

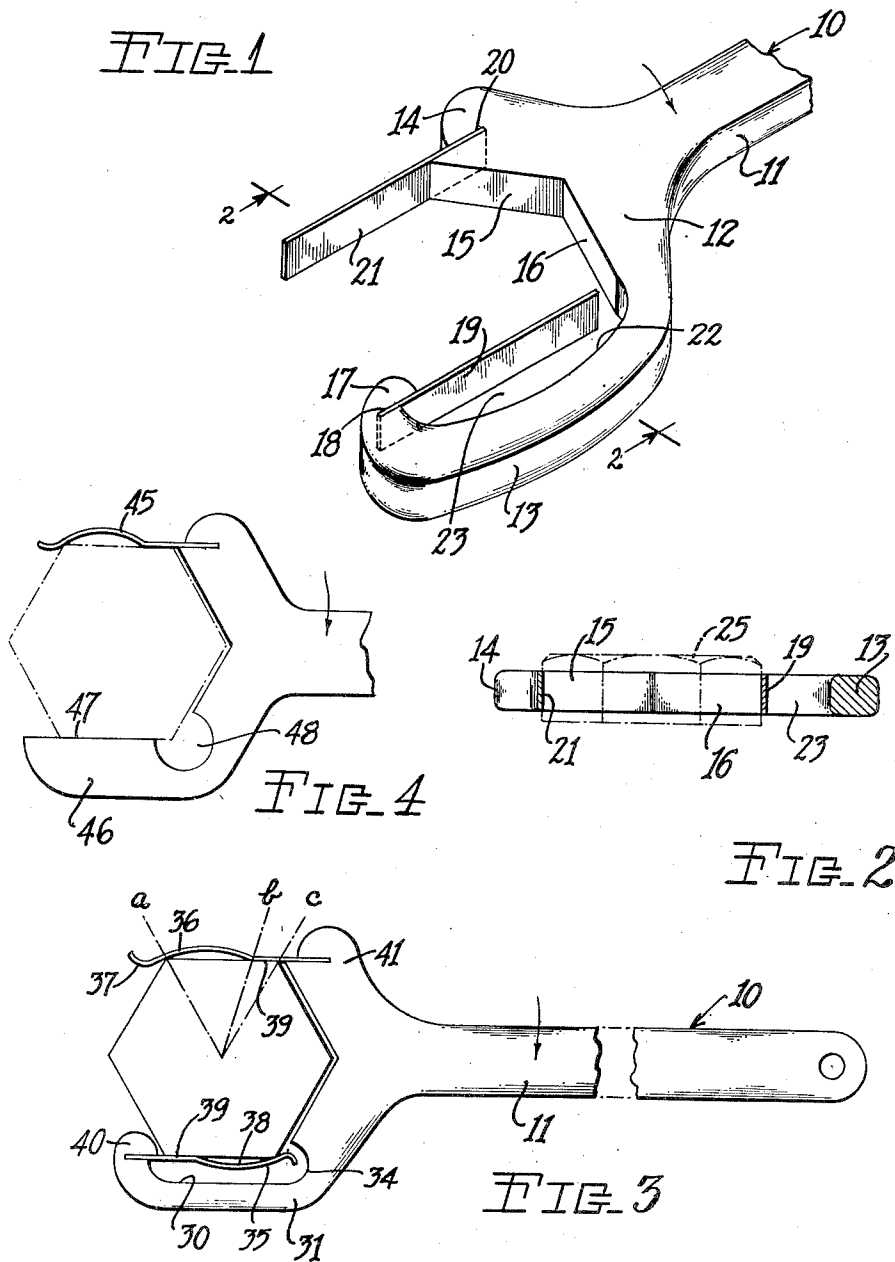
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WRENCH HAVING LEAF SPRING JAW

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WRENCH HAVING LEAF SPRING JAW

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This invention relates to wrenches and in particular to one of the flat, open ended type.

In many machines and other structures there are nuts and fittings that are so located that they are not readily accessible and cannot be adjusted with a regular adjustable jaw type wrench and require that a worker make a turn, remove the wrench and repeat the process until the nut or fitting is tightened or loosened even where flat open ended wrenches are employed. This practice is tedious, requires extra time and adds to the expense of the adjustment.

It is one of the objects of my invention to provide a wrench that can be used for tightening or loosening a nut or fitting without disengaging the wrench from the nut or fitting after every part turn.

Another object of the invention is to provide in a flat open ended type wrench a structure which permits of a ratcheting action of the wrench without using the usual pawl and ratchet combinations which are bulky and unfitted for use with a flat type wrench which is to be kept at a minimum thickness.

Still further objects of the invention are to provide an open end type wrench having jaws of yieldable form which may be replaced, will provide a ratchet action and permit the wrench to be readily and quickly placed over a nut or fitting without prior adjustment or manipulation; and to provide a wrench having the foregoing features of novelty and construction which can be made at minimum cost.

With these and other objects in view, the invention comprises certain construction herein-after described and then particularly pointed out in the claims and a preferred embodiment of my invention is illustrated in the accompanying drawing in which:

Figure 1 is a view in perspective of a wrench constructed in accordance with my invention and illustrating the mounting of the spring members,

Figure 2 is a section taken on the line 2-2 of Figure 1 showing the relative position of the spring jaws and the location of a nut engaged thereby, and

Figure 3 is a plan view of the wrench having a somewhat modified showing of the spring jaws and illustrating the principle of operation diagrammatically, and

Figure 4 is a plan view of a wrench having one spring jaw.

Referring to the drawing in detail 10 indicates a solid wrench body having a handle shank 11 of any suitable shape or length formed at the

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working end thereof to provide a head 12 having an integral aduncous arm 13 and a coplanar nub 14 formed at the opposite sides of said head. The forward edge of said head 12 is shaped to provide faces 15 and 16 disposed relatively to each other at a hexagonal angle to conform to the two faces of a hexagon nut. The arm 13 terminates in a shoulder 17 which is slotted as at 18 to receive and hold a flat spring strip 19. The shoulder 17 may serve as means for retaining the nut and wrench in working relation. The head 12 adjacent the nub 14 is also slotted as at 20 to retain a flat spring strip 21 in parallel relation to said spring strip 19. The springs 19 and 21 form with the faces 15 and 16 three hexagonal angles to provide four seats for respective faces of a hexagon nut 25 or similarly shaped portion of a fitting. The use of a hexagon shape is merely for illustration as it is evident that the wrench may be shaped to fit any nut or fitting of conventional form.

While the wrench illustrated in Figure 1 shows the inner wall 22 of the arm 13 to be curved to provide a space 23 in which the spring strip 19 may have room for yieldable flexing movement, the inner wall 30 of arm 31 in the form of wrench shown in Figure 3 is straight and the arm 31 where it joins the head 33 is recessed as at 34 to allow flexing movement of the free end of the spring 35. This spring, like its counterpart 36 at the opposite side of the head may be curved outwardly at the end as at 37 and bowed intermediate its ends as at 38. The ends 39 of both springs, secured respectively in the nub end 40 of the arm 31 and in the nub 41 of the wrench body are straight for flat engagement with part of each adjacent face of a nut.

The wrench can be readily slipped in place, in endwise direction, over the sides of a nut due to the yielding action of the springs and will be seated as indicated diagrammatically in Figure 3. In the latter figure by way of example the arc *ab* is equal to fifty-five degrees and arc *bc* is equal to five degrees. Along the curves of the spring the turning force in counterclockwise direction from *a* to *b* is constant. From *a* to *b* the spring will be deflected to allow the wrench to move in counterclockwise direction. The turning force in clockwise or work direction from *b* to *c* is eleven times the turning force from *a* to *b* so that the retract or ratchet action in counterclockwise direction will require one eleventh the force that will be exerted by the action of the *b-c* portions of the springs on the faces of the nut in working action.

It will be evident that the clockwise action

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of the wrench in work will be carried out by the combined turning forces applied at diametrically opposite sides of the nut.

The springs may be welded or riveted or force fitted into the body and arm of the wrench and may be tempered to suit the conditions under which the wrench is to be used. It is evident that once slipped over the nut it need not be removed to obtain another turning position but will ratchet due to the yield of the springs to alternately retract the wrench and advance the work. Having no moving parts the tool will not need servicing attention, can be made at a minimum cost, can be used in extremely close quarters and can be slipped endwise over the work in practically any angle to be self-seating on the nut. In this manner the operator need not pay attention to the relative positions of the nut and wrench as the latter, due to the yield of its springs will be properly self-seating. Only one spring jaw 45 may be used with a solid jaw 46 formed integrally with the handle to present a nut face 47 and a clearance opening 48.

My invention is not to be restricted to the precise details of construction shown since various changes and modifications may be made therein without departing from the scope of the invention or sacrificing the advantages to be derived from its use.

What I claim is:

1. A wrench comprising a handle having an end shaped to present contiguous hexagon angled faces and an arm portion, spring strips spaced to engage opposite sides of a nut, means for mounting said strips on said end in parallel relation with each other and at a hexagon angle to an adjacent face of said end, the fixed ends of the springs being disposed diagonally, and a projection on said arm portion opposing the contiguous faces of said end.

2. An open end wrench comprising a handle terminating in a wrench end portion and parallel spring strips extending from said end portion for engagement with the opposite parallel faces of a nut or the like the outer and inner ends of each spring strip being yieldable and substantially non-yieldable, respectively, to provide respective ratchet and non-ratchet movement of the wrench with respect to the nut when the handle is swung in opposite directions and the free ends of said springs being bowed to overlie the edges of a nut held therebetween to yieldably retain the latter in place.

3. A wrench comprising a handle terminating in an end portion shaped to present contiguous hexagon angled faces, an arm on said end portion, a spring strip fixed in said end portion, a spring strip fixed in said arm, said strips being parallel and providing with said faces a four sided seat for a nut or the like, and the fixed ends of said springs adjacent the end portion and the arm being diagonally opposite each other and constituting torque applying members when the wrench is turned in one direction.

4. An open end wrench comprising a handle having a head portion, an arm on said head portion, a leaf spring strip secured in the head portion

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and extending in spaced parallel relation to said arm and being adapted to yield at its outer end for ratcheting movement of the wrench in one direction over a nut and the edge of said head being shaped to coincide with the faces of the nut to be turned and to coact with the inner end of said spring to apply a turning force to said nut when the wrench moves in the opposite direction and the outer end of said leaf spring being bowed to overlie the edge of a nut to retain the latter in place in the wrench.

5. A wrench comprising a handle having an end portion, an arm extending from one side of said end portion, parallel strip springs secured in said arm and in said end portion, the fixed ends of the springs being disposed diagonally opposite each other, said end portion being shaped to provide faces substantially contiguous with said springs to fit about the sides of a member to be turned, and a projection on said arm for retaining the member to be turned in operative relation with said faces.

6. A wrench comprising a head having a forward edge shaped to fit about two contiguous faces of a nut, an arm extending from said head and recessed at its junction with said head, parallel strip springs mounted in the arm and in the head for engagement with opposite faces of the nut, the fixed ends of the springs being diagonally opposite each other, the springs adjacent their fixed ends, in work movement of the wrench, constituting nut turning means and beyond said mounting ends yielding with respect to said nut to movement of the wrench in opposite direction and the free ends of said springs being bowed to overlie the edges of a nut held therebetween to yieldably retain the latter in place.

7. An open end wrench comprising a handle terminating in an end portion shaped to provide an integral nut engaging jaw member and a plurality of nut engaging faces, the jaw member being recessed at its junction with one of said faces, a spring strip secured at one end in said end portion and extending therefrom in spaced parallel relation to said jaw member for engagement with the face of a nut opposite the face thereof engaged by said integral jaw member, and said spring being bowed at its free end to overlie the edge of a nut to yieldably retain the latter in the wrench.

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