housing tending to permit the cutting scraping blades presently referred to, from exerting a leverage tending to fracture the insulator or bend the central electrode.

The longitudinal slot 12 opens into a slot 15 extending transversely about or a little more than half of the diameter for the purposes of oscillating the shell about the axis of the central electrode, the slot 15 being sufficiently wide to prevent the ground electrode 13 from contacting with the opposing walls of the slot at any time, and particularly during the oscillation of the shell.

Permanently fixed or removably secured to the inner wall of the shell and projecting radially therefrom, are a number of scraping blades 16, which extend from the end of the shell to the edge of the slot 15, which blades, as shown in the drawing, are four in number, the cutting edges of the upper ends of three of which project closely enough to the periphery of the central electrode for removing carbon deposits thereon, while the upper cutting edge of the fourth blade, as seen at the right of Fig. 4, is sufficiently narrow to escape contact with the ground electrode 13, when the cleaner is in its operative position and being operated.

The cutting edges of the blade 16 conform to the contour of the surface of the ends, side and base of the insulator 7. That is to say, the inner edges of these blades are curved inwardly towards each other to conform to the curved end of the insulator, as indicated at 17; diverge, as indicated at 18, and are rounded at 19 to conform to the contour of the surface of the side and base of the insulator.

It is now to be observed that the longitudinal slot 12 is located adjacent one of the longer blades 16 in order that the ground terminal may be free to pass by to a position in a plane beyond the ends of the several blades, and by this means prevent contact of the blades therewith throughout the oscillation of the several blades around the common axis of the insulator and the central electrode, and as would not be practical were the slot located at any point substantially different from that above described.

For the removal of carbon deposited at the base of the insulator 7 and on the walls of the housing, the righthand end of the cleaner is inserted in the housing until the teeth 11 are in contact with the carbon at the bottom of the insulator and so that on oscillating the cleaner, the teeth 11 will cut away the carbon opposed thereto, while in the meantime the knife edges 10 will operate to cut and scrape clean the carbon from the side walls of the housing.

With the removal of the deposits of carbon from the portion of the base of the insulator and from the walls of its housing, provision is made for inserting the lefthand end of the cleaner to an operating position on the blades 16, as shown in Fig. 5; that is to say, so that, following the oscillation of the blades about the axis of the insulator, the blades first operate upon the carbon deposits on the side surface of the insulator, and finally from the rounded end portion and the curved portion at the base thereof.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. A spark plug cleaner provided with an inwardly projecting blade, a support therefor, said blade having a cutting edge shaped to conform to the outer surface of the spark plug insulator.

2. A spark plug cleaner, comprising a cylindrical shell provided with a plurality of inwardly projecting blades, the cutting edges of which conform to the contour of the outer cylindrical-like surface of a spark plug insulator, said blades converging inwardly along radial lines towards an axis common to that of said insulator.

3. A spark plug cleaner, one end of which is provided with teeth formed therein, and inwardly converging edges respectively adapted for cleaning from the base of the insulator and the sides of the housing therefor deposits of carbon and other foreign materials deposited thereon.

4. A spark plug cleaner, comprising a shell, internally provided at one end with a plurality of blades, the edges of which conform to the surface contour of and extend along radial lines with reference to the axis of a spark plug insulator, the opposite end edge of said shell being provided with teeth and inwardly converging or cutting edges adapted to remove carbon and other foreign materials deposited on the surface of the base of the insulator and on the opposing surface of the housing therefor.

5. A spark plug cleaner consisting of a tubular shell or body portion, provided internally at one end with blades conforming to the contour of the insulator therefor, and having a longitudinal slot adapted to straddle the ground electrode for permitting the passage of said blades to the base of the insulator the outer surface of which body portion substantially conforms to the inner surface of the housing and is thereby adapted to remove the socket therein.

6. A spark plug cleaner, consisting of a cylindrical shell adapted to removably fit with substantially a frictional tightness the housing surrounding the insulator for the plug, internal blades projecting from the inner walls of the housing the edges of which conform to the contour of the insulator, said

housing having a longitudinal and a transverse slot in open communication with each other respectively straddling the ground terminal and for oscillating the housing in its operative position on its own axis and that of the insulator and the housing therefor.

7. A spark plug cleaner, consisting of a tubular shell or body portion, the outer diameter of which substantially conforms to the inner diameter of the housing of the insulator for the plug, a plurality of blades extending longitudinally thereof conforming to the contour of the insulator, said shell being provided with a longitudinal slot open at both ends extending the length of said blades, and having a transverse slot of substantially greater width bisecting said longitudinal slot for the purposes described.

8. A spark plug cleaner, comprising a cylindrical shell, a number of internally projecting blades conforming to the contour of the insulator for the spark plug, said shell having a longitudinal slot and a transverse slot bisecting each other, which said trans-

verse slot is substantially wider than the other slot whereby the end of the shell may be projected past the ground terminal to a seated position at substantially the base of the insulator and may be oscillated about its axis with the side walls of the transverse slot free from contact with the ground terminal.

9. A spark plug, comprising a cylindrical shell or body portion conforming to and adapted to be projected into and removably fit the housing for the insulator of the plug, a series of blades projecting radially from the inner walls of the housing conforming to the contour of the insulator, one of which blades is narrower at its inner end than any of the other blades.

In witness whereof, I have hereunto set my hand and affixed my seal this 14th day of August, A. D. 1920.

FRANKLIN H. ELWELL. [L. s.]

Witnesses:

JNO. G. ELLIOTT,
H. SLACK.