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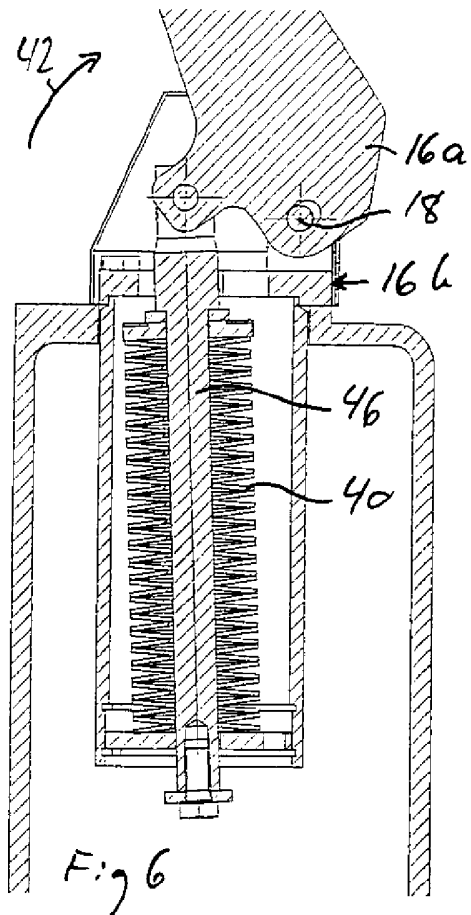
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(54) Benævnelse: **A decanter centrifuge with a hinged lid**

(57) Sammendrag:

A centrifuge housing has a lid with a hinge with two hinge parts (16a, 16b) and a horizontal hinge axis (18). The lid is able to rotate (42) between a closed position, in which the lid's centre of gravity is positioned on one side of a vertical plane through the hinge axis, and a fully opened position, in which the centre of gravity is positioned on the other side of the vertical plane. A longitudinal spring (40) is connected to a connection member (46) for urging it longitudinally. The connection member (46) is connected at a hinge point (48) at a distance from the hinge axis (18). The spring (40) assists raising the lid initially during opening and closing the lid initially during closing from the fully opened position. The lid has a position of stable equilibrium in an intermediate position between the closed position and a vertical position.

fortsættes



## P A T E N T   C L A I M S

1. A centrifuge (2) comprising a drum (4) with a axis (6) of rotation and a housing (10) for the drum (4), said housing (10) comprising a lower part (12) and a lid (14), the lid being attached to the lower part (12) by at least one hinge (16) comprising two hinge parts (16a, 16b) one of which is connected to the lid (14) and one of which is connected to the lower part (12), said hinge (16) having a horizontal hinge axis (18), whereby the lid (14) is able to rotate around the hinge axis (18) between a closed position, in which a centre of gravity ( $c_g$ ) of the lid is positioned on a proximal side (20) of a vertical plane (22) through the hinge axis (18), and a fully opened position, in which the centre of gravity ( $c_g$ ) is positioned on a distal side (24) of the vertical plane (22) through the hinge axis, the lid being provided with a handle (36) for manually opening the lid, at least one spring unit (40) being attached to the hinge for assisting raising of the lid (14) during opening, the spring unit (40) being a longitudinal spring unit having a longitudinal direction (44), the spring unit (40) being connected to a connection member (46) for urging the connection member in the longitudinal direction (44), the connection member (46) being connected to one of the hinge parts (16A) at a hinge point (48) at a distance from the hinge axis (18), the spring unit having a neutral extension in which it is not urging the connection member (46) in the longitudinal direction (44), when the lid (14) is in an intermediate position between its closed position and its fully opened position, the spring unit being stressed away from its neutral extension to urge the connection member (46) in the longitudinal direction and thus the lid in a direction towards the fully opened position, when the lid (14) is in the closed position, characterized in that the connection member (46) is connected to the spring unit (40) to stress it during at least a final part of the lids (14) rotation around the hinge axis (18) to the fully opened position, whereby the spring unit (40) will urge the lid (14) through the connection member (46) in a direction from the fully opened position towards the closed position, when the lid is in the fully opened position, and that the lid (14) has a position of stable equilibrium in an intermediate position of the lid between the

closed position and a vertical position, in which the centre of gravity ( $c_g$ ) is positioned vertically above the hinge axis (18).

2. A centrifuge according to claim 1, characterized in that the centrifuge is a decanter centrifuge (2) and the drum (4) has a horizontal axis (6) of rotation.

3. A centrifuge according to claim 1 or 2, characterized in that at least a part of the connection member (46) connected to the hinge part (16A) is shiftable between limits (72, 74) relative to a force transferring interface (66, 68) between the connection member (46) and the spring unit (40), when the spring unit is in a position, in which is has its neutral extension.

4. A centrifuge according to any of claims 1 to 3, characterized in that a vertical plane (49) parallel to the hinge axis and passing through the hinge point (48, when the lid (14) is in its closed position, is located between the centre of gravity ( $C_G$ ) of the lid and the hinge axis (18), and that the hinge (16) allows limited vertical movement of the lid (14) in the closed position.

5. A centrifuge according to any of claims 1 to 4, characterized in that the spring unit (40) is a mechanical spring unit, that the connection member (46) extends beyond a longitudinal extension of the spring unit (40), that the spring unit (40) is confined at its longitudinal ends between first abutments (56, 70b), which are fixed relative to the second of the hinge parts (16b), and that the connection member (46) comprises second abutments (72, 74) for compressing the spring unit (40) from either longitudinal end thereof.

6. A centrifuge according to claim 5, characterized in that the mutual distances between the first abutments (56, 70b) and the second abutments (72, 74), respectively, are different.

7. A centrifuge according to any of claims 1 to 6, characterized in that the spring unit (40) is hollow, and that the connection member (46) extends through the spring unit (40).

8. A centrifuge according to claim 7, characterized in that the spring unit (40) comprises a stack of Belleville washers.

9. A centrifuge according to any of claims 5 to 8, characterized

terized in that a washer element (66, 68) is provided at one of the longitudinal ends of the spring unit (40), the spring unit (40) abutting the washer element (66, 68), that the connection member (46) is passing through the washer element (66, 68), the connection member (46) being longitudinally slidable relative to the washer element (66, 68), that a second abutment (72, 74) is engagable with the washer element (66, 68), and that a stop (56, 70b) is provided restricting movement of the washer element (66, 68) in a longitudinal direction away from the spring unit (40), the stop thus providing a first abutment.

10 10. A centrifuge according to claim 9, characterized in that a washer element (66, 68) is provided at either longitudinal end of the spring unit (40).

11. A centrifuge according to claim 9 or 10, characterized in that the washer element (68) at the longitudinal end of the spring unit opposite the hinge point (48) is movable in the longitudinal direction between two stops (70a, 70b).

12. A centrifuge according to any of claims 1 to 4, characterized in that the connection member (46) is connected to a piston (80) of a pneumatic or hydraulic cylinder assembly (78) providing the spring unit.

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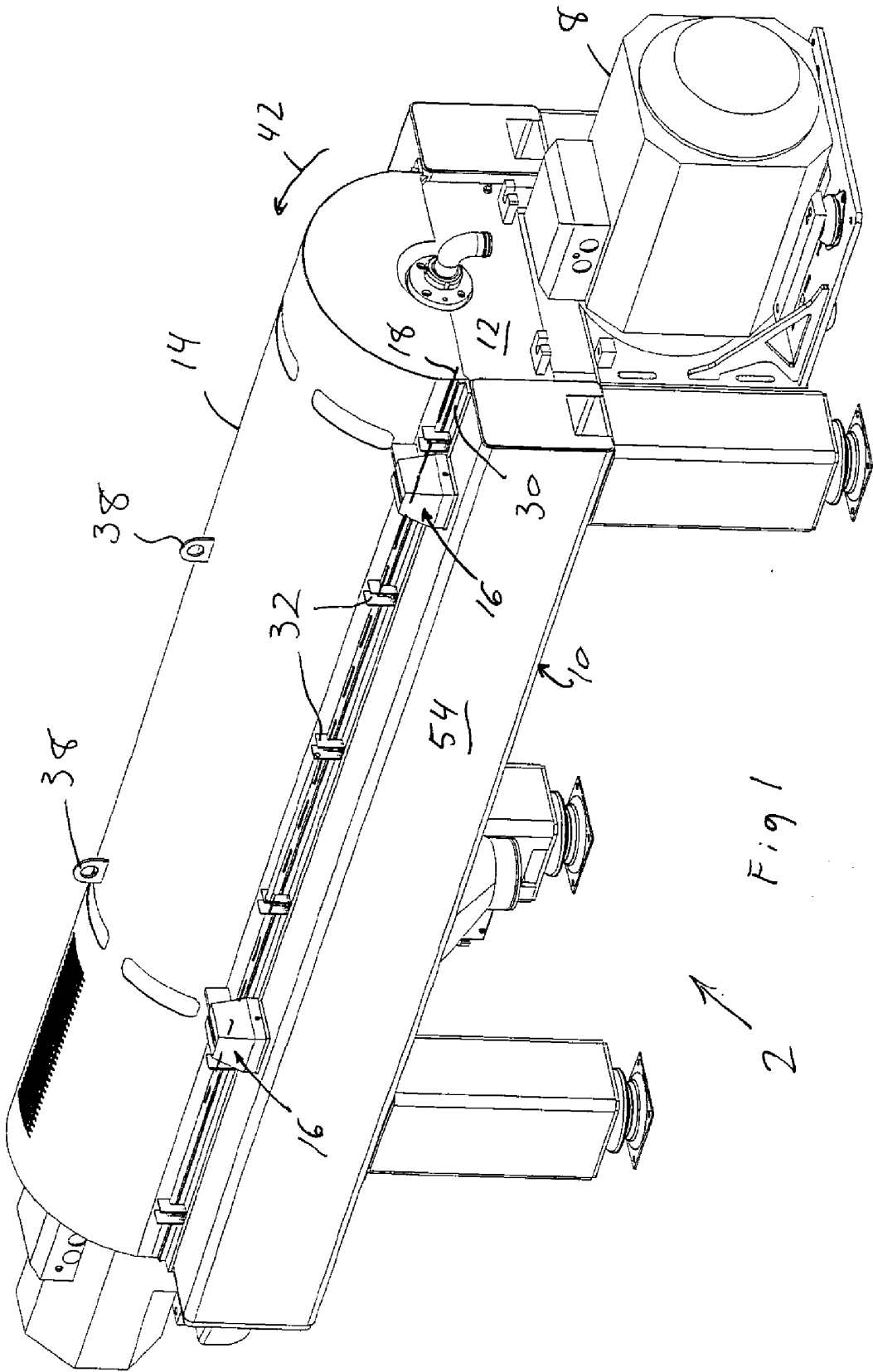


Fig 1  
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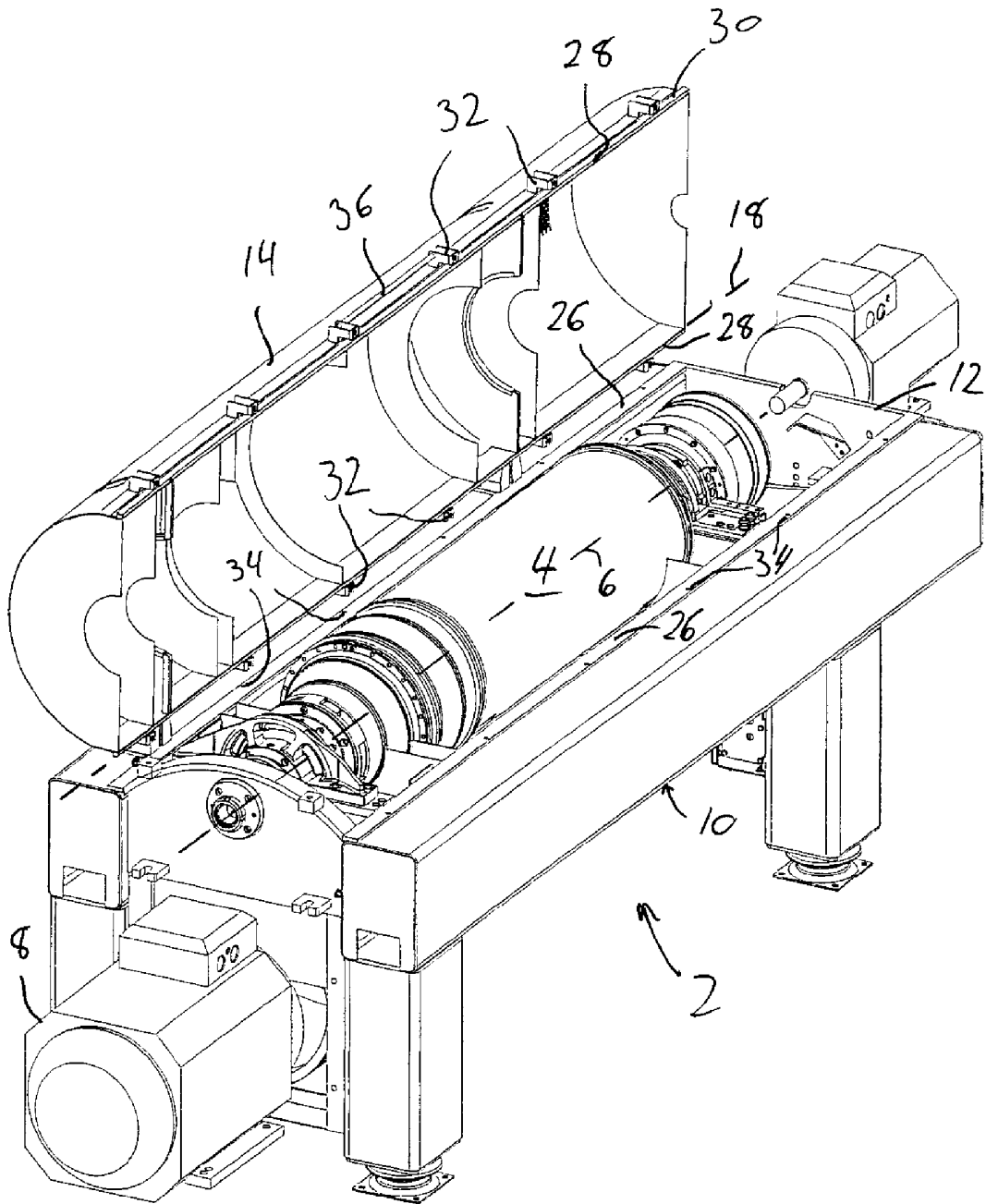
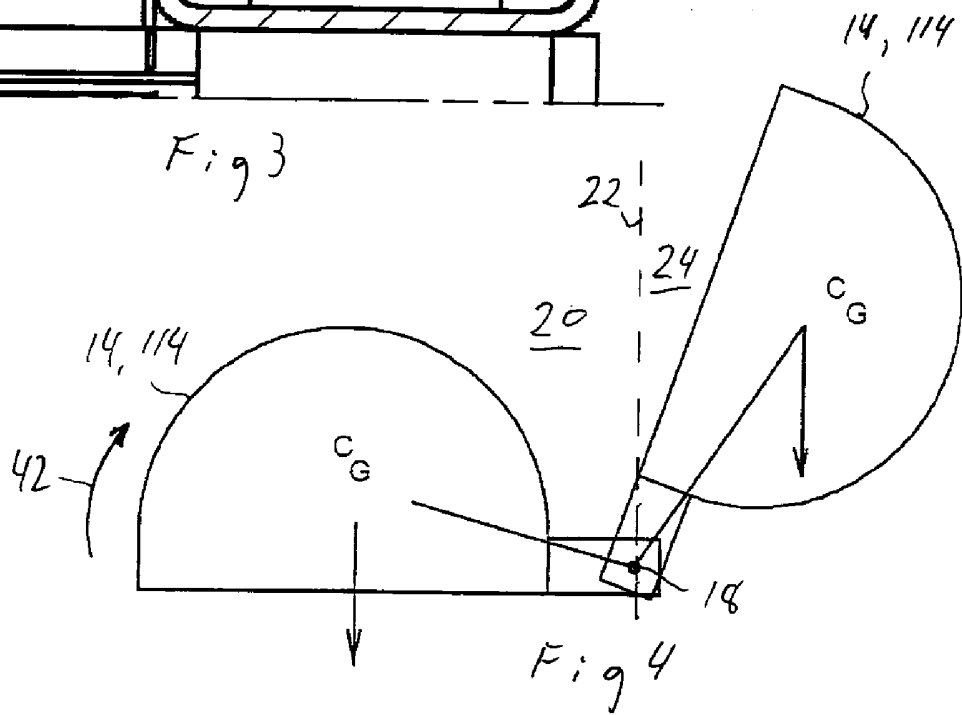
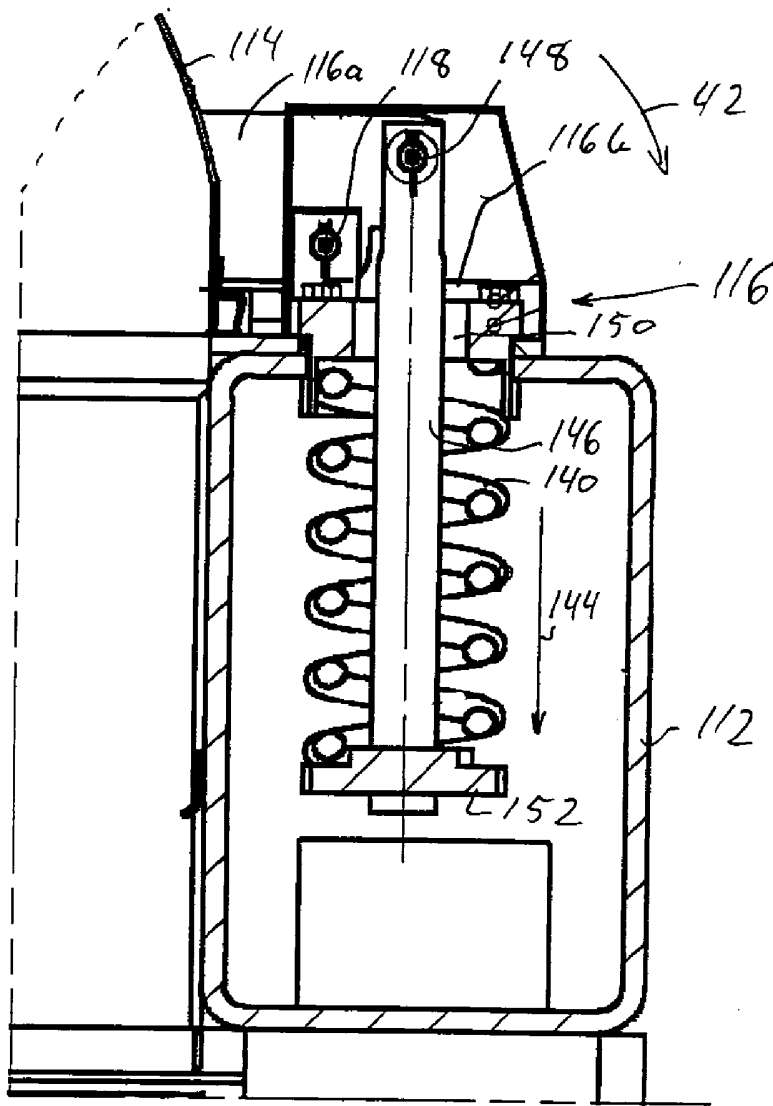


Fig 2



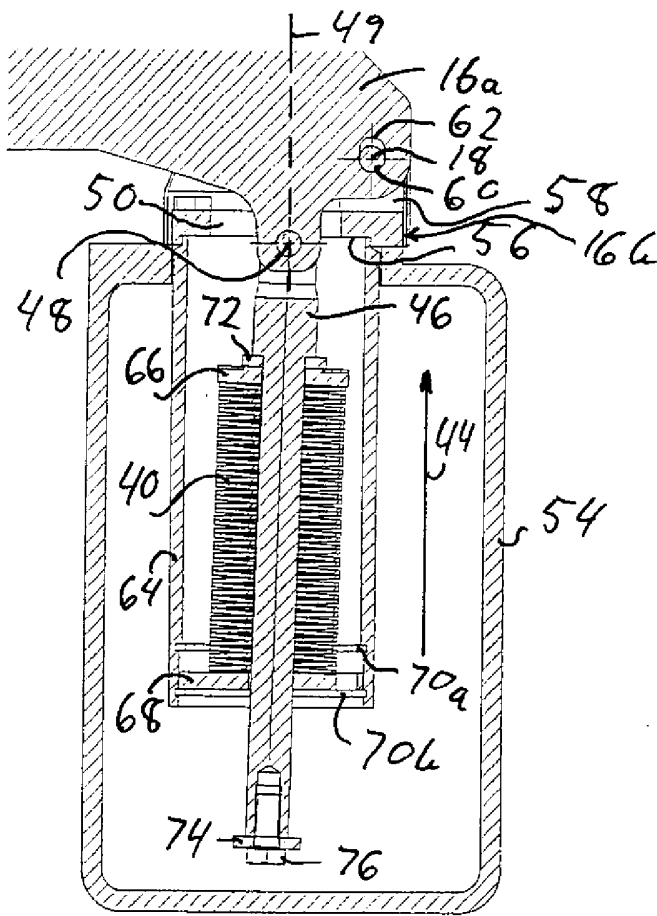


Fig 5

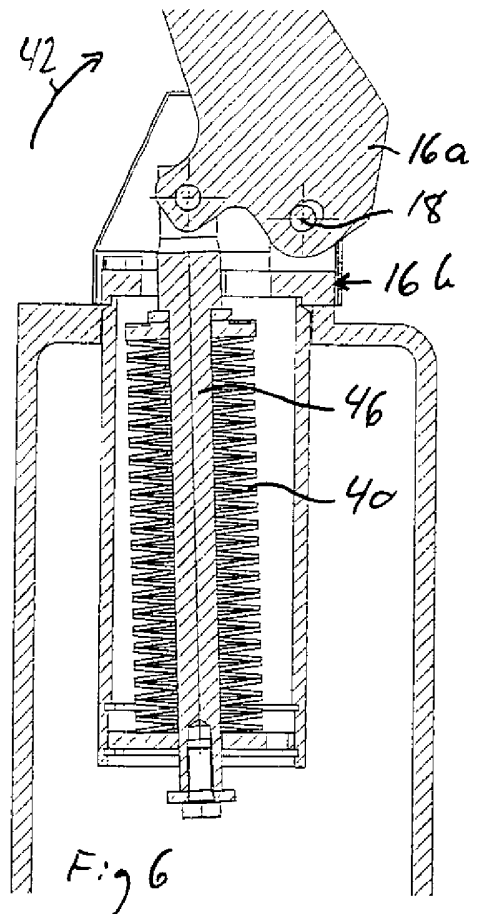


Fig 6

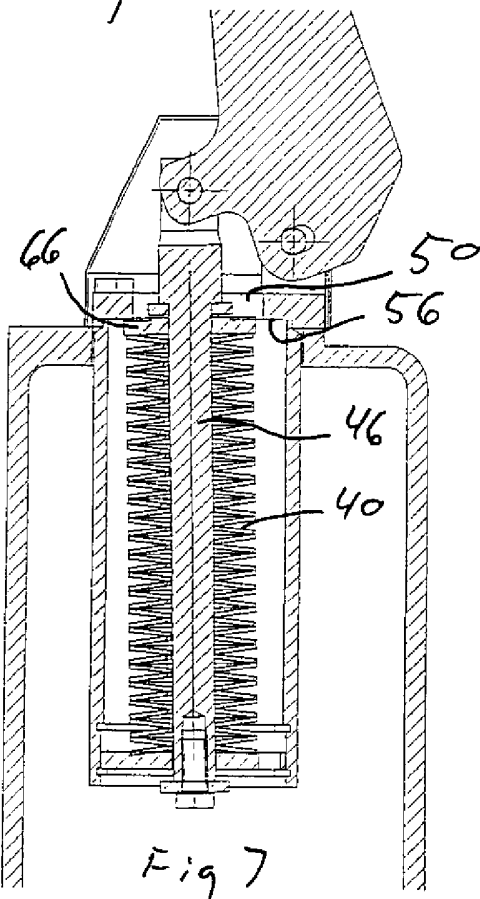


Fig 7

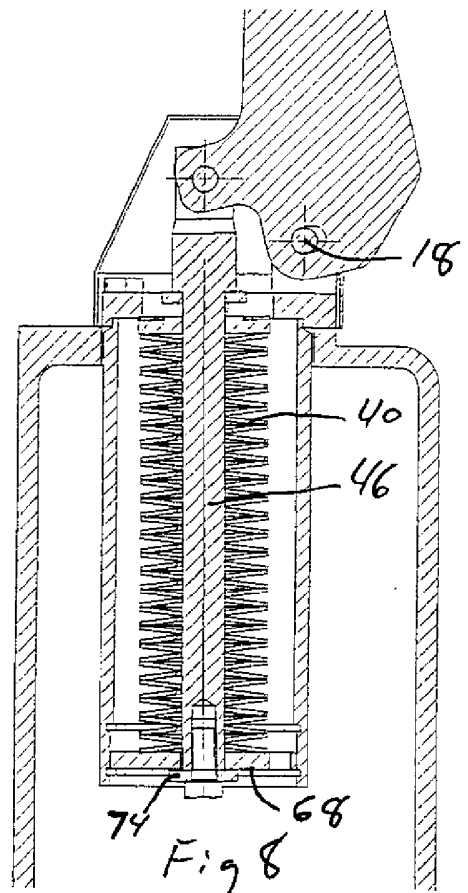


Fig 8

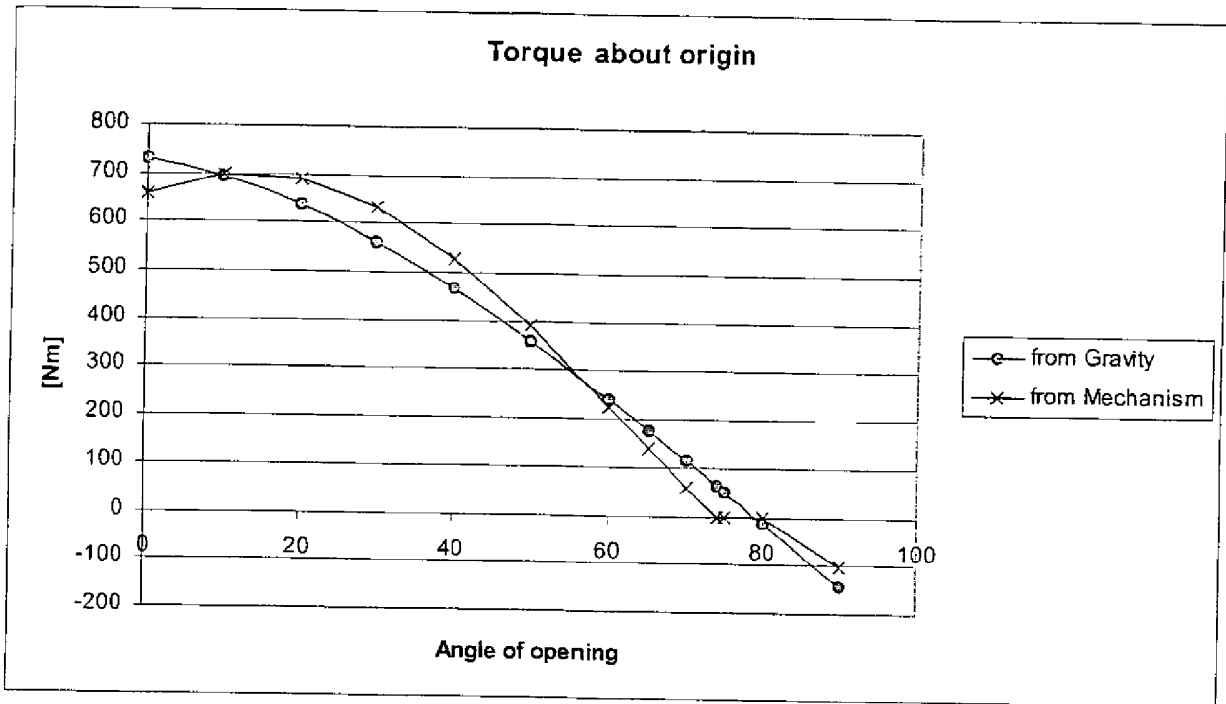


Fig 10

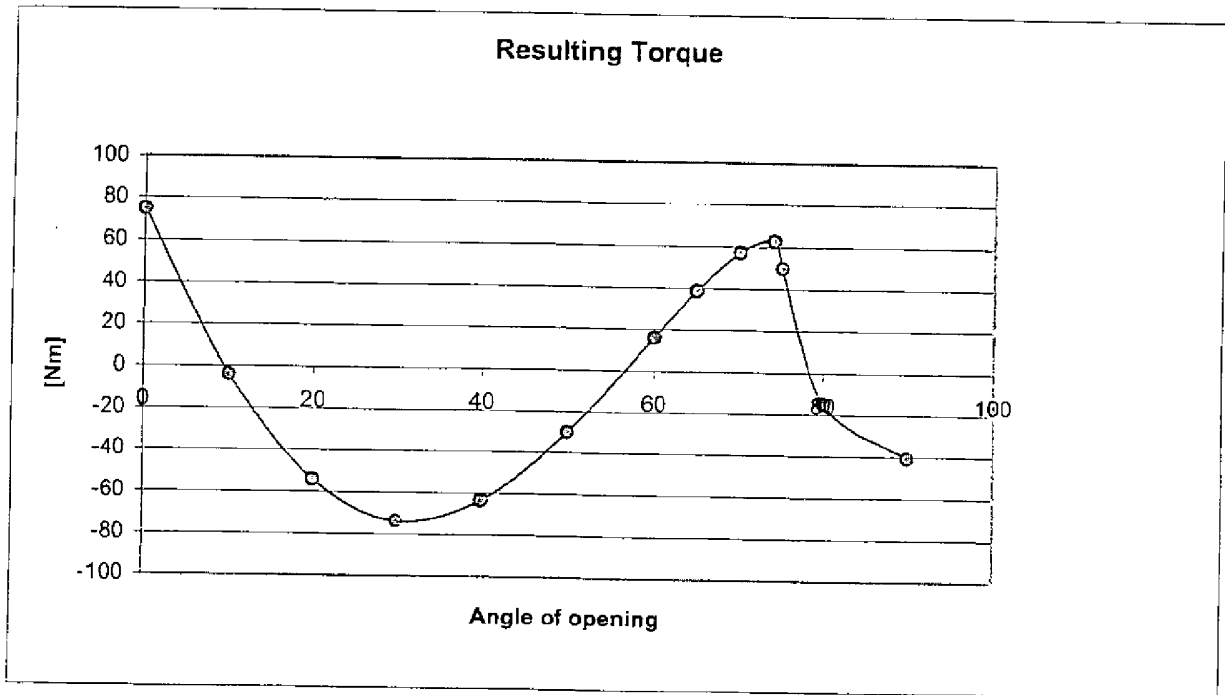


Fig 11

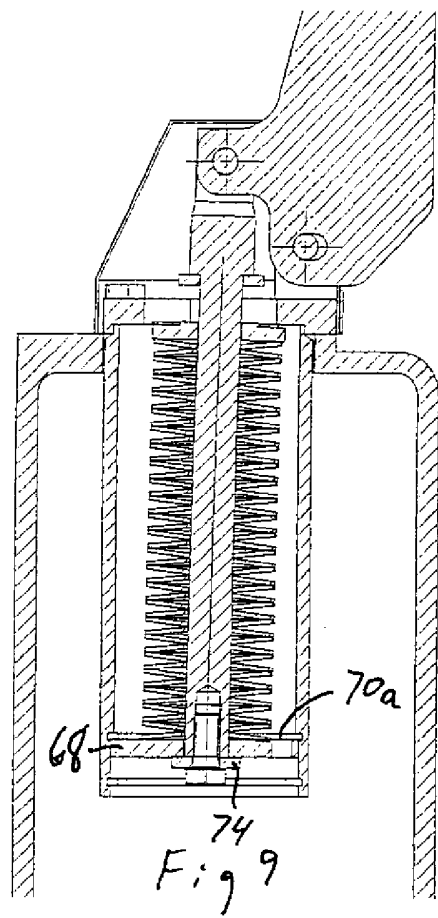


Fig 9

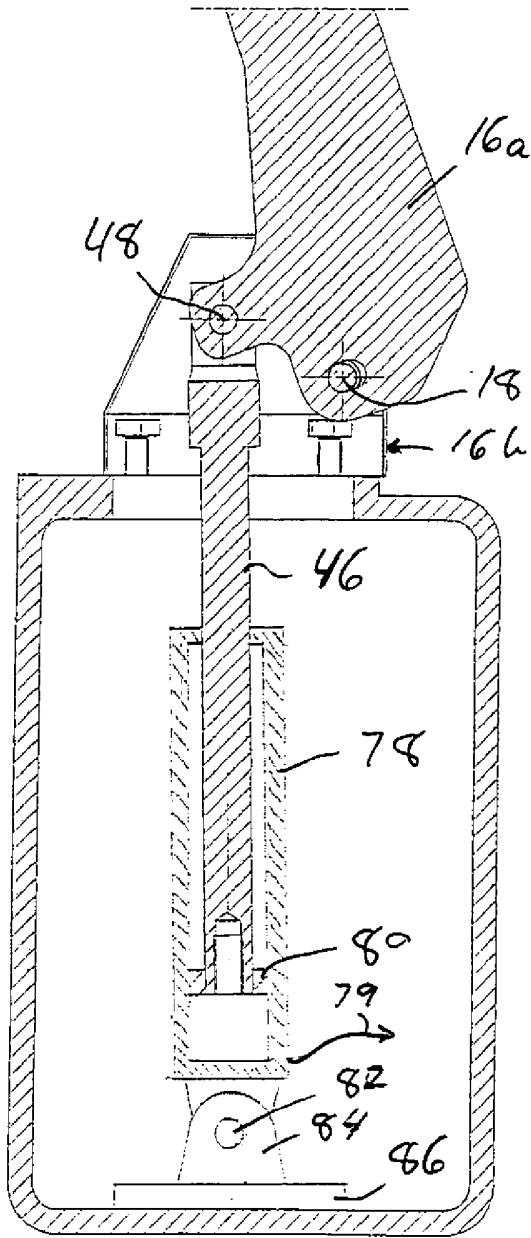


Fig 13

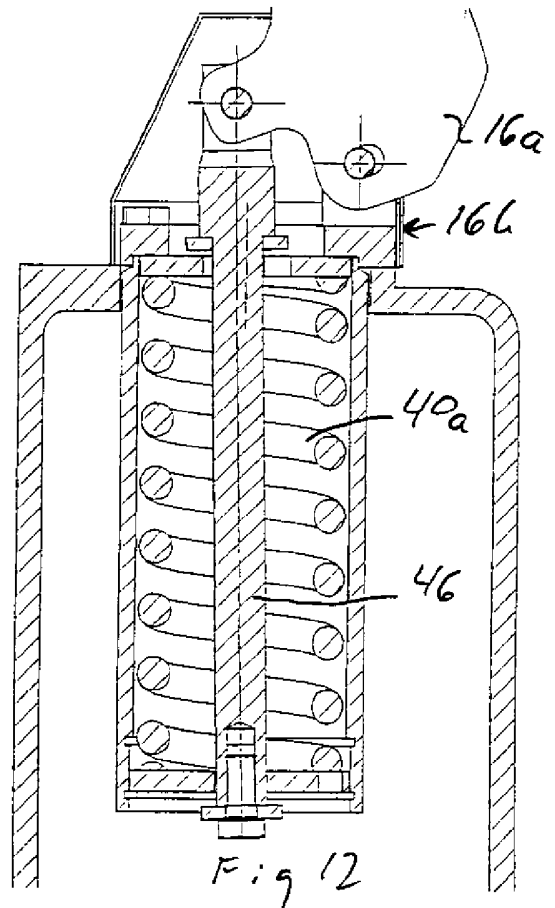


Fig 12