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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 3 :
B25B 13/00, 17/00

A1

(11) International Publication Number: WO 83/ 04207

(43) International Publication Date: 8 December 1983 (08.12.83)

(21) International Application Number: PCT/AU82/00083

(22) International Filing Date: 27 May 1982 (27.05.82)

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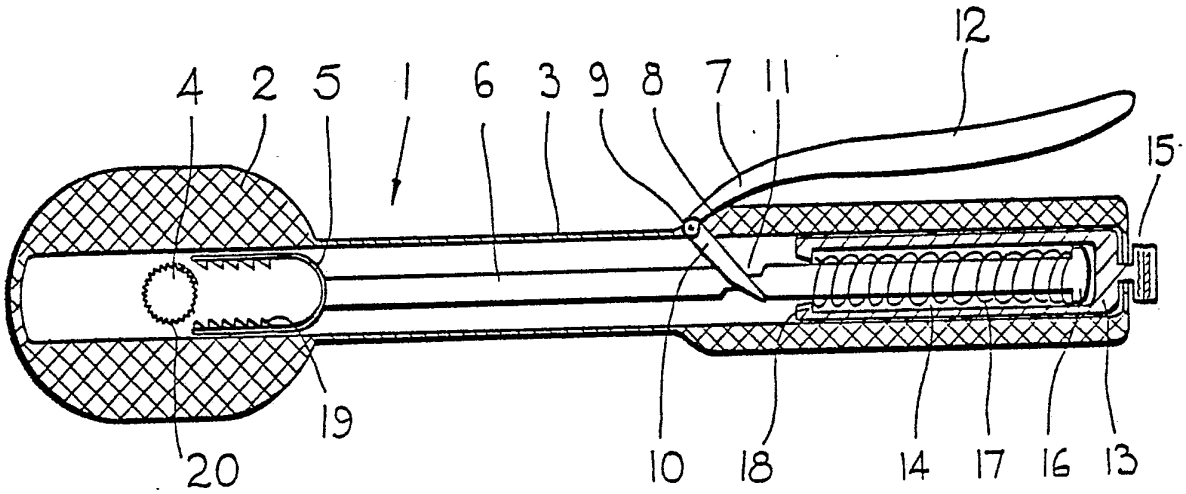
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(81) Designated States: AU, DE (European patent), FR (European patent), GB (European patent), JP, SE (European patent), US.

Published
With international search report.

(54) Title: IMPROVEMENTS IN OR RELATING TO SPANNERS



(57) Abstract

A spanner which enables simple and rapid removal of a loosened nut. The spanner (1) has a manually-operable handle (12) squeezing of which causes reciprocation of shaft (6) and bifurcated member (5). Assymetrical teeth (19) on the bifurcated member engage and rotate member (4). The member (4) forms part of the mechanism of a ratchet-spanner and a socket is usually attached thereto for removing nuts from bolts. Once the nut has been loosened in conventional manner, pumping of handle (12) causes rapid rotation of the socket and speedy removal of the nut.

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IMPROVEMENTS IN OR RELATING TO SPANNERS

Technical Field

This invention relates to a spanner, generally a ratchet spanner.

Background Art

Spanners are used to remove nuts from bolts. For speed and convenience the spanner may be provided with a ratchet mechanism which allows the nut to be removed by series of relatively short turning movements of the spanner. However, this is still a relatively slow way of removing a nut, once loosened.

It is an object of the present invention to provide a spanner which may be used to rapidly remove a loosened nut from a bolt.

Disclosure of the Invention

The present invention provides a spanner which comprises
a handle,
a head attached to one end of said handle,
a rotatable member rotatable mounted in the head;
reciprocatable drive means for rotating the rotatable member and reciprocation means connected to the drive means, the drive means having at one end thereof a set of assymetrical teeth adapted to engage and rotate said rotatable member during movements in one direction of said reciprocation but not in the other direction of reciprocation.

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Preferably the spanner further includes reversing means to enable the direction of rotation of the rotatable member to be reversed. This is done by diametrically changing the side of the rotatable member which is engaged by the set of teeth.

Preferably the drive means comprises a bifurcated member, the rotatable member being insertable between the arms of the bifurcated member, the reciprocation means being operable to cause reciprocal movement of the bifurcated member substantially parallel to the axis of said arms, the inner surface of each arm having teeth to catch the rotatable member and thereby rotate the rotatable member when moved in one direction and not catch the rotatable member when moved in the other direction. Each set of teeth is arranged to catch the rotatable member in a respective one of the directions of reciprocating movement.

Generally, the assymetrical teeth each have an abutment surface on one side for engaging the rotatable member, and a ramp surface on an opposed side for sliding over and not engaging the rotatable member. The direction of assymetry of all the teeth in a set is always the same.

Preferably the handle is hollow and the drive means comprises a shank in the handle attached at one end to the bifurcated member. The reciprocation means may comprise a lever passing through a hole in the handle and pivotal on the handle, the lever being engaged with the shank so that pivotal movement of the lever causes reciprocation of the shank.

Preferably, the lever includes a bifurcated end within the handle, the arm of the bifurcated end being positioned in a circumferential groove in the shank.

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Generally the reversing means comprise means to rotate the shank and bifurcated member through 180 degrees about the longitudinal axis thereof. An open-ended housing may be provided about the shank, an extension of the said housing passing through an aperture in the end of said handle so that the housing may be rotated by manually rotating the extension and connection means (for example, a spring) being provided between said shank and said housing.

Preferably, the housing has an enlarged internal bore and the shank has an enlargement on the end thereof, a spring being operative between the enlargement and a flange provided around the open entrance to the housing.

In further embodiments of the invention, the reciprocation means may be a conventional pneumatic or hydraulic reciprocating mechanism, such as those used in drills, chisels and hammers.

Brief Description of the Drawing

One preferred form of the invention will now be described with reference to the accompanying drawing which is a diagrammatical cross sectional view of a spanner according to one form of the invention.

Best Mode for Carrying out the Invention

In the form of the invention shown in the drawing a spanner (1) is provided with a head (2) and handle (3). The head (2) comprises a ratchet mechanism and a socket for a nut, or other type of spanner according to the task to be performed.

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A rotatable member (4) is rotatably mounted in the head (2). On the rotatable member (4) is mounted the ratchet mechanism (not shown). The rotatable member has logitudinal ribs (20) on the part within the head. Drive means are provided to rotate the rotatable member and in the embodiment shown in the drawings the drive means comprise a reciprocatable bifurcated member (5) having means on inner surfaces of the arms thereof to engage the rotatable member. These means comprise two sets of oppositely inclined asymmetrical teeth (19) which are arranged such that forward movement of the bifurcated member (5) will cause the teeth on one arm to engage ribs (20) and rotate the rotatable member (4), whilst backward movement in the other direction will cause the teeth on the other arm to rotate the rotatable member in the same sense. During the backward or forward movement only, one set of teeth (19) at a time bear against the ribs (20) and so cause rotation, the teeth on the other side sliding over the ribs. The distance apart of the bifurcated arms and length of the teeth are of a suitable size to allow this to happen. The rotatable member becomes released by the teeth at the inner end of the bifurcated member.

The drive means comprise a shank (6) which may be reciprocated by operation of a lever (7) passing through an aperture (8) in the wall of the housing and pivoted therein by a pivot pin (9). The lever (7) terminates in a bifurcated member (10) or alternatively there may be only one arm. The free end of the lever (7) engages in a circumferential groove (11) in the shank (6).

The lever (7) is shaped on the outer surface to provide a handle (12) which may be readily gripped in the hand along with the handle of the spanner.

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The bifurcated member (5) can be turned upside down, so that the rotatable member (4) may be rotated in the opposite direction, by turning the shank (6) through 180°. This is achieved by providing a housing (13) having an enlarged bore (14) with an extension which includes manually operable knurled knob (15) extending through an aperture in the end of the handle (3).

The shank (6) has an enlarged end (16) and a compression spring (17) is fitted between the end (16) and an inwardly directed flange (18) which defines the entrance to the housing. This spring causes some connection between the shank (6) and the housing (13) so that rotation of the knob (15) will rotate the housing and thereby the shank (6) and bifurcated member (5).

The spring (17) also returns the shank (6) to a rest position after pressing down of the handle (12).

Other peripheral elements may be associated with the construction. For example, operation of the spanner can be caused to deposit a small amount of lubricating fluid onto a nut being withdrawn.

The spanner may be used as follows:

The spanner is used initially in the normal manner to loosen a nut, generally by employing the spanner ratchet mechanism, however once loose, the nut can be readily removed by operating the lever (7) so as to cause reciprocating movement of the bifurcated member (5). This reciprocation rotates the rotatable member (4) and thereby rotates the spanner jaws and nut. The rotation is relatively rapid and thus enables a loosened nut to be withdrawn rapidly from a bolt without substantial movement of the handle of the spanner.

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Industrial Applicability

Thus it can be seen that a spanner is provided which has the advantage that a nut, once free, can be readily removed from a bolt without substantial rotation of the handle part of the spanner. The spanner finds application in all fields of engineering where nuts must be removed from bolts.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A spanner which comprises
a handle (3),
a head (2) attached to one end of said handle,
a rotatable member (4) rotatable mounted in the head;
reciprocatable drive means (5, 6) for rotating the rotatable member, and reciprocation means (7) connected to the drive means, the drive means having at one end thereof a set of assymetrical teeth (19) adapted to engage and rotate said rotatable member during movement in one direction of said reciprocation but not in the other direction of reciprocation.

2. A spanner according to claim 1, wherein said drive means comprises a bifurcated member (5) at said one end, the bifurcated member for embracing the rotatable member and having one set of assymetrical teeth on each arm thereof; one set being adapted to engage and rotate said rotatable member during reciprocation in one direction and the other set being adapted to engage and rotate said rotatable member during reciprocation in the other direction, whereby said rotatable member is rotated in one sense.

3. A spanner according to claim 2, wherein said bifurcated member is rotatable through 180 degrees around its longitudinal axis, so as to reverse the sense of rotation of the rotatable member.

4. A spanner according to any preceding claim, wherein the rotatable member is provided with ribs (20) extending parallel to the axis of rotation thereof, the ribs being engageable by said assymetric teeth (19) so as to rotate the rotatable member.

5. A spanner according to any preceding claim wherein the drive means comprises a shank (6) extending longitudinally of the handle; and the reciprocation means comprises a manually operable lever (7) pivotally mounted on the handle at a point (9) intermediate the ends of the lever, a free end (10) of the lever engaging the shank, whereby pivoting of the lever causes reciprocation of the shank.

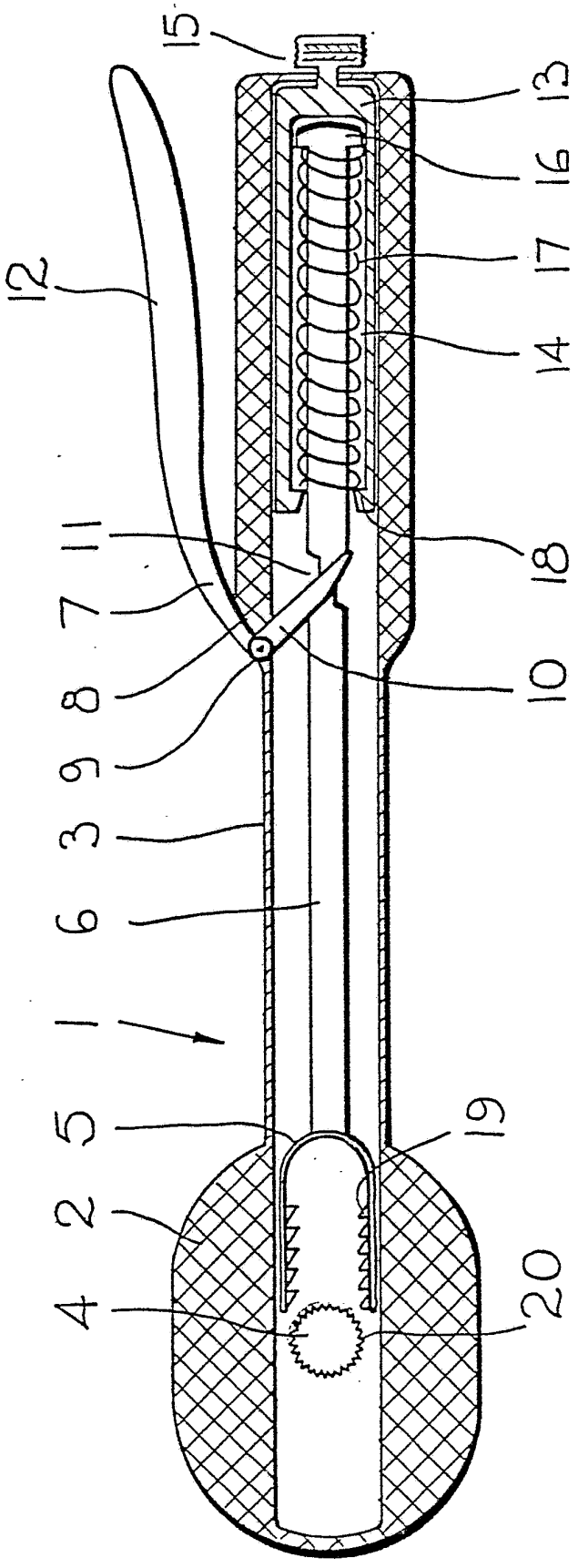
6. A spanner according to claim 5, wherein the reciprocation means comprises a pneumatic or hydraulic reciprocating mechanism.

7. A spanner according to any preceding claim, wherein the drive means is resiliently biassed towards one extreme of said reciprocating movement.

8. A spanner according to any preceding claim, wherein said assymetrical teeth each have an abutment surface on one side for engaging the rotatable member, and a ramp surface on an opposed side for sliding over and not engaging the rotatable member.

9. A spanner according to any preceding claim, wherein the lead comprises a reversible ratchet mechanism connected to the rotatable member for providing for rotation in a chosen sense.

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INTERNATIONAL SEARCH REPORT

International Application No PCT/AU82/00083

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl[3] B25B 13/00, 17/00

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC	B25B 13/00, 17/00

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

AU:IPC as above; Australian Classification 72.1

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
X	US,A, 1913669 (HEALD) 13 June 1933 (13.06.33)	(1)
Y	US,A, 3859875 (BIEGANSKI) 14 January 1975 (14.02.75)	(2)
	9 DE, A, 2402526	
A	US,A 2817257 (KNISER) 24 December 1957 (24.12.57)	
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IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
20 August 1982 (20.08.82)	25 August 1982 (25.08.82
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Australian Patent Office	R.E.W. May R.E.W. May

Form PCT/ISA/210 (second sheet) (October 1981)