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(54) **Self-closing pivot hinge**

(57) The self-closing pivot hinge according to the invention comprises a first part attachable to a door/window and a second part attachable to a door/window frame. The first and second parts are rotatable with respect to each other about a rotation axis from a closed position to at least a first open position. The hinge further comprises a spring mounted along the rotation axis and pro-

viding a self-closing function to the pivot hinge. The second part of the pivot hinge comprises a wedge-shaped upstanding part and a wedge-shaped counterpart, joined together by means of a tensioning bolt, for clamping the pivot hinge on a selectable height in a corresponding groove of a frame part provided on the side of the opening.

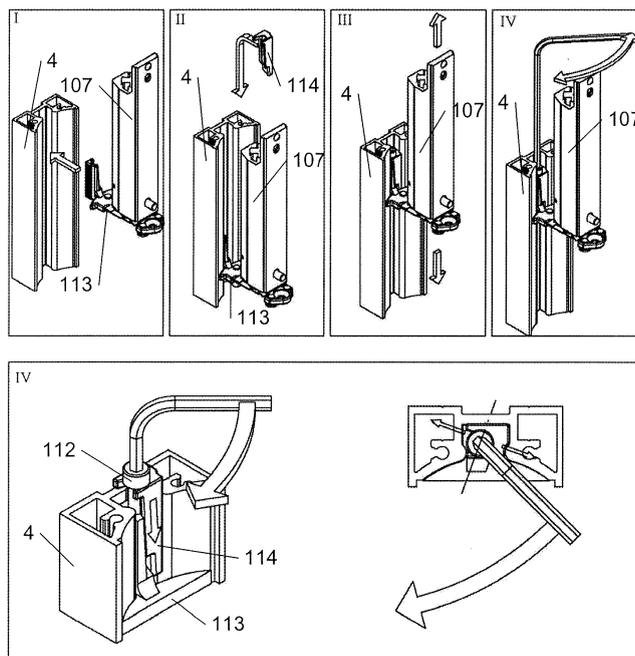


Fig. 10

Description**Technical field**

[0001] The present invention relates to a self-closing pivot hinge for rotatably mounting a rotatable element, such as for example a door, a window or the like, in an opening.

Background art

[0002] Pivot or spindle hinges are employed in the art for rotatably mounting doors, window, gates or other rotatable elements in their respective openings. This type of hinges generally comprises the combination of a spindle or pin which rotates in a hole in the rotatable element or in the side of the opening. This pin or spindle defines the rotation axis.

[0003] A self closing door hinge of this type is for example known from EP-A-0445559. This hinge comprises a bush which rotates around a spindle. A bottom bearing surface of the bush is shaped complementary to an upper bearing surface of a lower part of the spindle, on which the bush rests. These bearing surfaces show inclinations and recesses to define a number of predefined positions for the door, such that upon moving the door from one position to the other, the bush is lifted from one of the recesses against the action of a spring. The spring is located between the bush and a biasing ring, the position of which is adjustable. In this way, the compression rate of the spring and hence the force on the bush can be set.

Disclosure of the invention

[0004] It is an aim of the present invention to provide a self-closing pivot hinge which can be mounted to a corresponding frame part on a selectable height.

[0005] This aim is achieved according to the invention with a pivot hinge showing the technical characteristics of the first claim.

[0006] The self-closing pivot hinge according to the invention comprises a first part attachable to the rotatable element and a second part attachable to a side of the opening. The first and second parts are rotatable with respect to each other about a rotation axis from a closed position in which the rotatable element (the door, window or other rotatable element) closes off the opening to at least a first open position, i.e. there can be one or more open positions. The hinge further comprises a spring mounted along the rotation axis and providing a self-closing function to the pivot hinge.

[0007] According to the invention, the second part of the pivot hinge comprises a wedge-shaped upstanding part with counterpart and tensioning bolt for clamping the pivot hinge on a selectable height in a corresponding groove of a frame. This increases the range of applicability of the pivot hinge of the invention.

[0008] In a preferred embodiment, the hinge is a bidi-

rectional hinge which is provided for being opened both ways, i.e. to the first open position and to a second open position by rotation to the opposite side.

[0009] In a preferred embodiment, the first part is provided with user accessible adjustment means for adjusting the position of the rotatable element fixed to the first part in height and/or depth direction. In this way the position of for example a door with respect to a door frame can still be adapted if necessary when the door is already mounted in the door frame.

[0010] In a preferred embodiment, the pivot hinge comprises an integrated hinge lock for locking the hinge in the/each open position. In this way, the need for an additional device for locking the rotatable element fixed to the hinge in the/each open position can be avoided.

[0011] In a preferred embodiment, the pivot hinge comprises an integrated stop member for stopping the rotation at the/each open position. In this way, the need for an additional device for stopping the rotation of the rotatable element fixed to the hinge beyond the/each open position can be avoided.

[0012] Preferably, the spring is substantially completely enclosed in a spring housing which is constructed in a sound isolating material to isolate noises which may be generated by the spring.

Brief description of the drawings

[0013] The invention will be further elucidated by means of the following description and the appended figures.

Figure 1 shows a door suspended in a door frame by means of pivot hinges according to the invention.

Figure 2 shows a first embodiment of a pivot hinge according to the invention in exploded view.

Figure 3 shows the first embodiment of the pivot hinge, assembled, with part of the spring housing broken away for clarity.

Figure 4 shows how the pre-tension on the spring of the first embodiment of the pivot hinge shown in figures 2 and 3 is adjusted.

Figure 5 shows how the self-closing function in the first embodiment of the pivot hinge shown in figures 2 and 3 is disabled.

Figure 6 shows how the position of a door, suspended by means of the first embodiment of the pivot hinge, can be adjusted in depth direction.

Figure 7 shows how the position of a door, suspended by means of the first embodiment of the pivot hinge, can be adjusted in height direction.

Figure 8 shows the operation of the hinge lock of the first embodiment of the pivot hinge, for locking the hinge in an open position.

Figure 9 shows the operation of the stop member of the first embodiment of the pivot hinge, for stopping rotation of the hinge beyond the open positions.

Figure 10 shows how the first embodiment of the

sion can be set such that the spring will counteract opening of the rotatable element, hence achieving the self-closing function.

[0022] Figure 4 shows in detail in different steps, consecutively numbered with roman numbers, how the pre-tension is adjusted in this embodiment. In step I, the hinge is moved to the (first) open position. In step II, the hinge is fixed in this open position by means of the hinge lock 110. In step III, the locking screw 106 is released from its positioning slot in the pre-tensioning member by means of a suitable tool. Next, in step IV the pre-tensioning member 103 can now be rotated stepwise by means of a suitable tool to adjust the pre-tension. This causes a rotation of the top end 101 of the spring 100 which is held in slot 123 in the bottom of the pre-tensioning member 103. Once the desired new position/orientation of the pre-tensioning member 103 is set, in step V the locking screw 106 is screwed back into its hole and into the positioning slot of the pre-tensioning member 103 which is now in front of it. Finally, the hinge lock 110 is released in step VI and the hinge can be moved back to the closed position in step VII. Since the locking screw 106 and the pre-tensioning member 103 are accessible from outside the spring housing 107, the pre-tension is always adaptable without there being a need for dismantling the rotatable element from its opening.

[0023] The self-closing function of the hinge can be disabled by means of the pre-tensioning member 103. This is shown in detail in figure 5. In step I, the hinge is moved to the (first) open position. In step II, the hinge is fixed in this open position by means of the hinge lock 110. In step III, the locking screw 106 is released from its positioning slot in the pre-tensioning member by means of a suitable tool. Next, in steps IV, V and VI, the pre-tensioning member 103 is lifted from the top end 101 of the spring, rotated over 180° around the rotation axis and lowered back onto the top end 101 of the spring. This has the effect that the top end 101 of the spring is moved from the narrow slot 123, which immediately engages the end 101 upon rotation in either direction, to the middle of the free walk groove 124 which spans 180° so that the end 101 can freely travel through this free walk groove 124, i.e. the spring no longer performs its self-closing function in neither direction of opening the hinge. Once the desired new position/orientation of the pre-tensioning member 103 is set, in step VII the locking screw 106 is screwed back into its hole and into the positioning slot of the pre-tensioning member 103 which is now in front of it. Finally, the hinge lock 110 is released in step IIX and the hinge can be moved back to the closed position in step IX.

[0024] By the construction of the pre-tensioning member 103 with the stepwise adaptability of its position in steps of 90° and the narrow slot 123 and the 180° free walk groove 124, the following possibilities are achieved:

- self-closing in both directions (spring end 101 held in slot 123 and pre-tension in the closed position set

to about zero),

- self-closing from the first open position towards the closed position only (spring end 101 held in the groove 124, such that it is located at one end of the groove 124 in the closed position),
- self-closing from the second open position towards the closed position only (spring end 101 held in the groove 124, such that it is located at the other end of the groove 124 in the closed position),
- self-closing in neither direction (spring end 101 held in the groove 124, such that it is located substantially in the middle in the closed position).

In case the self-closing function is disabled in one direction only, still an amount of pre-tension can be set, provided that additional means are provided for well defining the closed position and/or holding the rotatable element in the closed position. Such means are for example known from the European Patent No. EP-B-0645517, which is incorporated herein by reference in its entirety.

[0025] The possibility in the pivot hinge of figures 2 and 3 to set the self-closing function in one direction only is extremely advantageous. In this way, provided that two complementary pivot hinges are used on opposite sides (e.g. top and bottom) of the rotatable element, the self-closing function of the rotatable element in one direction is achieved by the one pivot hinge while the other does not counteract. For example in figure 1 the pivot hinges 2 and 3 can be set such that closing the door 1 in one direction is performed by the top hinge 2 while the bottom hinge 3 is in the free walk state and closing the door 1 in the other direction is performed by the bottom hinge 3 while the top hinge 2 is in the free walk state.

[0026] The hinge of figures 2 and 3 is further provided with adjustment screws for adjusting the position of the flat part 121 with respect to the spring housing 107 and hence the position of the rotatable element with respect to its opening. The screws 105 which fix these parts 107 and 121 to each other are simultaneously used for adjustments in depth direction, i.e. for adjusting the gap between the flat part 121 and the spring housing 107. This gap is maintained by the spiral pressure springs 122. In case spacer screws 120 are placed, a minimal gap is defined. The adjustment in depth direction is always possible since the screws 105 are accessible even when the hinge is in use. The adjustment is shown in detail in figure 6: in step I the hinge is moved to the open position, in step II the hinge lock 110 is operated to lock the hinge in the open position and in step III the screws 105 are operated by means of a suitable tool to adjust the gap between the screw housing 107 and the flat part 121. In this way, in figure 1 the gaps D1 and D2 between the door 1 and the lateral parts of the frame 4 can be adjusted.

[0027] By means of height adjustment screw 104 which has a cone-shaped tip, a slight adjustment in height direction can be made. This is shown in detail in figure 7: by turning the screw 104 towards the flat part 121, the

slanted side of the cone-shaped tip will cause the flat part 121 and hence the rotatable element to be slightly raised. In this way, in figure 1 the gaps H1 and H2 between respectively the top part of the frame 4 and the top side of the door 1 and the bottom side of the door 1 and the floor can be adjusted.

[0028] As shown in figures 2 and 3, the hinge lock 110 is suspended in the spring housing 107 by means of a hinge lock spindle 119. This spindle also carries a hinge lock spring 111, located behind the hinge lock 110. The function is described with reference to figure 8, again with consecutive steps numbered by roman numbers. In step I, the hinge is moved to the (first) open position. The hinge lock 110 is pressed in step II, causing a corrugated part of it to enter and engage in a complementary hole in the hinge spindle 117 which is specifically provided for this purpose, thereby blocking the hinge in the open position. Step III represents a slight movement of the first part of the hinge beyond the open position, which causes the hinge lock 110 to be released. Step IV represents that the hinge lock spring 111 makes sure that the hinge lock 110 returns to its original position. Finally, step V is the returning of the hinge to the closed position.

[0029] In alternative embodiments, the hinge lock may be any type of sliding or revolving lock. The hinge lock 110 shown in the figures has a bore which provides user access to the underlying mounting screw 105 and to the hinge spindle 117 for lubrication, but a removable hinge lock 110 would also fulfil this purpose.

[0030] Another integrated function of the pivot hinge of figures 2 and 3 is that of a stop at the first open position (e.g. $+90^\circ$) and/or the second open position (e.g. -90°). This is achieved by means of a stop member 118, which is a leaf spring mounted on the base 113 of the hinge. The operation is explained by means of figure 9 which again shows consecutive steps using roman numbers. Step I represents that initially in the closed position the stop member 118 is slightly depressed by the bottom side of the spring housing 107, since the bottom side presses on an upwards protruding ridge 126 of the stop member 118. Steps II and III consecutively show what happens when the hinge reaches the (first) open position. In the bottom side of the spring housing 107 a notch 125 is provided for accommodating the ridge 126. Step II shows that this notch 125 approaches the ridge 126 when the hinge is opened. Once the fully open position is reached in step III, the ridge 126 enters the notch 125 so that the stop member 118 springs upwards to its neutral position. As a result, the end ridge 127 is moved in front of the side of the spring housing 107, stopping the rotation of the spring housing 107 at about 90° . At the bottom of figure 9 it is shown that the stop member 118 has a symmetrical structure and function: on the left it is shown that the end ridge 127 stops the spring housing 107 at about $+90^\circ$ and hence defines the first open position; on the right it is shown that the end ridge 128 at the opposite side stops the spring housing 107 at about -90° and hence defines the second open position. The angles of

about $+90^\circ$ and -90° at which the stop member 118 stops the rotation of the hinge may of course be varied. In other words, the angles between the first and second open positions and the closed position may be any suitable angles. In order to vary these angles, it is sufficient to replace the stop member 118 of the figures with another stop member having ridges for stopping the rotation at the desired angles.

[0031] The base 113 of the hinge can, on the one hand, be fixed to the floor or more generally the top and bottom sides of the opening in which the rotatable element is mounted. This fixing is quite simply achieved by means of a floor mounting screw 117 which is inserted through a hole in the base 113 into a bore in the floor. A number of shock absorbers 115 are then inserted on the bottom side of the base. On the other hand, the base 113 of the hinge can also be fixed to a lateral frame part 4 with a complementary shape. This is achieved by means of an upstanding part and a counterpart 114, which are both wedge-shaped with complementary slanted contact surfaces and corrugated outer surfaces, and are joined together by means of a tensioning bolt 112. As a result of the wedge shapes, both parts are clamped in two or three dimensions in a corresponding groove of the lateral frame part 4. The operation of this mechanism is shown in figure 10. In step I the upstanding part of the base 113 is brought into the frame part 4. In step II the counterpart 114 is brought into the frame part 4 above the upstanding part of the base 113. Step III shows that the mounting height of the pivot hinge in the frame part 4 can be chosen as desired (see also references P1 and P2 in figure 1) or to adjust the height of the rotatable element in its opening to a larger extent. Once the desired height is set, the tensioning bolt 112 is inserted and tensioned by means of a suitable tool (step IV), as a result of which the parts 113, 114 are pressed apart and become clamped in the groove of the frame part 4. In alternative embodiments, the base 113 may be provided with more common flanges for fixing the pivot hinge onto walls, floors, ceilings etc.

[0032] From the above it is clear that the pivot hinge of figures 2 and 3 fulfils a lot of integrated functions, among which:

- fixture of the pivot hinge by clamping in a corresponding door frame 4 at a random or fully selectable height (Fig. 1: P1 and P2), without requiring additional fixing means other than the wedge-shaped upstanding part of the base 113 with counterpart 114 and tensioning bolt 112;
- integrated height adjustment of the rotatable element 1 after mounting in its frame 4 by means of height adjustment screw 104 (Fig. 1: H1 and H2);
- integrated depth adjustment of the rotatable element 1 after mounting in its frame 4 by means of depth adjustment screws 105 (Fig. 1: D1 and D2);
- integrated stop which limits the rotation of the rotatable element beyond given angles, namely stop member 118;

- integrated self-closing function by means of the spring 100 with adjustable pre-tension and possibility of disablement in one or both directions provided by repositionable pre-tensioning member 103;
- integrated hinge lock 110 for locking the rotatable element 1 in one or both open positions.

As a result, the pivot hinge of figures 2 and 3 is a truly multifunctional element with which the need for multiple additional devices for e.g. closing the rotatable element, stopping its rotation, blocking its position or other can be avoided.

[0033] Preferably, the following materials are used for constructing the various parts of the pivot hinge of figures 2 and 3, but any other materials known to the person skilled in the art are of course possible:

- base 113 and counterpart 114: duplex steel,
- spring housing 107: plastic material with sound isolation properties,
- pre-tensioning member 103 and spring fixing member 109: aluminium or stainless steel,
- hinge lock 110: duplex or resilient steel,
- flat part 121: aluminium,
- spring 100 and spiral pressure springs 122: stainless steel,
- stop member 118 and hinge lock spring 111: resilient steel,
- shock absorbers 115: silicon.

[0034] Figure 11 shows a second embodiment of a pivot hinge according to the invention. In this embodiment, the top and bottom ends 201, 202 of the spring are respectively permanently welded to the pre-tensioning member 204 and the spring fixing member 209, which is in fact the same constructional part as the pre-tensioning member 204 but turned upside down and rotated over an angle Δe , see figure 12. Assembled in the spring housing 207 of the hinge, the spring fixing member 209 is fixed to the base 213 and the pre-tensioning member 204 is fixed to the spring housing by means of the locking screw 206 which engages in the groove 224 in the side of the pre-tensioning member 204. The angle Δe , i.e. the difference in orientation between the two parts 204 and 209, defines the pre-tension which is applied to the spring in the closed position. This pre-tension is a predetermined, fixed amount, independent of the room, the dimensions of the door, etc. If desired, the pre-tension could be increased to a great extent by releasing the locking screw 206, rotating the pre-tensioning member 204 over a full 360° and re-locking the orientation by means of the locking screw 206.

[0035] In the closed position, the locking screw 206 is located at an extremity of the groove 224. The hinge is bidirectional, but the top end 201 of the spring is only rotated along with the spring housing in one direction; in the other direction the groove 224 forms a free walk groove through which the locking screw 206 travels, so

that the top end 201 of the spring is not rotated along. As a result, the hinge of figure 11 is a bidirectional hinge with a self-closing function in one direction and a free walk function in the other direction. In this way, for example by using two of these pivot hinges as the hinges 2 and 3 in figure 1, a self-closing door 1 is achieved of which the self-closing function in each direction is provided by a different hinge while the other does not counteract.

[0036] If desired, the self-closing function of the hinge of figure 11 can be fully disabled, simply by removing the locking screw 206.

[0037] The other parts of the second embodiment of the hinge largely correspond to those of the first embodiment and will therefore not be described in detail again. Among others, the following parts can be distinguished in figure 11: one of the mounting and depth adjustment screws 205, the hinge lock 210, the hinge base 213 with counterpart 214, the floor mounting screw 216, the hinge spindle 217 and the stop member 218.

[0038] The third embodiment shown in figures 13-18 comprises an adjustment mechanism by which the pre-tension on the spring 300 can be more finely adjusted. The pre-tensioning member 203 meshes with the teeth 334 of a driving gear 332, which is provided for being rotated by means of a suitable tool through a hole in the spring housing 307. In the same way as in the first embodiment, a locking screw 306 is provided for engaging in one of a plurality of radially extending positioning slots 335, but there are more positioning slots in this third embodiment. Also, the driving gear 332 facilitates the adjustment of the orientation of the pre-tensioning member 303.

[0039] The pre-tensioning member 303 engages the top end 301 of the spring 300, whereas the bottom end 302 is engaged by a spring fixing member 309, which is fixed to the spindle 317 by means of a locking screw 308 and has a slot 325 for holding the bottom end 302 of the spring 300.

[0040] As shown in figure 17, the pre-tensioning member 303 is, like in the first embodiment, provided with a narrow slot 323 for engaging the top end 301 of the spring in either direction and a wide free walk slot 324 for enabling free movement of the top end 301 of the spring with respect to the pre-tensioning member 303. As a result, the self-closing function of the hinge can again be selectively disabled in one or both directions by repositioning the pre-tensioning member 303 on the top end 301 of the spring 300.

[0041] Another difference of the third embodiment with respect to the first embodiment is the mechanism 330 for adjusting the position of the flat part 321 with respect to the spring housing 307 in height direction. This mechanism 330 is separate from the spring housing 307 and is pre-mounted on the flat part 321 by means of a screw 331. The height adjustment is activated when the screw 331 is loosened, so that displacements of the mechanism 330 with respect to the flat part 321 are enabled. The

adjustment can then be made by means of the height adjustment screw 304 with cone-shaped tip, which is mounted eccentric with respect to the hole 337 in the flat part 321. Screwing the height adjustment screw 304 deeper into the hole causes the flat part 321 and hence the rotatable element 1 fixed to it to be lifted, which is also enabled by an amount of play around the mounting screw 305 which mounts the spring housing 307 to the flat part 321 and by the open sleeve 336 at the top side of the mechanism 330. The advantage of this mechanism, separate from the spring housing 307, is that the height adjustment is no longer linked to the depth adjustment, which greatly facilitates the making of these adjustments as they can be made independent from each other. Furthermore, as shown in figure 18, the height adjustment mechanism 330, pre-mounted on the flat part 321, facilitates the fixing of a rotatable element 1 to the hinge. Once the flat part 321 is fixed onto the rotatable element, the rotatable element is simply rested on the hinge by placing the mechanism 330 on top of the housing 307. The holes for the mounting screws 305 are thereby more easily brought in front of the mounting screws 305.

[0042] The other parts of the third embodiment of the hinge largely correspond to those of the first embodiment and will therefore not be described in detail again. Among others, the following parts can be distinguished in figure 13: the mounting and depth adjustment screws 305, the hinge lock 310 with spring 311 and spindle 319, the hinge base 213 with counterpart 214 and tensioning bolt 312, shock absorbers 315, the floor mounting screw 316 with a nut 333 which can be used for fixing the hinge to an upper frame part of a door frame, the hinge spindle 317, spacer screws 320 and spiral pressure springs 322.

[0043] Figure 20 shows a fourth embodiment of a pivot hinge according to the invention. In this embodiment, the top and bottom ends 401, 402 of the spring are respectively held by a pre-tensioning member 403 and a spring fixing member 409, which are together provided for imposing a minimal predetermined pre-tension on the spring 400, like in the second embodiment. The difference here is that the predetermined pre-tension is selectable upon assembling the hinge. To this end, the spring fixing member 409 comprises a plurality of slots 441-444, radially displaced with respect to each other, for engaging the bottom end 402 of the spring 400. Each of these slots 441-444 defines a different pre-tension.

[0044] Another difference here is in the pre-tensioning member, which is shaped for selectively engaging the top end 401 of the spring 400 either in one direction or in the other direction, so to achieve a hinge with a self-closing function in one direction and a free walk function in the opposite direction, the functions being switchable with respect to each other. To this end, the lower part of the pre-tensioning member 403 comprises a peripheral groove spanning 180° of rotation of the hinge, a through bore 405 for inserting a locking screw 406 from either side, and a marking 404 on the top side for indicating the

orientation of the pre-tensioning member 403 to the installer. In order to switch the functions, the installer unscrews the locking screw 406, rotates the pre-tensioning member 403 over 180° to bring the top end 401 of the spring at the opposite extremity of the peripheral groove and then reintroduces the locking screw 406 in the bore 405 to fix the orientation.

[0045] The other parts of the fourth embodiment of the hinge largely correspond to those of the first embodiment and will therefore not be described in detail again. Among others, the following parts can be distinguished in figure 20: the spring housing 407, the spring fixing screw 408, the hinge lock 410 with spring 411 and spindle 419, the hinge base 413, the hinge spindle 417, the stop member 418 and the nut 433 which is used when fixing the hinge to a top frame part of a door frame.

[0046] Figures 21 and 22 show alternative embodiments for the stop for stopping rotation of the hinge beyond the first and second open positions. The embodiment of figure 21 is used in the second embodiment of the hinge of figure 11 and the fourth embodiment of figure 20 and comprises a sheet metal stop member 218 with end ridges 227. The embodiment of figure 22 is used in the third embodiment of the hinge of figures 13-14 and has an end ridge 327 which is integrated on the hinge base 313. The embodiment of figure 21 has the advantage that the stop member 218 can be removed from the hinge if it is not necessary, for example if it is desired to have a door which can be swung open further. The embodiment of figure 22 has the advantage that one less constructional part is needed.

[0047] In embodiments described above, the pre-tension of the spring is after installation adjustable by repositioning the pre-tensioning member with respect to the spring housing, i.e. by means of an adjustment at the top end of the spring. In alternative embodiments, adjusting mechanisms for this purpose could also be provided at the bottom end of the spring, for example mechanisms enabling in some way adjustment of the orientation of the spring fixing member with respect to the base spindle.

Reference list

[0048]

1	door / rotatable element
2	pivot hinge
3	pivot hinge
4	frame
100	spring
101	first end
102	second end

103	pre-tensioning member	204	pre-tensioning member
104	height adjustment screw	205	mounting & depth adjustment screw
105	mounting & depth adjustment screw	5 206	locking screw
106	locking screw	209	spring fixing member
107	spring housing	210	hinge lock
108	locking screw	10 213	hinge base
109	spring fixing member	214	hinge base counterpart
110	hinge lock	15 216	floor mounting screw
111	hinge lock spring	217	hinge spindle
112	hinge base tensioning bolt	218	stop member
113	hinge base	20 224	groove
114	hinge base counterpart	227	end ridge
115	shock absorber	25 300	spring
116	floor mounting screw	301	first end
117	hinge spindle	302	second end
118	stop member	30 303	pre-tensioning member
119	hinge lock spindle	304	height adjustment screw
120	spacer screw	35 305	mounting & depth adjustment screw
121	flat part	306	locking screw
122	spiral pressure spring	307	spring housing
123	slot	40 308	locking screw
124	free walk groove	309	spring fixing member
125	notch	45 310	hinge lock
126	ridge	311	hinge lock spring
127	end ridge	312	hinge base tensioning bolt
128	end ridge	50 313	hinge base
200	spring	314	hinge base counterpart
201	first end	55 315	shock absorber
202	second end	316	floor mounting screw

317 hinge spindle
 319 hinge lock spindle
 320 spacer screw
 321 flat part
 322 spiral pressure spring
 323 slot
 324 free walk groove
 325 slot
 327 end ridge
 330 height adjustment mechanism
 331 screw
 332 driving gear
 333 nut
 334 teeth
 335 positioning slots
 336 open sleeve
 337 hole
 400 spring
 401 first end
 402 second end
 403 pre-tensioning member
 404 marking
 405 through bore
 406 locking screw
 407 spring housing
 408 locking screw
 409 spring fixing member
 410 hinge lock
 411 hinge lock spring

413 hinge base
 415 shock absorber
 5 417 hinge spindle
 419 hinge lock spindle
 441 slot
 10 442 slot
 443 slot
 15 444 slot

Claims

- 20 1. A self-closing pivot hinge for rotatably mounting a rotatable element (1), such as for example a door, a window or the like, in an opening (4), the pivot hinge comprising:
- 25 - a first part (107; 307; 407) attachable to the rotatable element and a second part (113; 213; 313; 314) attachable to a side of the opening, the first and second parts being rotatable with respect to each other about a rotation axis from a closed position in which the rotatable element closes off the opening to at least a first open position;
- 30 - a spring (100; 200; 300; 400) mounted along the rotation axis
- 35 and providing a self-closing function to the pivot hinge; **characterised in that** the second part (113; 213; 313; 413) of the pivot hinge comprises a wedge-shaped upstanding part and a wedge-shaped counterpart (114; 214; 314), joined together by means of a tensioning bolt (112; 312),
- 40 for clamping the pivot hinge on a selectable height in a corresponding groove of a frame part (4) provided on the side of the opening.
- 45 2. A self-closing pivot hinge according to claim 1, **characterised in that** the upstanding part and the counterpart have complementary slanted contact surfaces and corrugated outer surfaces.
- 50 3. A self-closing pivot hinge according to any one of the previous claims, **characterised in that** the hinge is provided for being opened in a first direction towards the first open position and in a second direction, opposite the first direction, towards a second open position.
- 55 4. A self-closing pivot hinge according to any one of the previous claims, **characterised in that** the first

part of the hinge is provided with user accessible adjustment means (104, 105; 330, 305) for adjusting the position of the rotatable element fixed to the first part in height and/or depth direction.

- 5
5. A self-closing pivot hinge according to any one of the previous claims, **characterised in that** the pivot hinge comprises an integrated hinge lock (110; 210; 310; 410) for locking the hinge in the/each open position. 10
6. A self-closing pivot hinge according to any one of the previous claims, **characterised in that** the pivot hinge comprises an integrated stop member (118; 218; 327; 418) for stopping the rotation at the/each open position. 15
7. A self-closing pivot hinge according to any one of the previous claims, **characterised in that** the first part comprises a spring housing (107; 307; 407) which substantially completely encloses the spring and is constructed in a sound isolating material. 20
8. A combination comprising 25
- a rotatable element (1), such as for example a door, a window or the like, provided for being mounted in an opening,
 - at least one frame part (4) provided for being mounted on a side of the opening and 30
 - at least one hinge for rotatably mounting the rotatable element (1) to the frame part (4), **characterised in that** the/each hinge is a self-closing pivot hinge according to any one of the claims 1-7 and **in that** the/each frame part (4) comprises a corresponding groove for clamping the wedge-shaped up-standing part and counterpart (114; 214; 314) of the pivot hinge on a selectable height. 35
- 40
- 45
- 50
- 55

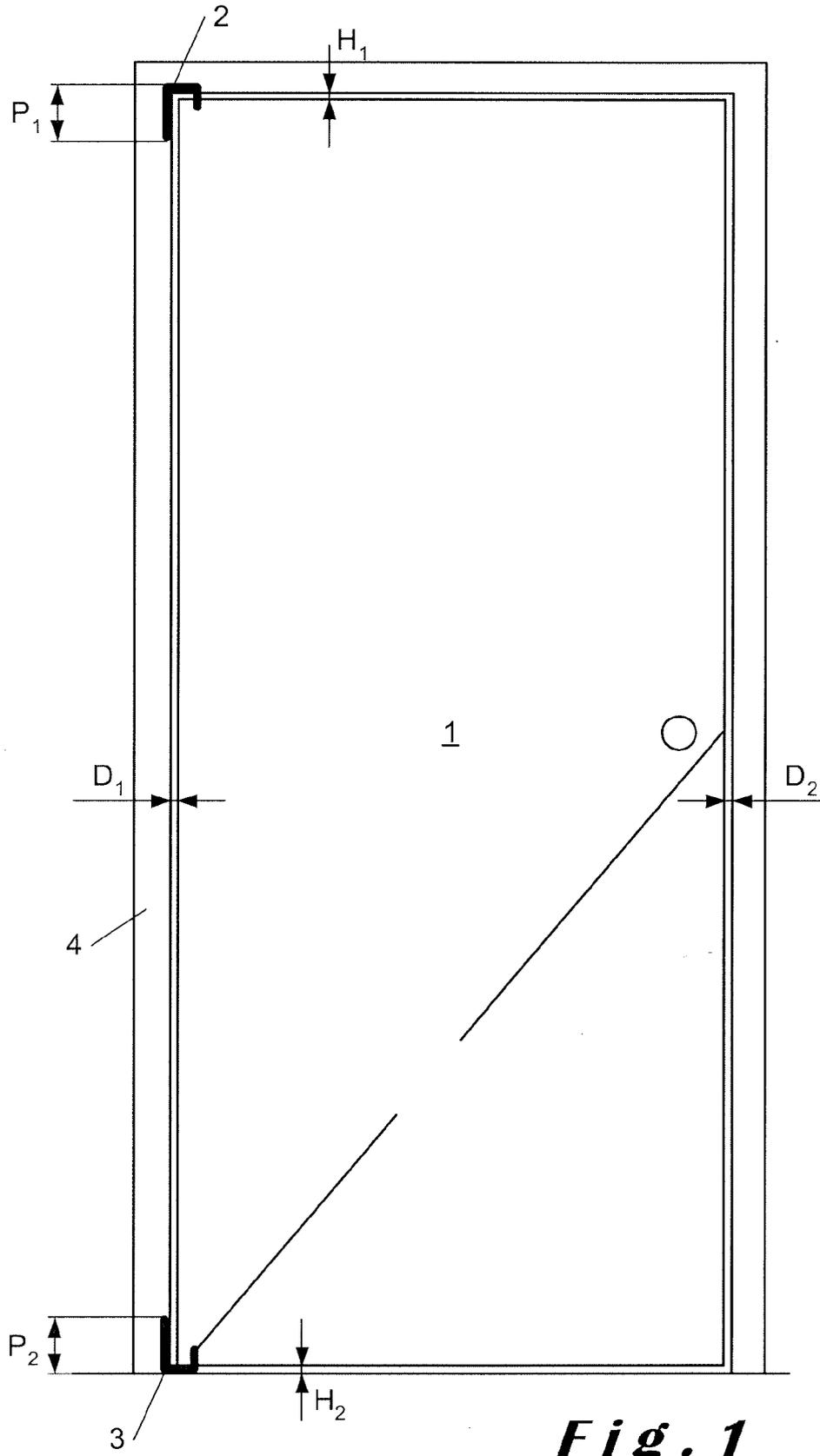


Fig. 1

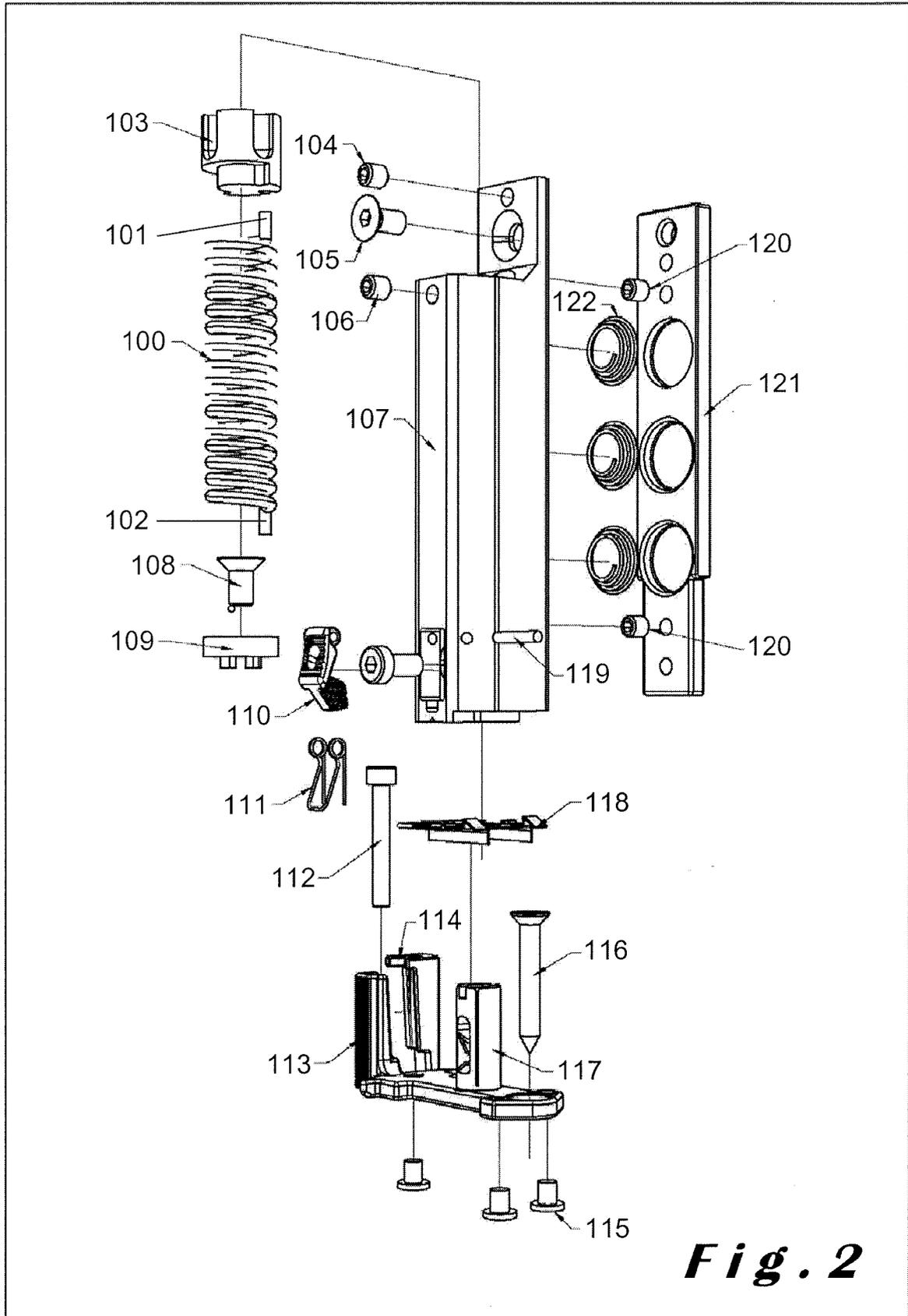


Fig. 2

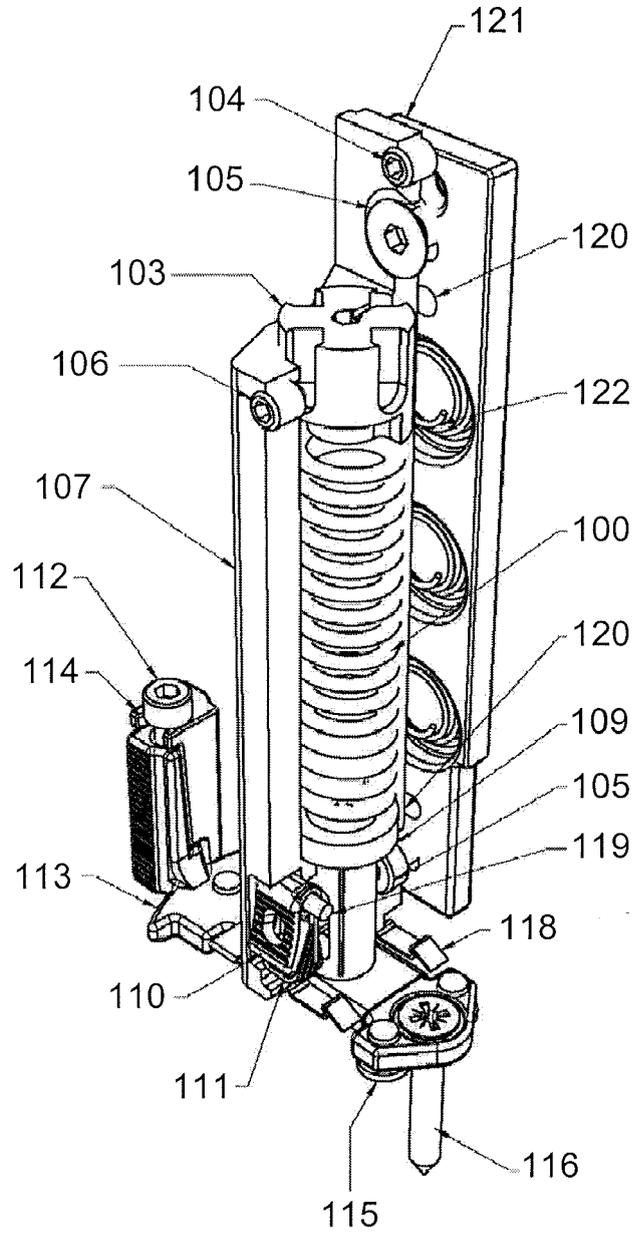


Fig. 3

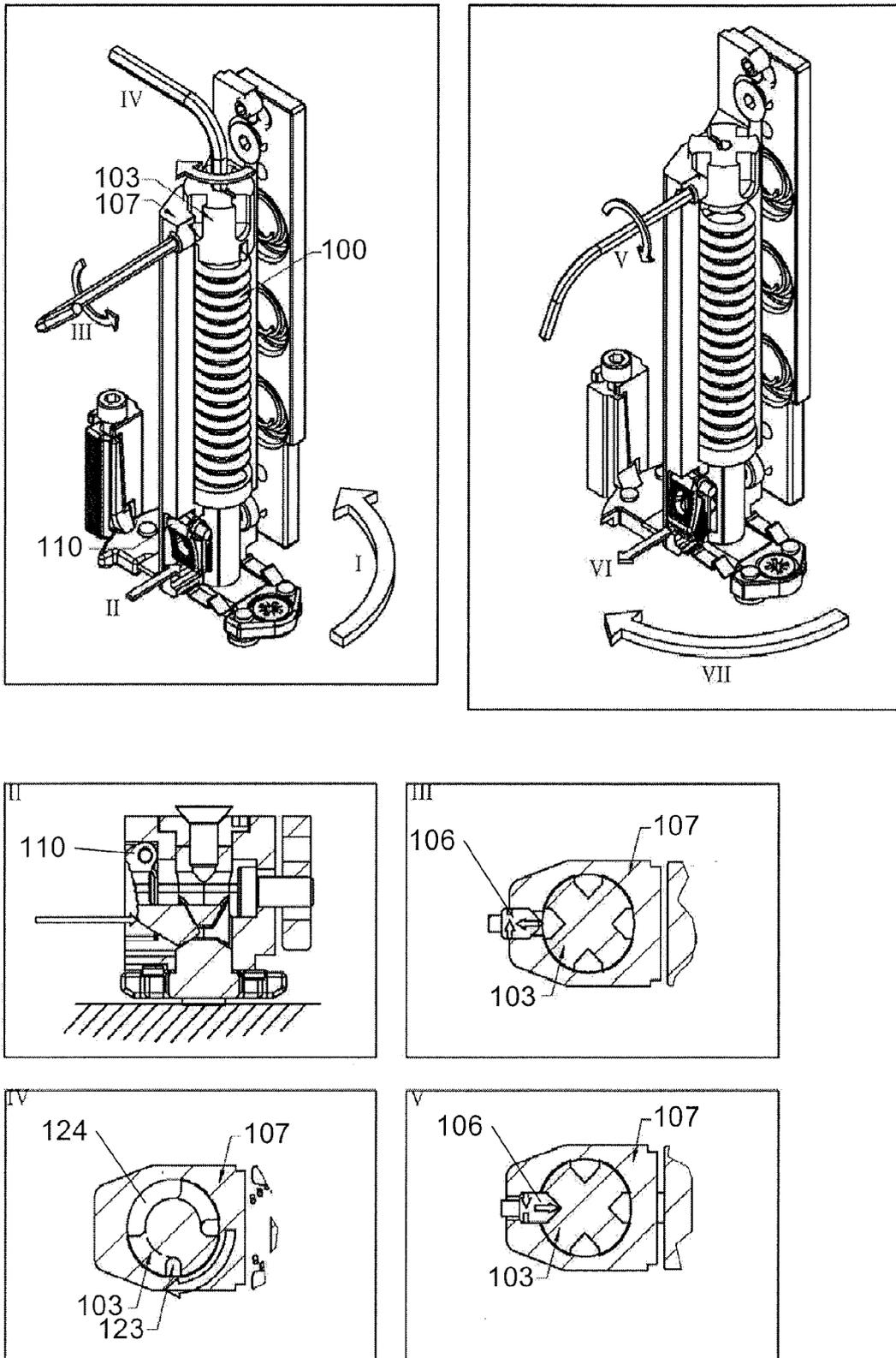


Fig. 4

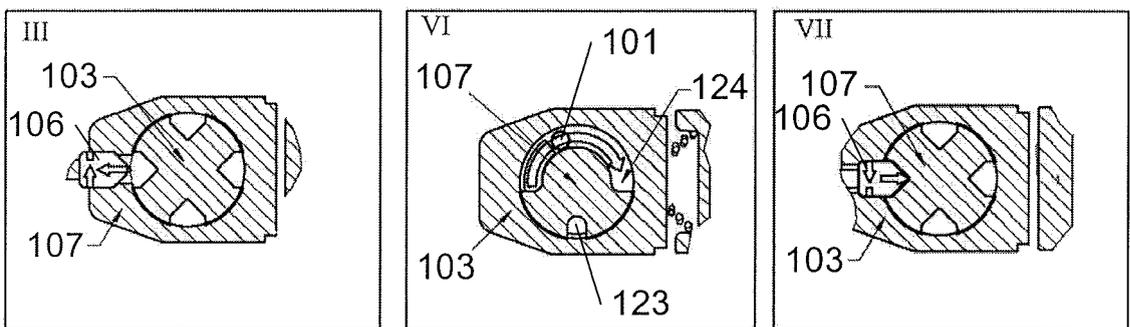
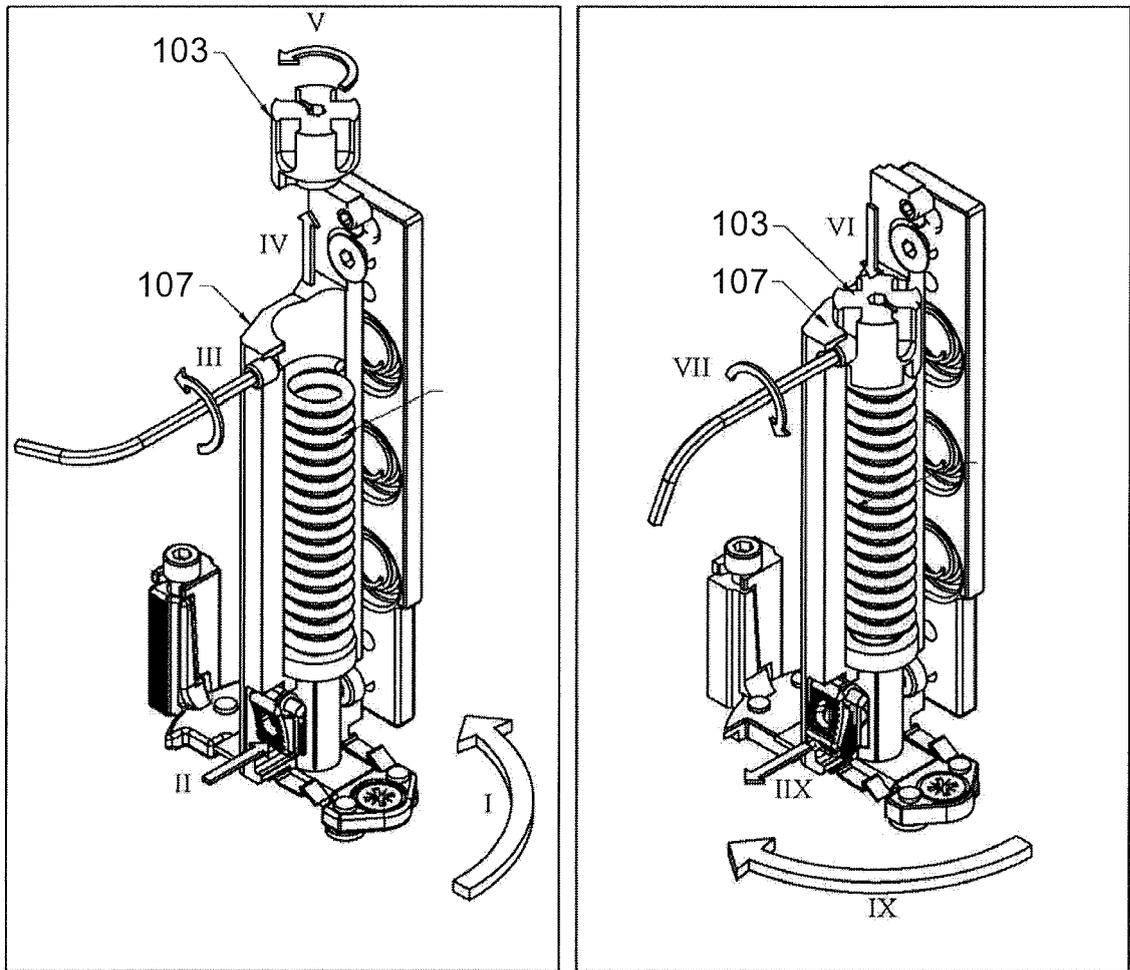


Fig. 5

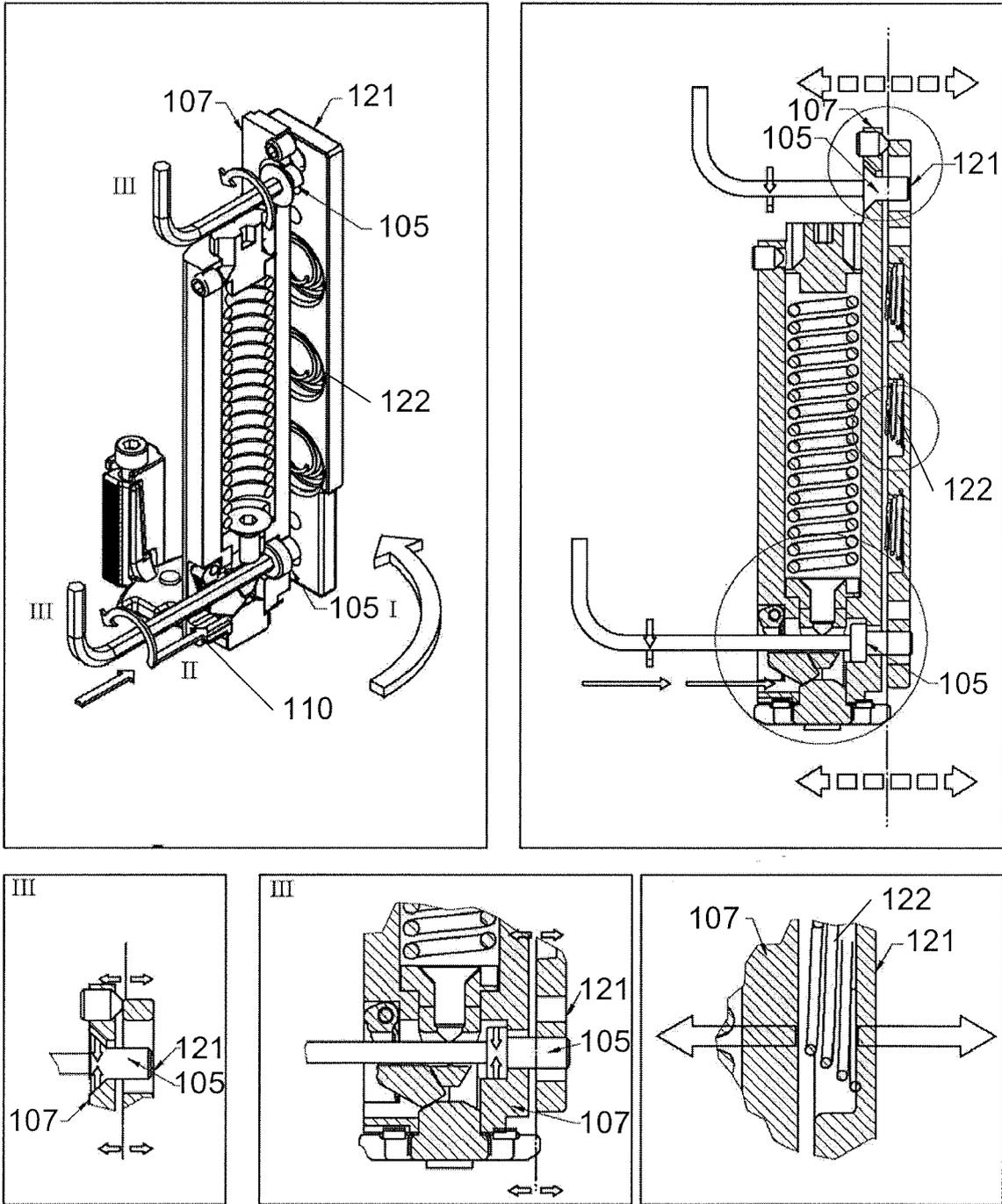


Fig. 6

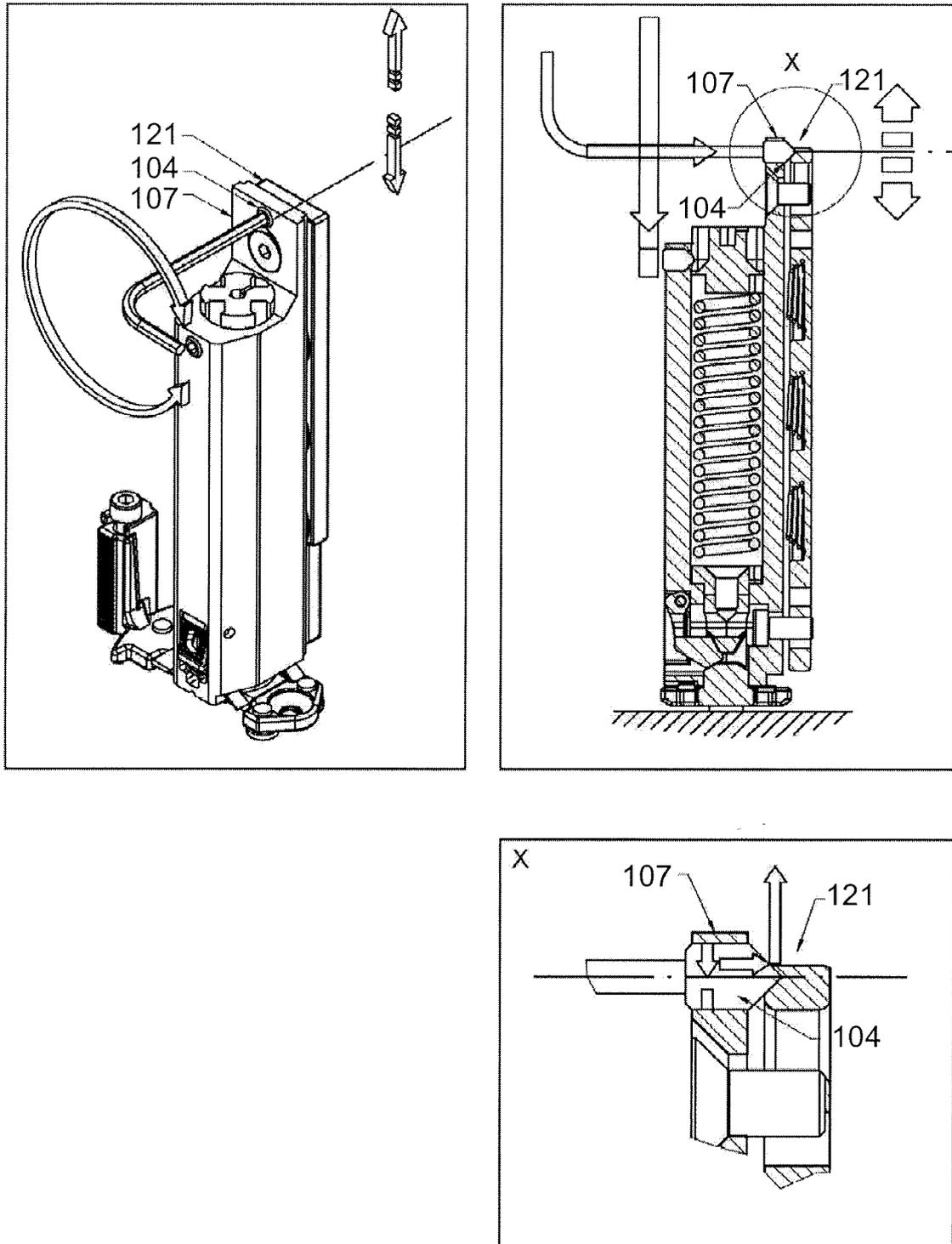


Fig. 7

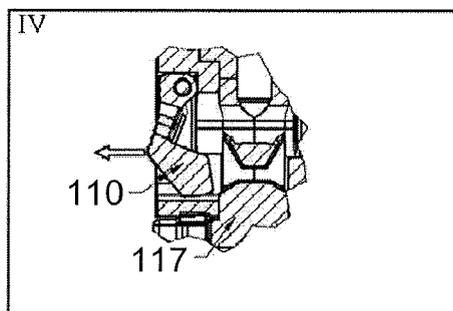
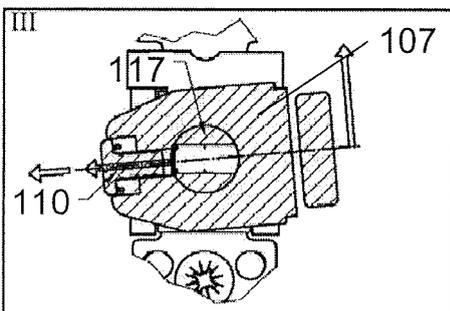
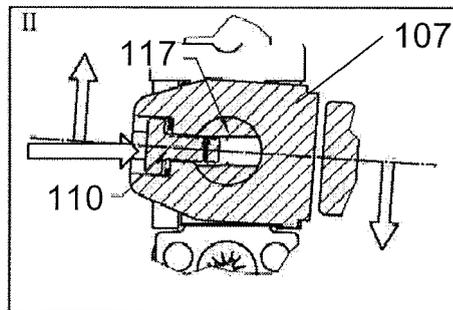
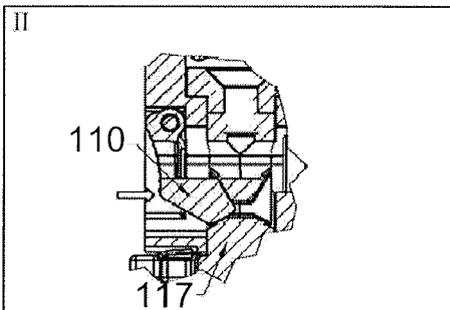
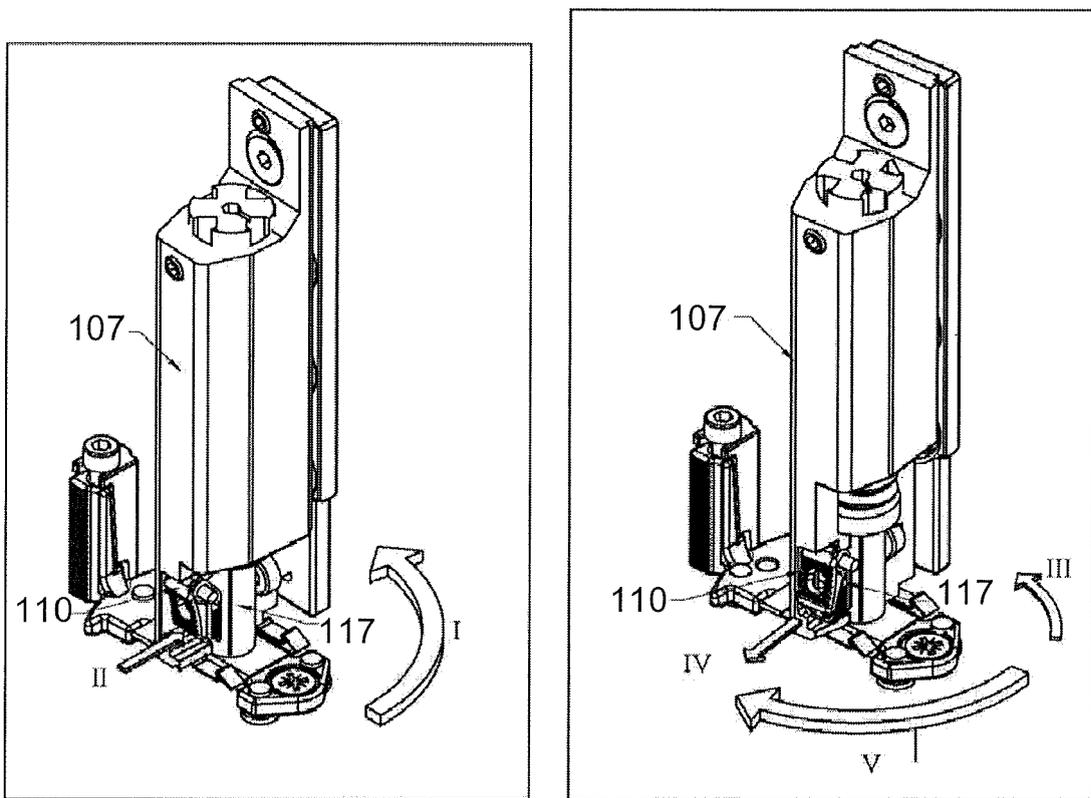


Fig. 8

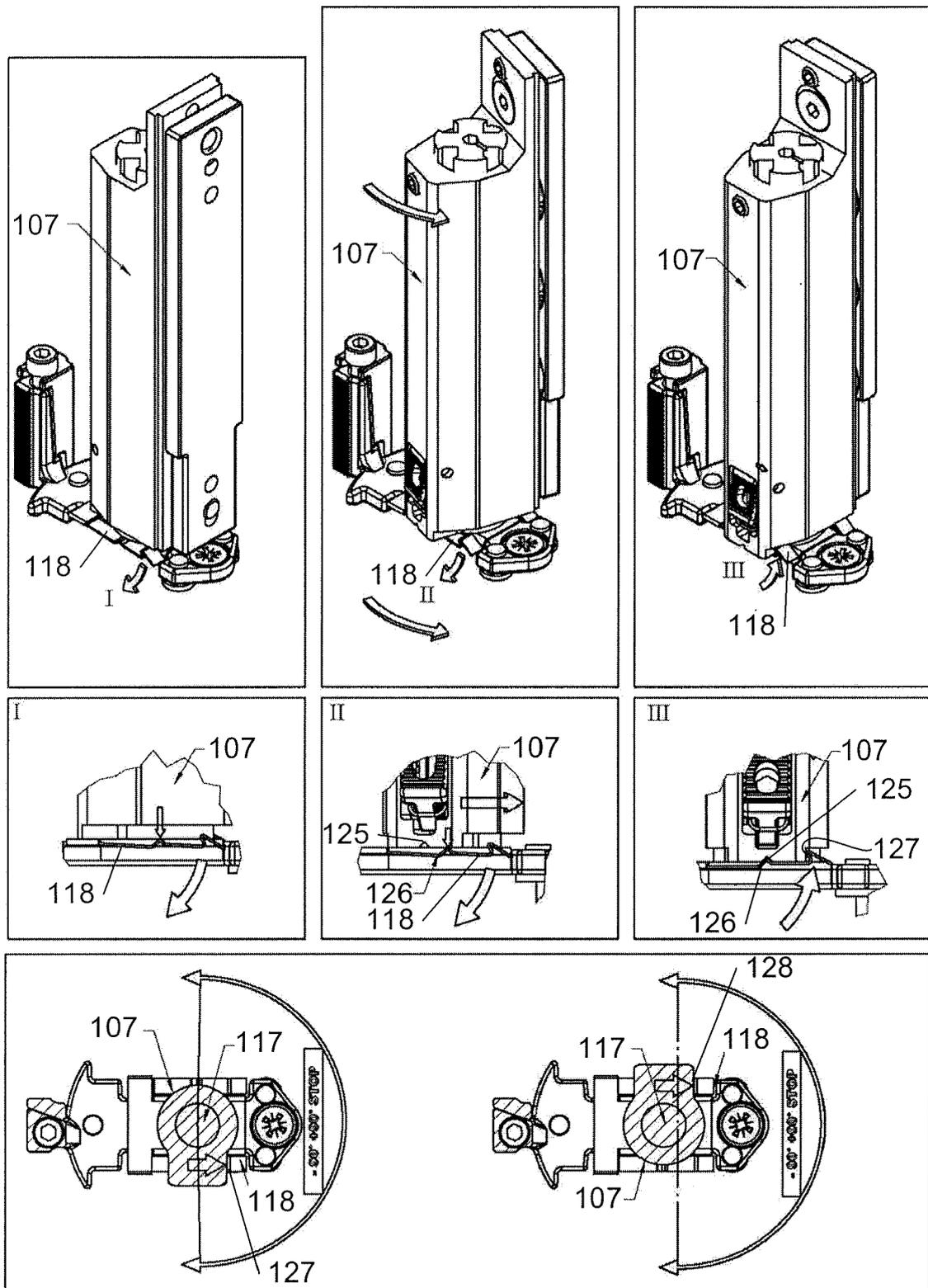


Fig. 9

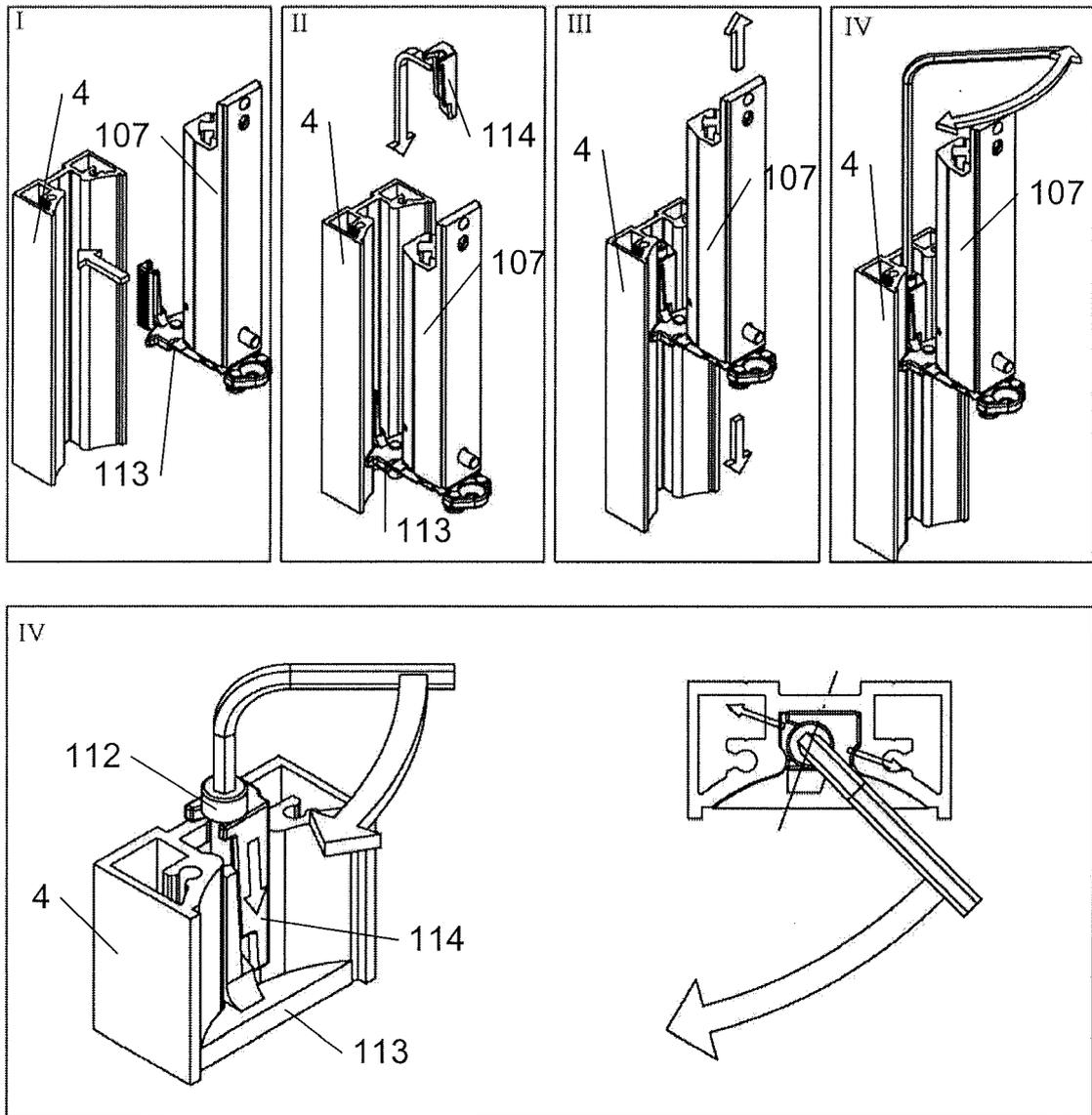


Fig. 10

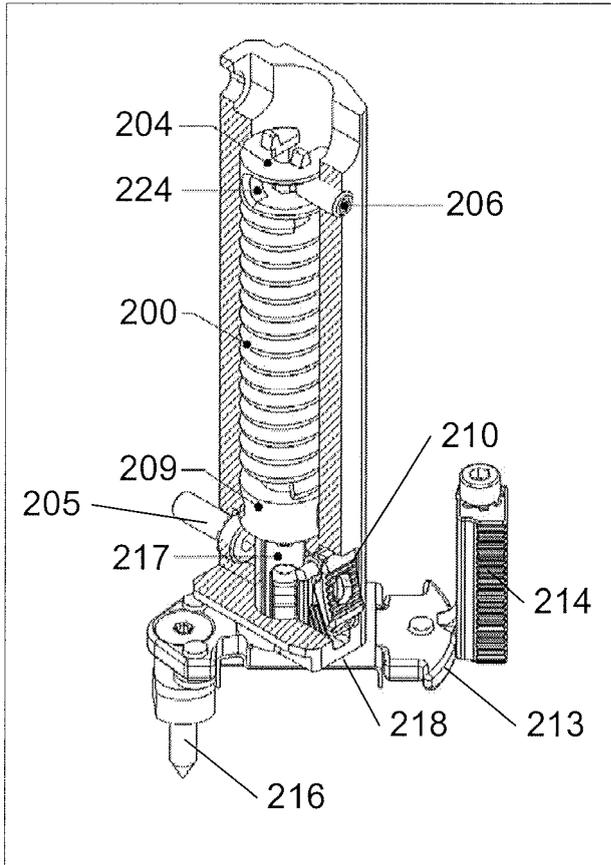


Fig. 11

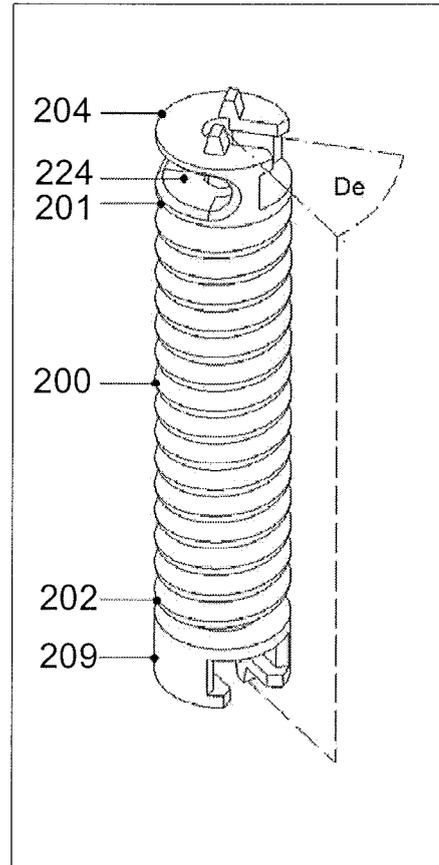


Fig. 12

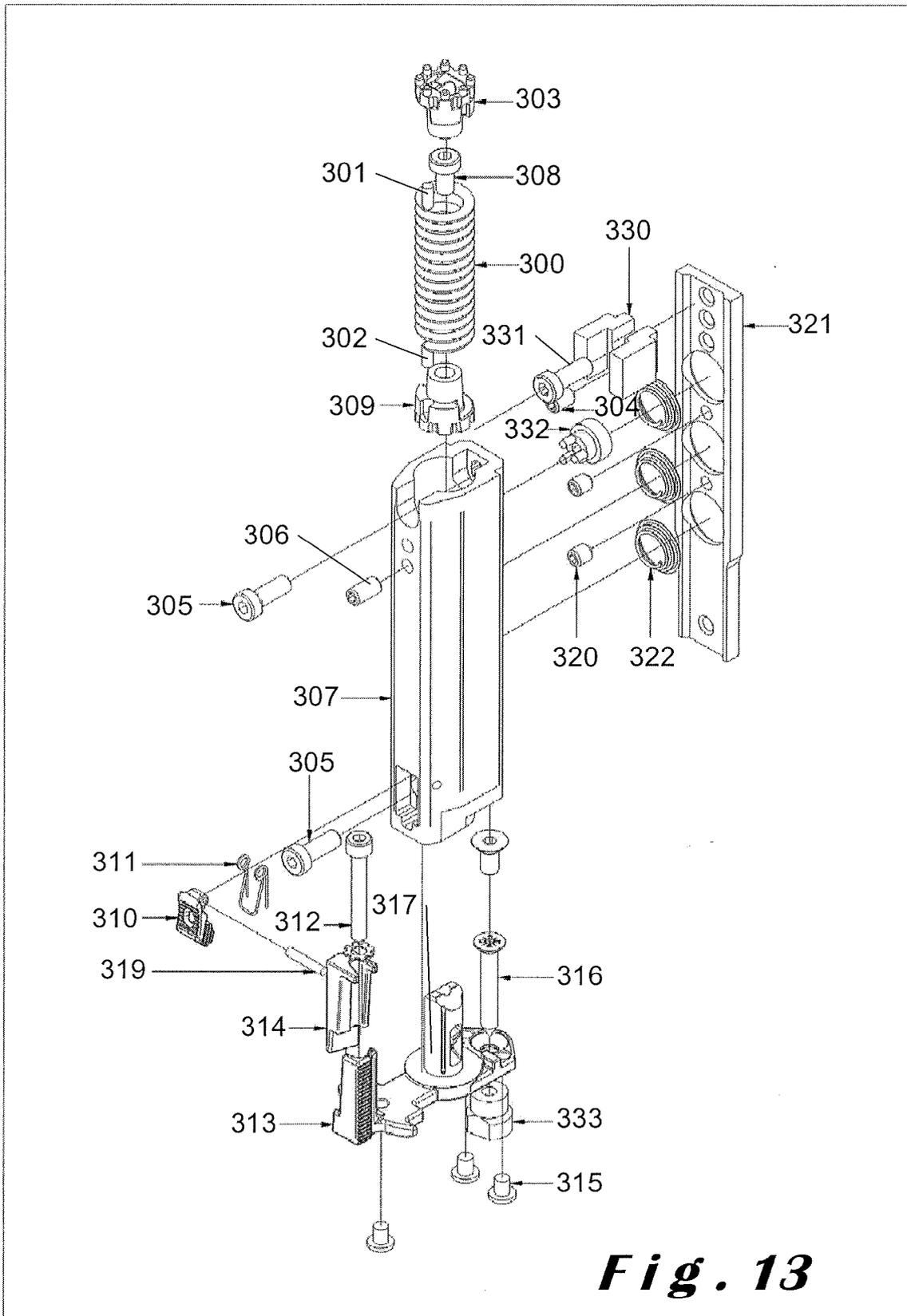


Fig. 13

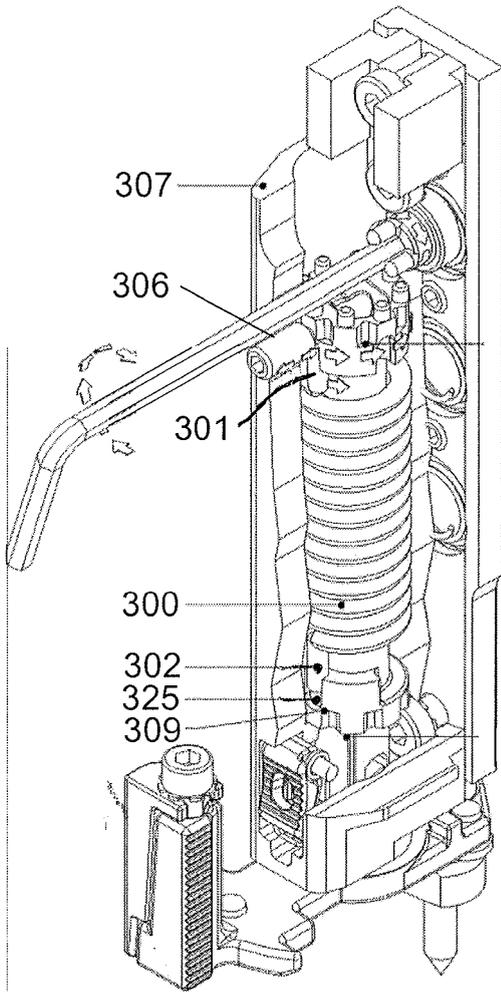


Fig. 14

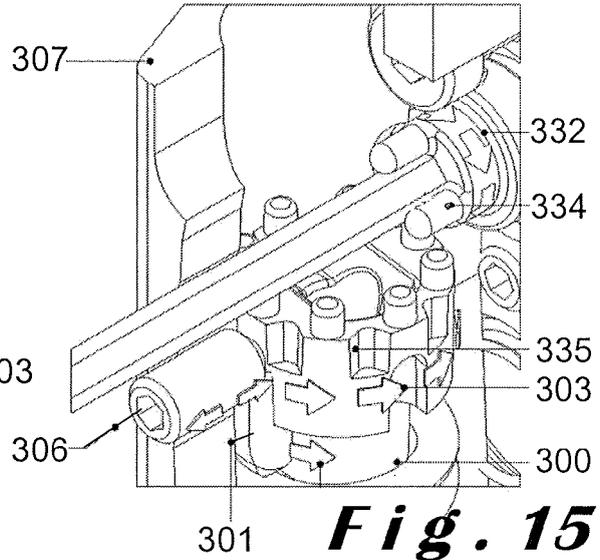


Fig. 15

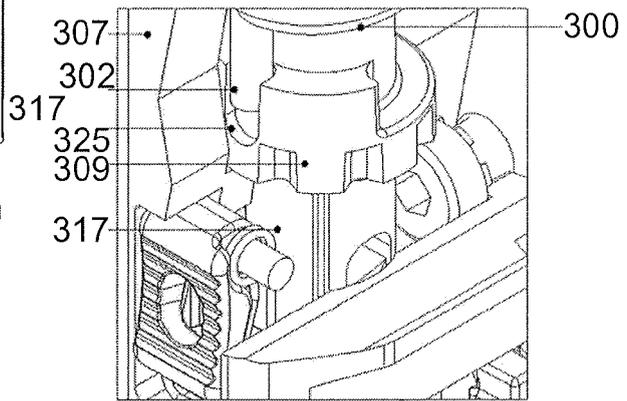


Fig. 16

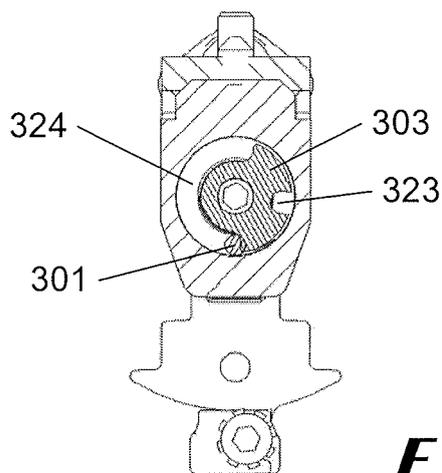


Fig. 17

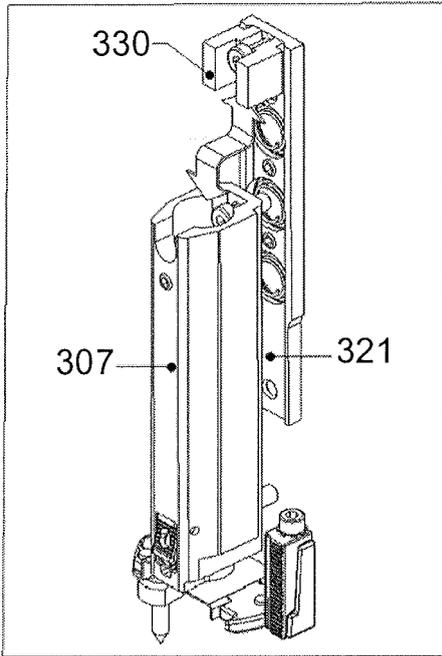


Fig. 18

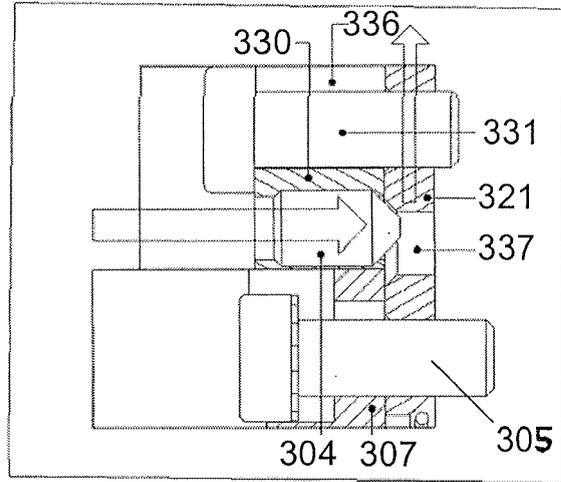


Fig. 19

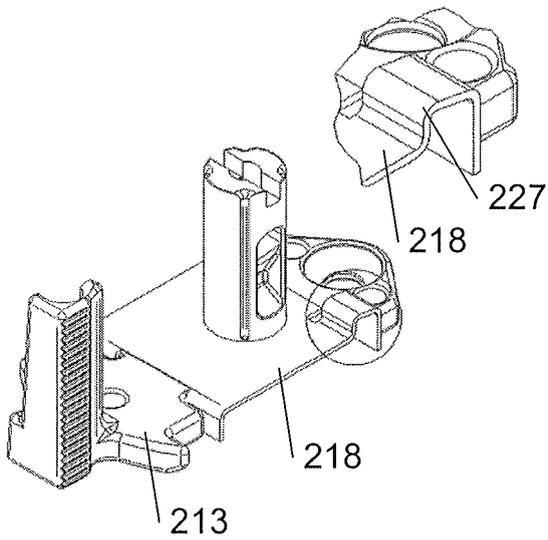


Fig. 21

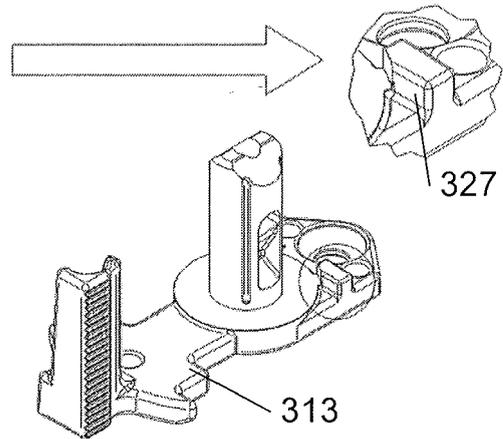


Fig. 22

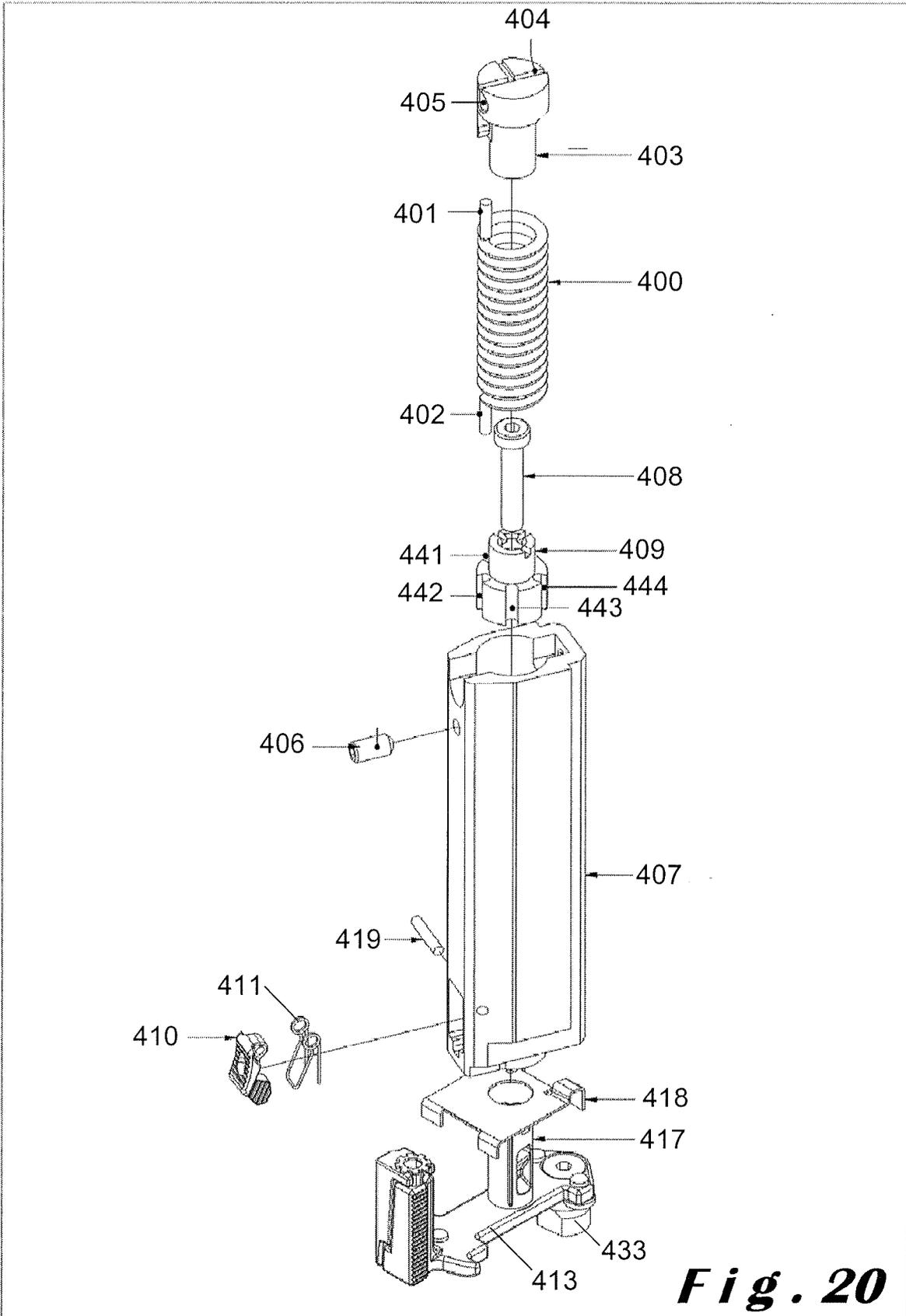


Fig. 20



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 Application Number
 EP 10 19 1416

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Munich		9 March 2011	Balice, Marco
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