July 18, 1944. A. A. BUICE 2,353,642

CHAIN WRENCH

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Fig. 1.

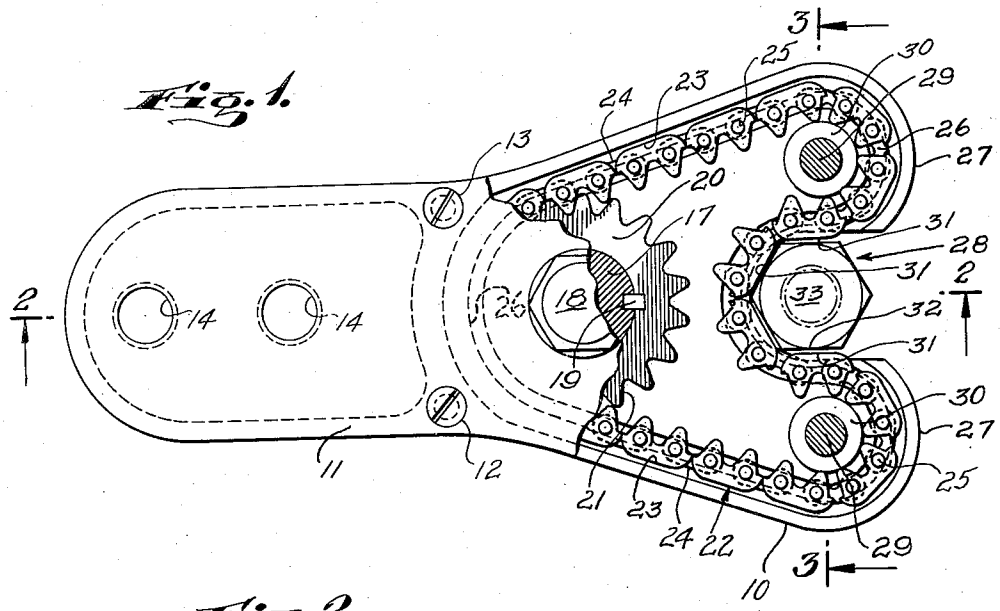


Fig. 2.

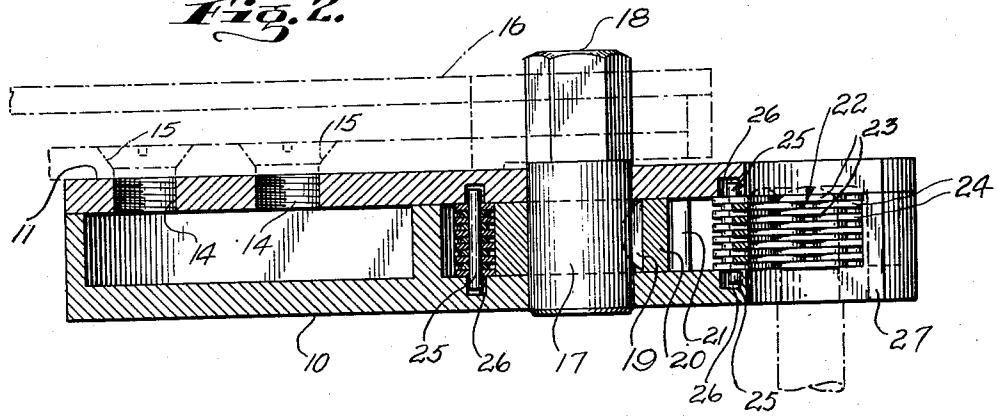
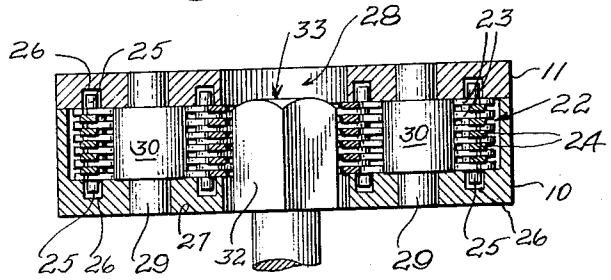


Fig. 3.



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CHAIN WRENCH

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8 Claims. (Cl. 81—57)

This invention relates to a wrench of the type utilizing a link chain. More particularly, my invention relates to a wrench of the link chain type in which the link chain is actually applied to the faces of a nut for rotating that nut.

The wrench of my invention is particularly designed for use in such locations where it is impossible to apply a socket type of wrench, but those skilled in the art will readily appreciate that it may be used as a substitute for a socket wrench if desired.

An important feature of my invention is the arrangement of the links of the chain so that they may be applied to the faces of a nut as are the jaws of a usual type of wrench, and thereby to rotate the nut without disfiguring it as the chain is moved. More particularly, I utilize guide means for so guiding the chain that its links may be applied to the faces of the nut as are the jaws of a wrench. Even more particularly, the guide means are adapted for cooperation with portions of each link for maintaining the links in position for engagement with the faces of a nut.

A further feature of my invention is the arrangement of the wrench body so as to present a pair of jaws between which is an open space for application laterally toward a nut, the chain being guided so that portions thereof lie about the said open space for direct application to the nut surfaces. Those skilled in the art will readily appreciate that my wrench is equally applicable to bolts and nuts, and that I have used the descriptive word "nut" in a general way only.

I have thus described my invention generally in order that its construction and operation will be better understood, and that the relation of my contribution to the prior art may be better comprehended. Naturally, I consider my contribution to the art a broad one, and the invention is not limited to the specific form illustrated in the drawing and described in the specification. Also, there are several features of my invention described more in detail hereinafter, but not outlined generally by me, which are important parts of my invention and will be claimed broadly.

Referring now to the drawing, Fig. 1 is a plan view of the wrench of my invention with certain parts thereof broken away. Fig. 2 is a view taken along the lines 2—2 of Fig. 1 showing certain parts in phantom. Fig. 3 is a view taken along lines 3—3 of Fig. 2.

Referring now more particularly to the drawing, the body of my wrench is formed of a lower portion 10 and an upper portion 11 held in assembled relation by any suitable means such as the screws 12 and 13, all as will be understood by those skilled in the art. The portion 11, which is in the form of a cover, has two threaded holes 14 for co-action with the screws 15 shown in phantom in Fig. 2, the screws being utilized for securing to my wrench a power wrench mechanism shown in phantom at 16. The construction of the power wrench is of no importance relatively to my invention but is merely set forth to illustrate one means of operating my wrench.

Mounted in bearing relation to the casing portions 10 and 11 is an operating shaft 17 extending outwardly at 18 from the casing in the form of a nut. Keyed to the shaft at 19 is a chain operating sprocket 20 whose teeth 21 are adapted for engagement with the links of a chain designated generally by the reference numeral 22. While the chain 22 may take any preferred form, I show it as embodying a series of superimposed plate links 23, and intermediate links 24 united with the links 23 by suitable pins 25. The manner in which the teeth 21 of the sprocket 20 mesh with the links 23 and 24 of the chain 22 is quite obvious and needs not be further discussed.

The pins 25 extend somewhat beyond the links of the chain 22 so as to lie within grooves 26 formed in the upper and lower casing portions 11 and 10 respectively. It is quite obvious that the said grooves will cooperate with the pins 25 to guide the chain links in a path determined by the form of the said grooves 26.

Referring now more particularly to Figs. 1 and 3, it will be noted that the upper and lower casing portions are shaped to form spaced jaws 27 defining therebetween an open space 28. Extending between the casing portions 10 and 11, and within each of the jaws 27, is a shaft 29 about which is mounted a roller 30, it being obvious from Fig. 1 that the rollers 30 assist the pins 25 and the grooves 26 in guiding the chain in the path shown in Fig. 1 so that the outer surfaces 31 of those links 23 which move along the periphery of the opening 28 are held in position for cooperating with the faces 32 of a nut or bolt head 33. This cooperation, it will be observed, is the same as though the chain links formed parts of the jaws of a wrench.

While I have shown a hexagon shaped nut, it is quite obvious that the chain shown in Fig. 1 will coact equally well with the faces of a square nut when the chain is moved by the sprocket 20. Those skilled in the art will further appreciate that the path taken by the chain may be so varied, and the links of the chain may be so changed as to cooperate with nuts of various shapes and sizes. It should also be understood that subcombinations and equivalents of the general combination shown in Fig. 1 are of value, and may be utilized for the particular purpose indicated without the employment of the entire combination. Thus, while I prefer to use both the rollers 30 and the grooves 26 and pins 25 for guiding the chain links, it is conceivable that for many purposes, rollers alone, or the pins and grooves alone, will suffice.

It is thought that from the description set forth those skilled in the art will now appreciate that the wrench of my invention may be used for lateral application to nuts not adapted for operation by socket wrenches, such nuts being found in brake systems, oil lines, gas lines, etc. It will also be quite obvious that the sprocket **20** may be actuated in any suitable manner to move the chain **22** as desired.

I now claim:

1. In a wrench of the class described, a chain having its links formed with nut contacting surfaces, guide means for guiding said chain and controlling its path of movement, means for moving said chain in said path, said guide means being formed so that said chain links in a portion of said path are positioned by said guide means with their nut contacting surfaces outlining substantially the contour of the nut contacting surfaces of a conventional nut wrench, whereby said links in the said portion of said path may be applied against the faces of a polyangular nut in the manner of a wrench, so that movement of the said chain will rotate the said nut.

2. In a wrench of the class described, a mounting member, a link chain having its links formed with nut contacting surfaces, spaced guide means on said mounting member over which said chain passes exposing an open chain portion adapted for lateral application to the faces of a nut in the manner of a wrench, the said links being of such length and so related to said guide means that when said open chain portion is applied against a polyangular nut, the nut contacting surfaces of the links in said open chain portion will be maintained by said guide means in juxtaposed operative relation to the faces of said nut in the manner of a wrench, and means for moving said chain whereby to loosen said nut.

3. In a wrench of the class described, a mounting member having upper and lower surfaces, a link chain movable between said surfaces having its links formed with nut contacting surfaces, guide means on said surfaces for cooperating with parts of said chain links whereby the links in a portion of said path are positioned with their nut contacting surfaces outlining substantially the contour of the nut contacting surfaces of a conventional nut wrench, whereby said links in the said portion of said path may be applied to the faces of a polyangular nut in the manner of a wrench, said upper and lower surfaces being cut away at least sufficiently to allow for the endwise application to a nut of said chain links in said portion of said path, and means for moving said chain relatively to said mounting member.

4. In a wrench of the class described, a mounting member having upper and lower surfaces shaped to form a pair of jaws with an open space therebetween, a link chain movable between said surfaces and having its links formed with nut contacting surfaces, guide means on each of said jaws over which the chain passes leaving a portion of said chain exposed between said jaws for lateral application to a nut, the said links being of such length and so related to said guide means that when said open chain portion is applied against a hexagonal nut, the nut contacting surfaces of the links in said open chain portion will lie in juxtaposed operative relation to at least three of the faces of said nut in the manner of a wrench, and means for moving said chain whereby to loosen said nut.

5. In a wrench of the class described, a mounting member having upper and lower surfaces shaped to form a pair of jaws with an open space therebetween, a link chain movable between said surfaces and having its links formed with nut contacting surfaces, guide means on said surfaces of said jaws for said chain links whereby the links thereof are guided in a fixed path, the links in a portion of said path being adapted to lie with their nut contacting surfaces exposed in said open space for lateral application to a nut, the said chain links and the said guide means being so formed that said chain links will be held by said guide means with their nut contacting surfaces outlining substantially the contour of the nut contacting surfaces of a conventional nut wrench, whereby said links in the said portion of said path may be applied against the faces of a polyangular nut in the manner of a wrench, and means for moving the chain.

6. In a wrench of the class described, a mounting member, a continuous link chain having its links formed with nut contacting surfaces, cooperative guide means on said link chain and said mounting member for guiding said link chain for movement in a continuous path on said mounting member, said guide means being formed so that the links of said chain when in a predetermined portion of said continuous path are positioned by said guide means with their nut contacting surfaces holding the positional alignment of the nut contacting surfaces of a conventional polyangular nut wrench so that said links may be applied to the faces of a polyangular nut in the manner of a wrench, and means on said mounting member for moving said chain in said continuous path.

7. In a wrench of the class described, a mounting member, a continuous link chain having its links formed with nut contacting surfaces, cooperative guide means on said link chain and said mounting member for guiding said link chain for movement in a continuous path on said mounting member, said guide means being formed so that the links of said chain when in a predetermined portion of said continuous path are positioned by said guide means with their nut contacting surfaces holding the positional alignment of the nut contacting surfaces of a conventional polyangular nut wrench having surfaces for cooperation with four sides of a hexagonal nut so that said links may be applied to the faces of a hexagonal nut in the manner of a wrench, and means on said mounting member for moving said chain in said continuous path.

8. In a wrench of the class described, a mounting member, a continuous link chain having its links formed with nut contacting surfaces, pins on the links of said chain lying in a guide groove in said mounting member for guiding the chain links for movement in a continuous path, said grooves being formed so that the links of said chain when in a predetermined portion of said path are positioned by said groove with their nut contacting surfaces holding the positional alignment of the nut contacting surfaces of a conventional polyangular nut wrench, and means for moving said chain in said continuous path.

ALBERT A. BUICE.