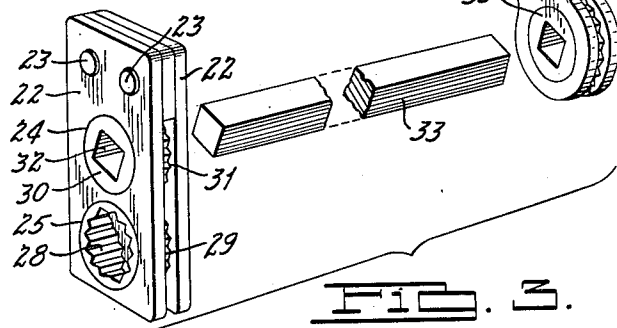
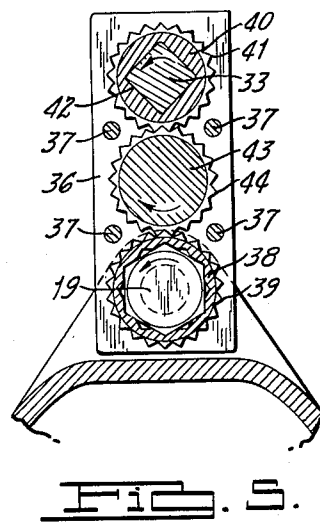
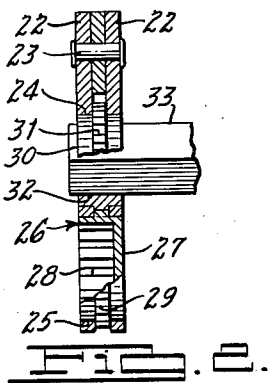
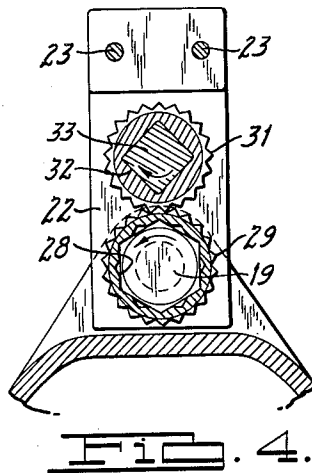
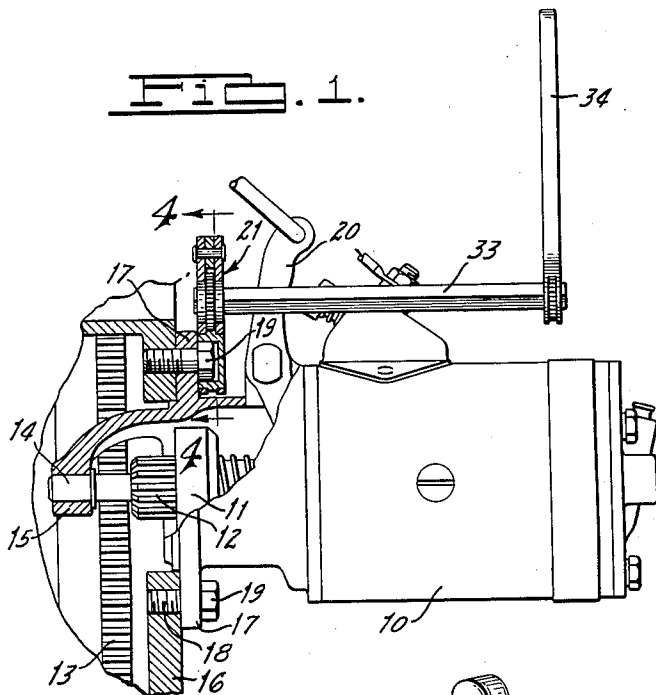


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GEARED SOCKET WRENCH
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FIG. 1.



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GEARED SOCKET WRENCH

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1 Claim. (Cl. 81—57)

1

My improvement pertains to what may be called an indirect-socket wrench—that is, a wrench in which the socket for application to, say, a nut is provided with geared teeth on its outer surface and is driven by a similarly geared member which receives a rod axially therein for rotation of said driving member. Sockets of this type are particularly needed for application where access by means of an ordinary socket driven by a rod axially disposed therein is difficult or impossible.

As an example as to where my socket wrench will be particularly desirable, I may refer to the location of bolts for support of a starter in conjunction with the conventional automobile engine. The location where some of said bolts are employed leaves but very limited space for application of a socket wrench so that removal of said bolts or tightening thereof with an ordinary wrench is extremely difficult and slow.

I shall now describe my improvement with reference to the accompanying drawings, in which:

Figure 1 is a side elevation, partly in section, of a starter as mounted upon an automobile engine, with my wrench applied to one of the mounting bolts;

Figure 2 is an enlarged, sectional view of the wrench shown in Figure 1;

Figure 3 is a perspective view of my socket wrench with a driving rod and a handle in an exploded relation with respect thereto;

Figure 4 is a vertical, sectional view of the wrench as taken on line 4—4 of Figure 1;

Figure 5 is a vertical, sectional view of a modified type of my socket wrench.

Similar numerals refer to similar parts throughout the several views.

For the purpose of illustrating the specific use for which my tool may be employed, I am showing in Figure 1 a conventional starter in use with automobile engines. Numeral 10 indicates a housing for said starter, numeral 11 indicates a clutch, while numeral 12 indicates a driving pinion to be shifted into engagement with a ring gear 13 on the fly wheel of the engine. The driving end of the pinion shaft 14 is mounted in a bearing 15. The housing of the motor is secured to the housing 16 enclosing the fly wheel by means of flanges 17 and bolts 18, said bolts passing through said flanges into the wall 16 of the housing and including heads 19, these being, according to the prevailing practice, hexagonal in shape.

It will be noted that the location of the head

2

of the upper of said bolts, as shown in Figure 1, is opposite the shifting lever 20 so that there is no space left for the application of a socket wrench with an axial extension for application of an operating rod. The manner in which said starting motor is mounted is a good illustration of the need for the socket wrench as described herein.

Specifically, the wrench, identified by numeral 21, is composed of two rectangular, oblong plates 22 held together in a spaced relation by means of bolts or screws 23. Each plate has two similar apertures 24 and 25, respectively, the apertures in one plate being in register with the apertures in the other plate. The apertures serve as bearings for the support of two members, one of them, the lower as shown in the drawings, being the wrench-socket proper, this being made in the form of a short cylinder 26 closed at one end 27 and open at the opposite end 28. The interior of cylinder 26 is corrugated or provided with a plurality of faces for application to the head of a nut, said cylinder also being of a diameter to fit into the lower apertures 25. The mid portion, however, of the cylinder forms an annular gear ring 29 of a diameter exceeding that of the cylinder.

Another short cylinder 30 of the same length as the one below it and provided with a similar gear ring 31 is disposed in apertures 24, the gear ring 31 being in mesh with gear ring 29. Cylinder 30 is provided with an aperture 32, this being preferably rectangular, for application of a driving rod 33 for operation by means of a handle 34. Said handle 34 includes a ratchet-driving element 35. As the handle is well known and generally used, it won't require any description herein.

It will be noted from the above description that the particular feature which differentiates my wrench from the conventional wrenches rises from the fact that the annular gears are disposed directly on the hollowed section of the respective cylinders so that no parts need protrude in either direction outside the two plates 22. This is a very important limitation. Were the socket to be provided with a geared member on the outside of the closed wall 27, this would immediately add to the thickness of said socket as a whole so as to make it practically impossible to apply such a wrench into the space shown in Figure 1, particularly since allowance should be made between said closed end of the socket and the lever 20 for removal of said sockets

from the operative position on the head 19 of the bolt 18.

A modified species of my socket wrench is shown in Figure 5 where the supporting plates are indicated by numeral 36, the plates being held in a spaced relation to each other by bolts 37. The socket at the lower end, for application to a nut, is identified by numeral 38, the outer gear ring being indicated by numeral 39. The cylindrical member for reception of the driving rod 33 is indicated by numeral 40, the ring thereon by numeral 41, while the inner rectangular aperture for reception of the driving rod 33 is indicated by numeral 42. However, an intermediate geared member is employed here, this being a solid cylindrical member 43 with a gear ring 44 skirting the mid section thereof. The result is that, in this case, because of the interposition of said intermediate member 43, the direction of rotation of socket 38 and the direction of the driving member 40 will be the same, the relative directions of the three rotating members in the socket illustrated in Figure 5 being indicated by arrows. Otherwise, the construction is similar in all respects to that of the wrench shown in Figure 2.

The operative use of the wrench is quite obvious. The socket for reception of a nut is applied to said nut, while the driving rod is inserted into the respective cylindrical member, with an axial aperture for the reception thereof, and then by the rotation of the driving member, the socket-enclosing cylinder is rotated for the purpose of tightening or loosening a respective nut.

It will be obvious that some changes may be made in the construction of my wrench as a whole without departing from the inventive principles disclosed herein.

What I, therefore, wish to claim is as follows:

A socket wrench of the kind described, comprising a casing including two rectangular plates held in parallel relation to each other, each plate having a plurality of circular openings, each opening in one plate being in register with and forming a pair with a similar opening in the other plate, a cylindrical member disposed in each pair of said openings, the ends of the cylindrical members being flush with the respective surfaces of the plates, one of the cylindrical members having an axially disposed aperture therein for insertion of a driving rod the aperture being shaped to fit the contour of the end of the rod, another cylindrical member being hollowed at one end to form a socket for application to a nut, each cylindrical member including in mid-section thereof, between said plates, a toothed ring, the teeth of each ring being in mesh with the teeth of the adjoining ring.

JOSEPH V. MADDOX.

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