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EUROPEAN PATENT APPLICATION

21 Application number: **89306776.9**

51 Int. Cl.⁵: **B25B 21/00**

22 Date of filing: **04.07.89**

30 Priority: **10.03.89 US 322074**

43 Date of publication of application:
12.09.90 Bulletin 90/37

84 Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

71 Applicant: **Junkers, John K.**
7 Arrowhead Lane
Saddle River New Jersey 07458(US)

72 Inventor: **Junkers, John K.**
7 Arrowhead Lane
Saddle River New Jersey 07458(US)

74 Representative: **Newby, John Ross et al**
J.Y. & G.W. Johnson Furnival House 14/18
High Holborn
London WC1V 6DE(GB)

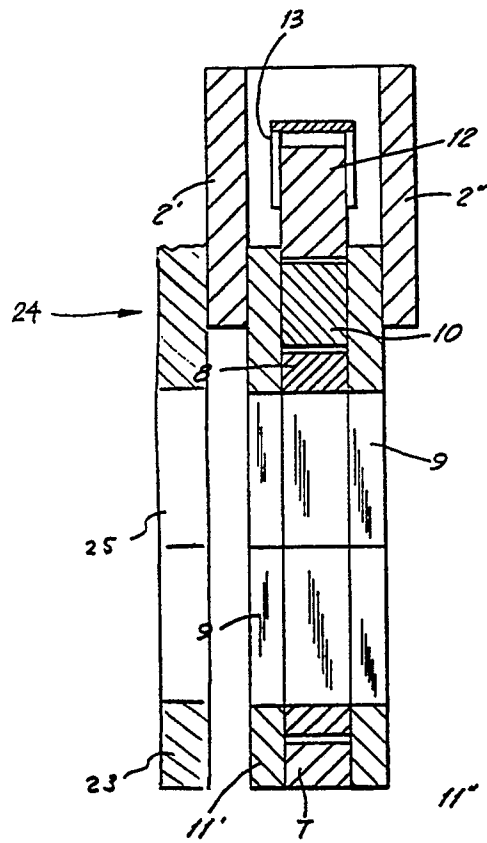
54 **Power wrench.**

57 A power wrench for tightening and loosening threaded connectors including a first threaded member and a second threaded member which is screwed on the first threaded member, the power wrench comprising a housing (1, 2), drive means (4, 5, 6) for providing a driving force, engaging means (7, 8) having one end (9) engageable with one of the threaded members and another end (12) connected with the drive means (6) so that when the one end of the engaging means engages the one threaded member and the driving force is applied to the other

end of the engaging means (7, 8), the one threaded member is turned for tightening or loosening, and holding means (23 - see Figure 2) having one end (24) connected with the housing and another end (25) engageable with the other threaded member of the threaded connector, so that when the one threaded member of the threaded connector is turned by the engaging means (7, 8) the other member of the same threaded connector is held by the holding means (23).

EP 0 386 355 A1

FIG. 2



POWER WRENCH

The present invention relates to a power wrench for tightening and loosening of threaded connectors including two threaded members, such as for example a bolt and a nut, or a stud and a nut, etc..

Power operated wrenches of the above-mentioned general type are known in the art. In many instances when the power wrench is actuated and turns one threaded member of a threaded connector, for example a nut, the other threaded member of the same threaded connector, for example a bolt or a stud turns together with the nut. It is to be understood that this phenomenon is highly undesirable. It creates tremendous problems for example in the case when a stud is screwed into a blind hole in a bottom half of a flange, and the user does not want the stud to bottom out since later on this would cause tremendous difficulties when trying to get the stud out of the bottom shell. This phenomenon is also undesirable when a user has a through bolt, since in this situation when the bolt turns along with the nut, a backup wrench is required. Not only an additional tool is needed in this situation, but also the backup wrench locks itself on, and it takes much longer to get it off than to tighten the nut. Thus, tremendous time is wasted, since while the wrench has means for turning one threaded member of a threaded connector, it is not provided with means for simultaneously preventing turning of the other threaded member of the threaded connector.

The present invention seeks to provide a power wrench which avoids the disadvantages of the prior art.

More particularly, the present invention seeks to provide a power wrench which during turning of one threaded member of a threaded connector for its fastening or loosening, prevents turning of the other threaded member of the same threaded connector.

In keeping with these aims and with others which will become apparent hereinafter, one feature of the present invention resides, briefly stated, in a power wrench which has drive means, engaging means for engaging one threaded member of a threaded connector and drivable by the drive means so as to turn the one threaded member in the direction of the drive means, a housing, and in addition to this holding means which hold the other threaded member of the same threaded connector during turning the one threaded member of the same.

When using a power wrench in accordance with the present invention the other threaded member of the threaded connector is no longer permit-

ted to turn during turning of the one member of the threaded connector. Thus, problems no longer arise from turning of the other threaded member and no additional backup wrench is needed for tightening or loosening a threaded connector.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, and given by way of example.

Figure 1 is a side view of a power wrench in accordance with the present invention;

Figure 2 is a view showing a section of the power wrench taken on the line 2-2 in Figure 1:

Figure 3 is a view showing a section of the power wrench taken along the line 3-3 in Figure 1:

Figure 4 is a side view of a holding element of the power wrench; and

Figure 5 is a view substantially corresponding to the view of Figure 3, but showing a further modification of a power wrench of the present invention.

A power wrench, for example a fluid-operated wrench in accordance with the present invention has a housing which can be subdivided into two housing portions 1 and 2 which adjoin one another over a dividing plane 3. However, the housing can be an integral structure as well. The housing 1, 2 accommodates a drive which is formed as a cylinder-piston unit. The cylinder-piston unit is provided with a cylinder 4 which forms an inner chamber, and a piston 5 which is movable in the inner chamber of the cylinder 4 under the action of fluid, for example a hydraulic or pneumatic medium, admitted into the inner chamber in the respective side of the piston 5. The piston 5 is connected with a piston rod 6 which extends in an axial direction beyond the housing portion 1 into the housing portion 2.

An engaging unit for engaging and turning a threaded connector is further provided and connected with a drive unit in a manner which will be described in detail hereinbelow. The engaging unit includes a link 7 having a central opening and an engaging member, which is formed for example as a ratchet wheel 8, arranged in the opening of the link 7 and provided with an engaging formation. In the embodiment shown in Figure 1, the engaging formation is a hexagonal opening 9 (with a central axis B) which can engage for example a hexagonal head of a nut. The engaging member is turnably

inserted into the link 7. A pawl 10 is connected with the link 7 in a known manner, for example pivotably as disclosed for example in US-A-4,079,641. The ratchet wheel 8 and the pawl 10 are provided with interengaging projections and grooves which are formed so that when the link 7 is turned in a working direction, the projections of the pawl 10 engage in the grooves of the ratchet wheel 8, while when the link 7 is turned in an opposite direction, the projections of the pawl 10 slip over the projections of the ratchet wheel 8 without turning the latter as disclosed in the above-mentioned patent. Two link plates 11' and 11'' are arranged one on each of the opposite sides of the link 7 so as to sandwich the link therebetween. The link 7 has an upper end 12 which is pivotally connected with a free end of the piston rod 6, for example by means of a pin as shown which is pivotally and slidingly guided in an opening 13 at the free end of the piston rod 6.

In accordance with possible embodiment of the invention, the housing portion 1 is round or square, while the housing portion 2 is formed by two housing plates 2' and 2''. Link plates 11' and 11'' are arranged between the housing plates 2' and 2'' and immovably connected with one another. The connection is formed by a pin 14 which extends through openings 15 in the housing plates 2' and 2'' and openings 16 in the link plates 11' and 11''. Projections 17 of the link plates 11' and 11'' engage in grooves 18 of the housing plates 2' and 2''.

A reaction member 19 is further provided in the power wrench. In the illustrated embodiment, the reaction member 19 is attachable to the link 7 and the link plates 11' and 11'' by means of two pins 20 and 21. The reaction member 19 also has an opening 22 for receiving the pin 14.

The power wrench constructed in accordance with the above presented description substantially corresponds to the power wrench disclosed in EP-A-89301565.1. It is to be understood, however, that it can be made somewhat differently as well.

In accordance with the present invention, the power wrench is provided with a holding element which is identified as a whole by reference numeral 23. The holding element has one end provided with an opening 24. The holding element 23 is connected with the housing 1, 2 by fitting its one end with the opening 24 on the pin 14. The opposite free end of the holding element 23 is provided with a holding formation which can be formed as a hexagonal opening 25. The holding element 23 can engage with its opening 25 a bolt head or the like, when the engaging opening 9 engages a nut of the same threaded connector. As can be seen from Figure 4, the holding element 23 is formed as a link which is somewhat similar to the link 7. Figure 2 clearly shows that the link 7

and the element 23 extend parallel to one another and very close to one another. This Figure also shows that the opening 9 of the ratchet wheel 8, which together with the link 7 forms the engaging unit, is coaxial with the opening 25 of the holding element 23.

The power wrench in accordance with the present invention operates in the following manner:

The opening 9 of the engaging unit is engaged with a nut to be turned, the reaction member 19 is brought to abutment against a neighbouring object and the opening 25 of the holding element 23 is engaged with a bolt head of the same threaded connector. A fluid under pressure is supplied to the inner chamber of the cylinder 4 during a working stroke, so that the piston 5 is moved and the piston rod 6 is extended, or in other words displaced to the left of the housing (as shown in Figure 1). In response to this displacement, the link 7 turns counterclockwise, thus turning the pawl 10 which with its projections engaging into the grooves of the ratchet wheel 8 turns the engaging member with the opening 9. The wheel 8 turns the nut of the threaded connector about the axis B in a counterclockwise direction. During this turning, the opening 25 of the holding element 23 is in engagement with the bolt head and therefore the bolt head of the same threaded connector cannot turn together with the nut.

As can be seen from Figure 3, one end of the pin 14 extends laterally beyond the housing, and the holding element 23 is supported on this projecting end of the pin 14. The holding element 23 can be fixedly arranged on the end of the pin 14, but, on the other hand, it can slide over the pin 14 so as to adjust the distance between the engaging unit 7, 8 which engages the nut and the holding element 23 which engages the bolt head, depending on the actual distance between the nut and the bolt head.

In accordance with another advantageous embodiment of the invention illustrated in Figure 5, the laterally extending end of the pin 14 can be provided with an outer thread 26, while the opening 24 of the holding element 23 can be provided with a complementary inner thread 27. Thereby the holding element 23 can be turned on the pin 14 as a result of interengagement of the threads 26, 27 so as to adjust the distance between the holding element 23 and the engaging unit 7, 8, depending on the actual distance between the nut and bolt head.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in a power tool, it is not

intended to be limited to the details shown, since various modifications and structural changes may be made without departing from the scope of the invention as defined in the following claims.

Claims

1. A power wrench for tightening and loosening threaded connectors including a first threaded member and a second threaded member which is screw-threadedly attached to the first threaded member, the power wrench comprising a housing (1, 2); drive means (4, 5, 6) for providing a driving force; engaging means (7, 8) having one end (8) engageable with one of the threaded members and another end (12) connected with said drive means (6) so that when said one end (8) of the engaging means engages the one threaded member and said driving force is applied to the other end (12) of said engaging means, said engaging means is displaced and turns the one threaded member for tightening or loosening thereof; characterised in that holding means (23) is provided having one end (24) connected with said housing (1, 2) and another end (25) engageable with the other threaded member of the threaded connector, whereby when the one said threaded member of the threaded connector is turned by said engaging means (7, 8) the other member of the same threaded connector is held by the holding means (23).

2. A power wrench as defined in claim 1, characterised in that said engaging means (7, 8) includes an engaging element (7), said holding means including a holding element (23) extending parallel to said engaging element (7).

3. A power wrench as defined in claim 2, characterised in that said engaging element (7, 8) and said holding element (23) each have connector-engaging formations (9, 25) at one end thereof for engaging the respective threaded member of the threaded connector, said engaging formations (9, 25) of said engaging element (7, 8) and holding element (23) being coaxial with one another.

4. A power wrench as defined in claim 3, characterised in that said engaging formation (9) of said engaging element (7, 8) and a holding formation (25) of said holding element (23) are formed as coaxial openings.

5. A power wrench as defined in any preceding claim, characterised in that said holding means (23) is removably mounted on said housing (1, 2) by mounting means including a mounting opening (24) provided on one end of said holding means (23) and a mounting pin (14) extending laterally outside of said housing and engaging said mounting opening (24) of said one end of said holding means

(23).

6. A power wrench as defined in claim 5, characterised in that said mounting means is formed so that said holding means (23) is displaceable relative to said engaging means (7, 8) so as to adjust the distance between said holding means (23) and said engaging means (7, 8).

7. A power wrench as defined in claim 6, characterised in that said mounting means is provided with an external thread (26), said mounting opening (24) of said holding means (23) being provided with an internal thread (27) so that said holding means (23) can be screwed on said mounting pin (14) to adjust the distance between said holding means (23) and said engaging means (7, 8).

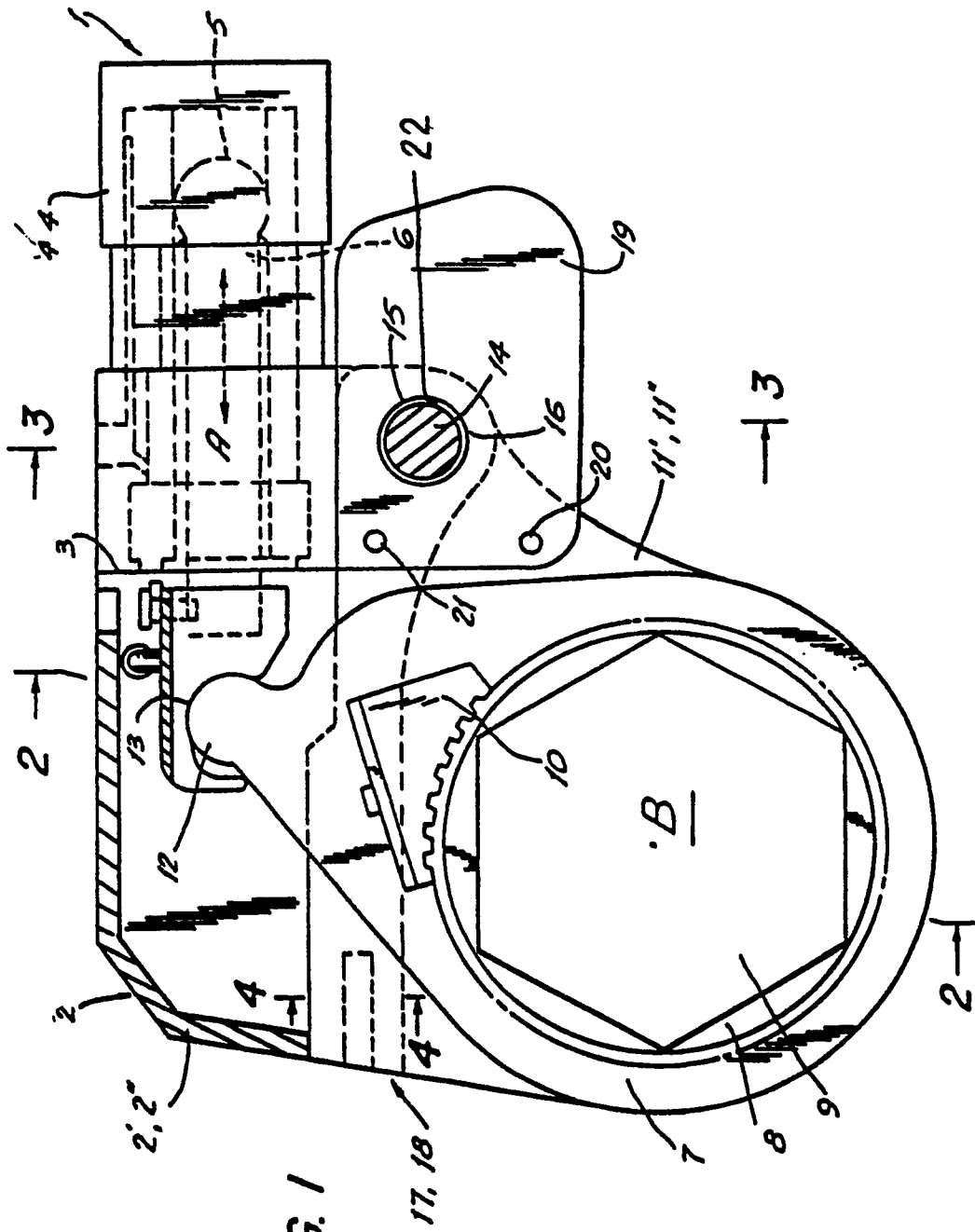


FIG. 1

FIG. 2

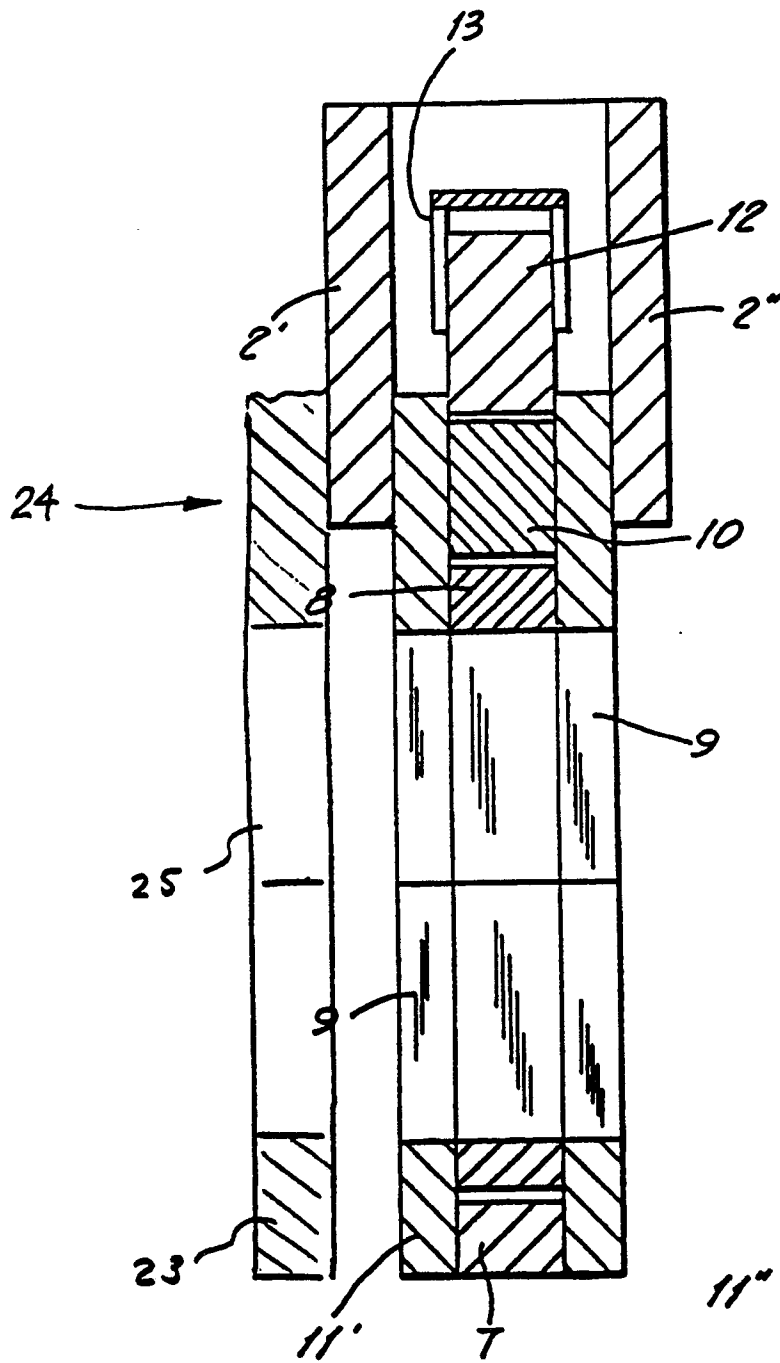
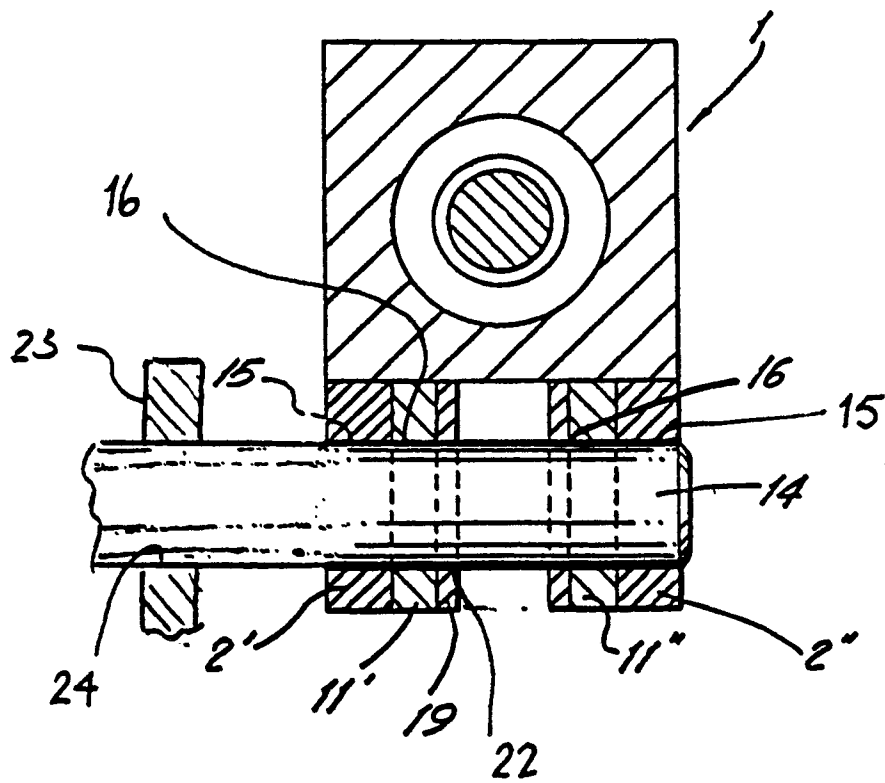


FIG. 3



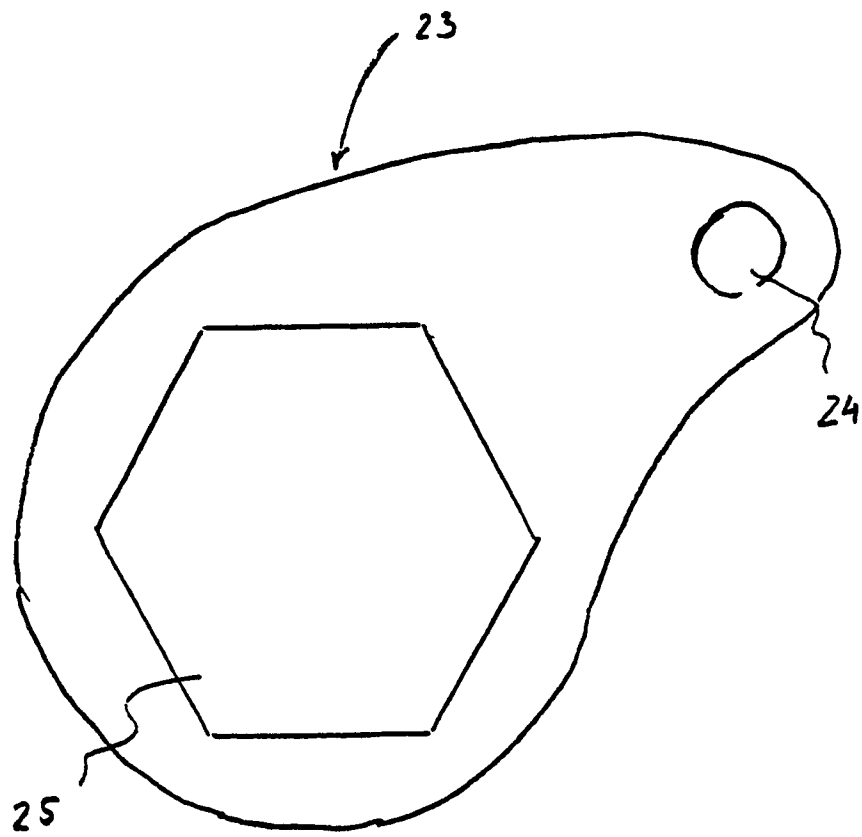
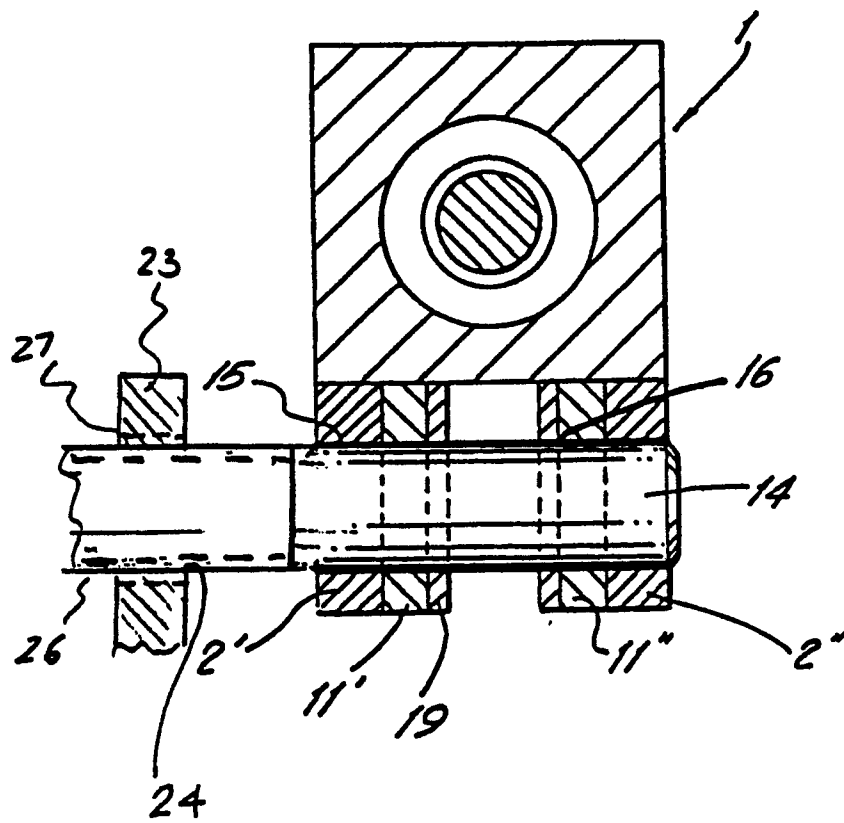


FIG. 4

FIG. 5





DOCUMENTS CONSIDERED TO BE RELEVANT			EP 89306776.9
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.)
X	<u>US - A - 3 198 040</u> (FRANCK) * Claim 1; column 2, lines 12-49; fig. 1,2 * --	1,2,3	B 25 B 21/00
A	<u>US - A - 3 097 551</u> (SCHMITT) * Claim 2; column 3, lines 16-38; fig. 1,2 * ----	5,6,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.)
			B 25 B 13/00 B 25 B 21/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 03-05-1990	Examiner BISTRICH
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	