O. E. STEWART AND M. K. COMBINE.

SOCKET WRENCH.

APPLICATION FILED MAR. 3, 1921.

1,388,979.

Patented Aug. 30, 1921.

2 SHEETS—SHEET 1.

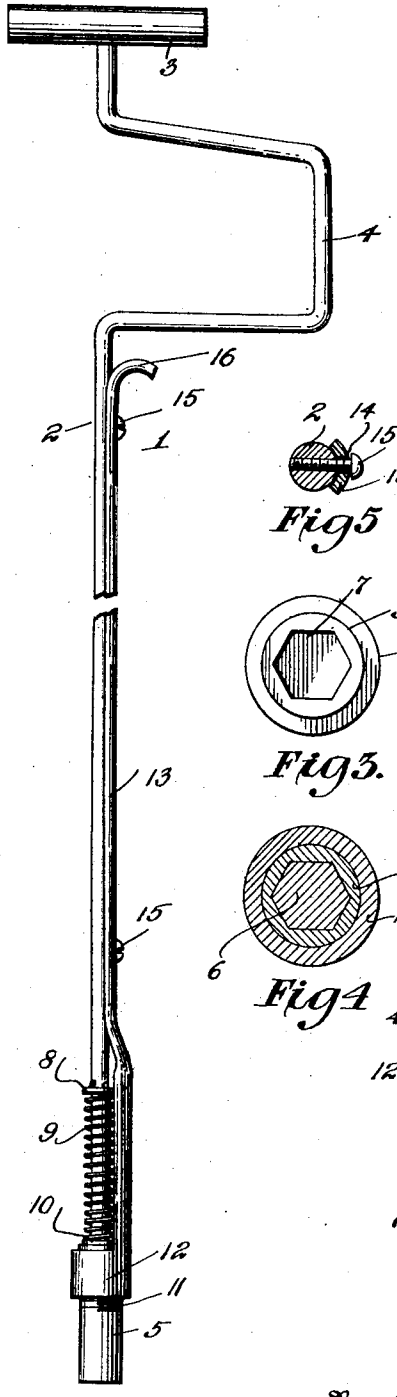


Fig1.

Fig5

Fig3.

Fig4

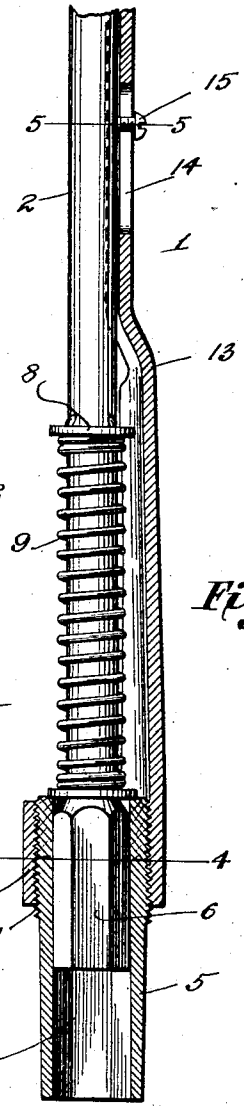


Fig2.

Inventor

Ora E. Stewart &

Macklin K. Combine

By C. C. Shepherd

Attorney

O. E. STEWART AND M. K. COMBINE.

SOCKET WRENCH.

APPLICATION FILED MAR. 3, 1921.

1,388,979.

Patented Aug. 30, 1921.

2 SHEETS—SHEET 2.

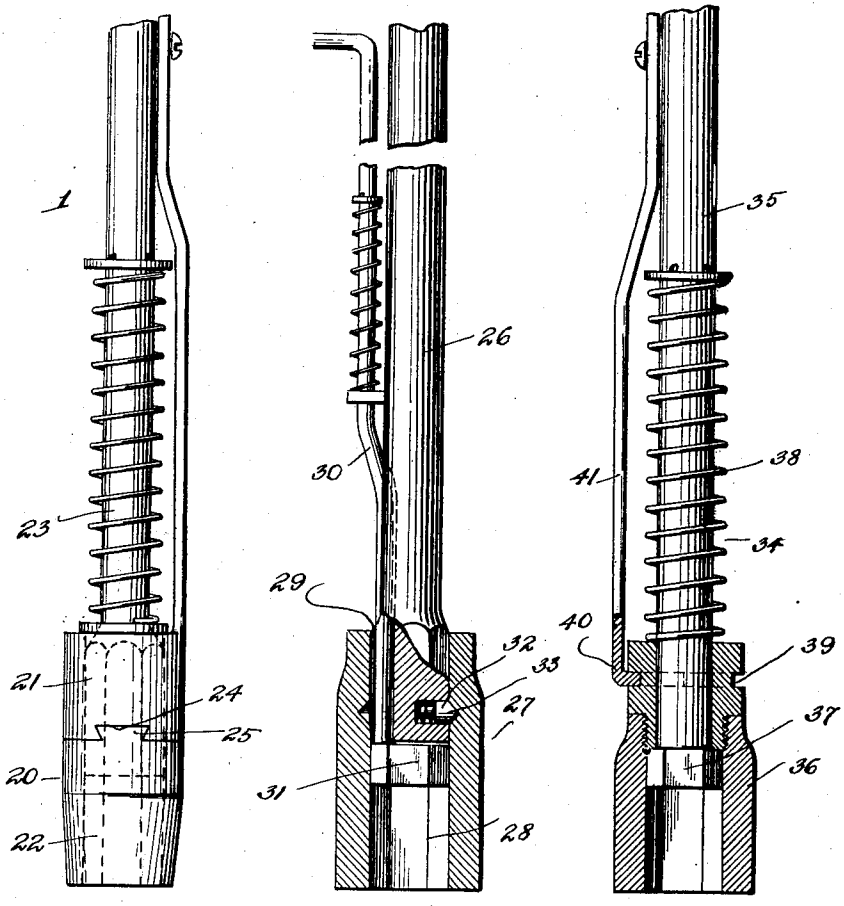


Fig 6. Fig 7. Fig 8.

Inventor
Ora E. Stewart &
Macklin K. Combine

By C. C. Shepherd
Attorney

UNITED STATES PATENT OFFICE.

ORA E. STEWART AND MACKLIN K. COMBINE, OF COLUMBUS, OHIO.

SOCKET-WRENCH.

1,388,979. Specification of Letters Patent. Patented Aug. 30, 1921.

Application filed March 3, 1921. Serial No. 449,280.

To all whom it may concern:

Be it known that ORA E. STEWART and MACKLIN K. COMBINE, citizens of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Socket-Wrenches, of which the following is a specification.

This invention relates to improvements in socket wrenches, and has for its object to provide a wrench wherein mechanism has been provided for effecting the positive ejection of nuts or other equivalent fastening devices from the socket of the wrench.

In the operation of socket wrenches, it frequently occurs that a nut or other device operated upon by the wrench will become lodged within the wrench socket and by reason of the inaccessibility thereof, it is frequently a matter of some considerable difficulty to effect the removal of the nut from the socket, the operation, under ordinary conditions, being quite tedious to perform and causes the operator to lose considerable time when employed in activities requiring more or less continued use of the wrench.

With this difficulty in view the present invention has been designed to provide a wrench which may be speedily operated and includes mechanism for effecting the positive ejection of a lodged nut from the socket thereof, the said mechanism being of such construction as to enable the same to be easily operated by but a minimum of effort on the part of the operator.

With these and other objects in view as will appear as the description proceeds, the invention accordingly consists in the novel features of construction, combinations of elements and arrangements of parts, hereinafter to be fully described and pointed out in the appended claims.

In the accompanying drawings, forming a part of this specification, and in which similar characters of reference denote like and corresponding parts throughout the several views thereof:

Figure 1 is a side elevation of the wrench comprising the preferred form of the invention.

Fig. 2 is a vertical sectional view taken therethrough.

Fig. 3 is an edge elevation thereof.

Fig. 4 is a transverse sectional view taken along the line 4—4 of Fig. 2.

Fig. 5 is a similar view taken along the line 5—5 of Fig. 2.

Fig. 6 is a side elevation disclosing a slightly modified form of the wrench, wherein the socket sleeve is formed in two parts, the latter being separably connected by means of a dove tail joint.

Fig. 7 is a sectional view disclosing a still further modification of the invention and disclosing a structure whereby the operating rod is directly connected with an ejection member, and,

Fig. 8 is a detail view of another modified form of the invention disclosing a swivel connection between the operating rod and the socket sleeve.

Referring more particularly to the form of the invention disclosed in Figs. 1 to 5 inclusive, use is made of a socket wrench which is of the type commonly employed in machine shops, garages and the like for the purpose of removing nuts or other threaded devices which are relatively inaccessibly located, the said wrench being designated in its entirety by the numeral 1 and includes a comparatively elongated handle 2, the upper end of which being terminated in a swiveled hand grip 3 and in an offset crank portion 4, the construction being such that the rotation of the handle may be conveniently effected by retaining the grip 3 in one hand and by rotating the crank portion 4 with the other, somewhat after the manner of an ordinary brace, the elongated handle of the wrench permitting the latter to be operated to an advantage when the fastening devices, such as threaded nuts, are located in obscure and difficult positions. The lower end of the handle 2 is formed to include a nut receiving socket 5, which may be of any desired formation and size, the same being adapted to receive within the confines thereof a nut or other similar device so that upon the rotation of the handle, the said nut may be removed from its position of application. In wrenches of this character, it is frequently a difficult matter to easily extricate the nut or other device from the socket 5 after the nut has been removed from a bolt or other

threaded projection, and in this respect it may be stated that the nuts become lodged or caught within the socket 5 and can not be readily removed therefrom without hammering or tapping the socket end of the wrench so as to jar the nut loose, and in fact in some cases it is necessary to thread a device into the bore of the nut positioned within the socket in order that the nut can be withdrawn. These devices tend to reduce the operator's effectiveness in various pursuits by reason of the delays involved in removing the nuts and even when this is not an important consideration, there is considerable annoyance involved in removing the lodged elements from the wrench sockets.

The present invention, therefore, aims to produce a construction whereby the nut receiving socket of the wrench may be readily relieved of such clogging or lodged devices and to permit the wrench to be operated with full efficiency and with but a minimum of delay in relieving the sockets thereof of the removed devices. To this end, the wrench 1 disclosed in Figs. 1 to 5 has the lower end of the handle portion 2 thereof provided with polygonal surfaces 6, which are adapted to slidably engage with the similar surfaces constituting the walls of the socket 5, the said socket 5 being provided within a sleeve 7 slidably positioned for vertical movement upon the lower end of the handle. At a point above the surfaces 6, the handle 2 is provided with a fixed collar 8, or other similar enlargement, which is adapted to act as an abutment for the reception of the upper end of a coiled spring 9, which is positioned about the lower end of the handle and has its opposite or lower end disposed for engagement with a slidable ring 10 so as to force the latter into engagement with the upper end of the sleeve 7. The action of the spring 9 is controlled by providing the upper and outer portion of the sleeve 7 with threads 11, which connect the sleeve with a collar 12, the latter in turn being connected in any suitable manner with the lower end of an actuating rod 13. This rod extends upwardly in parallelism with the handle 2 and, as shown in Fig. 2, is provided in its length with elongated slots 14, which are adapted to receive the shanks of screws 15 carried transversely of the handle 2. It will be seen by this construction that the spring 9 will press upon the upper end of the sleeve 7 so as to force the latter downwardly, this movement, however, is limited by the engagement of the set screws 15 with the ends of the slots 14, and consequently the socket 5 is formed in the sleeve 7 between the lower end of the latter and the corresponding end of the handle 2, the said socket being sufficiently large to receive a standard size nut. The upper end of the rod 13 is terminated in a curved hook 16, by means of which the same may be grasped so that by finger pressure, the said actuating rod may be drawn upwardly so as to move the sleeve in unison therewith against the resistance offered by the spring 9. It will be apparent that the upward movement of the sleeve will cause a foreshortening of the size of the socket 5, thus enabling a nut positioned within said socket to be forcibly ejected therefrom by the raising of the sleeve or diminution in the size of the socket.

By this construction it will be apparent that when the actuating rod is released, the spring 9 will operate to force the sleeve 7 to a normal position, so that the lower end of the handle 2 will be spaced the proper distance from the lower end of the sleeve 7 to constitute a nut receiving socket of proper and required size. The wrench is then operated in the usual manner to effect the removal of a nut from an associated device. After the nut has been removed, and in the event that the same should become lodged within the socket 5, the actuating rod is grasped and upward movement is imparted thereto by finger pressure directed properly upon the hook 16. This raises the sleeve, diminishes the size of the socket and hence causes a forcible ejection of the nut from the wrench. Since the surfaces 6 correspond with the polygonal surfaces of the socket 5, it follows that the rotation of the handle 2 will result in imparting corresponding movement to the sleeve 7. Also, since the socket 5 is of the same approximate size as the lower end of the handle 2, it follows that any grease or other extraneous matter, which may collect within the socket, will be discharged from the latter when the sleeve is moved upwardly to discharge a nut therefrom. As shown, the sleeve 7 is threadedly connected with the collar 12. This construction is optional, since the said collar may be formed integral with the sleeve, but by use of the threads, it is possible to employ sleeves having sockets of varying diameters, and to thus adapt the wrench to nuts or other devices of varying standard size, since the features of the invention will operate in connection with a straight handle as well as in connection with the crank handle.

While certain modifications have already been suggested, it will be apparent to those versed in the art that the principles of construction and operation contained in the disclosure of the preferred form of the invention are capable of being embodied in other practical forms and no attempt will be herein made to set forth all of the various forms in which the invention may find expression. However, in Figs. 6, 7 and 8 of the drawings, there have been disclosed modifications of the invention which may be generally dis-

cussed for the purpose of denoting certain other specific forms of the invention.

In Fig. 6, the wrench 1 includes a nut socket 20, which is formed to include separable sections 21 and 22, the same being provided with registering openings extending vertically therethrough which include polygonal sides. These sections are maintained in registering relation by the lower end of the handle 23, which lower end is provided with surfaces corresponding to the walls of the section openings. The upper section 21 includes a dove tail groove 24 which receives a similarly formed projection 25. This arrangement is such that when the lower end of the handle is removed from the opening in the lower section, the said lower section 22 may be removed from the tool and supplanted by means of a similar section in which an opening is provided for the reception of a different size nut.

In Fig. 7, the lower end of the handle 26 is adapted to removably receive a nut receiving section 27, which includes the usual socket 28 having an open lower end for the reception of a nut. The handle 26 is formed to include a groove 29, in which the lower end of an actuating rod 30 is adapted to be slidably received. The lower end of this rod is connected with a nut ejector 31, which is normally maintained in the upper end of the socket 28. However, upon actuating the rod 30, the said ejector may be moved vertically to effect the discharge of a nut from the section 27. The use of threads in this construction for connecting the section 27 with the handle 26 has been eliminated, and in lieu thereof, the said lower end of the handle is provided with a bore in which is situated a spring pressed plunger 32, the latter being disposed for engagement with the depression 33 provided in the inner wall of the section 27, the said plunger serving to prevent undue spreading between the parts 26 and 27.

In Fig. 8, the wrench 34 includes a handle 35 having an adjustable nut receiving section 36 on the lower end thereof. The lower end of the handle 35 is provided with an enlargement 37 capable of conforming with the shape and size of the nut receiving socket provided in the section 36, and a coil spring 38 surrounds the lower end of the handle and normally maintains the enlargement 37 in the upper end of the socket. In this instance, the section 36 includes an annular groove 39 in which is positioned a fork 40 provided upon the lower end of an actuating rod 41, the construction serving to securely connect the nut receiving section with the actuating rod and to provide simple means for carrying out the principles of the invention.

In view of the foregoing description, taken in conjunction with the accompanying drawings, it will be apparent that the present invention provides a wrench for effecting the convenient discharge of a nut from the socket thereof, and also for removing grease or other foreign matter from the socket. The construction is such that the wrench may receive sections adapted for the reception of nuts of varying size, and thus to enlarge the scope of employment of the wrench with but slight additional expense. Also, by intermittently operating the actuating rods of the device, a ratchet motion may be given the same which will enable the wrench to successfully operate in restricted areas.

What is claimed is:

1. In a wrench of the character described, a shank terminating in a multiple sided extremity, a sleeve slidably mounted upon said extremity, the lower end of said sleeve being normally spaced from the lower end of said extremity to provide a nut receiving socket, means normally operating to maintain the lower ends of the shank and sleeve in spaced relation, and means for permitting of the convenient reciprocation of said sleeve upon said shank independently of movement on the part of the latter.

2. In a socket wrench, a shank, a sleeve slidably mounted upon the lower end of said shank, a spring coöperative with said shank and sleeve and normally tending to maintain the lower end of said shank in spaced relation from the lower end of said sleeve to produce a nut receiving socket, and manually operated means connected with said sleeve and capable of moving the latter on said shank against the resistance offered by said spring to effect a relative change in position of the ends of said sleeve and shank.

3. In a socket wrench, a longitudinally extending shank having its lower end terminated in a polygonal extension, a sleeve slidably mounted upon said extension, the outer end of said sleeve being normally spaced from the corresponding outer end of said extension to produce a nut receiving socket, a spring surrounding said shank and normally operating to maintain the sleeve in a projected position upon said extension, an operating rod connected with said sleeve and extending upwardly in parallelism with said shank, and means connecting said rod with said shank and serving to govern the positions of said sleeve with respect to said shank.

4. In a socket wrench, a shank, a sleeve slidably mounted upon one end of said shank, a spring coöperative with said shank and operating upon said sleeve to force the latter outwardly, an operating rod connected with said sleeve for controlling the positions of the latter upon said shank against the

opposition offered by said spring and a removable socket means carried by the outer end of said sleeve.

5. In a socket wrench, a shank, a socket forming sleeve carried by the lower end of said shank, means for detachably connecting said sleeve with said shank, and manually operated means for varying the volume of the socket of said sleeve, said latter means operating independently of movement on the part of said shank.

In testimony whereof we affix our signatures.

ORA E. STEWART.
MACKLIN K. COMBINE.