

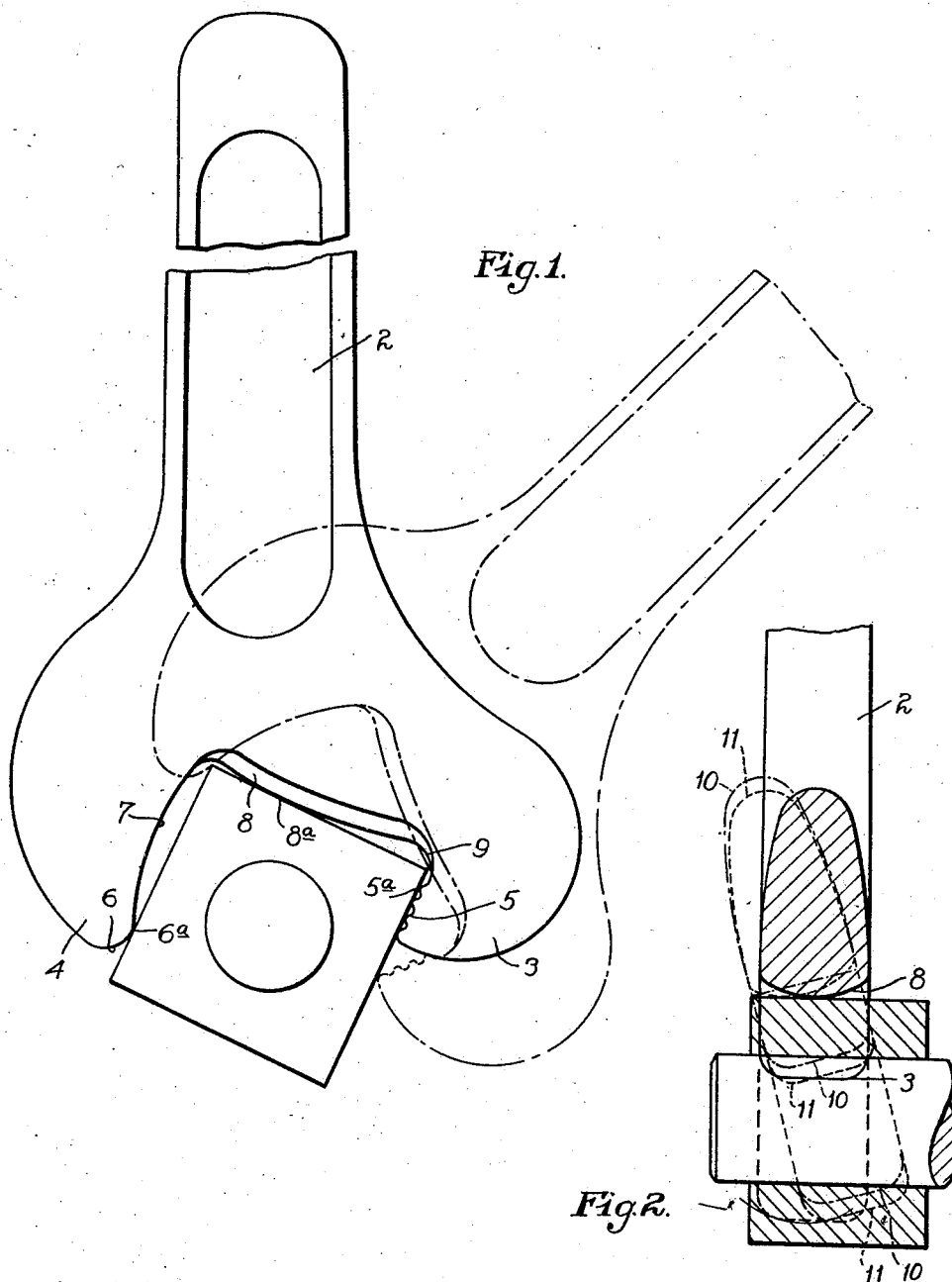
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WRENCH

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UNITED STATES PATENT OFFICE

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WRENCH

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My invention relates more particularly to one-piece wrenches that are so formed as to permit a ratchet-like movement of the wrench during the operation of turning a nut.

One object of my invention is to provide a one-piece ratchet wrench wherein there are no sharp corners or angles, thereby rendering the wrench less liable to develop cracks in such corners or angles during heat-treating thereof, and making it easier to forge or otherwise form the wrench than would be the case if it had sharp corners and the metal had to be caused to enter angular recesses in a forming die or mold.

Another object of my invention is to provide a wrench wherein while one jaw thereof has teeth or serrations, such teeth, instead of being angular or sharp, are rounded to thereby provide for a sufficient gripping of a nut, and at the same time avoiding sharp angles wherein cracks would tend to develop during heat-treatment of the wrench.

Another object of my invention is to provide a wrench having a short, substantially flat, jaw and its other jaw curved in such manner that the flat jaw will normally have extended contact with the side of a nut when the nut is being turned by the wrench, without reducing the length of contact by the flat jaw on the side of the nut.

Still another object of my invention is to provide a wrench of such form that during ratchet-like movement thereof, it may be moved in a plane that is angularly-disposed or inclined with respect to the plane of the nut being operated upon.

One form of wrench embodying my invention is shown in the accompanying drawing, wherein Figure 1 is a plan view of a wrench and the nut in cooperative relation, and Fig. 2 is a cross sectional view of the wrench.

The wrench comprises the usual handle portion 2 and jaw portions 3 and 4, the handle being partially broken away. The shorter jaw 3 has its nut-engaging surface provided with ribs or teeth 5 that are disposed in a common plane so that they will normally be engaged against the side of a

nut during a turning operation. The teeth instead of being sharpened as is usual in anti-slipping devices of this character are rounded or cylindrical, the radius of curvature of the teeth being such that, while they will exert adequate gripping action upon the side of the nut when turning force is applied to the wrench, are nevertheless not subject to cracking, through changes in temperature during heat-treatment of the wrench. Again, in the forming of the wrench, the rounded surfaces can be more conveniently and accurately formed than could be sharp or angular ribs.

The jaw 4 has its nut-engaging portion rounded or cylindrical as indicated at 6. This curvature of the larger jaw not only permits the toothed portion 5 of the jaw 3 to lie snugly against the side of the nut as shown in full lines, but facilitates movement of the wrench to dotted line position for the purpose of effecting a new grip on the nut. The jaw 4 is hollowed or recessed as indicated at 7 in order to permit the wrench to be moved with a ratchet-like motion into position for engaging the nut to turn the same.

The surface 7 continues along a curved line until it merges with the inner wall 8 of the nut-receiving recess. The wall 8 is also curved and a curved surface 9 connects the surface 8 and the nut-engaging portion of the jaw 3, to provide clearance for the corners of the nut during retractive movement of the wrench.

The curved surfaces at the ends of the wall 8 result in a stronger wrench and one which is not so likely to crack in service as would be the case if the ends of the surface 8 terminated in angles or corners at the bases of the jaws 3 and 4, and furthermore, cracks or fissures are not likely to be formed at such points through changes of temperature during heat-treatment.

The curvature of the surface 8 is such that it serves as a guide or camming surface, as shown in the dotted line position of the wrench, to facilitate turning of the wrench toward and past its dotted line position in making a fresh grip on the nut.

The surface 8 is also of convex form in a direction transversely thereof, as shown more clearly in Fig. 2, so that the wrench may be tilted with respect to the plane of the nut during operation, as when the nut is so located that the wrench cannot be operated in the same plane as the nut, or in case the operator accidentally tilts the wrench out of parallelism with the plane of the nut.

If the surface 8 is flat or straight in its transverse dimension, tilting the wrench results in lifting the short jaw off the nut a considerable distance, and decreases the length of contact of the short jaw, as shown by the dot and dash lines 10 in Fig. 2. It is evident that by decreasing the length of contact of the short jaw, the area of contact between the nut and the jaw is lessened to such an extent that turning stresses will be centralized on the nut.

On the other hand, in my form of wrench, the transversely convex surface 8 permits considerable tilting movement of the wrench with an increase in the length of the jaw contact, as shown by the dotted lines 11 in Fig. 2.

Obviously, the area of contact between the nut and the short jaw remains substantially constant for a considerable degree of tilting movement out of parallelism with the plane of the nut, thereby permitting turning movement of the nut by an angularly positioned wrench without possibility of damage to the nut.

In Fig. 2, the short jaw 3 is shown in full lines to more clearly indicate the normal position and extent of contact thereof with the side of a nut.

The surface 8 may also serve, when the wrench is in full line position, to take some of the thrust resulting from turning of the wrench in a counter-clockwise direction, thus relieving the nose 6 of the jaw 4 of some strain and reducing tendency of such nose portion to slide on the side of the nut during the turning thereof by the wrench.

All points of contact of the wrench with the nut, when force is applied to the wrench to turn the nut, are at locations removed from the corner of the nut, as shown for example at 5^a, 6^a and 8^a. Danger of damaging the corner of the nuts so that they become rounded and useless is therefore avoided.

I claim as my invention:—

1. A wrench for polygonal nuts comprising oppositely-disposed jaw portions defining two sides of a nut-receiving recess, and a surface constituting the inner wall of said recess, the said surface being of convex form in a direction transversely thereof, one of said jaws being greater in length than one-half the length of the said inner wall, and

the other jaw being less than one-half the length of the inner wall.

2. A wrench for polygonal nuts comprising oppositely-disposed jaw portions defining two sides of a nut-receiving recess, and a surface constituting the inner wall of said recess, the said surface being of convex form in directions transversely and longitudinally thereof, one of said jaws being greater in length than one-half the length of the said inner wall, and the other jaw being less than one-half the length of the inner wall.

3. A wrench for polygonal nuts, comprising oppositely-disposed jaw portions defining two sides of a nut-receiving recess, one of said jaws being substantially flat, and a wrench surface constituting the inner wall of the recess, the said surface normally constituting the inner wall of the recess, the said surface normally having contact with a nut and being of such form that upon tilting movement of the wrench transversely of the plane of the nut, the length of area of contact between the said flat jaw and the nut will not be materially shortened, one of said jaws being greater in length than one-half the length of the said inner wall, and the other jaw being less than one-half the length of the inner wall.

4. A wrench for polygonal nuts comprising oppositely-disposed jaw portions defining two sides of a nut-receiving recess and a wrench surface constituting the inner wall of a recess, the said surface normally having contact with a nut and being of such form that upon tilting movement of the wrench transversely of the plane of the nut, the distance between the said inner wall and the outermost point of the nut at which one of said jaws engages the nut will not be materially shortened, one of said jaws being greater in length than one-half the length of the said inner wall, and the other jaw being less than one-half the length of the inner wall.

In testimony whereof I, the said LOUIS E. ENDSLEY, have hereunto set my hand.

LOUIS E. ENDSLEY.