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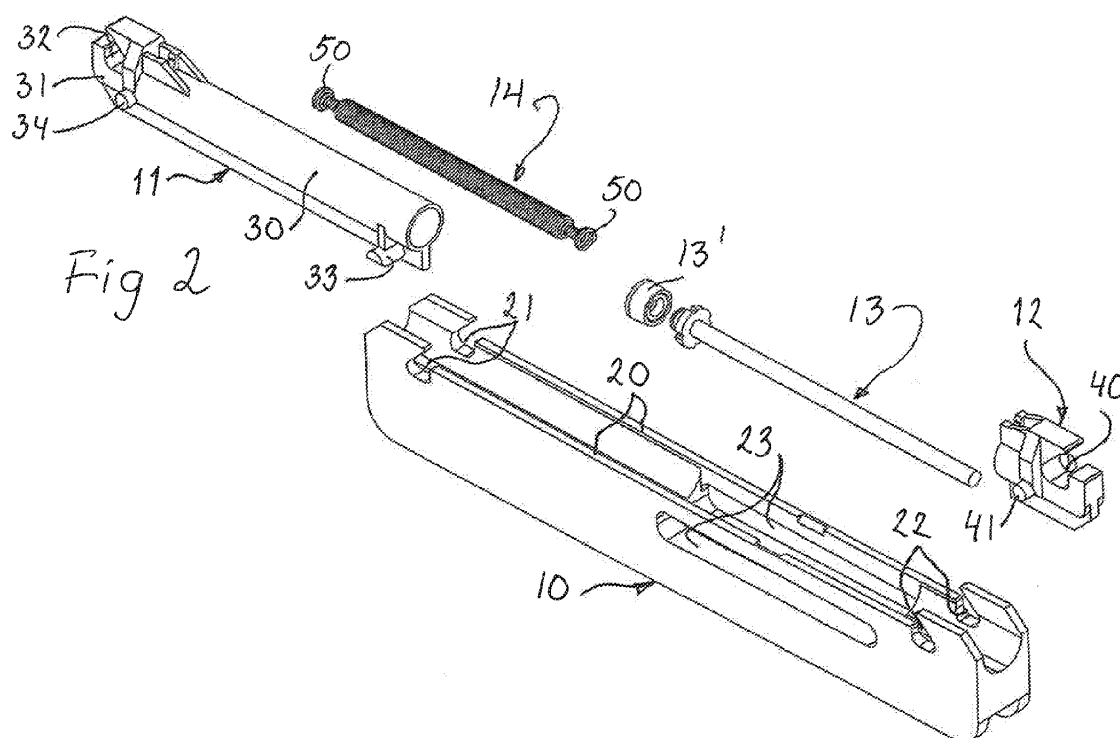
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(54) **A soft closing device**

(57) A device (1) for sideways bringing a movable part (2), such as a shower wall or the like, softly to either one of two defined end positions in relation to a fixed part (3), such as a fixed profile or the like, comprises in a housing (10) two end pieces (12,31), which are axially movably connected in relation to each other by a damping means (13, 30). Each end piece (12,31) has a recess (32, 40) for engagement with either of two actuating pins (5, 6) for engagement with either of two actuating pins

(5,6), attached to the other one of the movable (2) or fixed part (3) at either side of the device (1), and transverse locking pins (34, 41) for cooperation with respective notches (21, 22) in longitudinal sidewalls (20) of the housing (10). The engagement of the respective recess (32, 40) with the respective actuating pin (5, 6) is arranged to disconnect the respective locking pin (34,41) from the respective notch (21, 22) of the housing (10).



## Description

### Technical Field

[0001] The present invention relates to a device for sideways bringing a movable part, such as a shower wall or the like, softly to either one of two defined end positions in relation to a fixed part, such as a fixed profile or the like,

### Background of the Invention

[0002] In many instances it is desirable to bring a movable part softly to a defined end position in relation to a fixed part. A typical example is a furniture fitting for bringing a furniture or kitchen drawer or door softly to a fully closed position. A device of the defined kind, which can be called a soft closing device, can also be used in many other instances, such as for any slidable object, for example a shower wall or dividing wall.

[0003] There are numerous examples of soft closing devices working unidirectionally, i.e. accomplishing a soft closing after movement of the movable part in one direction only. If soft closing in both movement directions is desirable, it has hitherto been normal to make use of two soft closing devices: one for each movement direction.

[0004] The main object of the invention is to accomplish a unitary soft closing device working in both movement directions.

### The Invention

[0005] This and other objects are according to the invention fulfilled in that the device - to be attached to either the movable part or the fixed part comprises in a housing two end pieces, which are axially movably connected in relation to each other by a damping means, each end piece having a recess for engagement with either of two actuating pins, attached to the other one of the movable or fixed part at either side of the device, and transverse locking pins for cooperation with respective notches in longitudinal sidewalls of the housing, wherein the engagement of the respective recess with the respective actuating pin is arranged to disconnect the respective locking pin from the respective notch of the housing,

[0006] When both the end pieces are connected to the housing by means of their locking pins, the device may be said to be in a neutral or loaded condition, ready for engagement by one of its two end pieces with one of the actuating pins and thus disconnection from the housing.

[0007] In order to enable this function the recesses in the end pieces are in a position relative to the housing sidewalls to enable free engagement with the respective pin.

[0008] The soft closing itself is accomplished by the damping means connecting the two end pieces, of which one is disconnected from the housing (and in engagement with its actuating pin) and one is connected to the

housing.

[0009] The damping means preferably comprises a piston connected to one end piece and axially movable in a cylinder connected to the other end piece.

[0010] The two end pieces are preferably connected by a draw spring for exerting a pull force on the respective disconnected end piece. This pull force can bring the device to the desired end position.

[0011] The cylinder of the damping means is preferably guided for linear movements by the housing, such as by being provided with guide pins, cooperating with guide slots in longitudinal sidewalls of the housing.

### Brief Description of the Drawings

[0012] The invention will be described in further detail below under reference to the accompanying drawings, in which

Fig 1 is an isometric view of a shower wall with a device according to the invention,  
Fig 2 is an isometric view of the different parts constituting a device according to the invention,  
Fig 3 is an isometric view of the device in a nearly fully mounted condition,  
Figs 4a-g are illustrations of the working sequence at the left hand end of the device, and  
Figs 5a-f are illustrations of the working sequence at the right hand end of the device.

### Description of Embodiments

[0013] A soft closing device 1 according to the invention is in Fig 1 shown as being attached (in a way not shown or described) to the upper edge portion of a shower wall 2. This shower wall 2 is suspended from a fixed profile 3 by means of hangers 4 (of which the left one is shown and the right one is indicated by a hole 4' in the shower wall 2), so that it is slidable to the left and right in Fig 1. The profile 3 is provided with two actuating means in the form of pins 5 and 6 for cooperation with the soft closing device 1, as will be apparent below. The device 1 is shown in engagement with the left actuating pin 5. The distance between the actuating pins 5 and 6 defines the slide range or movement range for the shower wall 2.

[0014] As is visible in Fig 2, the soft closing device 1 comprises the following constituents: a housing 10, a cylinder and left end piece 11, a right end piece 12, a piston 13, and a draw spring 14.

[0015] The housing 10 has two longitudinal sidewalls 20, provided towards each end with a left notch 21 and a right notch 22, respectively. The sidewalls 20 are also provided with longitudinal guide slots 23.

[0016] The cylinder and left end piece 11 comprises a cylinder 30 and a left end piece 31 with a left recess 32. The cylinder and left end piece 11 is dimensioned to be axially movably received between the sidewalls 20 of the

housing 10. It is thereby guided by opposite guide pins 33, of which only one is visible in Fig 2 and which cooperate with the guide slots 23 in the housing sidewalls 20. The left end piece 31 is provided with two opposite transverse locking pins 34, of which only one is visible in Fig 2 and which are intended for cooperation with the left notches 21.

**[0017]** The right end piece 12 is dimensioned to be axially movably received between the sidewalls 20 of the housing 10. It is provided with a right recess 40 and two opposite transverse locking pins 41, of which only one is visible in Fig 2 and which are intended for cooperation with the right notches 22.

**[0018]** The piston 13 is attached to the right end piece 12. It is preferably rod-like in the majority of its length and provided with a piston portion 13' at its free end to fit into the cylinder 30, damping the relative movements between the two end pieces 12 and 31.

**[0019]** The draw spring 14 can be provided with attachments 50 at its ends. The spring 14 is attached to the two end pieces 12 and 31 and will exert a pull force thereon, biasing them together.

**[0020]** Fig 3 illustrates the device 1 in a nearly fully mounted condition, the exception being that the right attachment 50 of the draw spring 14 is not yet attached to the right end piece 12.

**[0021]** Provided that the spring 14 is attached to the right end piece 12, the device can be said to be in a loaded or neutral condition in Fig 3. The spring 14 exerts a pull force on the two end pieces 12 and 31, but they are kept in the shown position by the engagement of the locking pins 34 and 41 with straight end edges (substantially perpendicular to the axial direction of the housing 10) of the left and right notches 21 and 22, respectively.

**[0022]** As already stated, the guide pins 33 guide the longitudinal movement of the cylinder 30, but they also safeguard the intended function by providing that the locking pins 34 and 41 cannot concurrently leave their respective notches 21 and 22, so that only one side of the device can be active at one time.

**[0023]** It appears that the two end pieces 12 and 31 extend over any upper part of the sidewalls 20. It is visible, for example in Fig 1, that the device 1 is mounted on the shower wall 2 in such a position that in a relative movement either one of the end pieces 12 and 31 will hit either one of the fixed actuating pins 5 and 6 on the profile 3 but not get in any initial contact with the housing 10. Differently speaking, the function of the device 1 - to be described below - is triggered by engagement by either of the end pieces 12 and 31 with either one of the actuating pins 5 and 6.

**[0024]** It also appears that the end portions of the housing sidewalls 20 outside the notches 21 and 22 are at a somewhat higher level than the remainder of the sidewalls for defining beveled entrances to the notches 21 and 22 and movement stops for the locking pins 34 and 41, as will appear below.

**[0025]** The locking pins 34 and 41 on the respective

ones of the two end pieces 31 and 12 and the housing sidewall notches 21 and 22, with which they cooperate, as well as the recesses 32 and 40 in the two end pieces 31 and 12 for cooperation with the fixed pins 5 and 6 can together collectively be called means for disconnecting and connecting.

**[0026]** The function of the device will now be described with reference to Figs 4 and 5. For the sake of clarity, these Figures are not provided with any reference numerals. For the same reason, the spring 14 is omitted. Figs 4a-g illustrate the function of the device 1 when it approaches, hits and then leaves the left actuating pin 5, whereas Figs 5a-f in the same manner illustrate the function at the right actuating pin 6.

**[0027]** The device 1 is in Fig 4a shown in the same loaded or neutral condition as in Fig 3. The shower wall 2, on which it is mounted, moves to the left towards the left actuating pin 5 on the profile 3.

**[0028]** In Fig 4b the left end piece 31 has hit the left actuating pin 5. By the beveled shape of the entrance to the recess 32 in the left end piece 31, the latter will be lifted somewhat, so that its locking pins 34 eventually lose their engagement with the left notches 22 in the housing walls 20.

**[0029]** When this engagement is lost, which is shown in Fig 4c, the device 1 can continue its movement to the left, whereas the cylinder and left end piece 11 is stopped by the left actuating pin 5 and the locking pins 34 are above the housing sidewalls 20. The piston 13 is pushed into the cylinder 30, damping the continued movement. During this movement the cylinder 30 is guided by its guide pins 33 engaging the guide slots 23 in the housing sidewalls 20.

**[0030]** The movement can continue, until the piston 13 has reached the bottom of the cylinder 30, which is illustrated in Fig 4d. The sequence illustrated in Figs 4a -4d goes from full movement speed of the shower wall 2 with the device 1 mounted thereon to a standstill in a deceleration controlled by the damping function of the piston 13 in the cylinder 30.

**[0031]** If the movement of the device 1 ends, before the position shown in Fig 4d has been reached, the draw spring 14 will bias it to this position, which thus will be well defined.

**[0032]** In Fig 4e the shower wall 2 with its device 1 has been given a movement to the right. By the shape of the recess 32 in the left end piece 31 (namely a straight edge substantially perpendicular to the axial direction of the cylinder 30), the cylinder and left end piece 11 will be stopped by the left actuating pin 5 from following this movement to the right. The piston 13 will accordingly be pulled to right in the cylinder 30.

**[0033]** In Fig 4f the movement has continued, until the locking pins 34 of the left end piece 31 hits the beveled portion of the left notches 21. This means that the left end piece 31 will be forced down therein and that the engagement of the left actuating pin 5 with the left recess 32 of the left end piece 31 will cease. The pull force from

the draw spring 14 will guarantee that the locking pins 34 come to proper rest against the end of the left notches 21, so that the loaded or neutral position of the device 1 (as shown in Fig 3) is restored.

**[0034]** This situation is shown in Fig 4g, where the device 1 has left its engagement with the left actuating pin 5 in its movement to the right.

**[0035]** Figs 5a-f illustrate the same procedure at the right actuating pin 6. The sequence is readily understood after having studied the sequence at the left actuating pin 5 with reference to Figs 4a-g, and the description is not repeated.

**[0036]** It appears that the shown and described device is fully double-acting. It provides a damped stopping of the movement in both directions and also two well defined end positions.

**[0037]** The device has been shown and described in its use with a slidable shower wall, but it shall be understood that it can be used in a variety of different applications, such as also for any slidable wall, furniture or kitchen drawer or the like, where the same function is desirable, namely a damping of a linear movement in both directions.

**[0038]** Generally speaking, the singular device provides soft-closing and self-closing features between two parts, which are movable relative to each other in two opposite directions.

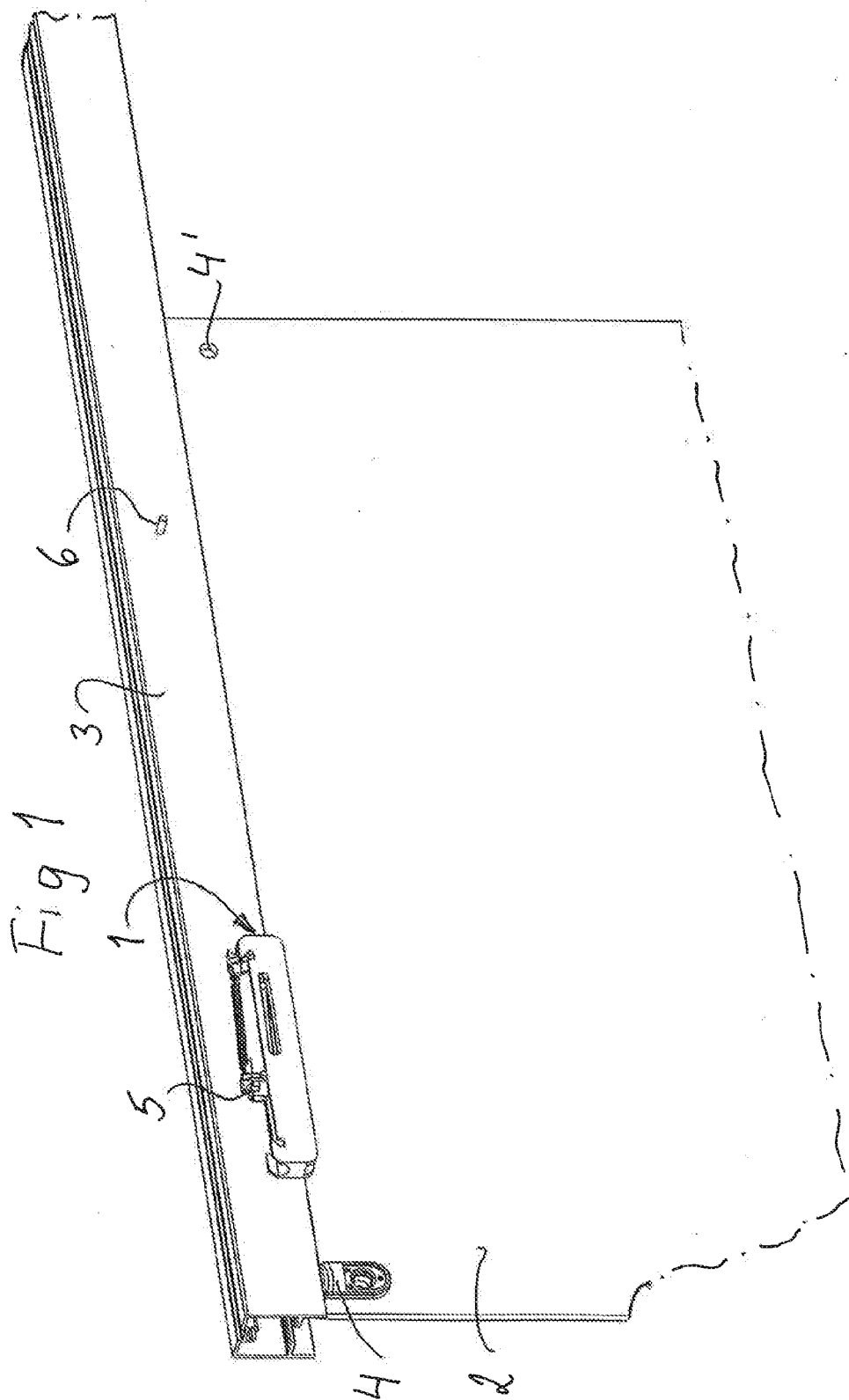
**[0039]** In the shown and described example with a slidable shower wall, the shower wall 2 can be broadly defined as a movable part and the fixed suspension profile 3 as a fixed part. Generally, the device according to the invention can be attached to the movable part (as in the shown and described example) and the actuating means to the fixed part (at either side of the device, defining the moving range for the movable part), but it is also possible to have the device attached to the fixed part and the actuating means to the movable part.

wherein the engagement of the respective recess (32, 40) with the respective actuating pin (5, 6) is arranged to disconnect the respective locking pin (34, 41) from the respective notch (21, 22) of the housing (10).

2. A device according to claim 1, wherein the damping means comprises a piston (13) connected to one end piece (12) and axially movable in a cylinder (30) connected to the other end piece (31).
3. A device according to claim 1, wherein the two end pieces (12, 31) are connected by a draw spring (14).
4. A device according to claim 2, wherein the cylinder (30) is guided for linear movements by the housing (10), such as by being provided with guide pins (33), cooperating with guide slots (23) in longitudinal side-walls (20) of the housing (10).

## Claims

1. A device (1) for sideways bringing a movable part (2), such as a shower wall or the like, softly to either one of two defined end positions in relation to a fixed part (3), such as a fixed profile or the like, **characterized in that** the device (1) - to be attached to either the movable part (2) or the fixed part (3) - comprises in a housing (10) two end pieces (12, 31), which are axially movably connected in relation to each other by a damping means (13, 30), each end piece (12, 31) having a recess (32, 40) for engagement with either of two actuating pins (5, 6), attached to the other one of the movable (2) or fixed part (3) at either side of the device (1), and transverse locking pins (34, 41) for cooperation with respective notches (21, 22) in longitudinal sidewalls (20) of the housing (10),



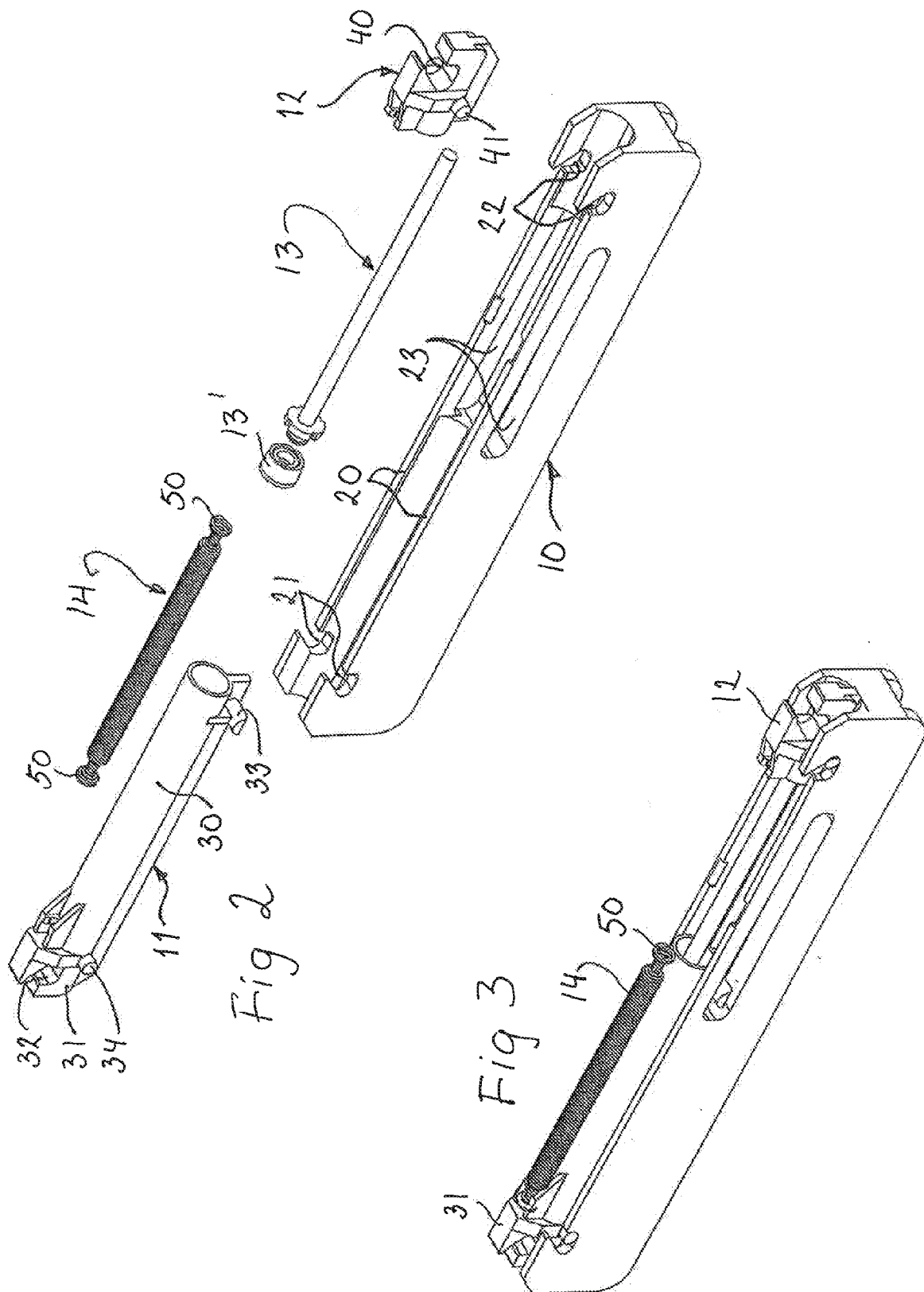


Fig 4

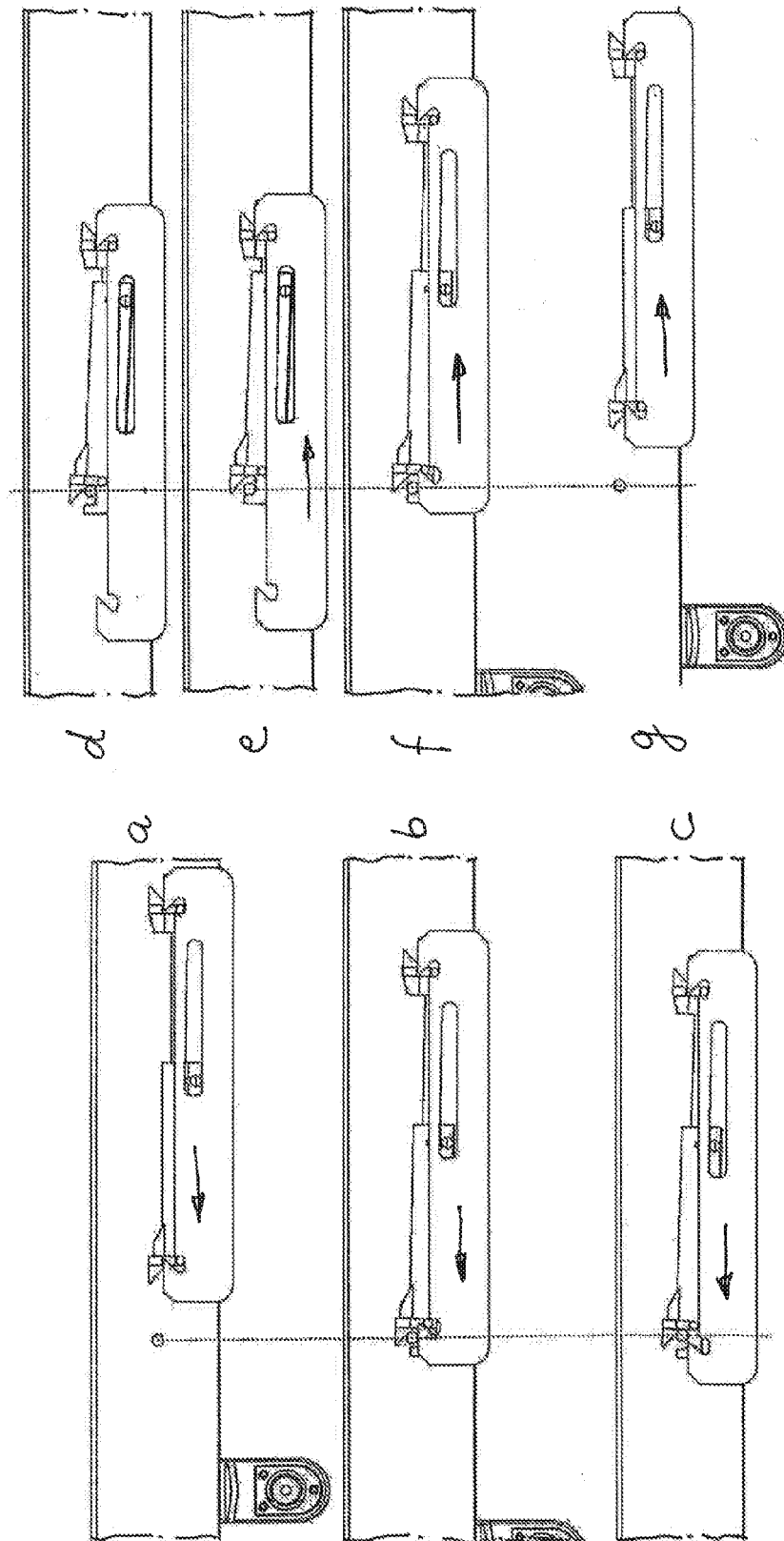


Fig 5

