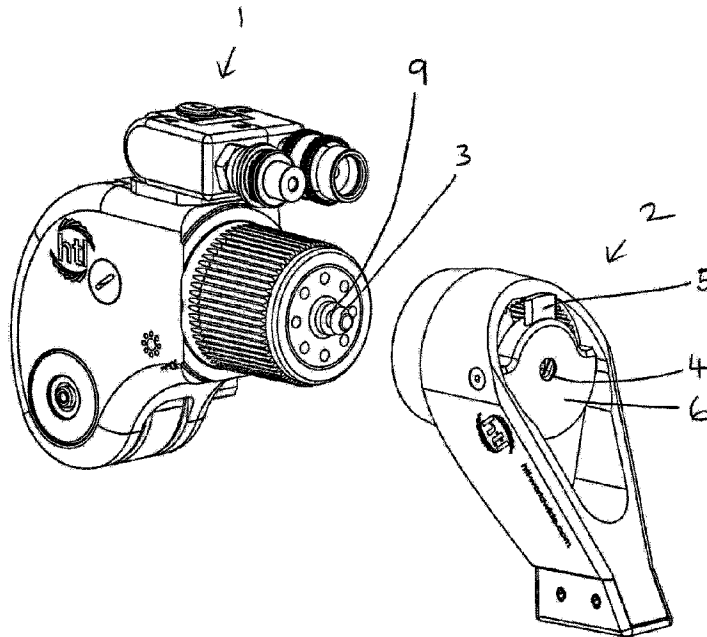




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 (72) Inventeur/Inventor:  
 QUICKE, STEPHEN, GB  
 (73) Propriétaire/Owner:  
 ENERPAC UK LTD, GB  
 (74) Agent: ADE & COMPANY INC.

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(57) **Abrégé/Abstract:**

Abstract Torque Wrench Assembly A torque wrench assembly comprises a torque wrench and a reaction arm and locking means for locking together the torque wrench and the reaction arm The locking means comprises a connection member located on the torque wrench, an opening on the reaction arm for receipt of the connection member of the torque wrench, a locking member slidably mounted in a channel on the reaction arm, the locking member including an aperture sized to allow the connection member to pass therethrough, and biasing means arranged to bias the locking member into a position wherein the aperture is partially aligned with the opening The connection member has an insertion end for insertion into the opening of the reaction arm, and immediately adjacent the insertion end is a recess The recess is shaped to receive a part of the locking member

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- (71) **Applicant:** HIRE TORQUE LIMITED [GB/GB]; 45 Colbourne Avenue, Nelson Park Industrial Estate, Cramlington Northumberland NE23 1WD (GB).
- (72) **Inventor:** QUICKE, Stephen; c/o Hire Torque Limited, 45 Colbourne Avenue, Nelson Park Industrial Estate, Cramlington Northumberland NE23 1WD (GB).
- (74) **Agent:** HARGREAVES ELSWORTH; 26 Northumberland Square, North Shields Tyne and Wear NE30 1PW (GB).
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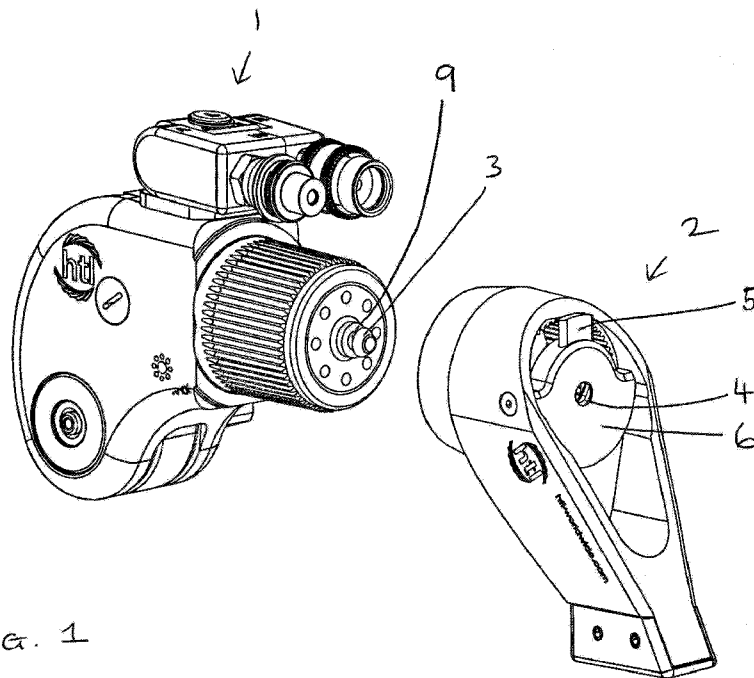
(54) **Title:** TORQUE WRENCH AND REACTION ARM ASSEMBLY

FIG. 1

(57) **Abstract:** Abstract Torque Wrench Assembly A torque wrench assembly comprises a torque wrench and a reaction arm and locking means for locking together the torque wrench and the reaction arm. The locking means comprises a connection member located on the torque wrench; an opening on the reaction arm for receipt of the connection member of the torque wrench; a locking member slidably mounted in a channel on the reaction arm, the locking member including an aperture sized to allow the connection member to pass therethrough; and biasing means arranged to bias the locking member into a position wherein the aperture is partially aligned with the opening. The connection member has an insertion end for insertion into the opening of the reaction arm, and immediately adjacent the insertion end is a recess. The recess is shaped to receive a part of the locking member.

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## **TORQUE WRENCH AND REACTION ARM ASSEMBLY**

### **FIELD OF THE INVENTION**

3           The present invention relates to torque wrenches and in particular a type  
of torque wrench mounting a reaction arm and a quick-release mechanism for locking  
together the torque wrench and reaction arm.

### **BACKGROUND OF THE INVENTION**

          Hydraulic torque wrenches are used widely, particularly in the oil and  
gas industries. Torque wrenches require some form of reaction member or reaction  
9   arm that engages with an immovable object to prevent the wrench from spinning about  
the component that is to be tightened or loosened.

          GB2524825 describes a torque wrench which couples to a reaction arm  
12   using a quick release mechanism incorporating ball bearings which locate in a groove.

          This type of quick release mechanism requires the user to depress a  
button before connecting the reaction arm to the wrench. If the button is not depressed  
15   prior to assembly this leads to improper assembly and/ or damage to the component  
parts. We have also found that this prior art locking mechanism doesn't always engage  
properly.

18           It would therefore be desirable to provide an improved torque wrench  
and an improved quick release mechanism for connection with a reaction arm.

### **SUMMARY OF THE INVENTION**

21           According to the invention there is provided a torque wrench assembly  
comprising a torque wrench and a reaction arm and locking means for locking together

the torque wrench and the reaction arm, wherein the locking means comprises:

3 a connection member having an end with an end diameter and located  
on either one of the torque wrench or the reaction arm;

6 an opening on a respective other one of the torque wrench and the  
reaction arm for receipt the end of the connection member and a locking member  
slidably mounted in a channel on said torque wrench or reaction arm, the locking  
member including an aperture sized to allow the connection member to pass  
therethrough, the aperture having a first portion with a first diameter larger than the  
9 end diameter and a second portion with a second diameter less than the end diameter;

and biasing means arranged to bias the locking member into a position  
wherein the aperture of the locking member is partially aligned with the opening;  
12 wherein the connection member includes a recess, and wherein both the locking  
member and the recess are shaped and dimensioned such that the locking member  
is a sliding fit in the recess.

15 The aperture of the locking member preferably has a chamfered edge.  
The insertion end of the connection member is preferably tapered in shape. The  
biasing means may be a spring.

18 The reaction arm may further comprise a hole into which the connection  
member locates.

21 Preferably, the connection member is located on the torque wrench and  
the locking member is located on the reaction arm.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the Drawings, which illustrate the prior art and preferred embodiments of a torque wrench according to the invention:

3                    Figure 1 is a schematic representation of a hydraulic torque wrench and a reaction arm prior to assembly;

6                    Figure 2 is a schematic representation of the assembled hydraulic torque wrench and a reaction arm of Figure 1;

9                    Figure 3 is a schematic representation of the assembled hydraulic torque wrench and a reaction arm of Figure 2, shown with the end plate of the reaction arm removed;

                    Figure 4 is a vertical cross-sectional view of the torque wrench assembly shown in Figure 2;

12                  Figure 5 is a vertical cross-sectional view of the torque wrench assembly of Figure 2 shown just prior to the engagement of the locking member;

15                  Figure 6a is a close up schematic representation of the locking means of the torque wrench assembly shown just prior to the engagement of the locking member;

18                  Figure 6b is a close up schematic representation of the locking means of the torque wrench assembly shown after the engagement of the locking member;

                    Figure 7a is a schematic representation of a locking member component part of a reaction arm;

21                  Figure 7b is a cross-sectional view of the locking member of Figure 7a, along the line A-A and

Figure 8 is a schematic representation of the reaction arm of Figure 1 with the end plate removed.

3 **DETAILED DESCRIPTION**

Figure 1 illustrates a torque wrench 1 and a reaction arm 2. The torque wrench 1 is provided with a connection member 3 and the reaction arm 2 includes an opening 12 (see Figure 7a) for receiving the connection member 3. In the illustrated embodiment the reaction arm 2 also includes a back plate 6 with a hole 4 therein, into which the connection member 3 locates, although this is not essential, for example a hollow portion inside the reaction arm would suffice for receiving the end of the connection member 3. The reaction arm 2 includes a locking member 5 which is slidably mounted in a channel 10. The locking member 5 includes an aperture 7 sized to allow the connection member 3 to pass therethrough. As shown in Figures 7a and 7b, the edge 11 of the aperture 7 is preferably chamfered. The end of the connector member 3 is preferably tapered as illustrated.

15 The locking member 5 has an upper end which protrudes from the reaction arm 2, as shown in the drawings, and a lower end which is connected to a spring 8. The spring is arranged to bias the locking member 5 towards the reaction arm 2. When the locking member 5 is at rest the aperture 7 is partially overlaps with opening for receiving the connection member 3.

21 The locking member 5 is shown in more detail in Figures 7a and 7b. The aperture is preferably roughly the shape of an inverted pear, with a first region of larger diameter and a second region of smaller diameter. The edge 11 of the aperture 7 with

which the connection member 3 first engages is preferably chamfered.

As shown in Figures 5 and 6a, when the connection member 3 of the torque wrench 1 is pushed into the opening 12 of the reaction arm 2, the end of the connection member 3 pushes down on the chamfered edge 11 of the aperture 7 which then pushes the locking member 5 downwards against the force of the spring 8. The part of the aperture 7 with larger diameter is now aligned with the opening 12, allowing the end of the connection member 3 to pass through the aperture 7 and locate in the hole 4 in the back plate 6. The connection member 3 includes a recess 9 located adjacent to the tapered end, the recessed part 9 having a diameter which is smaller than the insertion end of the connection member 3 and shaped to receive part of the locking member 5.

[0034] As shown in Figures 3, 4 and 6b, once the tapered end of the connection member 3 has passed through the aperture 7 of the locking member 5, the locking member 5 springs up automatically and locks into the recess 9 behind the end of the connection member 3 due to the force exerted by the spring. The torque wrench 1 and reaction arm 2 are now securely locked together since the aperture 7 of the locking member is not aligned with the opening 12 on the reaction arm and the two devices cannot be unlocked without some manual intervention. Figure 2 illustrates the two devices locked together. To unlock the two devices, the user simply presses down on the upper end of the locking member 5, and this causes the locking member 5 to slide towards the spring and causes the aperture 7 to fully align with the first opening allowing the connection member 3 of the torque wrench 1 to be withdrawn from the

reaction arm 2, uncoupling the two devices.

The torque wrench assembly of the invention provides an improved  
3 mechanism for securely locking together a torque wrench and a reaction arm without  
the requirement for user input prior to assembly of the two devices.

6

CLAIMS

1. A torque wrench assembly comprising a torque wrench and a  
3 reaction arm and locking means for locking together the torque wrench and the  
reaction arm, wherein the locking means comprises:

a connection member having an end with an end diameter and located  
6 on either one of the torque wrench or the reaction arm;

an opening on a respective other one of the torque wrench and the  
reaction arm for receipt the end of the connection member and a locking member  
9 slidably mounted in a channel on said torque wrench or reaction arm, the locking  
member including an aperture sized to allow the connection member to pass  
therethrough, the aperture having a first portion with a first diameter larger than the  
12 end diameter and a second portion with a second diameter less than the end diameter;

and biasing means arranged to bias the locking member into a position  
wherein the aperture of the locking member is partially aligned with the opening;

15 wherein the connection member includes a recess, and wherein both  
the locking member and the recess are shaped and dimensioned such that the locking  
member is a sliding fit in the recess.

18 2. A torque wrench assembly according to claim 1, wherein the  
aperture of the locking member has a chamfered edge.

3. A torque wrench assembly according to claim 2, wherein the end  
21 of the connection member is tapered in shape, and wherein, during connection of the  
reaction arm and the torque wrench, the chamfered edge of the aperture is

engageable with the tapered end of the connection member to move the locking member against the bias of the biasing means.

3           4.     A torque wrench assembly according to claim 1 or 2, wherein the end of the connection member is tapered in shape.

            5.     A torque wrench assembly according to any one of claims 1 to 4,  
6 wherein the biasing means is a spring.

            6.     A torque wrench assembly according to any one of claims 1 to 5,  
            wherein the connection member is located on the torque wrench and the locking  
9 member is located on the reaction arm.

            7.     A torque wrench assembly according to claim 6, wherein the  
            reaction arm has a reaction end engageable with an object and an opposite end, and  
12 wherein the locking member has a member end engageable by a user to move the  
locking member against the bias of the biasing means, the member end being  
proximate the opposite end of the reaction arm and projecting away from the reaction  
15 end.

            8.     A torque wrench assembly according to any one of claims 1 to 7,  
            wherein the aperture tapers from the first diameter to the second diameter.

18           9.     A torque wrench assembly according to any one of claims 1 to 8,  
            wherein the connection member defines a second recess having a diameter less than  
the end diameter, the second recess receiving the second portion of the aperture.

21           10.    A torque wrench assembly according to claim 9, wherein the  
            diameter of the second recess is approximately the same as the second diameter.

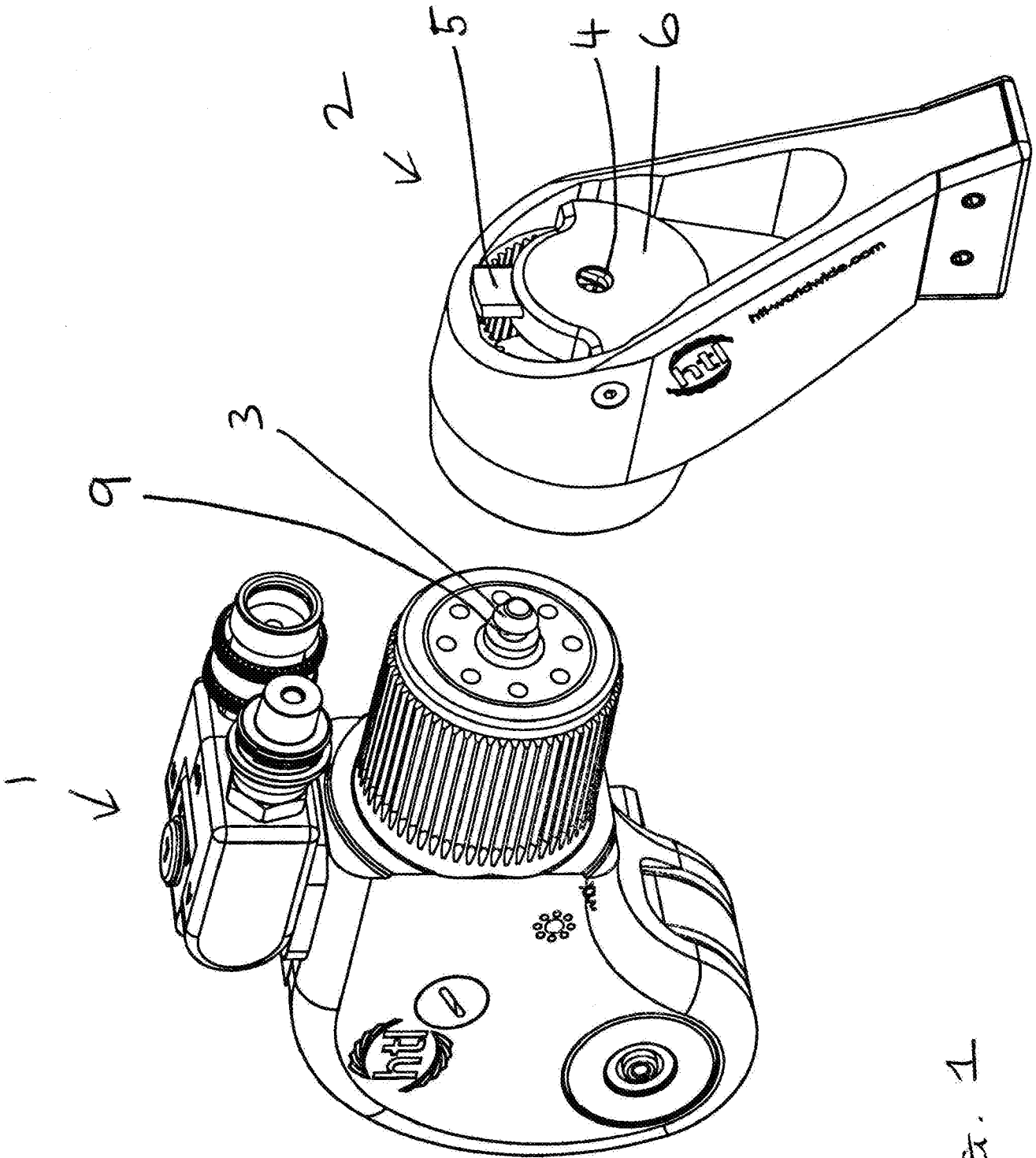


FIG. 1

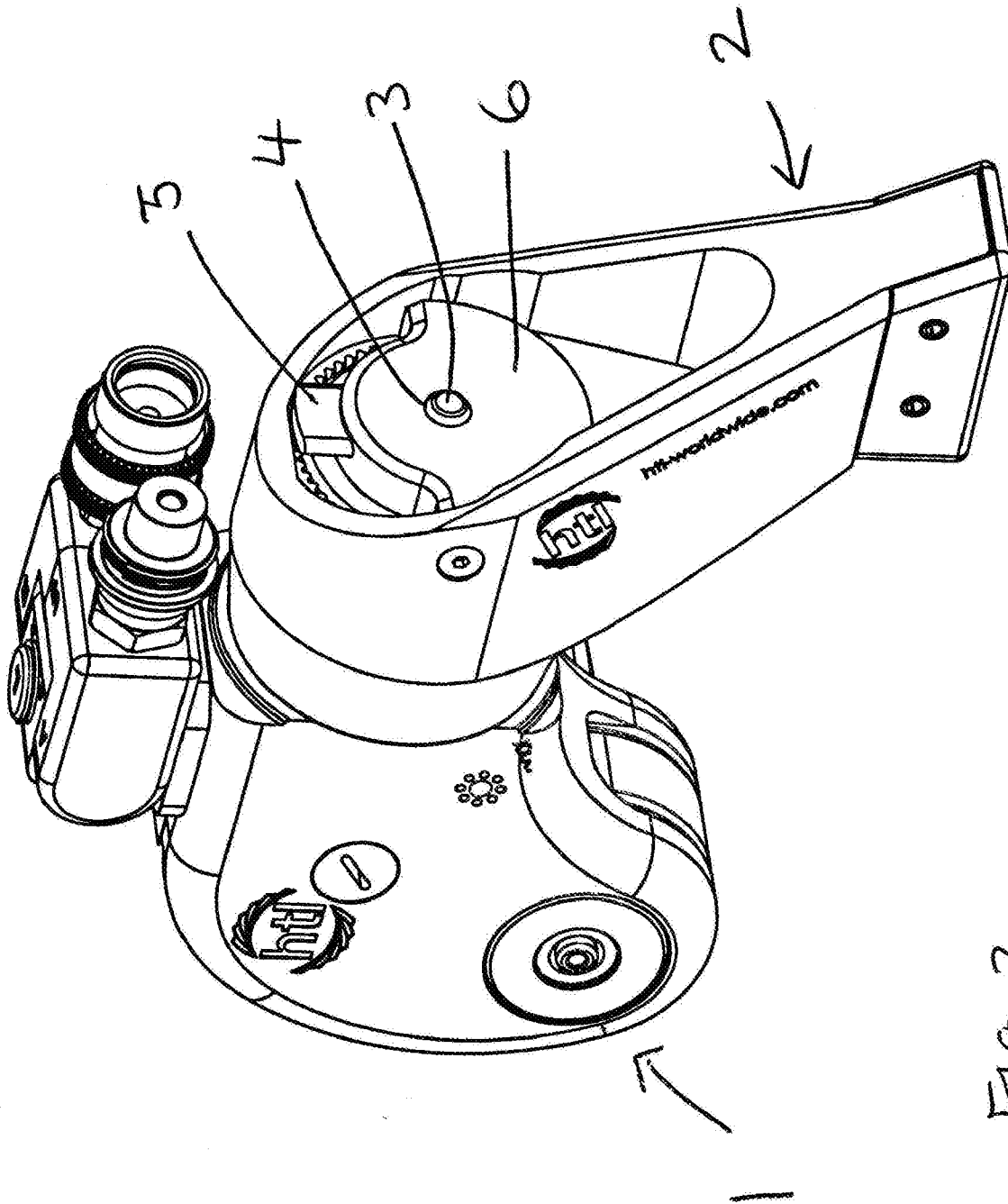


FIG. 2

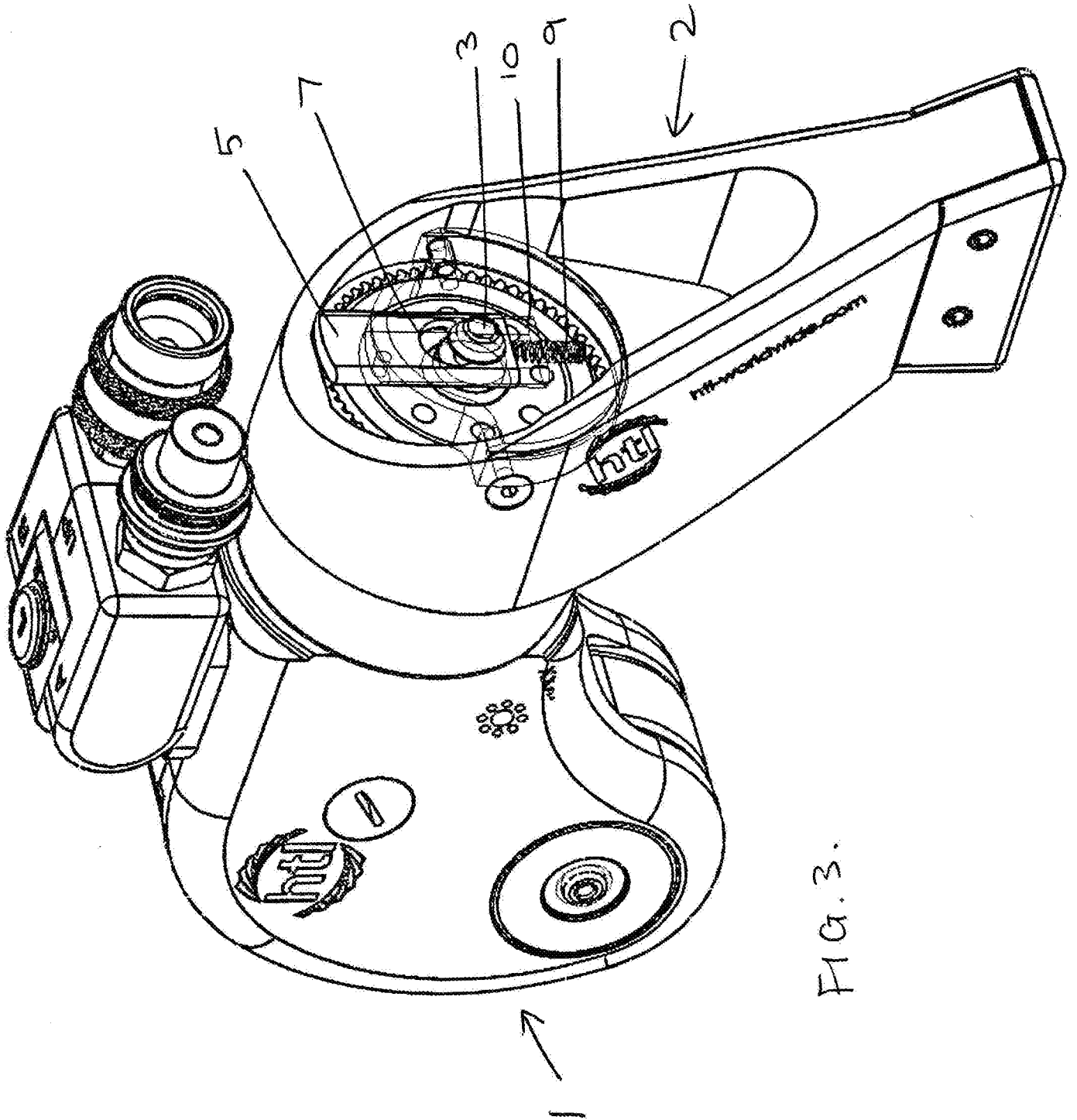


FIG. 3.

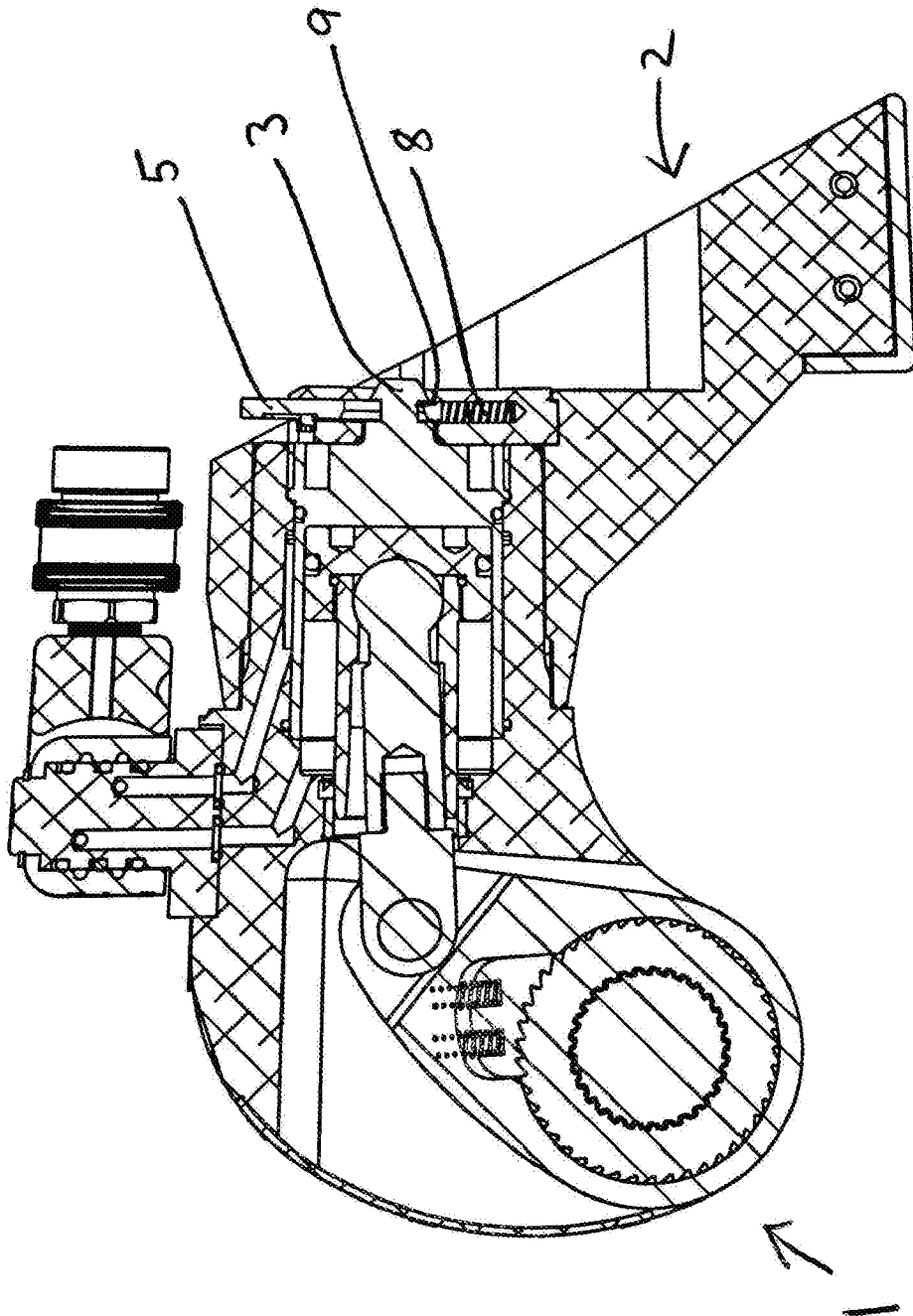


Fig. 4

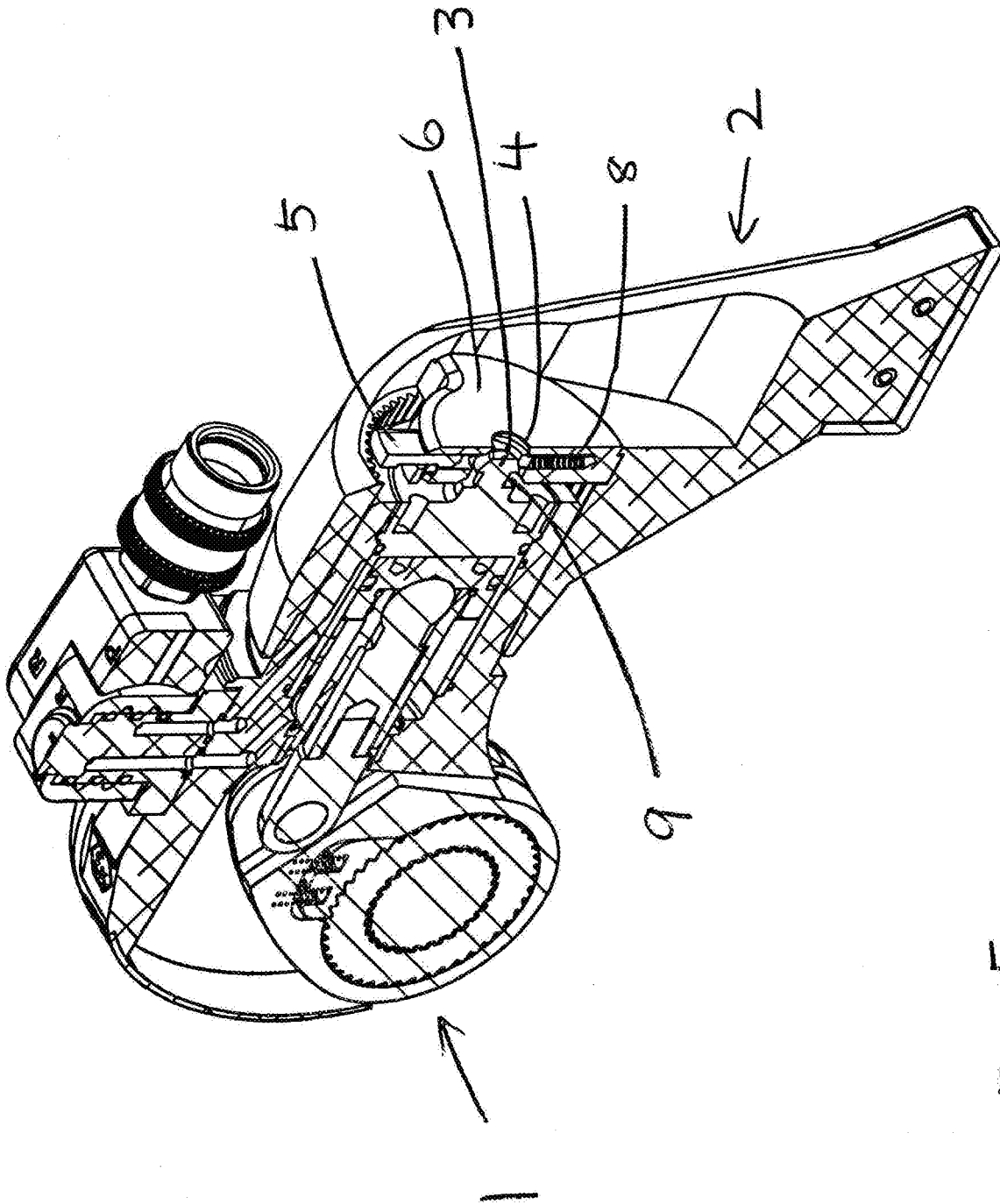


FIG. 5

FIG 6a.

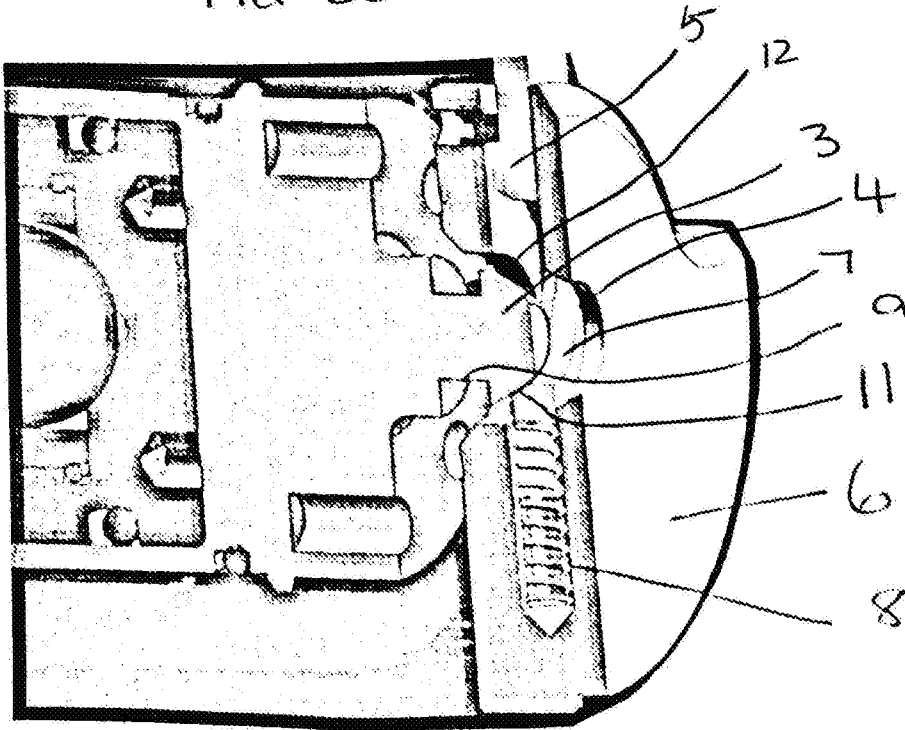
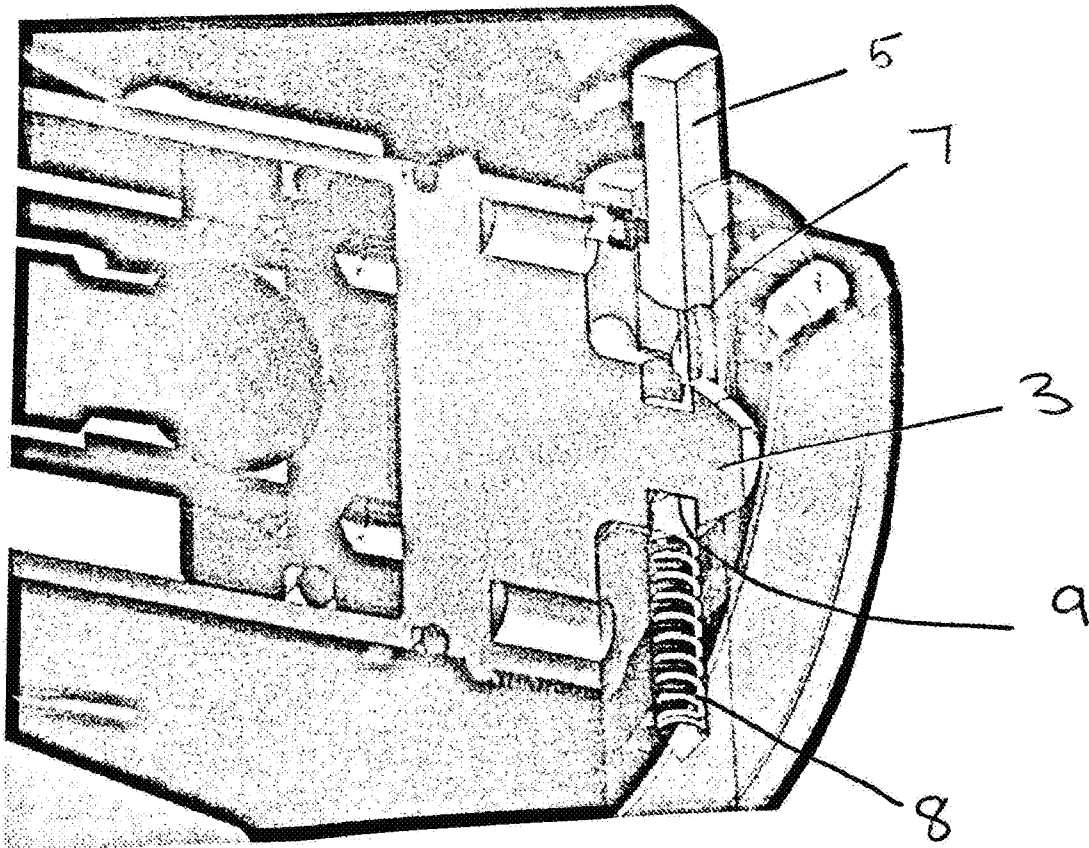


FIG 6b.



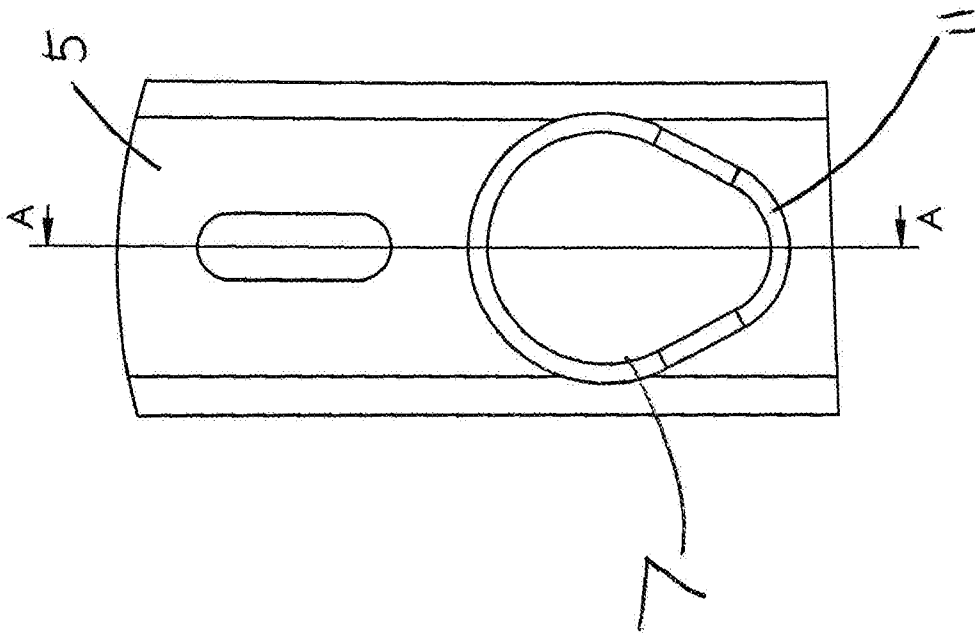


FIG. 7a

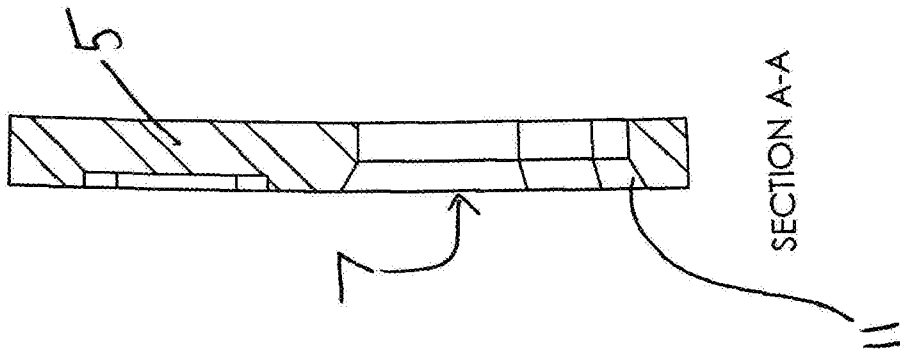


FIG. 7b.

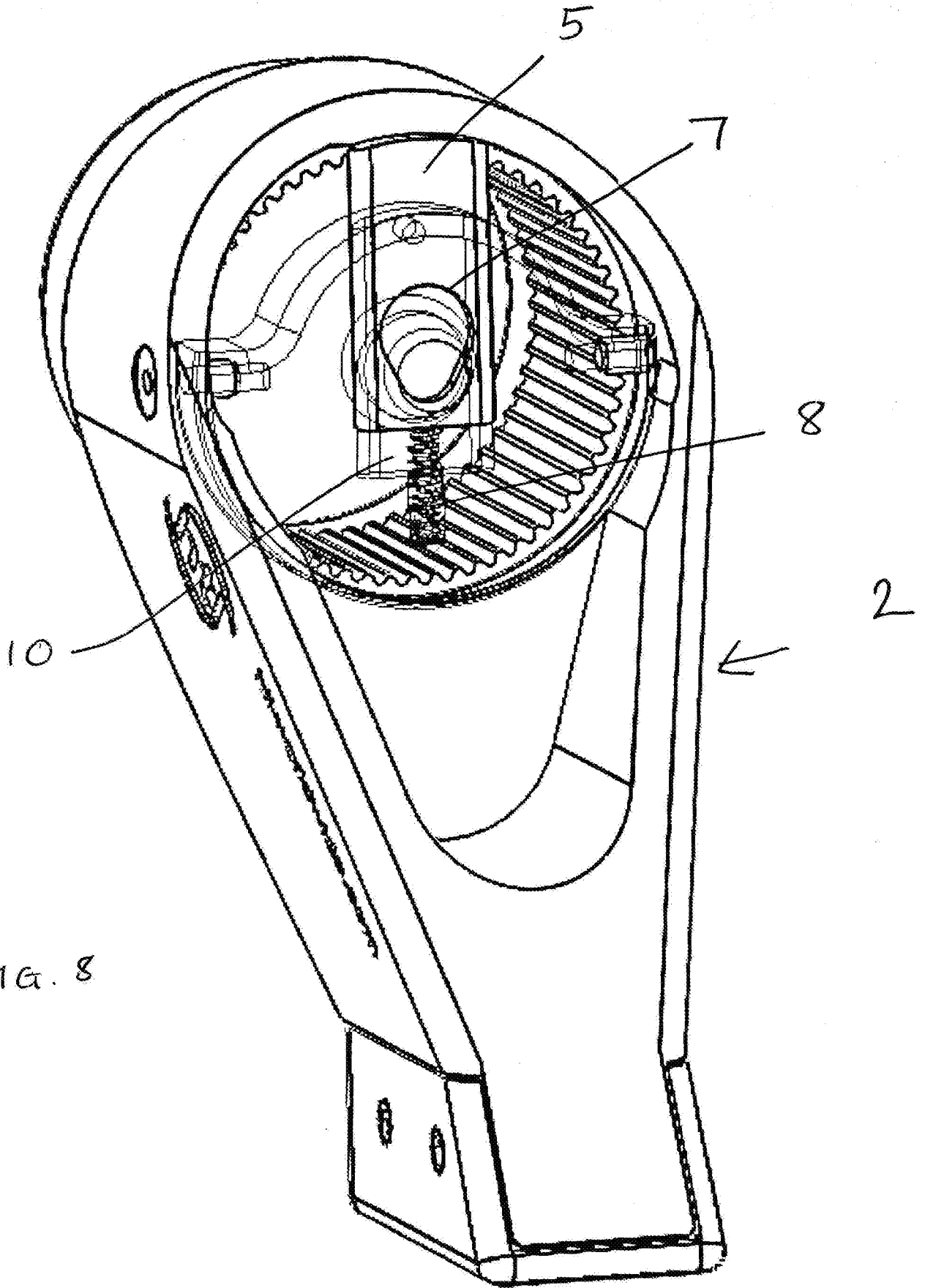


FIG. 8

