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WRENCH FOR SPARK PLUGS AND THE LIKE

2,304,271

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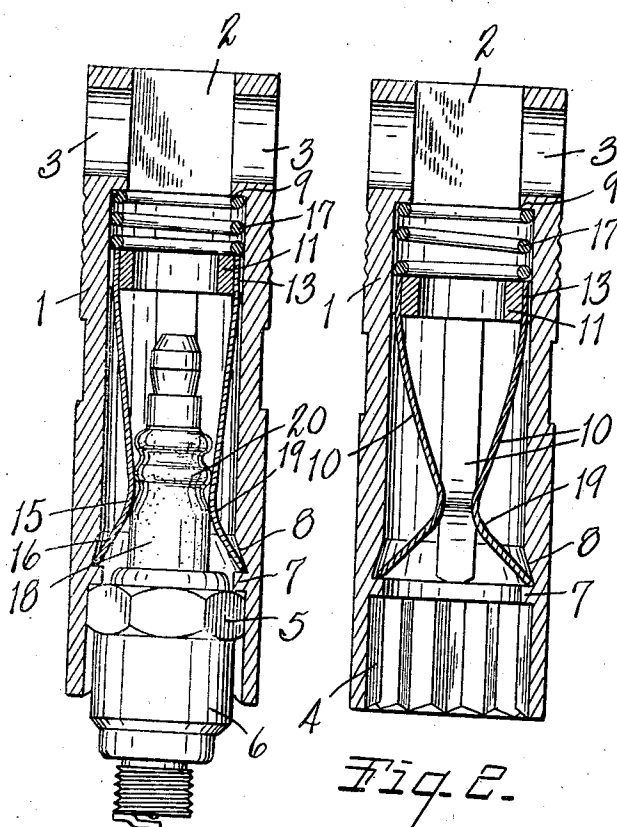


Fig. 1.

Fig. 2.

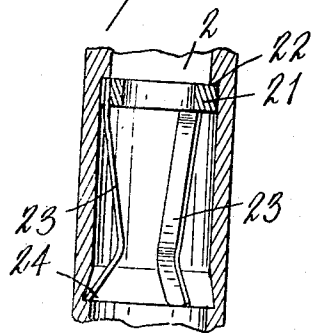


Fig. 5.

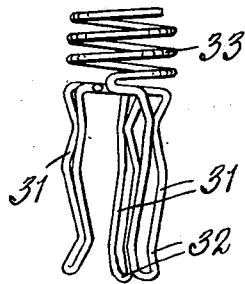


Fig. 6.

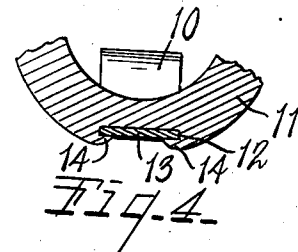


Fig. 4.

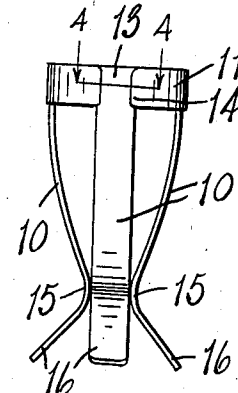


Fig. 3.

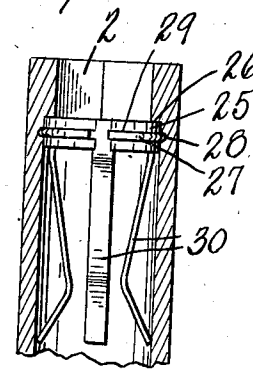


Fig. 7.

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WRENCH FOR SPARK PLUGS AND THE LIKE

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10 Claims. (Cl. 81—125)

The main objects of this invention are:

First, to provide a wrench by means of which spark plugs and the like may be quickly and easily removed from or inserted in an engine with little likelihood of injury to the spark plug.

Second, to provide a wrench of this character which protects the porcelain and other parts of a spark plug which are likely to be broken or injured and also facilitates the removal and replacement of the spark plugs and constitutes a holder therefor while the spark plug is being cleaned.

Third, to provide a wrench having these advantages which is simple and economical in its parts and very durable.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

Preferred embodiments of the invention are illustrated in the accompanying drawing, in which:

Fig. 1 is a longitudinal section of a spark plug wrench embodying the invention with a spark plug in position therein.

Fig. 2 is a view corresponding to that of Fig. 1 with the spark plug removed.

Fig. 3 is a side view of the spring spark plug gripping and supporting fingers assembled as a unit with the supporting member.

Fig. 4 is an enlarged detail section on line 4—4 of Fig. 3.

Fig. 5 is a fragmentary longitudinal section of a modified form or embodiment of the invention.

Fig. 6 is a side view of a modified form of spring finger assembly formed of wire.

Fig. 7 is a fragmentary view of a still further modification or embodiment of the invention.

Our present invention is in certain respects an improvement upon the invention, the subject matter of the Merriman application for Letters Patent, Serial No. 339,653, filed June 10, 1940.

We have not illustrated the handle of our wrench but our improved socket or body member 1, illustrated in Figs. 1 and 2, has a socket 2 at its inner end adapted to receive the shank or spindle of a handle or actuating member and has aligned transverse bores 3 adapted to receive a transversely disposed shank of a handle.

At its inner end, the tubular body member 1 is provided with a non-circular socket 4 adapted to receive the non-circular portion 5 of a spark plug 6. This body member is provided with an internal annular rib 7 at the inner end of the socket 4 and preferably has a conical recess 8

above this rib. The body member also has an internal annular shoulder 9 adjacent its inner end.

We provide a plurality of blade spring fingers 10 which are supported to engage a spark plug as indicated in Fig. 1. These spring fingers are mounted at their inner ends on an annular support 11, this support having recesses 12 in the periphery thereof receiving the ends 13 of the spring fingers which are retained therein by upsetting the metal at 14, see Fig. 4.

The member 11 is mounted for axial movement within the body member—that is, it is axially slidable therein, the spring fingers, as stated, being inwardly bowed, there being in the preferred embodiment rather sharp bowing offsets 15 adjacent the outer ends of the fingers, the outer ends 16 of the fingers being laterally directed and are seated on the rib 7 and have supporting engagement with the rib 7 within the recess 8.

The coiled spring 17 is arranged in thrust engagement with the shoulder 9 and acts upon the support 11 to urge the same outwardly and urges the ends of the fingers against the rib 7.

It will be observed by reference to Fig. 1 that when a spark plug is engaged within the wrench, the bowed portions of the spring fingers are pressed outwardly, and owing to the ends of the fingers being in thrust engagement with the rib 7, the upper ends of the fingers are urged upwardly against the thrust of the spring 17. This avoids the necessity of a distorting bowing of the spring fingers.

The structure is highly effective in supporting the spark plug so that the porcelain or frangible portion thereof indicated at 18 is yieldably supported and cannot come into contact with the walls of the wrench. Also, they serve to keep the spark plug centered in the socket for effective guidance of the spark plug and in inserting it.

The wrench serves as an effective means for supporting the spark plug while it is being cleaned and minimizes the handling and consequent liability to breakage or damage. It greatly facilitates not only the placement of the spark plugs in the original assembly but is more particularly advantageous in the removal and cleaning and replacement of the spark plugs.

It will be observed that the inward offsets 19 of the spring fingers are positioned so as to engage below the annular rib 20 on the porcelain portion of the spark plug, the spark plug illustrated being quite widely used. However, there is an effective gripping and supporting action on variously shaped sizes of spark plugs—that is,

so far as the frangible porcelain portions thereof are concerned. It will be understood of course that the wrench members must have sockets suitable for the particular sizes of spark plugs so far as their wrench receiving portions are concerned.

In the embodiment of our invention shown in Fig. 5, the thrust spring 17 is omitted and the support 21 corresponding to the support 11 is seated directly against a shoulder 22, the ends of the spring fingers 23 being in supporting engagement with the internal shoulder 24. In this embodiment, the spring members 23 will yield or spring in themselves when the spark plug is introduced. As in the embodiment of Figs. 1-4, the springs 23 are secured to support 21 for insertion therewith as a unit in the wrench body member.

In the embodiment shown in Fig. 7, the support member 25 is seated against the shoulder 26 and is retained in that position by means of the split ring 27 which engages in an annular recess or groove 28 in the wall of the wrench member and in a groove 29 in the support member. In this case, the spring fingers 30 are appropriately secured to support 25 and may move downwardly when a spark plug is inserted so that the kinking action thereof is not necessary.

In Fig. 6, we illustrate a structure in which the spring fingers 31 are formed of wire suitably offset at 32 to engage a spark plug. In this case, the thrust spring 33 is formed integrally with the spring fingers—that is, the wire forming the spring fingers is formed into coils to provide the thrust spring 33. The action is the same as that of the embodiment shown in Figs. 1 and 2.

It will be observed that in the embodiment shown in Figs. 1 and 2, the parts may be assembled by inserting the spring 17 and then inserting the unit consisting of the spring fingers 10 and the support 11, and compressing the spring 17 until the ends of the fingers snap behind the supporting rib 7.

In assembling a unit such as shown in Fig. 6, it is only necessary to insert it into the tubular body and compress the coiled spring portion 33 until the ends of the fingers snap or spring behind the supporting ledge.

In the embodiment shown in Fig. 5, the unit consisting of the support 21 and the fingers 23 are inserted in the body and the spring fingers bent or snapped behind the supporting shoulder.

In the embodiment shown in Fig. 7, the unit consisting of the spring fingers 30 and the supporting element 25 with the ring 27 engaged therein is pushed into the tubular body until the supporting member abuts the shoulder 26 and the retaining ring snaps into the groove 29.

In all of these embodiments, the parts are quite economical to produce and easily inserted.

The structures are well adapted for both new work and repair work and they are very desirable for use in service stations as our implements render rapid work possible.

We have not attempted to illustrate or describe other embodiments or embodiments of our invention as we believe the disclosure made will enable those skilled in the art to embody or adapt our improvements as may be desired.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. A wrench member comprising a tubular body member adapted to receive the major portion of a spark plug and having a non-circular spark plug socket at its outer end, a plurality of

spring fingers having inward offsets adjacent their outer ends, a support to which the inner ends of said fingers are fixedly secured axially slidable within said body member, and a thrust spring acting to urge said support and the spring fingers carried thereby outwardly, said body member having an internal annular shoulder constituting a seat for said thrust spring and an annular rib constituting a support for the laterally directed outer ends of said spring fingers and a stop for a spark plug within said socket, said socket member having a conical recess above said rib receiving the ends of said fingers.

2. A wrench member comprising a tubular body member adapted to receive the major portion of a spark plug and having a non-circular spark plug socket at its outer end, a plurality of spring fingers having inward offsets adjacent their outer ends, a support to which the inner ends of said fingers are fixedly secured axially slidable within said body member, and a thrust spring acting to urge said support and the spring fingers carried thereby outwardly, said body member having an internal annular shoulder constituting a seat for said thrust spring and an annular rib constituting a support for the laterally directed outer ends of said spring fingers.

3. A wrench comprising a tubular body member adapted to receive the major portion of a spark plug and having a spark plug socket at its outer end, there being an internal rib constituting a stop for a spark plug at the inner end of said socket, said body member having a conical recess above said rib and an annular shoulder in spaced relation to said rib, a plurality of inwardly bowed spring spark plug engaging fingers, a support slidable within said body member and to which the inner ends of said fingers are secured, and a spring seated on said shoulder and acting to urge said spring finger support outwardly, the outer ends of said fingers being directed laterally into said recess and being in end supporting engagement with said rib.

4. A wrench comprising a tubular body member adapted to receive the major portion of a spark plug and having a spark plug socket at its outer end, there being an internal rib constituting a stop for a spark plug at the inner end of said socket, said body member having an annular shoulder in spaced relation to said rib, a plurality of inwardly bowed spring spark plug engaging fingers, a support slidable within said body member and to which the inner ends of said fingers are secured, and a spring seated on said shoulder and acting to urge said spring finger support outwardly, the outer ends of said fingers being in end supporting engagement with said rib.

5. In a wrench, the combination of a tubular body adapted to receive the major portion of a spark plug and having a non-circular spark plug socket at its outer end, a plurality of spring fingers having inward offsets adjacent their outer ends and laterally directed outer ends, a support for said fingers disposed within said body for movement axially thereof, and a thrust spring acting to urge said support outwardly, said body member having an internal support for the outer ends of said spring fingers.

6. In a wrench, the combination of a tubular body adapted to receive the major portion of a spark plug and having a spark plug engaging socket at its outer end, a plurality of spark plug engaging fingers of spring material mounted within said body at the inside of said socket and

adapted to yieldably receive and retainingly grip a spark plug engaged by the socket, the inner ends of said spring fingers being yieldably supported by means acting to urge them outwardly, and thrust sustaining means within the body with which the outer ends of said fingers are engaged. 5

7. In a wrench, the combination of a tubular body member having a work socket at its outer end, a plurality of spring fingers disposed longitudinally within said body and having inwardly disposed work engaging offsets, means for supporting the inner ends of said fingers for movement longitudinally of the body, a stop means coacting with the outer ends of said fingers, and a thrust spring acting to urge said fingers against said stop means. 10 15

8. In a wrench, the combination of a tubular body member having a work socket at its outer end, and a plurality of inwardly bowed spring fingers disposed longitudinally within said body in opposed relation to yieldably grip work engaged within the socket and extending inwardly therefrom, the inner ends of said fingers being supported for limited axial movement within said body member and their outer ends being in lateral supported engagement with the wall of the body member. 20 25

9. A wrench comprising a chambered body member having a work receiving socket at its outer end, a plurality of inwardly bowed spring work engaging fingers disposed longitudinally within said body member, means for sustaining said fingers relative to the body member at one end of the fingers, and a spring sustained support for the other end of said fingers slidably mounted within said body member whereby the fingers are supported to yieldably engage the end of work projecting inwardly beyond the socket.

10. In a wrench, the combination of a chambered body member having a work socket at its outer end, and a plurality of spring fingers disposed longitudinally within said body member and having inwardly disposed work engaging offsets adjacent their outer ends, said fingers being sustained at one end thereof and having means yieldably supporting the same at the other, and being adapted to yieldably receive the outer end of the work intermediate said ends to yieldably support the work and prevent its coming into contact with the walls of the body member.

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