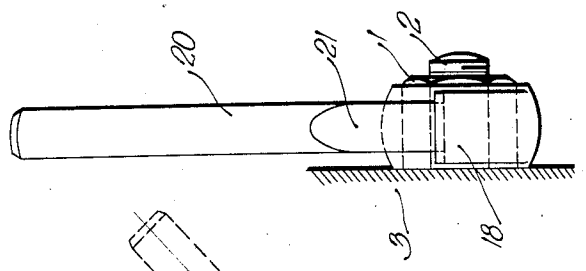
Jan. 2, 1934. S. MANDL 1,941,565

SOCKET WRENCH

Filed March 20, 1933

Fig. 2.



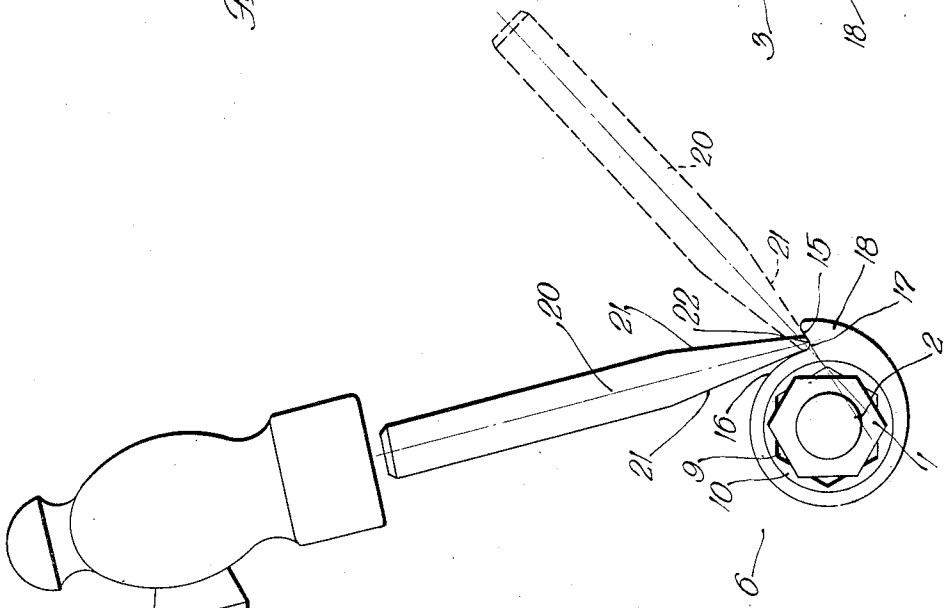


Fig. 1.

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SOCKET WRENCH

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3 Claims. (Cl. 81—53)

This invention relates to impact socket wrenches.

An impact socket wrench is a wrench for loosening nuts or the like by the impact of hammer blows or impacts. Such wrenches are usually provided with a socket for receiving a nut, and a projecting shoulder or lip against which a punch is placed for imparting the blows to turn the wrench and thus loosen the nut. Heretofore the face of the shoulder for receiving the punch was usually extended radially of the center of the socket. This I have found to be objectionable. Difficulty is encountered in using such a wrench due to the fact that the punch tends to slide radially off of the shoulder. This is especially true after the wrench has been used a short time. It is an object of the present invention to cure this difficulty. I propose to accomplish this by changing the angularity of the lip or projection, and by providing what might be termed a concaved or reentrant face or socket on the shoulder and a convex end face on the punch. By this arrangement, the punch may be held within a wide angular range without any possibility of being forced off of the shoulder under the hammer impact. I further facilitate this by having the body portion immediately in advance of the shoulder of reduced radial dimensions and by using a thin wedge-shaped punch having a rounded nose.

The socket is preferably of the multiple type to receive either a hexagon nut or a square nut, the inner periphery being provided with six equally spaced notches permitting application of the socket in any one of twelve different positions to either a hexagon nut or a square nut. Hence, in a close situation where the punch can follow the shoulder only a small distance the socket may be driven forward one-twelfth of its circumference and then the socket may be repositioned. A further advantage of this form of socket is that the cut away portions provide a certain amount of resiliency, which is desirable in an impact device.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawing forming a part thereof.

In the drawing:

Figure 1 is a view illustrating my improved socket wrench and the manner of using the same; and

Figure 2 is an end view of the wrench shown in Figure 1.

Reference may now be had more particularly to Figures 1 and 2. In those figures I have shown a hexagonal nut 1 threaded on a shank 2 which may be considered as stationary with respect to a stationary structure or machine portion 3. The wrench is indicated in general by the reference numeral 6.

The wrench is provided with an opening having flat walls adapted to fit over the hexagonal nut 1 and is further cut away between those openings, as indicated at 9, so that the wrench can be turned through an angle of thirty degrees with respect to the nut 1 and again fit about the nut. One advantage of the cut out portions 9 lies in the fact that those portions render possible the yielding of the metal remaining at 10, that is, between the cut out portions 9 and the corners of the nut 1. Under stress, this metal has a small permissible yield. This small yield is sufficient to relieve the shock that would otherwise be produced by a severe impact, and thus prevent stripping of the threads on the shank 2, or cracking of the wrench 6.

The wrench 6 is provided with a projecting lip 15 which joins with the curve 16 of the wrench along a smooth curve 17 at the radially innermost portion of the lip 15. This smooth curved reentrant portion 17 constitutes, in the form illustrated, a portion of a cylindrical surface. A body of metal 18 provides reenforcement at the lip portion 15.

It is to be noted that the impact surface of the lip 15 does not extend radially of the wrench. The angle between the inner edge of the lip 15 and the end of the circular curve 16 of the wrench 6 would be less than ninety degrees if the curve 17 were omitted.

A punch, indicated at 20, is provided with a wedge-shaped end portion defined by flat tapering sides 21—21, and the end face is rounded, as indicated at 22. It is to be noted that the angle between the surface of the lip 15 and the center line of the punch is always less than ninety degrees. By this arrangement, the force of impact on the punch 20 does not tend to drive the round nose portion thereof outward along the surface 15. It is also to be noted that the punch 20 need not be held at any critical angle. Even if the punch is turned from its full line position to its dotted line position, it is still effective to move the wrench. The angle of the surface 15 is such that the force of impact transmitted through the punch 20 will always have a component radially inward, that is, towards the center of the socket, and no component radially outward along the

shoulder. By this arrangement there is no tendency for the punch to be driven off of the shoulder or surface 15. As the wrench turns under the impact transmitted to it by the punch 20, there will be no tendency to drive the punch off of the shoulder 15 even if the punch is in the position illustrated in Figure 1. As the wrench turns, the curved surface 16 rolls along the tapered side 21 of the punch. Due to the size of the shoulder 15, with respect to the punch, there can be an appreciable turning of the wrench before the curved surface 16 will force the punch outwardly an amount approaching the height of the shoulder. This amount of permissible turning is generally in excess of the amount of turning that takes place under a single impact. If the punch is directed at an angle somewhat more to the right from the position illustrated in Figure 1, an even greater extent of turning of the wrench is possible, per impact.

It is to be noted that any wear on the wrench will take place at and adjacent the corner 17. By this arrangement, I overcome a difficulty inherent in such wrenches of the past since, in wrenches wherein the shoulder 15 extends outward along a radius of the circle 16 the punch tends to be driven out along the surface 15, and off of the same, thereby producing wear on the surface 15. In my wrench, the punch is forced inwardly toward the corner 17, thereby avoiding this difficulty.

While I have herein shown a preferred embodiment of my invention, it is to be understood that the invention is not limited to the precise construction herein shown, the same being merely illustrative.

What I consider new and desire to secure by Letters Patent is:

1. An impact socket wrench comprising a body of metal having a socket for receiving a nut and engaging the sides adjacent the corners thereof, said wrench having an impact shoulder including an impacting surface extending substantially, but not exactly, radially of the socket, the angle of the surface to a true radius being such that the force of impact on the shoulder will have a component radially inward of the shoulder and none radially outward of the shoulder, to prevent a punch from sliding outwardly on the shoulder by the force of an impact, the back of the shoulder merging with the rest of the wrench along a smooth curve providing a reenforcement for the shoulder.

2. An impact socket wrench combination, comprising a ringlike body portion and a cooperating punch, said body portion having a socket for embracing a nut to be turned, and being provided on its outer periphery with an impact shoulder which is adapted to be engaged by the punch, said shoulder having an impacting surface which is concaved relative to a radius of said body, so that the force of impact transmitted by the punch against the concaved surface will have a component radially inward of the shoulder to keep the punch and shoulder in engagement, said punch having a wedgelike tapered end portion terminating in an end face which is convex to fit the concave surface of the shoulder and to articulate therewith, the body portion in front of the shoulder being of less radius than the shoulder to permit the punch to retain engagement with the shoulder throughout a substantial movement of the body portion angularly and of the punch longitudinally.

3. An impact socket wrench comprising a body of metal having a socket for receiving a nut and engaging the sides adjacent the corners thereof, the metal between certain nut engaging portions of the socket being cut away to render the nut engaging portions of the wrench yielding under excessive impact, said wrench having an impact shoulder including an impacting surface extending substantially, but not exactly, radially of the socket, the angle of the surface to a true radius being such that the force of impact on the shoulder will have a component radially inward of the shoulder and none radially outward of the shoulder, to prevent a punch from sliding outwardly on the shoulder by the force of an impact, the back of the shoulder merging with the rest of the wrench along a smooth curve providing a reenforcement for the shoulder.

SIGMUND MANDL.