Dec. 21, 1954 P. A. KNOTT 2,697,369

OFFSET SOCKET WRENCH

Filed April 13, 1953

Fig. 1

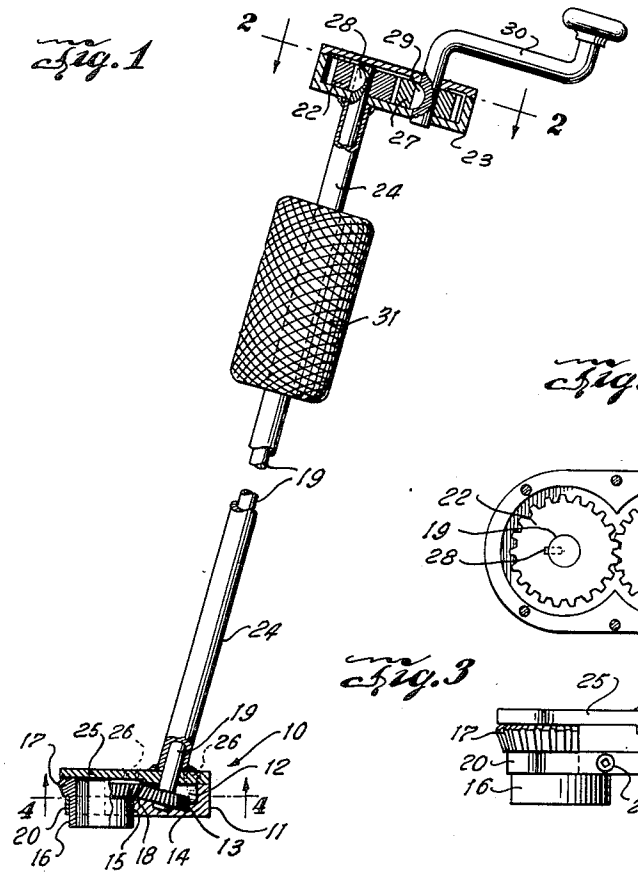


Fig. 2

Fig. 3

Fig. 4

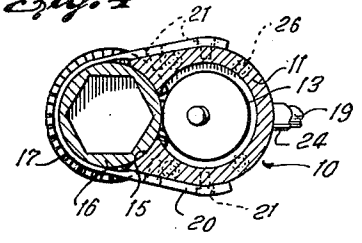
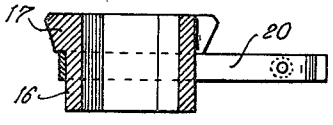


Fig. 5



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OFFSET SOCKET WRENCH

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1 Claim. (Cl. 81—57)

This invention relates to mechanics' wrenches and it has particular reference to a gear wrench especially designed for the removal and replacement of nuts used in the assembly of airplane engines where accessibility is difficult with any other known type of wrench.

The principal object of the invention is to provide a wrench having a gear driven socket mounted in a housing whose thickness, including the length of the nut engaging socket, is substantially equal to the width of the thumb and finger so that the socket may be accommodated in such limited space while being rotated to either remove or replace a nut. The invention anticipates a considerable saving in time in the operation for which it has been designed, particularly in view of the fact that such operation requires the removal and replacement of more than one hundred nuts.

Another object of the invention is to provide a wrench of the character set forth in which the operating shaft is disposed at an angle in relation to the rotative axis of the socket which it drives and further, the provision of a particular type of housing for the socket and the gear on the operating shaft which actuates the socket, the arrangement being such as to make for ready interchangeability of parts to accommodate nuts of different sizes.

Further objects will appear as the description proceeds taken in connection with the accompanying drawing wherein:

Figure 1 is a side elevational view of a wrench constructed according to the invention, with parts in cross section.

Figure 2 is a top plan view of the upper gear housing with its top plate removed.

Figure 3 is a fragmentary view of the wrench showing a side elevational view of the lower gear and socket housing.

Figure 4 is a sectional view taken on line 4—4 of Figure 1; and

Figure 5 is a detailed view, partly in section, showing the socket and retaining strap constituting a part of the housing.

Continuing with a more detailed description of the drawing, reference numeral 10 denotes generally the lower gear and socket housing which consists of the body 11 which has a cavity 12 to accommodate a beveled gear 13, the bottom 14 of the cavity being inclined to the longitudinal dimension of the body and having in its forward edge an arcuate recess 15 corresponding to the periphery of a socket 16 which is received in the recess. The socket 16 has formed thereon beveled gear 17, the under side of which bears against that portion of the body next adjacent to the arcuate recess 15, as a support for the

socket and to resist pressure of the gear 13 imposed by the driving shaft 19, to which further reference will be made presently.

It will be observed in Figure 1 that the gears 13 and 17 are meshed with each other in the housing 10, and in further support of the socket 16, there is provided a strap 20 having its ends secured to each side of the body 10 by means of countersunk screws 21 and embracing at its midsection that portion of the socket 16 opposite the arcuate recess 15. The socket 16 is thus held secure against other than rotative movement within the housing 10 which is accomplished through rotation of the driving shaft 19 through the medium of a gear 22 mounted in a housing 23 which is affixed to the upper end of a hollow shaft 24 through which the driving shaft 19 extends. To the lower end of the hollow shaft 24 is affixed, by welding or otherwise, a plate 25 which forms the cover for the lower socket and gear housing 10 and which is secured to the housing by countersunk screws 26.

Referring again to the upper gear housing 23, it will be observed in Figure 1 that this housing also contains a gear 27 whose teeth are engaged with the teeth of gear 22. The upper end of the driving shaft 19 is secured by means of a key 28 while a similar key 29 secures the end of a crank 30 to the gear 27 and by which the latter is driven to rotate gear 22, shaft 19, gear 13, which latter imparts rotation to the gear 17 and integral socket 16. A hand grip 31 is secured to the stationary hollow shaft 24 and by which the wrench may be manipulated in relation to the work.

Manifestly, the construction as shown and described is capable of some modification and such modification as may be construed to fall within the scope and meaning of the appended claim is also considered to be within the spirit and intent of the invention.

What is claimed is:

In a socket wrench, a lower gear and socket housing comprising a body having a cavity in which is disposed for rotation a bevel gear, said body further having an arcuate recess in one end thereof, a socket having an integral gear whose teeth are engaged by the teeth of said bevel gear, the underside of a portion of the socket gear being adapted to bear upon a portion of said body adjacent to said arcuate recess, a strap embracing said socket diametrically opposite to said arcuate recess and having its ends detachably secured to the sides of said body to hold said gears in mesh, a driving shaft connected at one end to said bevel gear and having a second gear mounted on its opposite end, a cover for said lower gear and socket housing, a hollow shaft having its lower end affixed to said cover, a third gear engaging said second gear, a housing enclosing said second and third gears and to which the upper end of said hollow shaft is affixed, and means for rotating said third gear to impart rotation to said socket gear through said second gear, driving shaft and said first gear.

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