July 13, 1937. J. P. THOMSON 2,086,587

TOOL FOR REMOVING AND APPLYING SPARK PLUGS

Filed June 19, 1935

Fig. 1.

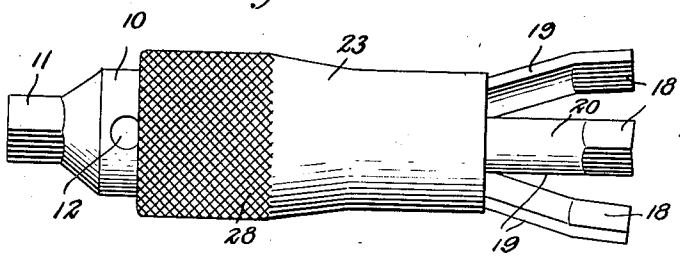


Fig. 2.

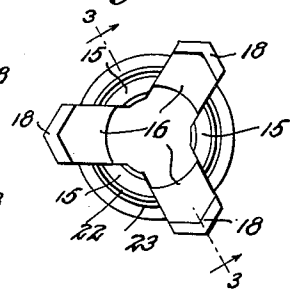


Fig. 3.

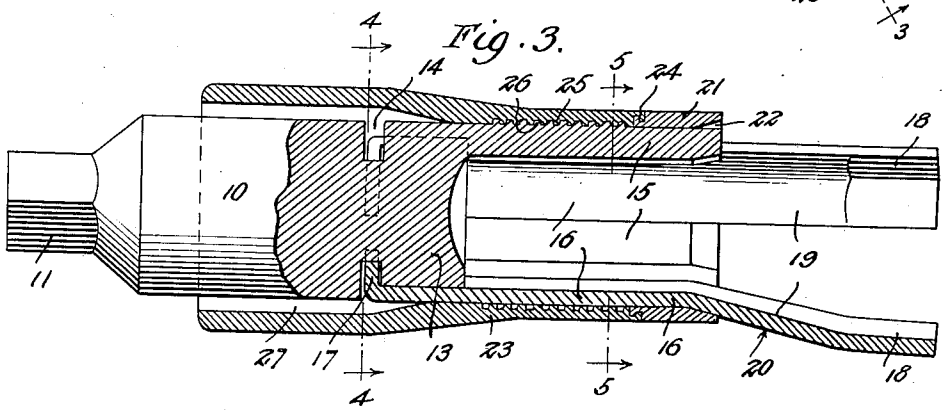


Fig. 4.

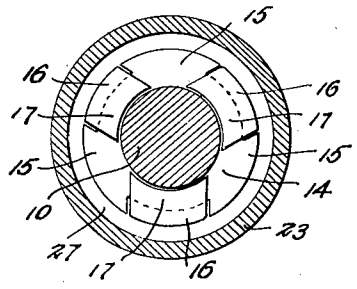


Fig. 5.

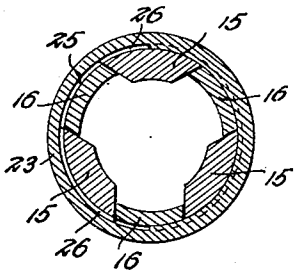
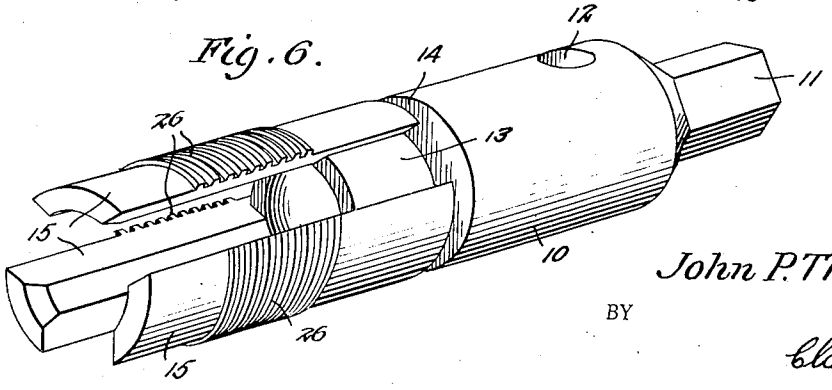


Fig. 6.



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2,086,587

UNITED STATES PATENT OFFICE

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TOOL FOR REMOVING AND APPLYING SPARK PLUGS

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Application June 19, 1935, Serial No. 27,393

1 Claim. (Cl. 81—112)

This invention relates generally to the class of tools and while not necessarily restricted to such use, the invention refers particularly to an improved tool for applying spark plugs to motors and for removing the same therefrom.

Inasmuch as there are an appreciable number of spark plugs of varying types and sizes which in many instances are so located that they cannot be applied to and removed from the motor with an ordinary wrench, service stations, garages, repair shops and other similar establishments are required to carry a great variety of tools or wrenches of different types and sizes in order to be properly equipped to handle the various types and sizes of spark plugs and to install and remove them from the different makes of motors.

The present invention, therefore, comprehends an improved tool of the indicated character and for the purpose specified which, while useful for other purposes, provides a device which is especially adaptable for applying to and removing spark plugs of practically any size and make from the various types of motors.

More specifically, the invention resides in a tool for the purpose set forth which includes a body having at one end thereof a plurality of jaws mounted for longitudinal swinging movement with cooperative gripping terminals protruding therebeyond and means for effecting movement of the jaws into gripping relation with the body of a spark plug, the arrangement of the jaws and body being such as to accommodate the outer end of the spark plug, while the tool is so designed as to render the same useful upon the various types of motors encountered.

The invention further contemplates an improved tool or wrench of this nature which embodies but few and simple parts capable of economical production and assembly, which is readily adjustable to the varying sizes of spark plugs and which is strong and durable and efficient for its intended purpose.

With the above enumerated and other objects in view, reference is now made to the following specification and accompanying drawing in which there is disclosed a preferred embodiment of the invention, while the appended claim covers variations and modifications thereof which fall within the scope of the invention.

In the drawing:

Fig. 1 is a side view of a tool constructed in accordance with the invention.

Fig. 2 is an end view.

Fig. 3 is a longitudinal sectional view of an enlarged scale taken approximately on the line 3—3 of Fig. 2.

Fig. 4 is a transverse sectional view therethrough taken on a plane indicated by the line 4—4 of Fig. 3.

Fig. 5 is a similar view taken on the line 5—5 of Fig. 3.

Fig. 6 is a perspective view of the body of the tool with the jaws, sleeve and tubular element removed therefrom.

Referring to the drawing by characters of reference, 10 designates the body of the tool which is preferably of cylindrical formation and is provided at one end with a multi-faced terminal 11 for the application thereto of a wrench or other device for turning the body. The body may also be provided with a transverse opening 12 for receiving therethrough an alternate type of means for turning the body. Adjacent the opposite end, the body is provided with a head 13 of reduced diameter between which and the main portion of the body an annular groove 14 is formed. Extending from the inner end of the head 13, and outwardly beyond its outer end thereof are a plurality of longitudinally disposed circumferentially spaced fingers 15 preferably integral with the head or attached thereto so as to form a rigid part thereof. A jaw 16 is arranged between each adjacent pair of fingers and said jaws each has an inner terminal 17 which is directed inwardly and positioned within the annular groove 14 to secure the same against longitudinal sliding movement, while permitting of longitudinal rocking of the jaws with reference to the head 13 the outer edge of which serves as a fulcrum, it being evident that each adjacent pair of fingers 15 serves as a guide for the rocking movement of the jaws, while also functioning therewith to resist the turning strains imparted to the jaws, when the tool is in use. The jaws are provided with gripping terminals 18 at their outer ends which are preferably of angulated cross sectional configuration, three jaws being shown which cooperate to engage the surfaces of the usual hexagonal portion of a spark plug body at the corners thereof. The gripping terminals 18 merge into and are joined to the major portion of the jaws 16 by longitudinally inclined shank portions 19 which diverge outwardly and are each formed with a transversely arcuate outer convex surface 20.

A longitudinally slidable annular sleeve 21 surrounds the fingers 15 and the jaws 16 and the outer end of the sleeve is provided with an internal frusto-conical surface 22 which is adapted to

co-act with the convex arcuate outer surfaces 20 of the inclined shank portions 19 of the jaws upon outward movement of the sleeve to effect a contraction of the terminals 18 into gripping engagement with the spark plug body, while retractive movement of the sleeve in the opposite direction permits of the release and spreading of the jaws.

In order to provide means for effecting sliding movement of the sleeve 21 in opposite directions, a rotatable tubular element 23 is provided which surrounds the jaws and fingers and extends from the sleeve 21 over the head 13 and body 10 of the device. The element 23 is swivelly connected with the sleeve 21 by an annular tongue and groove connection 24 and the element 23 is formed with internal threads 25 which engage with correspondingly threaded portions 26 on the fingers 15. The rear portion of the manipulating element 23 is formed with an enlarged bore 27 to provide a clearance which allows for the longitudinal rocking of the jaws 16, but limits the radial outward movement of the jaw terminals 17 so that they do not completely disengage the groove 14. The external surface of the rear portion of said element is knurled as at 28 to facilitate the rotation of the same in order to advance and retract the sleeve 21. The manipulating element 23 and the sleeve 21 serve to retain the jaws 16 in assembled relation with the tool body and it will be observed that when the manipulating element is in fully retracted position, as illustrated in Fig. 3, the forward portion of the bore thereof which is of reduced diameter, coacts with the jaws in rear of the forward face of the head 13 to maintain the jaws in their maximum opened relation.

In use, the jawed end of the tool is engaged over the spark plug, it being understood that the outer end of the plug will be received in the recess or socket formed by the jaws 16 and fingers 15. By turning the manipulating element 23 in one direction, due to the interengaging threads 25 and 26, the sleeve 21 will be advanced towards the inclined portions 19 of the jaws, whereby its frusto-conical internal end surfaces 22 will serve as a cam engageable with the outer convex surfaces 20 of the jaw portions 19 to rock the jaws longitudinally so that the gripping terminals 18 are radially advanced inwardly into gripping engagement with the spark plug body. The threaded connection between manipulating element 23 and the fingers 15 will serve as an effective lock to hold the gripping terminals of the jaws in gripping relation with the spark plug body, while the tool is rotated by applying a wrench to the multi-faced terminal 11 or by the insertion of an element in the opening 12 for applying or removing the spark plug.

What is claimed is:

An adjustable spark plug wrench including a cylindrical body having at one end a head of reduced diameter and formed with an annular groove at the juncture of the head therewith, rigid circumferentially spaced fingers carried by and extending from the inner edge of the head longitudinally beyond the outer edge thereof, a jaw arranged between each adjacent pair of fingers fulcrumed on the outer edge of the head for longitudinal rocking movement and defining, together with the portions of the fingers extending beyond the head, a recess for the accommodation of the outer end portion of a spark plug, an inwardly directed terminal at the inner end of each jaw engaging within the groove, said jaws having outwardly divergent portions to accommodate the tapered portion of the spark plug and terminals at the free ends of said divergent portions, a longitudinally shiftable sleeve surrounding the jaws and fingers and having an end engageable with the outer surfaces of the divergent portions of the jaws for effecting longitudinal rocking and radial inward movement of the gripping terminals so as to engage with the wrench engaging faces of the spark plug, said jaws being of a length to extend beyond the outer ends of the fingers and sleeve respectively when the jaws are expanded and engaging with the spark plug, and interengaging threads internally of the sleeve and externally of the fingers for effecting longitudinal shifting of the sleeve upon relative turning movement of the sleeve and body.

JOHN P. THOMSON.