





## UNITED STATES PATENT OFFICE.

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## WRENCH.

SPECIFICATION forming part of Letters Patent No. 729,316, dated May 26, 1903.

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*To all whom it may concern:*

Be it known that I, MICHAEL J. FITZGERALD, a citizen of the United States, and a resident of Salt Lake City, in the county of Salt Lake and State of Utah, have invented a new and Improved Nut and Pipe Wrench, of which the following is a full, clear, and exact description.

This invention has for its object to provide novel details of construction for a combined nut and pipe wrench that adapt the wrench for reliable service either as a parallel plain-jawed wrench or as a pipe-wrench having serrated faces on the jaws for biting upon a cylindrical pipe or bolt body to turn it, a further object being to so construct the improved features that working parts of the wrench may be quickly changed in adjustment to adapt the implement for use as a nut-wrench or a pipe-wrench.

The invention consists in the novel construction and combination of parts, as is hereinafter described, and defined in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view of the improved implement, having parts adjusted to serve as a pipe-wrench. Fig. 2 is a sectional side view of the same, showing the relative position the movable jaw assumes when the wrench is subjected to strain while turning a pipe. Fig. 3 is a plan view of the lever of the wrench in part and of the fixed jaw thereon, together with a toothed facing-block and a keeper-band that holds the block yoked upon the fixed jaw. Fig. 4 is a side view of the wrench-lever in part and of a fixed and sliding jaw, together with a changeable facing-block, the jaws and block being arranged for use as a nut-wrench. Fig. 5 is an enlarged transverse sectional view substantially on the line 5-5 in Fig. 3, and Fig. 6 is a perspective view of a keeper-band employed.

The wrench-lever 10 is in the form of a quadrangular bar, having a grip-piece 11 secured on one end, said part complete being shaped for convenient manipulation, as is usual in this class of nut-wrenches. Upon the opposite end of the lever 10 a jaw 12 is

affixed, forming the head of the wrench, said jaw being disposed transversely of the lever end and having its gripping-face at a right angle with the lever in the ordinary way.

A slidable jaw 13 is loosely mounted on the lever-bar 10 by means of the two spaced rectangular loops 13<sup>a</sup> 13<sup>b</sup> and is engaged by the adjusting-screw 14, which screws into a threaded perforation formed longitudinally in the jaw-body, said screw having a journal-pin *a* formed on the end that extends toward the grip-piece 11, said pin loosely engaging a socket *a'*, formed in the heel-block 11<sup>a</sup>, mounted upon the lever-bar and affording an abutment for the adjacent end of the grip-piece.

A milled head 14<sup>a</sup> is formed near the end of the screw 14, having the journal-pin *a* thereon, said head having loose engagement with a notch *b*, formed in the adjacent face of the lever 10, whereby the manual rotation of the head 14<sup>a</sup> will adjust the slidable jaw 13 toward or from the fixed jaw 12, in accordance with the direction of rotation given to the milled head, this means for moving and retaining a sliding jaw being in common use on what are known as "monkey-wrenches."

The slidable jaw 13 is provided with a toothed facing-piece 15, which is secured thereon by rivets *c* or other means, the teeth *d* being formed on the transverse face of said facing-piece 15, that is opposite the gripping-face on the fixed jaw 12.

The looped projection 13<sup>a</sup>, that is extended below the facing-piece 15, is of such length as permits the toothed face on said facing to incline away from the gripping-face on the jaw 12 when a pipe is gripped by the wrench, such inclination being shown in Fig. 2.

To facilitate the inclination of the facing-piece 15, a socket *e* is formed in the body of the sliding jaw 13 opposite the looped projection 13<sup>a</sup>, and in said socket the shank of a presser-pin *e'* is inserted, together with a spiral spring *e*<sup>2</sup>, that is mounted upon said shank. A cylindrical head *e*<sup>3</sup> is formed on the lower end of the pin *e'*, said head having a rounded lower end, and the stress of the spring *e*<sup>2</sup> is adapted to press the pin-head upon the adjacent surface of the lever 10, which will incline the working face of the slidable jaw as indicated in Fig. 2. The journal-pin *a* is convexed on the outer end, and



the socket  $a'$  is correspondingly concaved in the bottom, which facilitates a rocking movement of the pin in said socket, which is essential for effecting the inclined adjustment of the facing-piece 15, together with the slidable jaw 13.

The facing-block 16, that provides a supplementary jaw for the improved wrench, is formed with a rectangular opening  $g$  at one end to permit the block to receive the lever-bar 10 and slide thereon, said block having its transverse surfaces essentially parallel with each other and with the gripping-face  $k$  on the fixed jaw 12. The transverse face  $k'$  of the block 16, that is opposed to the transverse face  $k$  on the fixed jaw 12, is plain and may have close contact throughout its area with said face on the fixed jaw, as shown in Figs. 1 and 2. The remaining transverse surface of the facing-block 16 is toothed, as shown, said teeth  $h$  hooking in a direction that adapts them to interlock with the teeth  $d$  when these two series of teeth are made to contact with each other, as shown in Fig. 4.

The facing-block 16, near its end that corresponds with the outer ends of the fixed jaw 12 and slidable jaw 13, is furnished with a keeper-band 17, which is in bail-loop form and is pivoted at the ends of its parallel limbs  $17^a$  upon the facing-block, which is embraced by said limbs.

The jaws 12 13 are reduced on their transverse outer sides near their free ends, so as to produce offset shoulders  $i$  and  $i'$ , respectively, these shoulders that are an equal distance from the lever-bar 10 each affording a seat for engagement of the looped keeper-band 17 therewith, as it will be seen that when the facing-block 16 is caused to impinge upon the fixed jaw 12 the keeper-band may be rocked over its free end and by close contact with the jaw hold the facing-block in bearing engagement therewith.

By securing the facing-block 16 in contact with the fixed jaw 12, as shown and described, the teeth  $h$  are disposed opposite the teeth  $d$  and are thus adapted to coact with said teeth for service as details of a pipe-wrench.

When the wrench is to be used on nuts or bolt-heads that require parallel plain surfaces on the opposed jaws, the facing-block 16 is caused to interlock its teeth  $h$  with the teeth  $d$  on the facing-piece 15, and the keeper-band 17 is rocked over the end of the slidable jaw 13, so as to draw the facing-block closely against the facing-piece 15 and seat the keeper-band on the shoulder  $i'$ , as represented in Fig. 4, which will hold the jaw 13 so that the plain faces on the fixed jaw 12 and on the facing-block 16 are disposed at right angles with the transverse sides of the lever 10.

To prevent accidental displacement of the keeper-band 17 when adjusted in engagement with the fixed jaw 12 or the facing-piece 15, it is preferred to employ the means shown in Figs. 2 and 5, consisting of the following details.

A socket or depression  $m$  is formed in the outer end of the facing-block 16, and through this socket at right angles thereto the cross-bar  $17^b$ , which serves as a pivot connection for the keeper-band on the facing-block 16, is extended near the concaved bottom of said socket. (See Fig. 2.) The middle portion of the cross-bar  $17^b$ , which occupies the concave lower portion of the socket  $m$ , is flattened on opposite sides, and upon said flattened surfaces  $m'$  the flanged head  $n'$  of a presser-bolt  $n$  is alternately seated, as will be presently explained.

A coiled spring  $n^2$  encircles the bolt-body  $n$  and at the lower end seats upon the flange of the head  $n'$ , the opposite end of the spring having enforced engagement with the inner end of a short screw  $n^3$ , that has threaded engagement with the threaded wall of the socket  $m$ .

One limb  $17^a$  of the keeper-band 17 is circularly perforated, as shown at  $o$  in Fig. 6, and directly opposite said perforation a preferably rectangular hole  $o'$  is formed in the parallel limb of the keeper-band. The cross-bar  $17^b$  is mainly cylindrical in the body, has a headed enlargement on one end, and at the opposite end  $o^2$  is squared to engage within the rectangular hole  $o'$  when the cross-bar is passed through the circular orifice  $o$  toward said angular hole.

The squared end  $o^2$  is arranged, with regard to the flattened sides  $m'$  of the cross-bar  $17^b$ , so that when the cross-bar is positioned transversely in the perforations  $o$   $o'$  and is secured therein by riveting its ends either of the flattened surfaces  $m'$  will be adapted to receive the flat head  $n'$  of the presser-bolt  $n$  and hold the keeper-band rocked into engagement with either shoulder  $i$  or  $i'$  upon which it may be imposed, the coiled spring  $n^2$  enforcing the contact of the flanged head  $n'$  of the bolt upon the cross-bar  $17^b$ , so as to effect this retention of the keeper-band until it is purposely released.

It will be apparent that the peculiar construction and arrangement of the keeper-band 17 and its cross-bar  $17^b$ , together with the slidable and spring-pressed bolt  $n$ , will permit the keeper-band to be rocked in opposite directions and engage its looped end with either of the wrench-jaws 12 or 13, thus retaining the facing-block 16 in secured position for service either as an adjunct of a nut-wrench having plain-faced jaws or as a portion of a pipe-wrench having serrated jaws.

Having described my invention, I claim as new and desire to secure by Letters Patent—

1. A convertible wrench, comprising a lever-bar, a fixed jaw on one end of said bar and having a plain gripping-face, a vertically-rockable and longitudinally-slidable jaw having a toothed gripping-face and loosely mounted on the lever-bar, means to rock said jaw to incline its gripping-face, a rotatable screw loosely engaging a threaded opening in the slidable jaw, a journal-pin on one end of said



screw having a convexed end, and a heel-block carried by the lever-bar, having a concave-bottomed socket, wherein the journal-pin seats and may rock.

5 2. A convertible wrench, comprising a lever-bar, a fixed jaw on one end of said bar having a plain working face, a movable jaw held to rock and slide on the lever-bar, means for adjusting the movable jaw on the lever-  
10 bar, a facing-block mounted to slide on the lever-bar between the jaws one face nearest the fixed jaw being plain, and the opposite working face having teeth, a keeper-band rockable on the facing-block said band being  
15 adapted for rocking movement toward and have engagement with either jaw, and a spring-pressed bolt adapted to retain the keeper-band in rocked engagement with either jaw.

20 3. In a convertible wrench of the character described, the facing-block held to slide

on the lever-bar, the fixed jaw on the end of said lever-bar and having an offset shoulder thereon near its outer end, a rockable and  
25 slidable jaw on the lever-bar having a toothed face, and an offset shoulder thereon, a block slidable on the lever between the jaws, having a plain face, and an opposite toothed face, a looped keeper-band pivoted near its ends  
30 on the block, so as to rock and rest upon either offset shoulder, a pivot for the looped band comprising a flat-sided cross-bar fixed in perforations near ends of the looped keeper-band, and a spring-pressed bolt resting on a  
35 flat side of the pivot cross-bar.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MICHAEL J. FITZGERALD.

Witnesses:

SAM RANEY,  
JOSEPH J. LA BEE.