May 29, 1928.

1,671,843

J. H. SCOTT

SPARK PLUG CLEANER

Filed Jan. 18, 1927

2 Sheets-Sheet 1

Fig. 1.

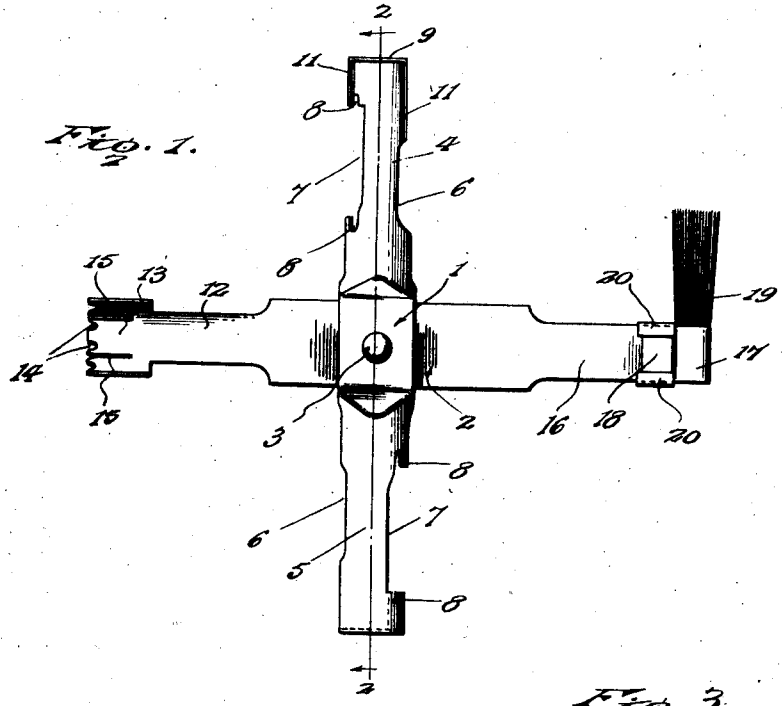


Fig. 3.

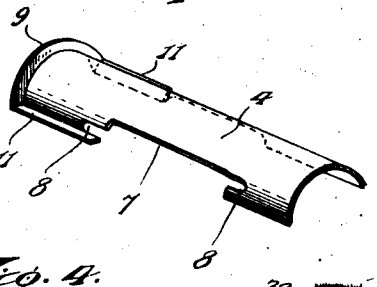


Fig. 2.

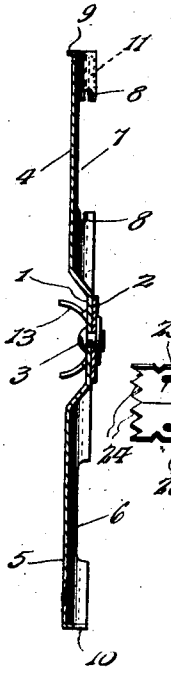


Fig. 4.

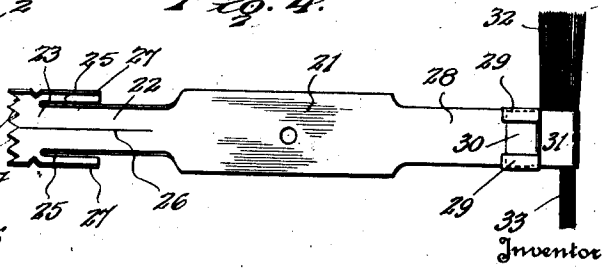
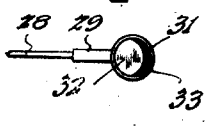


Fig. 5.



Inventor

John H. Scott.

By Lacey & Lacey, Attorneys

May 29, 1928.

1,671,843

J. H. SCOTT

SPARK PLUG CLEANER

Filed Jan. 18, 1927

2 Sheets-Sheet 2

Fig. 6.

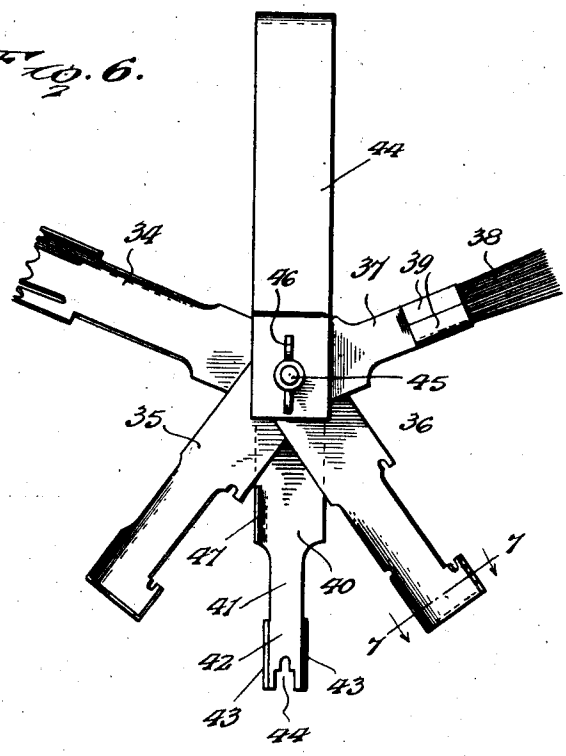
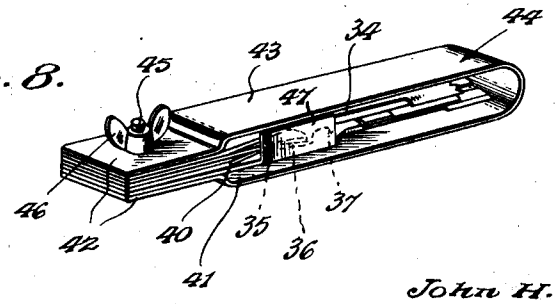


Fig. 7.



Fig. 8.



Inventor

John H. Scott.

By Lacey & Lacey, Attorneys

Patented May 29, 1928. 1,671,843

UNITED STATES PATENT OFFICE.

JOHN H. SCOTT, OF MUSKOGEE, OKLAHOMA.

SPARK-PLUG CLEANER.

Application filed January 18, 1927. Serial No. 161,884.

This invention relates to compound tools and more particularly to a spark plug cleaner.

After a spark plug has been in use for some time carbon accumulates within the shell and upon the electrodes and inner end portion of the porcelain insulation and is liable to cause the spark plug to be short circuited and prevent proper operation of the internal combustion engine with which the spark plug is employed. It is then necessary to remove the plug from its seat in the engine cylinder and thoroughly clean it. This has been found tedious and difficult to perform as carbon upon the insulation and inner face of the sleeve cannot be readily removed without taking the plug apart. Some plugs may be taken apart for cleaning and then reassembled but others are so formed that the insulation for the central electrode is permanently mounted in the shell.

Therefore, one object of the invention is to provide an implement by means of which all portions of the plug may be easily and thoroughly cleaned without it being necessary to disassemble the plug.

Spark plug cleaning tools are now in use but they have been found unsatisfactory as they do not thoroughly remove the carbon and in addition are rather large and cannot be conveniently carried upon the person. It is, therefore, another object of the invention to combine in one assemblage tools for cleaning various portions of the plug and so assemble the tool that they may be folded into a compact mass of such size that they may be easily placed in a coat or vest pocket and carried upon the person where they will be accessible when a spark plug unexpectedly becomes foul and requires cleaning before it will again properly operate.

Another object of the invention is to form the plug cleaning implements of sheet metal so that they will be strong and durable and at the same time light in weight and cheap to produce.

The invention is illustrated in the accompanying drawings, wherein

Figure 1 is a view showing one form of spark plug cleaner with the implements constituting the same swung into position for use;

Fig. 2 is a longitudinal sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged perspective view of one of the plug cleaning implements;

Fig. 4 is a top plan view of a modified form of plug cleaning implement;

Fig. 5 is a fragmentary view of one end portion of the implement shown in Fig. 4 and showing the cleaning brush thereof in end elevation;

Fig. 6 is a view similar to Fig. 1 illustrating a modified form of spark plug cleaner;

Fig. 7 is a transverse sectional view taken on the line 7—7 of Fig. 6, and

Fig. 8 is a perspective view showing the spark plug cleaning implements of Fig. 6 folded into the handle.

The spark plug cleaning tool shown in Fig. 1 comprises companion implements 1 and 2 pivotally connected through the medium of a fastener 3 so that they may be disposed in crossed relation to each other, as shown, or swung to a folded position in which they will extend longitudinally of each other. The fastener 3 may be either a rivet, as shown, or a bolt carrying a securing nut which may be tightened to securely but releasably retain the implements in an adjusted position. Each of the implements is formed of steel or other sheet metal having sufficient resiliency and are stamped to assume the proper configuration. The end portions 4 and 5 of the strip 1 are stamped, as shown in Fig. 2, to assume a concavo-convex formation in cross section and each is formed with side recesses 6 and 7 and with auxiliary recesses 8 leading from opposite ends of the recess 7. The recesses 6 and 7 impart additional flexibility to the end portions of the strip 1 and the reduced recesses 8 constitute pockets in which the electrodes of a plug may be received and carbon scraped from the electrodes by imparting a sliding movement to the implement longitudinally of the electrodes. In this manner the carbon may be very easily and quickly scraped from the electrodes. It should be further noted that by forming the strips of sheet metal of the proper thickness the device may be employed as a gage in order to properly space the electrodes from each other after they have been cleaned.

Flanges 9 and 10 are formed at opposite ends of the strip 1 and flanges 11 are formed along opposite sides of the end portion carrying the flange 9. The flange 10 extends from the concave face of the strip 1 and is employed to scrape carbon from the insulation of the central electrode, whereas the flanges 9 and 11 project from the convex face of the implement and are employed to scrape carbon from the inner concave surface of the shell of the plug. It will thus be seen that the carbon which accumulates upon the insulation and inner surface of the shell about the inner end portion of the insulation may be very easily scraped loose and removed.

The strip or cleaner section 2 has one end portion reduced transversely to form a neck 12 and terminates in a head 13. The head 13 is arcuate in cross section and along its free end is formed with teeth 14. The head 13 is of approximately the same size and contour in cross section as the end portions of the strip 1 and is intended to be inserted into the shell with the teeth engaging the shell and insulation of the central electrode. After the head 13 is fitted into the shell, a rotary motion is imparted to it and carbon which is accumulated in the reduced inner end portion of the space between the shell and insulation scraped loose. Longitudinally extending slits 15 are formed in the head in order to impart additional flexibility to it and thereby permit the carbon to be very readily scraped loose. The opposite end portion of the strip 2 is partially reduced in width to form a neck 16 and its free end portion is bent to form a sleeve 17 having a tongue extension 18. A brush head 19 formed of wire strands is placed in the sleeve 17 and when the tongue is forced into close contacting engagement with the neck 16 and the side arms 20 bent into overlying relation to the tongue the sleeve will be retained in tight binding engagement with the wire strands forming the brush head. In the preferred form, the wire strands are embedded in sealing wax or some other suitable binder which will hold them assembled and prevent them from accidentally slipping longitudinally out of proper position. The brush 19 is employed after the carbon has been scraped loose from the plug and will very effectively serve to polish the scraped surfaces and remove fine particles of carbon not scraped loose by the scrapers.

In Fig. 4, there has been shown an implement 21 which may be substituted for the implement 2 shown in Fig. 1. This implement is also formed of resilient sheet metal and has one end portion reduced to form a neck 22 carrying a scraping head 23 which corresponds to the head 13 and is formed with scraping teeth 24 along its free end. Slits 25 lead from the rear end of the head 23 at opposite sides of the neck 22 and a slit 26 leads from the forward end of the head. The slits 25 and 26 impart flexibility to the head and the slits 25 form tongues 27 which may be employed to clean portions of the plug if so desired. The opposite end portion of the implement or strip 21 is reduced to form a neck extension 28, corresponding to the neck 16, and carrying side arms 29 for gripping engagement with the tongue extension 30 of the sleeve 31. The sleeve 31 carries a brush head 32 formed of wire similar to the brush head 19 but certain of the wire strands are of greater length than the remaining strands so that they project from the opposite end of the sleeve and form an auxiliary bush head 33 by means of which fine carbon may be brushed out of the reduced inner end portion of the space between the shell and the porcelain insulation for the central electrode.

When the plug cleaner shown in Figures 1 through 5 is in use, the members 1 and 2 are turned so that they extend in crossed relation to each other. The implement can then be grasped with a selected end portion of one of the strips or members projecting from the hand in position for use and the other member constituting a cross bar so that the device may be firmly gripped and a scraping motion readily applied to the member in use. By this arrangement of parts the device may be very firmly held and easily operated. After the plug has been thoroughly cleaned, the two members are turned about the pivot fastener 3 so that they extend longitudinally in overlying relation to each other and are reduced to a compact mass. The device can then be placed in a tool box or pocket and will not be liable to be bent or caught in the pocket when removed.

The plug cleaner illustrated in Figures 6, 7 and 8 includes implements 34, 35, 36 and 37 which are formed similar to the end portions of the members or implements 1 and 2 and, therefore, do not need to be described in detail. It should be noted, however, that the implement 37 instead of being provided with a sleeve to carry the brush head 38 is merely formed with side wings 39 which are folded inwardly into overlying and gripping engagement with the inner end portion of the brush head. This form of cleaner also includes an implement 40 which is also formed of sheet metal and formed with a reduced shank portion 41 having a head 42 at its free end. The side portions of the head are sharpened as shown at 43, and a recess 44 leads from its outer end. This implement is intended for use when cleaning a spark plug having a hollow porcelain and when used straddles the walls of the porcelain with the sharpened side edges engaging the inner and outer faces thereof

to remove carbon when the implement is moved circumferentially of the porcelain. It should be also noted that since the shank 41 is reduced in width carbon may be scraped from the under portions of the electrodes. The companion implements have their inner end portions disposed between the end portions 42 of the arms 43 of a U-shaped handle 44 and loosely mounted upon a bolt 45. The bolt 45 extends transversely through the handle and carries a wing nut 46 which, when tightened, will force the arms of the handle toward each other into tight gripping engagement with the inner end portions of the implements. A side wing 47 is provided upon the implement 40 so that it may be easily moved out of the handle. When this form of the cleaner is in use, the implements may be swung out of the handle one at a time or they may be all swung outwardly, as shown in Figure 6, and the wing nut tightened to hold them in an extended position for selective use. By having the implements all swung outwardy one may be employed to remove carbon from a plug and certain of the remaining implements constitute a turning bar for the implement in use. After a plug has been thoroughly cleaned, the implement will all be swung back into the handle, as shown in Fig. 8, and the nut tightened. The device can then be placed in a pocket until again needed.

Having thus described the invention, I claim:

1. A spark plug cleaner comprising members having flattened portions in face to face contact with each other and free end portions curved transversely and formed with scraping flanges along their sides, and a pivot fastener passed through the flattened portions of said members to retain the same assembled in close contacting engagement with each other and allow a selected member to be swung transversely of another to a position for use.

2. A spark plug cleaner comprising a strip of material curved tranversely to provide a concavo-convex formation and having its side portions bent to form scraping flanges.

3. A spark plug cleaner comprising a strip of material formed with a recess leading from a marginal edge thereof and with a notch extending into the strip from the recess and providing an auxiliary recess to receive an electrode of a spark plug when scraping the electrode.

In testimony whereof I affix my signature.

JOHN H. SCOTT. [L. S.]