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SOCKET WRENCH

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Fig. 1.

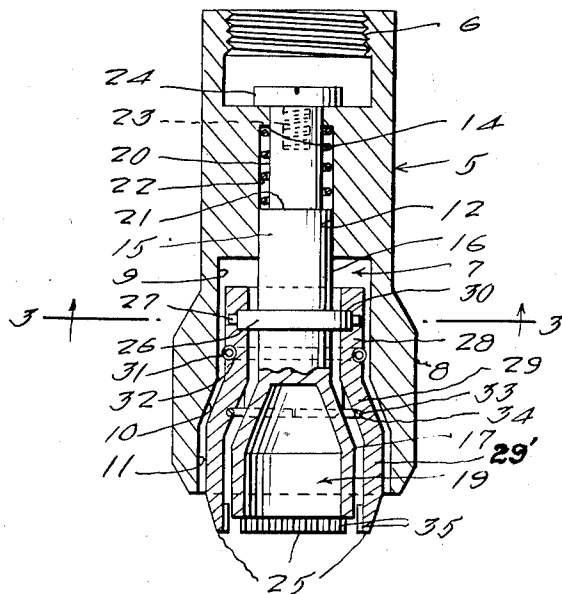


Fig. 3.

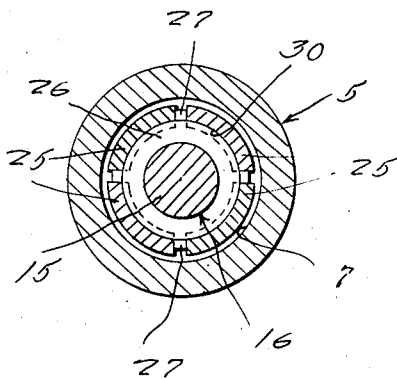
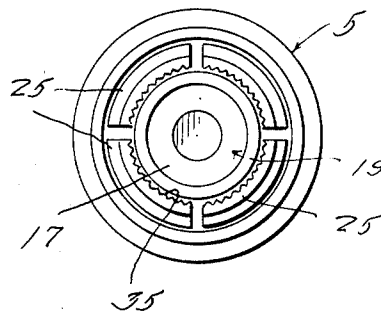


Fig. 2.



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SOCKET WRENCH

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2 Claims. (Cl. 81—128)

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This invention relates to improvements in socket wrenches, and more particularly to a novel self-adjusting socket wrench which is arranged so that as the wrench is pressed against the work the jaws adjust themselves to properly grip the element to be turned, the primary object of the invention being to provide a simple and efficient wrench of this kind which will eliminate the need for several different wrenches when working with such as serrated ring and round nuts, which frequently vary somewhat in size, so that a corresponding number of wrenches is required or the job is attempted with inadequate wrenches with consequent damage to the nuts and the work.

Another important object of the invention is the provision of a self-adjusting socket wrench of the above indicated character which is especially adaptable for use with a rotary air gun and the like.

Another important object of the invention is the provision of a self-adjusting socket wrench of the above indicated character which is comprised of a minimum number of simple component parts in a rugged and mechanically efficient assembly.

Other important objects and advantageous features of the invention will be apparent from the following description and accompanying drawings, wherein, merely for illustrative purposes, a specific embodiment of the invention is set forth in detail.

In the drawings—

Figure 1 is a general transverse vertical section.

Figure 2 is a bottom plan view, and,

Figure 3 is a horizontal section, taken on the line 3—3 of Figure 1.

Referring in detail to the drawings, the numeral 5 generally designates the cylindrical body of the illustrated wrench, formed in its upper end with an axial driving tool socket 6, and in its lower end with an axially aligned jaw chamber 7, adjacent which the surrounding lower portion of the body 5 is diametrically expanded, as indicated at 8.

The jaw chamber 7, which is substantially cylindrical, comprises an upper portion 9, which may be of substantially the same diameter as the socket 6 relative to the body 5, merging at its lower end in a bevelled or flaring shoulder portion 10, whose wider lower end merges into an enlarged diameter cylindrical portion 11 opening through the lower end of the body.

The socket 6 and chamber 7 are connected

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by an axial bore 12 having a reduced upper end portion defining a stop shoulder 14 at the upper end of the bore. In the bore 12 works the smooth cylindrical shank 15 of the jaw carrier 16, which is formed on its lower end with a hollow inverted frusto-conical jaw-expanding part 17, which, in the normal position of the wrench, extends somewhat below the lower end of the body 5 to engage such as the serrated ring or flange on the round nut. The upper part of the shank 15 is reduced, as indicated at 20 to define a shoulder 21 and provide space for a helical expanding spring 22, which is circumposed on the portion 20 and is compressed between the stop shoulder 14 and the shank shoulder 21 so as to normally position the jaw carrier in the depressed position shown in Figure 1. A screw 23, having a flat head 24 larger in diameter than the upper end of the bore 12 is threaded downwardly into the upper end of the shank 15 to hold the same in place in the bore.

The adjustable jaws 25 are positioned in the space in the jaw chamber 7 between the jaw expanding portion 17 and shank portion 15 of the jaw carrier 16, and the surrounding wall portions 9, 10 and 11 of the chamber 7, and are supportably carried by the carrier 16, which has formed thereon or otherwise suitably secured thereto the laterally projecting annulus 26, having, in this instance, four equally circumferentially spaced radial pins 27.

Each of the four, or other suitable number of jaws 25 which may be provided, are segmental in cross section and comprise an upright upper portion 28, an outwardly flaring intermediate portion 29 for camming or wedging engagement with the flared jaw chamber surface 10, and the upright lower portion 29', whose lower end normally depends below the lower end of the carrier 16, as shown in Figure 1.

The upper portions 28 of the jaws are formed at their inward sides with grooves 30 conformably securing the annulus 26 between adjacent pins 27, with the pins disposed between the facing edges of adjacent jaws so as to space them, whereby the jaws are suspended from the annulus in properly spaced working relation.

For holding the jaws 25 in place on the annulus 26 a spring ring 31 is circumposed about the upper jaw portions 28 and is seated in a retaining groove 32 formed in the outer sides of the portions 28 below the annulus 26. For holding the jaws 25 normally in expanded position, a spring ring 33 is seated in grooves 34 formed in the inward side of the flaring inter-

mediate portions 29 of the jaws. The inward sides of the lower ends of the jaws are provided with inwardly projecting serrations or teeth 35 for cooperative engagement with the nut or ring serrations.

In using the above described wrench, the hollow frustro-conical lower or guide part 17 of the jaw carrier 16 is concentrically engaged with the nut or ring to be tightened and downward pressure is exerted on the body 5, sufficient to compress the spring 22 and cause the carrier 16 to move upwardly in the body and thereby force the outer flaring surface 29 of the jaws 25 to engage the flaring surface 10 of the chamber 7 and thereby compress the jaws 25 together and force their serrations or teeth 35 into engagement with the nut serrations, whereupon axial rotation of the body 5, produced by suitable means, will tighten or loosen the nut. Elevating the body 5 permits the spring 22 to expand and produce expansion and disengagement of the jaws 25 from the nut.

What is claimed is:

1. A socket wrench comprising an axially rotatable body having a flaring jaw chamber opening through its lower end and formed thereabove with an axial bore opening into the top of said chamber, an axially movable jaw carrier having an upper shank portion positioned in said bore and a flaring hollow lower portion, means securing said shank in said bore for limited axial movement therein, spring means normally depressing said jaw carrier whereby said hollow flaring lower portion is normally extended below the lower end of said body for concentric engagement with a peripherally serrated nut or ring, a plurality of segmental jaws positioned in the space in said jaw chamber between said jaw carrier and flaring jaw chamber, said jaws having flaring portions positioned for cooperation with said flaring jaw chamber and gripping portions depending below said carrier, and means flexibly securing said jaws on said shank portion of the jaw carrier whereby, upon pressing the lower end of said carrier upon the nut or ring to be turned by rotation of said body, said carrier will rise in said body and force the flared portions of the jaws into engagement with said flared jaw chamber in a manner to compress said jaws and force their gripping portions into gripping relation with the peripheral serrations of the nut or ring, said last named means including a contractile spring ring surrounding upper portions of said jaws and holding the same in place on said carrier, and an expanding spring ring engaging lower inner surfaces of said jaws and normally holding said jaws in expanded position, said means flexibly securing said jaws on said shank portion of said carrier comprising an annular projection on and surrounding said shank having circumferentially spaced radial spacing pins, inner surfaces of upper portions of said jaws being formed with grooves receiving said annular projection with

said spacing pins positioned between facing edges of adjacent jaws.

2. A self-adjusting socket wrench comprising a body formed with a bore in its upper portion opening through its upper end and an enlarged jaw chamber in its lower portion axially aligned with the lower end of said bore, said chamber having a downwardly flared lower end portion opening through the lower end of said body, a jaw carrier comprising an upper shank portion sliding in said bore, and depending within said chamber, spring means in said bore acting between said shank portion and a portion of said body to normally urge said jaw carrier downwardly toward a depressed position and yieldably resist upward displacement of said jaw carrier therefrom, stop means on said shank portion engageable with a portion of said body to prevent depression of said jaw carrier below said depressed position by said spring means, said jaw carrier further comprising an enlarged downwardly flaring portion on the lower end of said shank portion, said flaring portion of the jaw carrier being concentrically spaced from the flaring lower end portion of said chamber and having a lower end normally depending below the lower end of said chamber, and a plurality of jaws positioned in the space between the flaring lower end portion of the chamber and the flaring portion of the jaw carrier, said jaws comprising unflared upper portions surrounding said shank portion of the carrier and lower portions downwardly flared internally and externally to provide inner and outer flared surfaces engageable by the flaring lower portion of the jaw carrier and with the flared lower end portion of said chamber, connecting means acting between the unflared upper portions of the jaws and the carrier shank portion serving to securably and flexibly connect said jaws to said shank portion, and expanding spring means yieldably maintaining the lower portions of the jaws spread away from the flaring portion of the jaw carrier, the flared lower end of said chamber acting upon the external flared surfaces of said jaws upon upward displacement of said jaw carrier relative to said body produced by downward pressure of the lower end of said flaring portion of the carrier with the work acting to cam the lower portions of the jaws inwardly into gripping engagement with a nut on the work.

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