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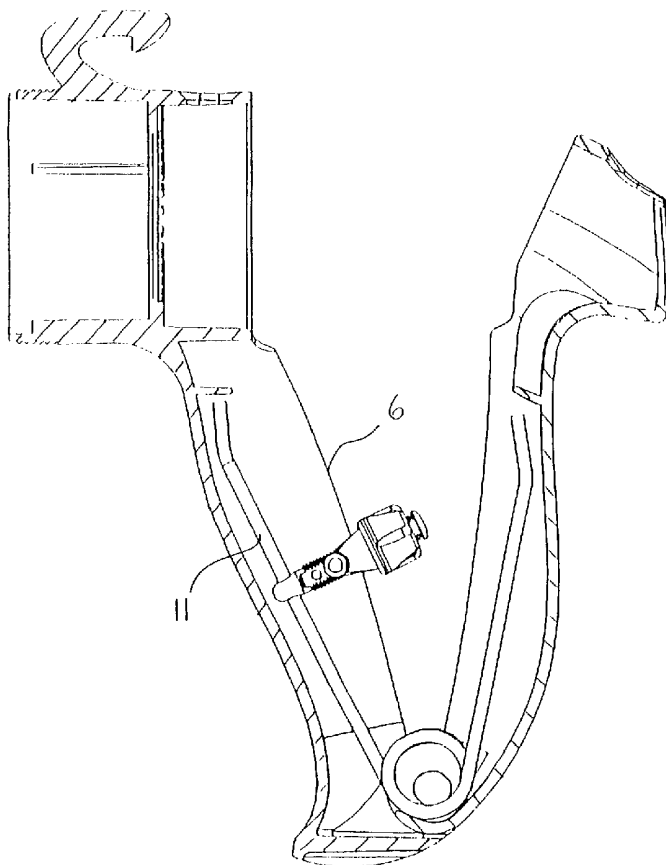
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[Continued on next page]

(54) Title: DISPENSING APPARATUS SPRING ADJUSTMENT



(57) Abstract: Dispensing apparatus where a squeezable handle assembly (1) to effect fluid expression has a torsion spring (11) provided return bias. The torsion spring is of a kind having first and second arms (11) each defined by an end of a coil, the coil being located by a pivot providing pin (21) for handle components with the second arm (11) of the spring bearing on the second handle component and the first arm (11) of the spring bearing on an adjustment mechanism (3, 4) carried by the first handle component. Preferably the adjustment mechanism comprises or includes an at least partly threaded spring engagement member (4) through which said first arm (11) of the spring is passed laterally of the thread axis, a guide (12) to slideably guide said spring engagement member (4), said guide (12) being carried by said first handle component, and a threaded member which bears on said guide (21) directly or indirectly and which threadingly engages the thread of said spring engagement member (4), and is such that adjustment of the thread interengagement varies the position of said first arm (11) of the spring relative to said first handle component.



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— *with international search report*

“DISPENSING APPARATUS SPRING ADJUSTMENT”**TECHNICAL FIELD**

The present invention relates to dispensing apparatus.

5 Dispensing apparatus of a kind for dispensing a fluid (usually a viscous liquid, whether in the form of a paste or otherwise) is well known for applying therapeutic substances into animals or onto animals. Such dispensing apparatus also have applications elsewhere, eg; for dispensing predetermined amounts of a material into, for example, a pot or the like for growing plants.

10 Dispensing apparatus of the present invention is preferably of a kind adapted for oral drenching or pour-on application of an animal remedy and/or supplement. Examples include parasiticides such as anthelmintics.

15 Whilst discharging of such fluids has been common from cartridges it is more usual for such liquid or liquid carried materials to be supplied via a conduit from a tank or pouch pack into a dispensing gun type apparatus. Such apparatus or dispensing means are typically operated by the manual squeezing of a handle which is often return biased by way of a spring member.

20 Whilst dispensing apparatus (such as that of NJ Phillips Pty Ltd of Australia) may allow adjustment of squeeze bias where it is provided by a tension spring (see their DE 19827035) we are not aware of any variant that allows adjustment where the spring providing the bias is a torsion spring.

25 It is to be noted that the applicator of our NZ503496, as do many prior art applicators (for whatsoever use they might be intended, e.g. for animal drenching purposes, grease injection, source application, or the like), have a standard spring pressure leading to a return bias to be overcome during application yet which enables recharging without external powering. Such torsion spring systems can be of a number of different forms including a simple “v” or “u” shaped spring or the torsion spring as depicted in NZ503496.

30 A disadvantage of such spring systems however (and irrespective of whether or not the spring bias is to assist discharge or to resist discharge - depending on the type of dispenser involved) is that a standard squeezing or triggering pressure is utilised that will not be appropriate for all users, i.e. the spring resistance required by a burly farmer for drenching purposes may be quite different from that which might be required of an applicator for less able bodied persons.

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The content of the complete specification of NZ503496 is hereby herein incorporated by way of reference.

The present invention is directed to apparatus allowing an adjustment of a torsion spring provided return bias to be overcome in a triggering, squeezing or the like (hereafter “squeezing”) actuation of an apparatus of any of the kinds hereinbefore described.

DISCLOSURE OF INVENTION

In a first aspect the invention consists in **apparatus** having two components to be squeezed towards each other against a torsion spring bias **characterised** in that there is provided an adjusting assembly adapted to adjust the relative position of an arm of the torsion spring relative to one of said components (hereafter “said one component”) thereby, for each adjustment of the adjustment assembly, providing a different relativity of said arm to said one component, and, as a consequence, providing a different resistance to such squeezing together of said two components.

Preferably said two components are pivoted one component to the other.

Preferably said two components are moveable relative to each other in a reproducible manner otherwise than as a consequence of pivoting of one component to the other.

Preferably said components are adapted to be squeezed together in a person’s hand.

Preferably said components are part of a fluid dispenser.

Preferably said torsion spring has two arms, one each to bear directly or indirectly (e.g. via part of said adjusting assembly) on a respective one of said components.

Preferably said adjusting assembly is adjustable by rotation of a threaded member forming part thereof.

Preferably said adjusting assembly, at least in part, is connected to said arm of the spring and is also connected to or bears on said one component.

In another aspect the invention is a **dispensing apparatus** of a kind having a squeezable handle assembly which comprises or includes first and second handle components pivoted relative to each other on a pivot axis to move upon a squeezing together of such components, against a spring return bias to cause, in use, a piston discharge of a fluid from the barrel thereof, and to move, upon at least partial release of the squeeze on the handle, to cause a piston retraction,

wherein said spring is a torsion spring having first and second arms each defined by an end of a coil, the coil being located by a pivot providing pin for the handle components that

passes on said pivot axis through the spring coil with the second arm of the spring bearing on said second handle component and the first arm of the spring bearing on an adjustment mechanism carried by the first handle component, said adjustment mechanism enabling by movement of said first arm of the spring relative to said first component a change to the return bias provided by the torsion spring for the squeezable handle.

Preferably said adjustment mechanism comprises or includes an at least partly threaded spring engagement member through which said first arm of the spring is passed laterally of the thread axis,

a guide to slideably guide said spring engagement member, said guide being carried by said first handle component, and

a threaded member which bears on said guide directly or indirectly and which threadingly engages the thread of said spring engagement member,

and wherein adjustment of the thread interengagement varies the position of said first arm of the spring relative to said first handle component.

Preferably said guide is mounted from said first handle component by a pivot having an axis parallel to said pivot axis of said first and second handle components.

Preferably said apparatus is substantially as herein described with reference to any one or more of the accompanying drawings.

In another aspect the invention is **a fluid dispenser** having a torsion spring biasing adjustment of a kind substantially as herein described with reference to any one or more of the accompanying drawings.

In another aspect the present invention consists in **an arrangement for controlling or adjusting the spring biasing apart of two components of apparatus to be squeezed together against the bias**, said method involving providing an adjusting assembly connected to one arm of the spring and connected to one component and adapted to adjust the relative position of said one arm of the spring relative to said one of said components together thereby, for each adjustment, providing a different resistance to such squeezing together or apart.

Preferably said adjusting assembly acts on one of several principles of adjustment. One such principle is that of the helical screw which would enable by rotation of for example a screw head when they are all alike such adjustment as is required. Another arrangement is a wedge or ramp like camming action which involves the sliding or other adjustment relative to the component of an adjusting member which wedges or ramps directly or indirectly (via a linkage) said one arm of the spring through a range of relative positions as before said. Yet

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another arrangement is a camming surface which acts by rotation. Yet a further arrangement is a toggle arrangement which provides at least 2 adjustment positions.

Other forms of adjustment mechanism are within the scope of the present invention.

In yet a further aspect the present invention consists in a **method of controlling or adjusting the spring biasing apart of two components**, said method being the use of apparatus as previously defined.

Or alternatively said adjusting assembly is provided by a lever.

In another aspect the present invention consists in **apparatus for association with a spring structure in a dispenser**, such apparatus having a capability of being adjusted insofar as its assembly is concerned, (e.g. by screwing or other simple adjustment means) and thereby affect the bias. Preferably the spring is of a kind having two arms adapted to be squeezed together against the spring connection thereof (preferably the spring is of a kind substantially as hereinafter described), each of said arms being adapted to engage members to be urged apart by such arms, and an assembly engaging both one of said arms and one of said members to be kept apart and capable of being adjusted so as to affect the disposition of said arm relative to the associated component and thereby to affect the pre-tensioning, pre-compressing or the like of the spring.

Preferably the apparatus for association with the arm is a threaded assembly and adjustment is by rotation of said thread or at least one member on said thread.

Preferably the adjustment assembly is of a kind substantially as hereinafter described with reference to Figures 1 through 5.

Or alternatively the apparatus for association with the arm is a ramped slide assembly and adjustment is made by sliding the apparatus.

Preferably the ramped slide assembly is of a kind substantially as hereinafter described with reference to Figures 12 to 14.

Or alternatively the apparatus for association with the arm is a lever assembly and adjustment is made by movement of the lever in the apparatus.

Preferably the lever assembly is of a kind substantially as hereinafter described with reference to Figures 15 to 17.

In still a further aspect the present invention consists in **adjustment mechanisms for a triggering or actuating assembly** of apparatus (such as dispensing apparatus) which is of a kind substantially as hereinafter described insofar as the adjustment mechanism and/or biasing means or both is concerned.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention consists in the foregoing and also envisages constructions of which the following gives examples.

A preferred form of the present invention will now be described with reference to the accompanying drawings;

Figure 1 shows in plan a preferred spring adjustor,

Figure 2 is a side elevation of the device of Figure 1,

Figure 3 is an end elevation view of the spring engagement end of the spring adjustor of Figure 1,

Figure 4 shows another end elevation view of the device of Figure 1,

Figure 5 is an exploded view of the spring adjustor of Figure 1 through 5, the device comprising (from left to right) a collar, a threaded nut or similar, and a compatibly threaded elongate member possessing an eyelet end and a flanged head end,

Figure 6 shows a drench gun in accordance with the present invention with its squeezable handle in its biased apart condition which it assumes at the end of the withdrawal of the piston in the barrel under the action of a spring within the handle structure,

Figure 7 is a perspective view of the dispensing apparatus of Figure 6 from above, the spring adjustor of Figures 1 through 5 being exposed in relation to the squeeze handle, and

Figure 8 shows a diagrammatic side view of a squeeze handle of a kind described previously, there being installed a spring adjustor which is pivot mounted through a fixed axis in the handle and slidably engaged with the left arm of the spring,

Figure 9 shows a close up view of the spring adjustor of Figure 8,

Figure 10 is a similar view to that of Figure 8, however in this case the adjustment of the spring has been made such that the left arm of the spring is now relatively closer to the right arm, such an adjustment providing greater biasing effect and than the configuration shown in Figure 8, and

Figure 11 is a close up view of the spring adjustor of Figure 10.

Figure 12 shows a side view of a squeeze handle of a kind described previously, there being installed a slide with a ramped camming surface connected by a cam following linkage to an arm of the spring,

Figure 13 shows a close up view of the slide of Figure 12, where an adjustment of the spring has been made such that the arm of the spring is now relatively closer to the other arm, such an adjustment providing greater biasing effect than the configuration shown in Figure 12,

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Figure 14 is a perspective view of the dispensing apparatus of Figures 12 and 13,

Figure 15 shows a side view of a squeeze handle of a kind described previously, there being installed a lever assembly which is pivot mounted through a fixed axis in the handle and linked to an arm of the spring,

5 **Figure 16** shows a close up view of the lever assembly of Figure 15, however in this case the adjustment of the spring has been made such that the arm of the spring is now relatively closer to the other arm, such an adjustment providing greater biasing effect than the configuration shown in Figure 15, and

10 **Figure 17** is a perspective view of the dispensing apparatus of Figure 16 with the lever assembly in place.

DETAILED DESCRIPTION

In the preferred form of the present invention where possible a majority of the components are moulded in an appropriate plastics material. If desired however, metal
15 members can be used for those likely to be subjected to abuse and requiring a degree of malleability.

As can be seen in Figures 1 through 5 the spring adjustor assembly 1 preferably comprises (from left to right) a collar member 2, an adjustment nut or similar 3, and a threaded
20 member 4.

20 The collar 2 preferably has two circular outstands 5 that mate and engage with suitably shaped rebates or holes provided for in the squeeze handle 6, the engagement providing a pivot mount support for the assembly 1 as shown in Figures 6 through 11.

25 Preferably the threaded member 3 has a helical or similar thread so as to enable mechanical screw type engagement of the adjustment nut 4. As depicted in Figure 5, the threaded member 3 possesses a flanged head 8 to prevent the nut 4 from inadvertently being removed during adjustment. The other end 9 is characterised by an eyelet or hole 10 which is made through the diameter, the hole 10 being preferably circular but otherwise suitably shaped to engage the spring arm 11 of the squeeze handle 6 as shown in Figures 6 through 11.

30 The adjustment nut 4 is preferably of the type shown in Figures 1 through 5, there being a plurality of flanges 12 around the circumference to assist with the manual adjustment of the spring resistance.

In the arrangement shown in Figure 8 the spring adjustor has been configured to the most relaxed setting, this state being characterised by the relative separation of the arms of the

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springs (with reference to Figure 10). Thus as the adjustment is made to the more relaxed configuration of Figure 8 the force or effort required to operate the squeeze handle is minimized accordingly.

By contrast the configuration shown in Figures 10 and 11 depict the least relaxed state, the relative degree of separation of the arms of the spring being less than that shown in Figure 8. Accordingly the force or effort required to operate the squeeze handle in the arrangement shown in Figure 10 is relatively greater than the force required in the arrangement shown in Figure 8.

The preferred form of the present invention, the spring adjuster is positioned as shown in Figures 6 through 11, the pivot axis of the spring adjuster being approximately half way down the length of the handle. While not shown the present invention also envisages alternative embodiments where one or perhaps two spring adjustors of the type depicted in Figures 1 through 5 might be engaged with either one or both spring arms.

As can be seen in Figures 12 through 14 the ramp or wedge assembly 13 has a slidable camming surface 14, suitably shaped receiving means 15, and linkage 16 to the arm of the spring. As depicted in Figure 14 the linkage 16 has a portion 17 that slidably moves along the camming surface 14 as that surface moves to engage in the receiving means 15.

In the arrangement shown in Figure 12 the slide 13 has been configured to the most relaxed setting, as it is correspondingly depicted in Figure 8. The configuration of the slide 13 in Figure 13 is similar to that shown in Figure 10.

As can be seen in Figures 15 through 17 the lever assembly 18 comprises a toggle 19, a linkage 20 and a pivot pin 21. As depicted in Figures 15 and 16 as the toggle 18 is moved from the position in Figure 15 in direction A the linkage 20 moves in an upwards manner relative to said toggle 19 such that the pivot pin 21 is in a raised position within the head of the toggle 18. In the arrangement shown in Figure 15 the lever assembly 18 has been configured to the most relaxed setting, this state being characterised by the relative separation of the arms of the springs (with reference to Figure 16). Thus as the adjustment is made to the more relaxed configuration of Figure 15 the force or effort required to operate the squeeze handle is minimized accordingly.

By contrast the configuration shown in Figure 16 depicts the least relaxed state, the relative degree of separation of the arms on the spring being less than that shown in Figure 15. Accordingly the force of effort required to operate the squeeze handle in the arrangement

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shown in Figure 16 is relatively greater than the force required in the arrangement shown in Figure 15

Persons skilled in the art will appreciate therefore how the present invention provides an alternative to other adjustment features in dispensing guns.

WHAT WE CLAIM IS:

1. **Apparatus** having two components to be squeezed towards each other against a torsion spring bias **characterised** in that there is provided an adjusting assembly adapted to adjust the relative position of an arm of the torsion spring relative to one of said components (hereafter "said one component") thereby, for each adjustment of the adjustment assembly, providing a different relativity of said arm to said one component, and, as a consequence, providing a different resistance to such squeezing together of said two components.

2. Apparatus as claimed in claim 1 wherein said two components are pivoted one component to the other.

3. Apparatus as claimed in claim 1 wherein said two components are moveable relative to each other in a reproducible manner otherwise than as a consequence of pivoting of one component to the other.

4. Apparatus of any one of the preceding claims wherein said components are adapted to be squeezed together in a person's hand.

5. Apparatus as claimed in any one of the preceding claims wherein said components are part of a fluid dispenser.

6. Apparatus of any one of the preceding claims wherein said torsion spring has two arms, one each to bear directly or indirectly (e.g. via part of said adjusting assembly) on a respective one of said components.

7. Apparatus as claimed in any one of the preceding claims wherein said adjusting assembly is adjustable by rotation of a threaded member forming part thereof.

8. Apparatus as claimed in any one of the preceding claims wherein said adjusting assembly, at least in part, is connected to said arm of the spring and is also connected to or bears on said one component.

9. **Dispensing apparatus** of a kind having a squeezable handle assembly which comprises or includes first and second handle components pivoted relative to each other on a pivot axis to move upon a squeezing together of such components, against a spring return bias to cause, in use, a piston discharge of a fluid from the barrel thereof, and to move, upon at least partial release of the squeeze on the handle, to cause a piston retraction,

wherein said spring is a torsion spring having first and second arms each defined by an end of a coil, the coil being located by a pivot providing pin for the handle components that passes on said pivot axis through the spring coil with the second arm of the spring bearing on said second handle component and the first arm of the spring bearing on an adjustment

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mechanism carried by the first handle component, said adjustment mechanism enabling by movement of said first arm of the spring relative to said first component a change to the return bias provided by the torsion spring for the squeezable handle.

10. Apparatus as claimed in claim 9 **wherein** said adjustment mechanism comprises or
5 includes

an at least partly threaded spring engagement member through which said first arm of the spring is passed laterally of the thread axis,

a guide to slideably guide said spring engagement member, said guide being carried by said first handle component, and

10 a threaded member which bears on said guide directly or indirectly and which threadingly engages the thread of said spring engagement member,

and wherein adjustment of the thread interengagement varies the position of said first arm of the spring relative to said first handle component.

11. Apparatus as claimed in claim 10 wherein said guide is mounted from said first handle
15 component by a pivot having an axis parallel to said pivot axis of said first and second handle components.

12. Apparatus as claimed in any one of the preceding claims substantially as herein described with reference to any one or more of the accompanying drawings.

13. A fluid dispenser having a torsion spring biasing adjustment of a kind substantially as
20 hereinbefore described with reference to any one or more of the accompanying drawings.

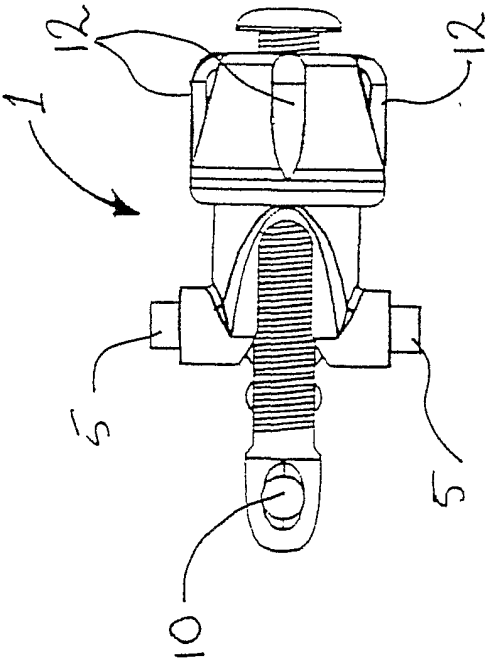


FIGURE 1

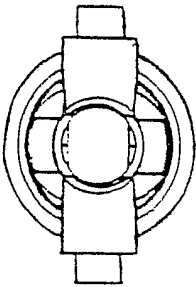


FIGURE 3

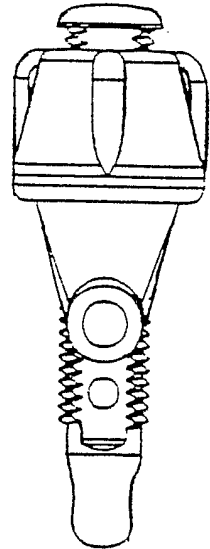


FIGURE 2

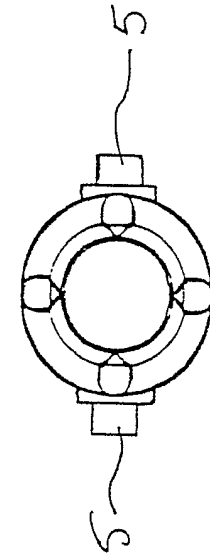
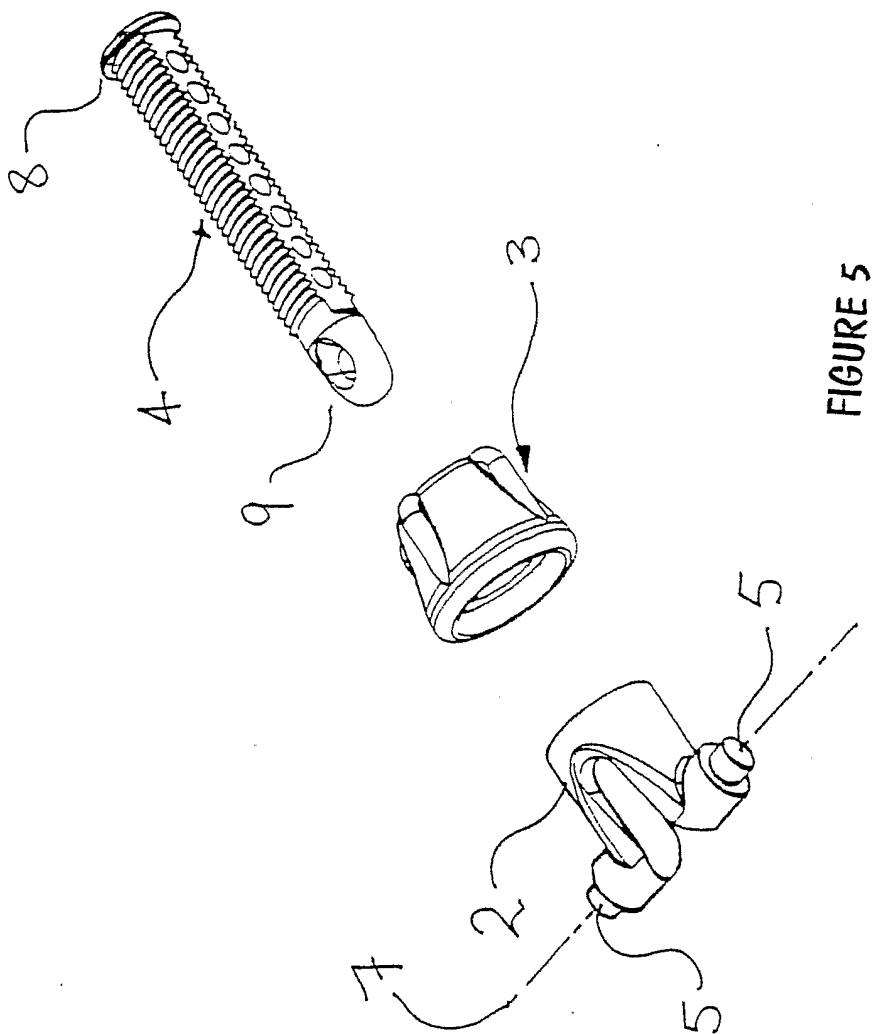


FIGURE 4



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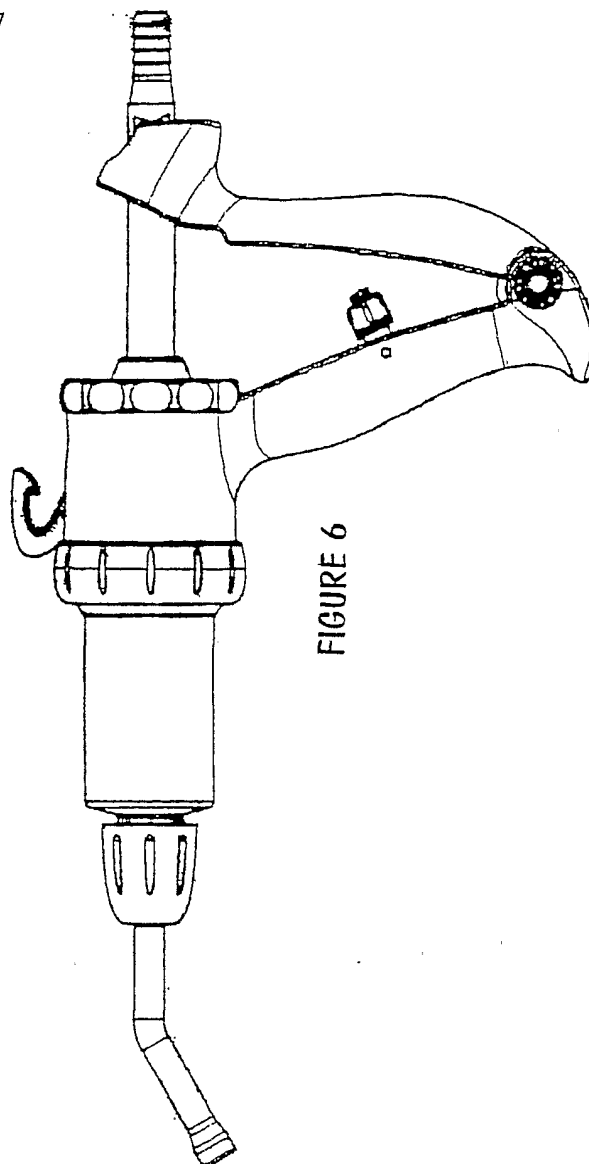


FIGURE 6

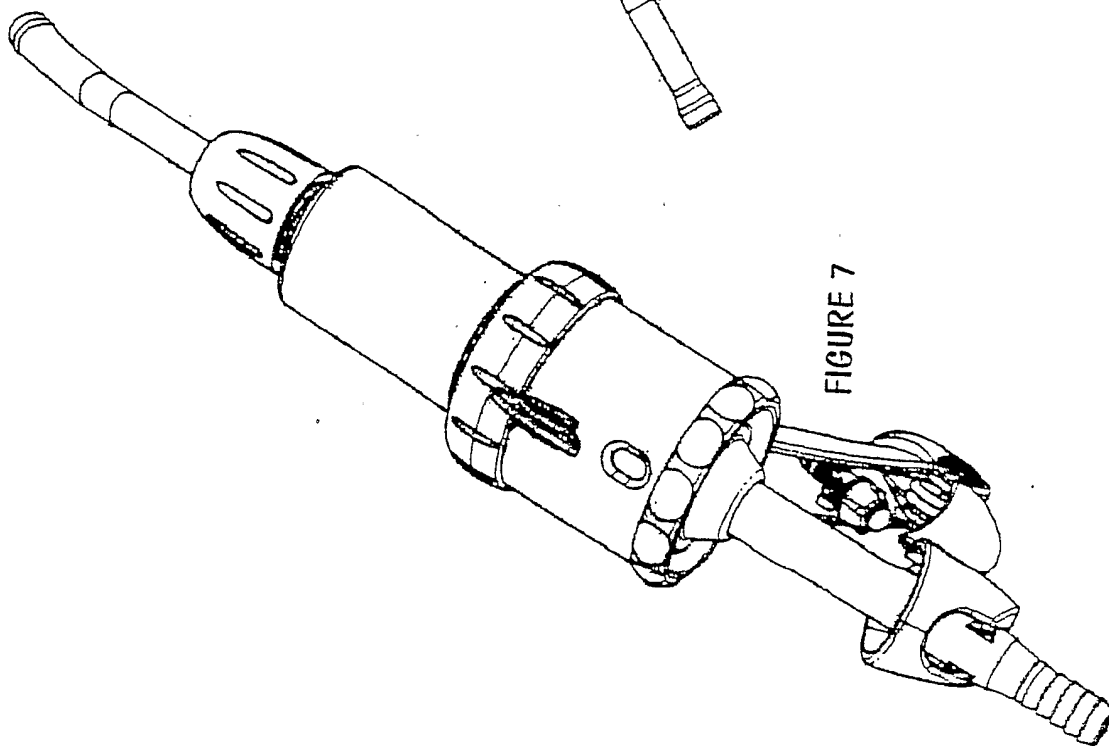


FIGURE 7

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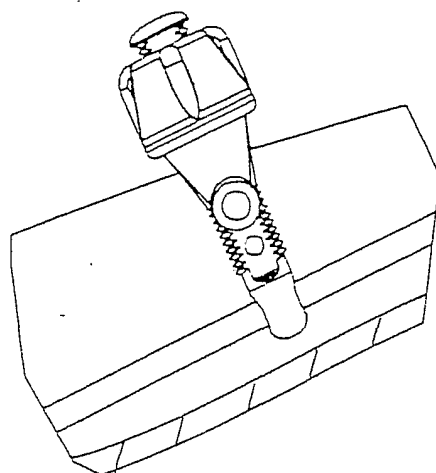


FIGURE 9

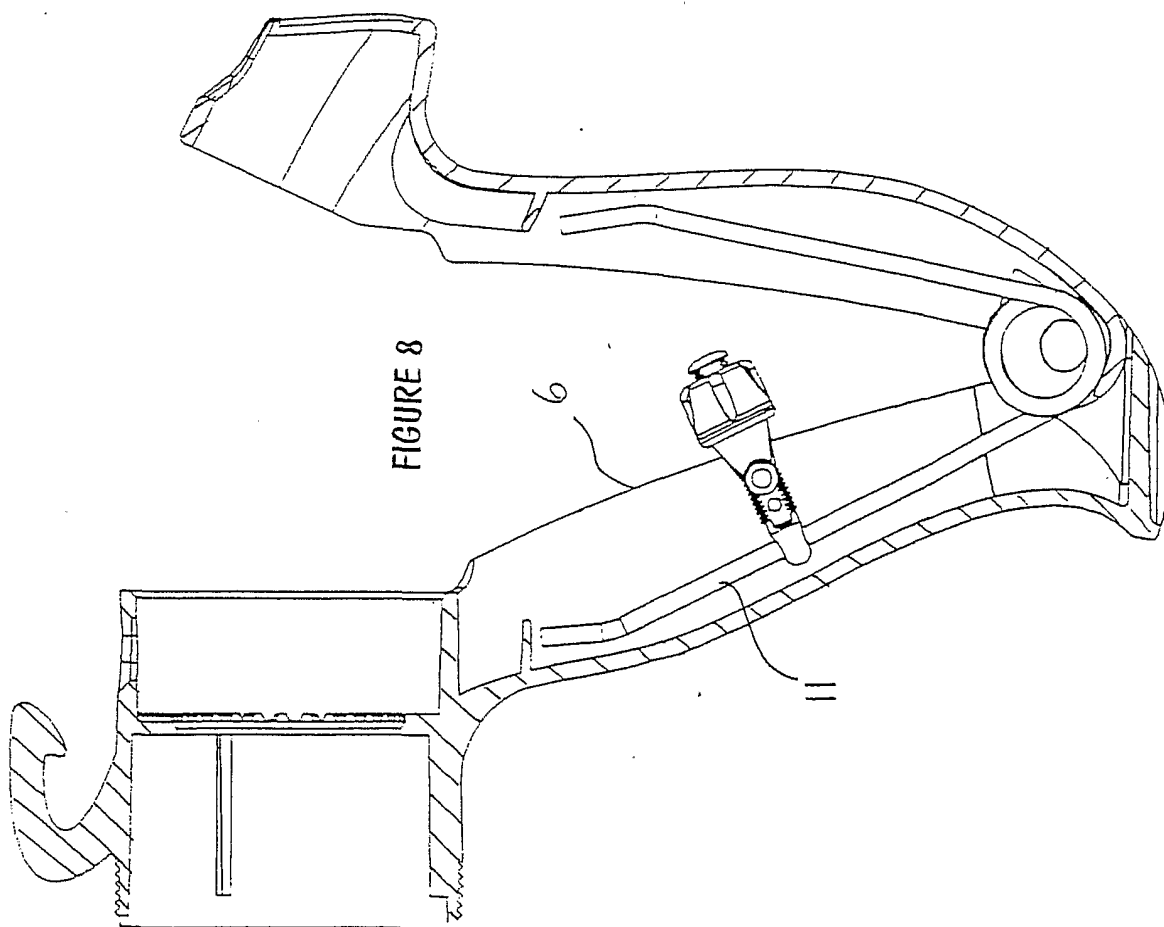


FIGURE 8

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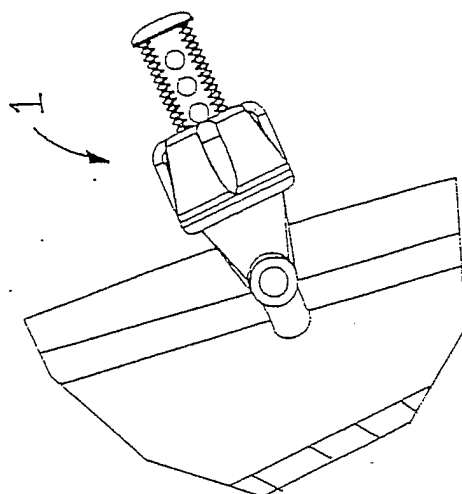


FIGURE 11

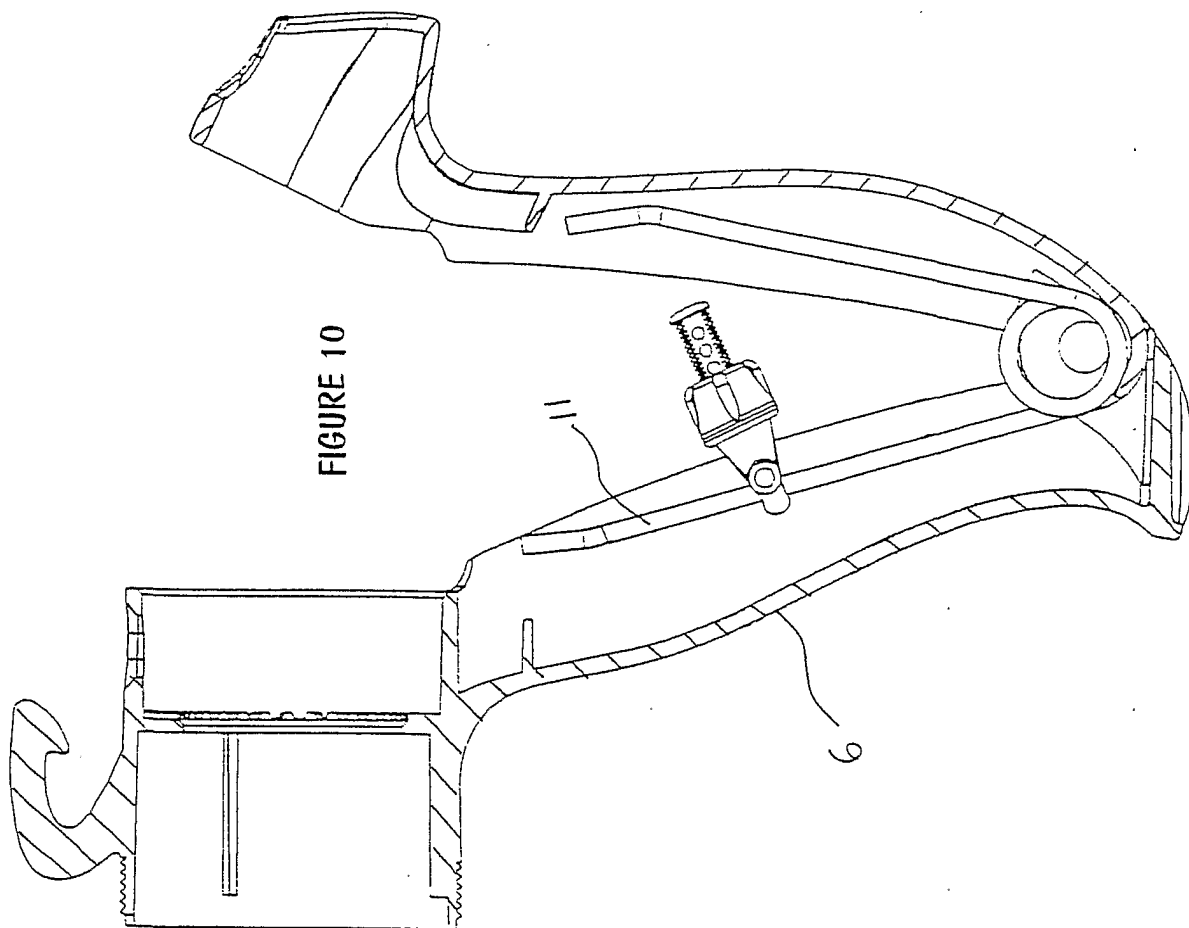


FIGURE 10

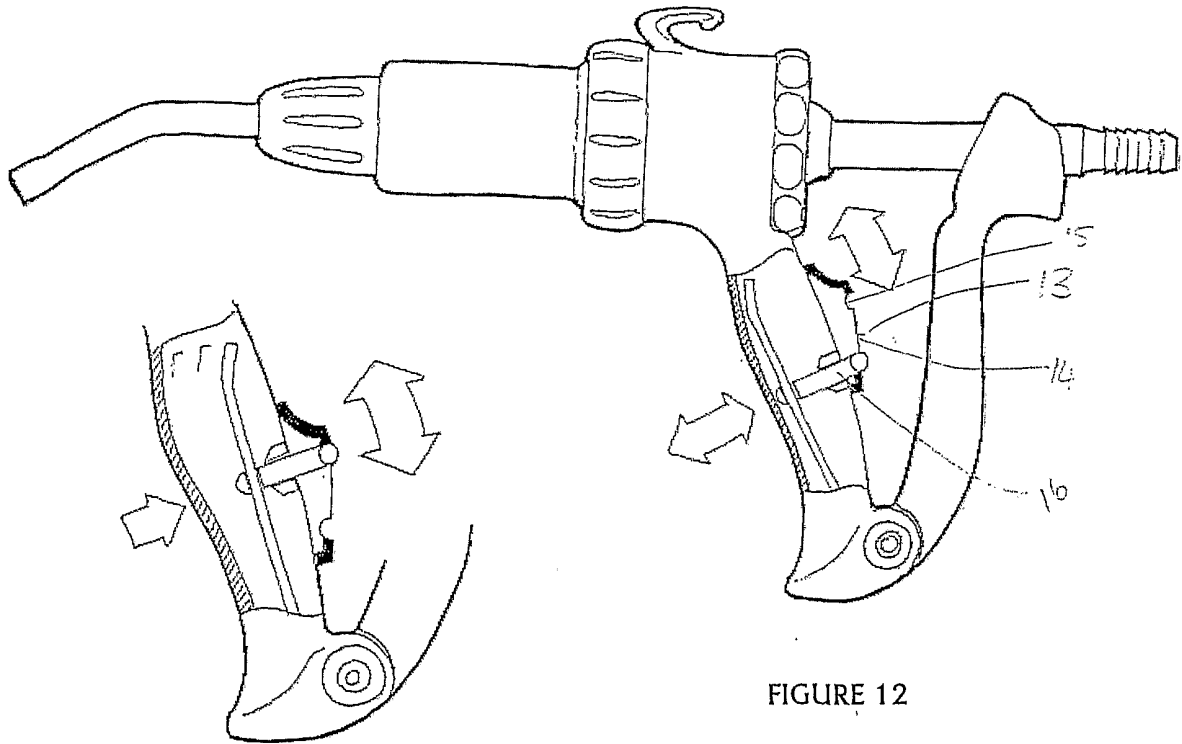


FIGURE 12

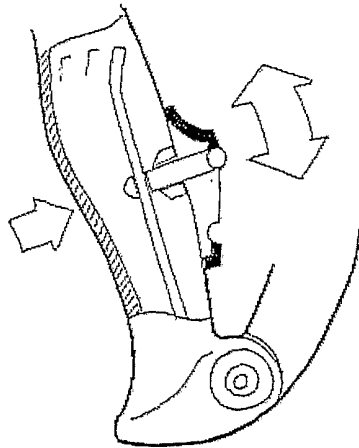


FIGURE 13

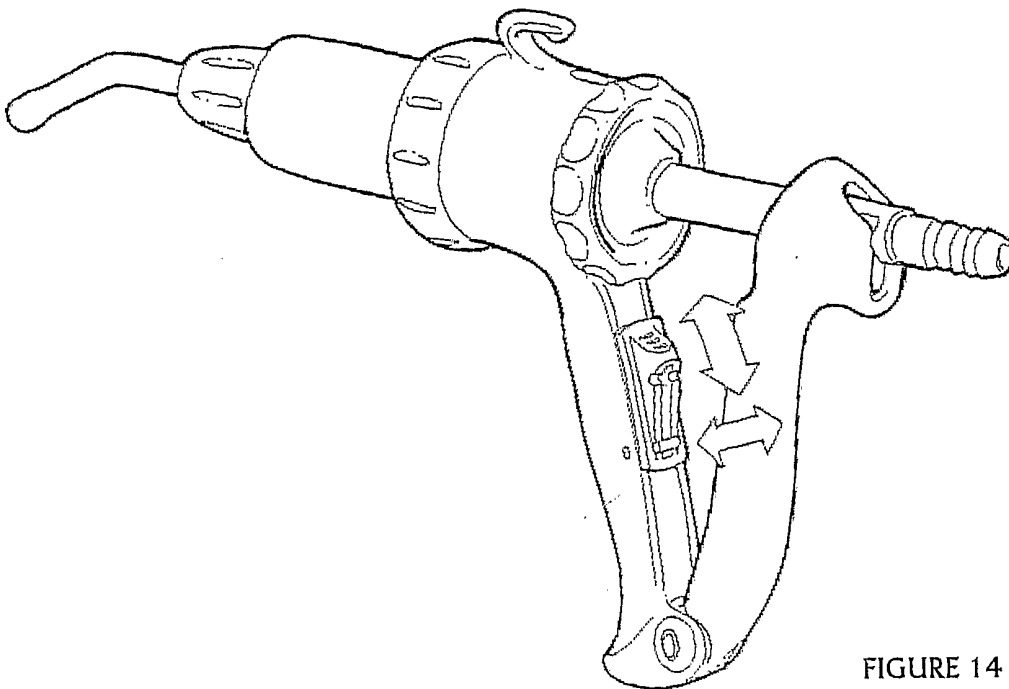


FIGURE 14

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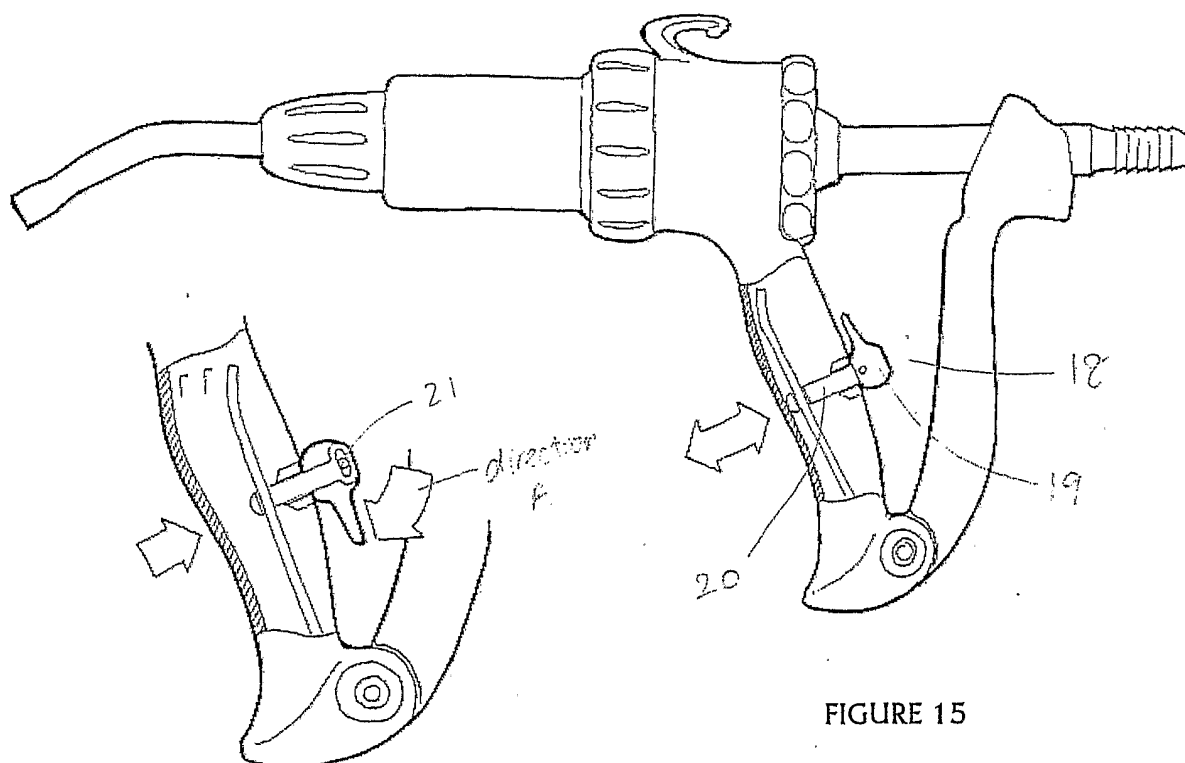


FIGURE 15

FIGURE 16

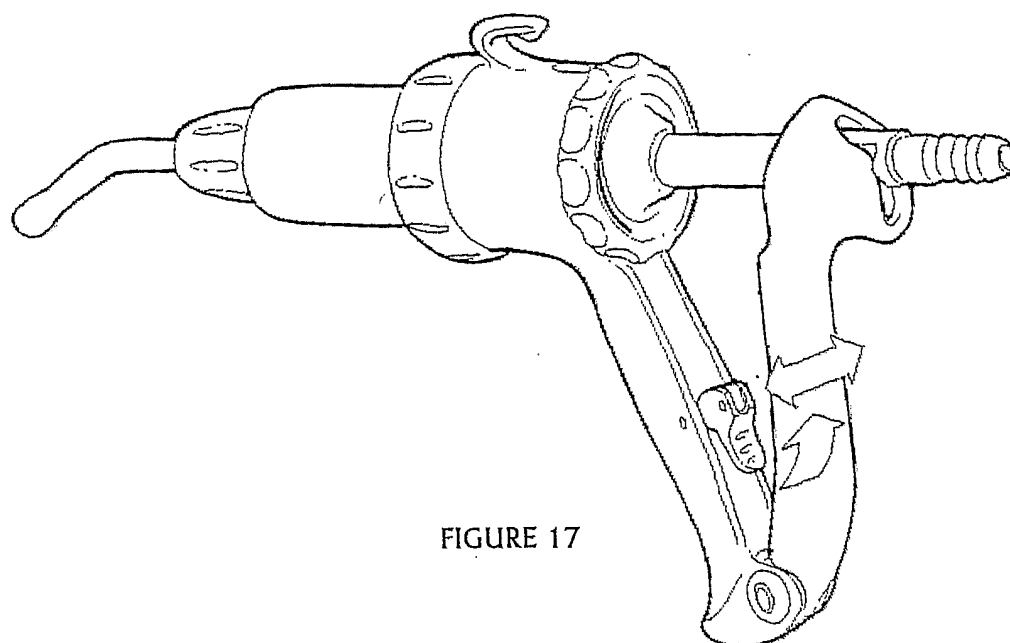


FIGURE 17

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ01/00122

A. CLASSIFICATION OF SUBJECT MATTERInt. Cl. ⁷: B05C 17/005

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Refer to Electronic database consulted below

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI: IPC B05B 9/-, 11/-, B05C 17/-, 11/-, 5/-, F16N 3/12, E04 21/30, A01K 13/00, 29/00, A61D 7/00, B67D 5/-, B65D 83/-, G01F 11/- & keywords: spring, squeeze, handle, adjust, meter, torsion, and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4406654 A (BRISTOW) 27 September 1983 Whole document	1-13
X	US 4090639 A (CAMPBELL ET AL) 23 May 1978 Whole document	1-13
Y	US 4566610 A (HERB) 28 January 1986 Whole document	1-13

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Date of the actual completion of the international search
28 August 2001

Date of mailing of the international search report

13 SEPTEMBER 2001

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Y	GB 2329941 A (N J PHILLIPS PTY LIMITED) 7 April 1999 Whole document	1-13
Y	DE 3808641 A (GALAC ET AL) 17 November 1988 Whole document	1-13

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Patent Document Cited in Search Report		Patent Family Member					
US	4406654	NONE					
US	4090639	AU	33206/78	GB	1591495	NZ	186429
		ZA	7800839				
US	4566610	CH	663733	DE	3234250	FR	2532862
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