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(54) **Device , especially baking oven**

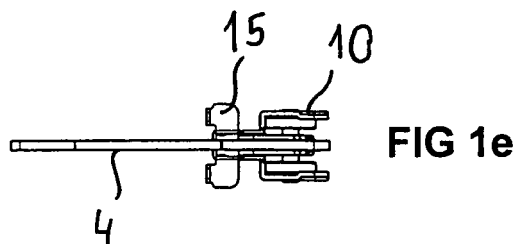
(57) Device, especially a baking oven, particularly a home baking oven,

- a) with a door,
- b) with a feeding area, especially a baking muffle,
- c) where the feeding area is closable by the door,
- d) where the door is connected with the feeding area by at least one hinge (5),
- e) where in the door-sided part, the at least one hinge comprises a door lever (4),

f) where at the door lever (4), a traction lever (6) is rotatably attached,

g) where the traction lever (6) is connected via a coupling element (7,16') with at least one traction element (8), whereby through the at least one traction element (8), a first force F1 is applicable to the coupling element (7),

h) where the coupling element (7,16') is in an interacting connection with at least one interacting element (9,13,14), by which a second force F2 is applicable onto the coupling element (7,16').



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Description

[0001] The invention relates to a device, especially a baking oven, particularly a home baking oven, with a door, with a feeding area, especially a baking muffle, where the feeding area is closable by the door, where the door is connected with the feeding area by at least one hinge.

[0002] For closing of the door, the door is rotated around the center of the hinge.

[0003] When closing, it should be avoided that the door closes too fast, which can cause injuries, damages or noise. On the other hand, it should be ensured that the door closes densely so that the feeding area is safely closed. This makes it easier to keep the desired temperature inside the feeding area.

[0004] Consequently, it is desirable that the closing of the door is done in a controlled way which prevents the named disadvantages.

[0005] Furthermore, it is desired that the solution can be achieved in a way that no further separate parts or at least as few separate parts as possible are necessary. This can save manufacturing costs as well as space. Cost reduction is a very important action to keep competitive, especially in the production of baking ovens, particularly in the production of home baking ovens. Also, the space required should be reduced as much as possible.

[0006] Therefore, it is an object of the invention to propose a new device without the names disadvantages.

[0007] This object is solved by a device according to claim 1. Advantageous embodiments are described particularly in the dependent claims.

[0008] According to claim 1, the invention comprises a device, especially a baking oven, particularly a home baking oven, with a door, with a feeding area, especially a baking muffle, where the feeding area is closable by the door, where the door is connected with the feeding area by at least one hinge, where at at least one hinge, a traction lever is attached, where in the door-sided part, the at least one hinge comprises a door lever, where at the door lever, a traction lever is rotatably attached, where the traction lever is connected or connectable via a coupling element with at least one traction element, where by the at least one traction element, a first force F1 is applicable to the coupling element, where the coupling element is bringable into or is in at least one interacting connection with at least one interacting element, where a second force F2 is applicable onto the coupling element by the at least one interacting element.

[0009] This means that the traction lever and thus the force when opening or closing the door can be influenced via the coupling element by the at least one traction element, implying a traction force, on the one hand and by the at least one interacting element, implying an interac-

tion force, on the other hand.

[0010] By these elements, it can be, on the one hand, avoided, particularly by the traction force, that the door moves, opens or closes too fast. On the other hand, a dense closing of the door closes can be supported, which is particularly enabled by the interaction force. The splitting of these tasks into at least two elements makes it, on the one hand, easier to optimize the opening and closing behaviour of the door and, on the other hand, easier and cheaper to manufacture as, after splitting the tasks into simpler force paths, simpler and thus cheaper elements can be used.

[0011] Consequently, the closing and opening of the door is possible in a controlled way which is, at the same time, at least relatively simple and cheap to achieve.

[0012] Preferably, the device, especially the hinge, comprises a housing which is preferably arranged below or at the feeding area, where the lever extends into the housing and/or the coupling element and/or the at least one traction element and/or the at least one interacting element is/are arranged inside the housing. This is a safe and space-saving way to place and/or protect the coupling element and/or the at least one traction element and/or the at least one interacting element and to assemble it/them into the device.

[0013] In a preferred embodiment, the first force F1 is at least essentially parallel to at least one surface of the housing and/or the second force F2 has an interacting component parallel to a surface of the housing. A force or at least a component parallel to a surface of the housing is necessary or at least helpful for the interaction with the traction lever, especially if, which is advantageous, the traction lever also moves parallel to a surface of the housing.

[0014] Preferably, the at least one traction element is a spring, especially a spiral spring. A spring, especially a spiral spring is a good way to apply a constant force to the coupling element. Furthermore it is easy to assemble, at least relatively cheap to produce and needs at least relatively little space.

[0015] Preferably, the at least one interacting element is a spring, especially a flat spring, and/or a damping element. A flat spring is also at least relatively easy and cheap to produce and to assemble, furthermore it can apply a force which is changing in a defined way along the moving path of the coupling element. That means, for example, the force can increase and then decrease during opening or closing along the moving path, as desired. Also a damping element can interact in a useful way with the traction lever.

[0016] In a preferred embodiment, the at least one interacting element has at least two different interacting areas where a first interacting area is directed towards the center of the hinge which is the pivot point of the hinge and a second interacting area is directed away from the center of the hinge. The direction towards the center or away from the center of the hinge enables different in-

teractions with the coupling element along the moving path.

[0017] Preferably, the at least one interacting element has two different interacting areas where a first interacting area implies a force onto the coupling element towards the center of the hinge and a second interacting area implies a force onto the coupling element away from the center of the hinge. This makes it possible, for example, to support the closing of the door right before closing in the first interacting area on the one hand and to support the opening of the door in the second interacting area on the other hand after passing the first interacting area.

[0018] Preferably, the coupling element is a roll pivoted by a bolt. A roll can be moved with very little friction so that the moving path is not much influenced or retarded by the movement of the coupling element itself.

[0019] In a preferred embodiment, the pivot axis of the bolt is parallel to a side surface of the traction lever. This enables a very narrow design of the housing.

[0020] In an alternative preferred embodiment, the pivot axis of the bolt is perpendicular to a side surface of the traction lever. This enables a very stable design of the housing.

[0021] Preferably, the traction lever is rotatably attached to the door lever by a pivot centered by a pivot axis, where the pivot axis of the traction lever is fixed outside the housing, especially above the top side of the housing. This can elongate the way by which the lever is moved, while, on the other hand, the housing can be designed in a flat way.

[0022] In a preferred embodiment, the traction lever is movable inside the housing, preferably parallel to at least one side surface of the housing, where particularly the traction lever is movable along a certain and/or predefined distance and/or is designed in such a way that it elongates the covered distance during opening or closing the door.

[0023] Preferably, the traction lever is movable by a distance of 20 to 40 mm, in a preferred embodiment by 25 to 35 mm and in a particularly preferred embodiment by 29 to 30 mm. The movability by 20 to 40 mm, in a preferred embodiment by 25 to 35 mm and in a particularly preferred embodiment by 29 to 30 mm, is a good basis for controlling the opening and/or closing of the door as the traction and/or interacting elements need a certain and/or predefined moving path to work properly. Especially it is useful if the path is long enough that all desired elements can interact. On the other hand, the moving path should not be too long as this increases the costs for the housing and the overall hinge.

[0024] The invention will now be described in further detail with reference to the drawings where it shows

FIG 1a the hinge according to an embodiment of the invention in a perspective view,
 FIG 1b the hinge according to FIG 1a in a view from the bottom,
 FIG 1c the hinge according to FIG 1a in a view from

FIG 1d the side,
 the hinge according to FIG 1a in a view from the top,
 FIG 1e the hinge according to FIG 1a in a view from the front,
 5 FIG 2a the housing according to an embodiment of the invention in a view from the side,
 FIG 2b the housing according to FIG 2a in a view from the bottom,
 10 FIG 2c the housing according to FIG 2a in a view from the front,
 FIG 2d the housing according to FIG 2a in a perspective view,
 15 FIG 3a the traction lever according to an embodiment of the invention in a view from the side,
 FIG 3b the traction lever according to FIG 3a in a perspective view,
 FIG 3c the traction lever according to FIG 3a in a view from the front,
 20 FIG 4a the door lever according to an embodiment of the invention in a perspective view,
 FIG 4b the door lever according FIG to 4a in a view from the side,
 25 FIG 4c the door lever according to FIG 4a in a view from the front,
 FIG 5a the locking hatchet according to an embodiment of the invention in a view from the side,
 FIG 5b the locking hatchet according to FIG 5a in a view from another side,
 30 FIG 5c the locking hatchet according to FIG 5a in a cross sectional view along A-A,
 FIG 5d the locking hatchet according to FIG 5a in a perspective view,
 35 FIG 6a the roll according to an embodiment of the invention in a perspective view,
 FIG 6b the roll according to FIG 6a in a view from the front,
 FIG 6c the roll according to FIG 6a in a view from the side,
 40 FIG 7a the bolt according to an embodiment of the invention in a view from the front,
 FIG 7b the bolt according to FIG 7a in a view from the side,
 45 FIG 7c the bolt according to FIG 7a in a perspective view,
 FIG 8 the interior of the housing according to an embodiment of the invention with one flat spring,
 50 FIG 9 the interior of the housing according to another embodiment of the invention with two flat springs,
 FIG 10 the interior of the housing according to another embodiment of the invention with a damper,
 55 FIG 11a the interior of the housing according to another embodiment of the invention with two flat springs from the side in a cross sectional

view,
 FIG 11b the interior of the housing according to FIG 11a with two flat springs from the top,
 FIG 11c the interior of the housing according to FIG 11a with two flat springs from the top,

[0025] FIG 1a to FIG 1d show the hinge 5 according to an embodiment of the invention in different views. A door lever 4 is, at its lower outer end, rotatably fixed to an edge area of a housing 10 in a pivot point 10d. In its lower part, the door lever 4 comprises at its inner side a bore to establish a further pivot point 4e.

[0026] A traction lever 6 is at its front end rotatably fixed to the pivoting area 4e of door lever 4 with its pivoting area 6d. The traction lever 6 extends into the housing 10. The traction lever 6 is, at its back end, rotatably fixed to a roll 7 via a bolt 16. When the door is closed, the traction lever 6 is pushed into the housing 10.

[0027] The traction lever 6 is, with its pivoting area 6d, rotatably fixed to the pivoting area 4e of the door lever 4 outside and above the housing 10. This elongates the covered distance of the traction lever 6 inside the housing 10 during opening and closing the door so that the desired interactions can be performed. On the other hand, the required space for the housing 10 can be reduced.

[0028] Also rotatably fixed at the pivoting area 4e of the door lever 4 is a locking hatchet 15 with its pivoting area 15d.

[0029] FIG 2a to FIG 2d show the housing 10 according to an embodiment of the invention in different views. It comprises an upper face 10a and two side faces 10b and 10c adjoining perpendicularly to both sides of the upper face 10a. The upper face 10a comprises a recess 10g which is at least substantially quadratic. The side faces 10f comprise elongated recesses 10f which work as a bearing for the roll.

[0030] FIG 3a to FIG 3c show the traction lever 6 according to an embodiment of the invention in different views. It comprises an bottom face 6a and two side faces 6b and 6c adjoining perpendicularly to both sides of the bottom face 6a. The side faces 6b and 6c comprise, in the front part, two extensions 6f, 6g, which are directed to the front and then upwards from the bottom surface 6a. Consequently, the traction lever 6 is, in a side view, at least substantially L-shaped.

[0031] In the end areas of the extensions 6f, 6g, bores 6d are arranged which are used as pivoting points.

[0032] FIG 4a to FIG 4c show the door lever 4 according to an embodiment of the invention in different views. It comprises an upper surface 4a and two side surfaces 4b and 4c adjoining perpendicularly to both sides of the upper surface 4a. At the upper front end, a bore 4d is arranged which is used as a pivoting point. In the lower front area, a bore 4e is arranged which is used as a pivoting point for the traction lever 6.

[0033] FIG 5a to FIG 5d show the locking hatchet 15 according to an embodiment of the invention in different views. It comprises an upper face 15a and two side faces

15b and 15c adjoining perpendicularly to both sides of the upper face 15a. In the end areas of the side faces 15b and 15c, bores 15d and 15e are arranged which are used to form a pivoting point. Furthermore, it comprises side faces 15f and 15g adjoining perpendicularly to the side faces 15b and 15c and to the upper face 15a. At its upper end, the side faces 15f and 15g have bendings extending parallel to the upper face 15a.

[0034] FIG 6a to FIG 6c show the roll 7 according to an embodiment of the invention in different views. It has a bore 7d in the center which forms a pivoting point.

[0035] FIG 7a to FIG 7c show the bolt 16 arranged in the bore 7d of the roll 7 according to an embodiment of the invention in different views. It forms a pivoting point.

[0036] FIG 8 shows the interior of the housing 10 according to an embodiment of the invention with a roll 7 pivoted on a bolt 16 which is used as a coupling element. The bolt 16 is, on the one hand, connected with the traction lever 6. The traction lever 6 is directed towards the pivoting point of the hinge 5.

[0037] On the other hand, the bolt is connected with the spiral spring 8 which is directed away from the pivoting point of the hinge 5.

[0038] The roll 7 is movable towards and away from the pivoting point of the hinge 5. The spiral spring 8, however, applies a force F1 onto the roll 7 which is directed parallel to the surfaces of the housing 8. This force F1 is passed on to the traction lever 6 which again passes the force to the door lever 4 so that a counterforce is applied to the door which is directed into the closing direction of the door.

[0039] To avoid that the door closes too quickly, a flat spring 9 which is fixed by a screw 17 on the one side and an insertion area 10h on the other side is arranged with its side areas above the upper surface 10a of the housing 10 spanning a recess in the upper surface 10a of the housing 10 where the center part is bended into the housing 10 so that it touches the roll 7 when the roll is passing the flat spring 9. The bending of the flat spring 9 results in a first interacting area 9a which directed outwards to the pivot point of the hinge 5 and a second interacting area 9b which directed inwards.

[0040] Therefore, the flat spring 9 applies a force F2 onto the roll which is directed against the force F1 and is increasing the force for opening the door while the roll 7 moves along the second interacting area 9b. While the door is being opened further and the roll 7 moves along the first interacting area 9a, the force F2 is directed in the same direction as the force for opening and thus supporting the opening of the door. While the door is being closed, the first interacting area 9a works as a counterforce and the second interacting area 9b supports the closing.

[0041] The distance h1 along which the roll 9 is moved and mostly interacted by the flat spring 9 is about 29 to 30 mm.

[0042] As an alternative, the flat spring can also be formed in a way that it supports the spiral spring during

the whole closing or opening path. By this, an undesired opening of the door is avoided if the spiral spring needs support.

[0043] FIG 9 shows the interior of the housing 10 according to another embodiment of the invention with two flat springs 9 and 13. The auxiliary spring 13 is fixed at the bottom face of the housing 10 and, like the flat spring 9, is bended into the housing 10. The spring 13 is designed similar like flat spring 9, with interacting areas 13a and 13b and arranged opposite to the flat spring 9 where both springs 9 and 13 are oriented contrarily, each showing with its interacting areas to the interior of the housing 10.

[0044] FIG 10 shows the interior of the housing 10' according to another embodiment of the invention with a spiral spring 8' as a traction element connected to the back end of the traction lever 6' by a bolt 16'.

[0045] As an interacting element, a damper 14 is arranged behind the spiral spring 8' and is connected via a transmission part 18 passing the spiral spring 8' and the bolt 16' with the back end of the traction lever 6' and the front end of the spiral spring 8' and can so interact with the spiral spring 8'.

[0046] The distance h1' along which the traction lever 6' is moved and at least mostly interacted by the damper 14 is about 29 to 30 mm.

[0047] FIG 11a to FIG 11c show the interior of the housing 10'' according to another embodiment of the invention with a traction lever 6'' connected with a flat spring via a roll 7'' pivoted on a bolt 16''.

[0048] The embodiment also comprises two flat springs 9'' and 13'' with the same behaviour as described above. However, the pivot axis of the roll 16'' is perpendicular to the bottom face 6a'' of the traction lever 6''.

[0049] In all embodiments, the traction lever moves about 29 to 30 mm inside the housing. However, also a movement along a distance of about 25 to 35 mm or along another distance is possible.

Reference Numerals

[0050]

4	door lever
4a	top side
4b,c	side areas
4d,e	pivoting areas
5	hinge
6, 6', 6''	traction lever
6a, 6a''	bottom face
6b,c, 6c''	side face
6d,e	pivoting areas
6f, g	extensions
7, 7''	coupling element - roll
7d	bore
8, 8', 8''	traction element - spiral spring
9, 9''	interacting element - flat spring
9a	first interacting area

9b	second interacting area
10, 10', 10''	housing
10a	top face
10b,c	side face
5 10d	pivoting area
10f,g	openings
10h	insertion area
13, 13''	auxiliary flat spring
13 a, b	interacting areas
10 14	damping element
15	locking hatchet
15a	top face
15b,c	side face
15d	pivoting area
15 15f, g	side areas
15h, i	bendings
16, 16', 16''	bolt
17, 17''	screw
18	transmission part
20 h1, h1'	moving distance

Claims

- 25 1. Device, especially a baking oven, particularly a home baking oven,
 - a) with a door,
 - b) with a feeding area, especially a baking muffle,
 - c) where the feeding area is closable by the door,
 - d) where the door is connected with the feeding area by at least one hinge (5),
 - e) where in the door-sided part, the at least one hinge comprises a door lever (4),
 - f) where at the door lever (4), a traction lever (6) is rotatably attached,
 - g) where the traction lever (6) is connected or connectable via a coupling element (7, 16') with at least one traction element (8), where by the at least one traction element (8), a first force F1 is applicable to the coupling element (7),
 - h) where the coupling element (7, 16') is bringable into or is in at least one interacting connection with at least one interacting element (9, 13, 14), where a second force F2 is applicable onto the coupling element (7, 16') by the at least one interacting element (9, 13, 14).
- 50 2. Device according to claim 1, where the device, especially the hinge (5), comprises a housing (10) which is preferably arranged below or at the feeding area,
 - where the lever (6) extends into the housing (10) and/or the coupling element (7) and/or the at least one traction element (8) and/or the at least one interacting element is/are arranged inside the housing (10).

3. Device according to any of the preceding claims, particularly preferred embodiment by 29 to 30 mm. where the first force F1 is at least essentially parallel to at least one surface of the housing (10) and/or the second force F2 has an interacting component parallel to a surface of the housing (10). 5
4. Device according to any of the preceding claims, where the at least one traction element (8) is a spring, especially a spiral spring and/or the at least one interacting element (9, 13) is a spring, especially a flat spring, and/or a damping element (14). 10
5. Device according to any of the preceding claims, where the at least one interacting element (9, 13) has at least two different interacting areas (9a, 9b; 13a, 13b) where a first interacting area (9a, 13a) is directed towards the center of the hinge (5) and a second interacting area (9b, 13b) is directed away from the center of the hinge (5). 15 20
6. Device according to any of the preceding claims, where the at least one interacting element (9, 13) has two different interacting (9a, 9b; 13a, 13b) areas where a first interacting area (9a, 13a) implies a force onto the coupling element towards the center of the hinge (5) and a second interacting area (9b, 13b) implies a force onto the coupling element away from the center of the hinge (5). 25
7. Device according to claim 1, where the coupling element (7) is a roll pivoted by a bolt (16, 16"). 30
8. Device according to claim 7, where the pivot axis of the bolt (16) is parallel to a side surface (6b) of the traction lever (6). 35
9. Device according to claim 7, where the pivot axis of the bolt (16") is perpendicular to a side surface (6c") of the traction lever (6"). 40
10. Device according to any of the preceding claims, where the traction lever (6) is rotatably attached to the door lever (4) by a pivot centered by a pivot axis (6d), where the pivot axis (6d) of the traction lever (6) is fixed outside the housing (10), especially above the top side of the housing (10). 45
11. Device according to any of the preceding claims, where the traction lever (6) is movable inside the housing (10), where particularly the traction lever (6) is movable along a certain distance and/or is designed in such a way that it elongates the covered distance during opening and/or closing the door. 50 55
12. Device according to claim 11, where the traction lever (6) is movable by a distance (h1) of 20 to 40 mm, in a preferred embodiment by 25 to 35 mm and in a

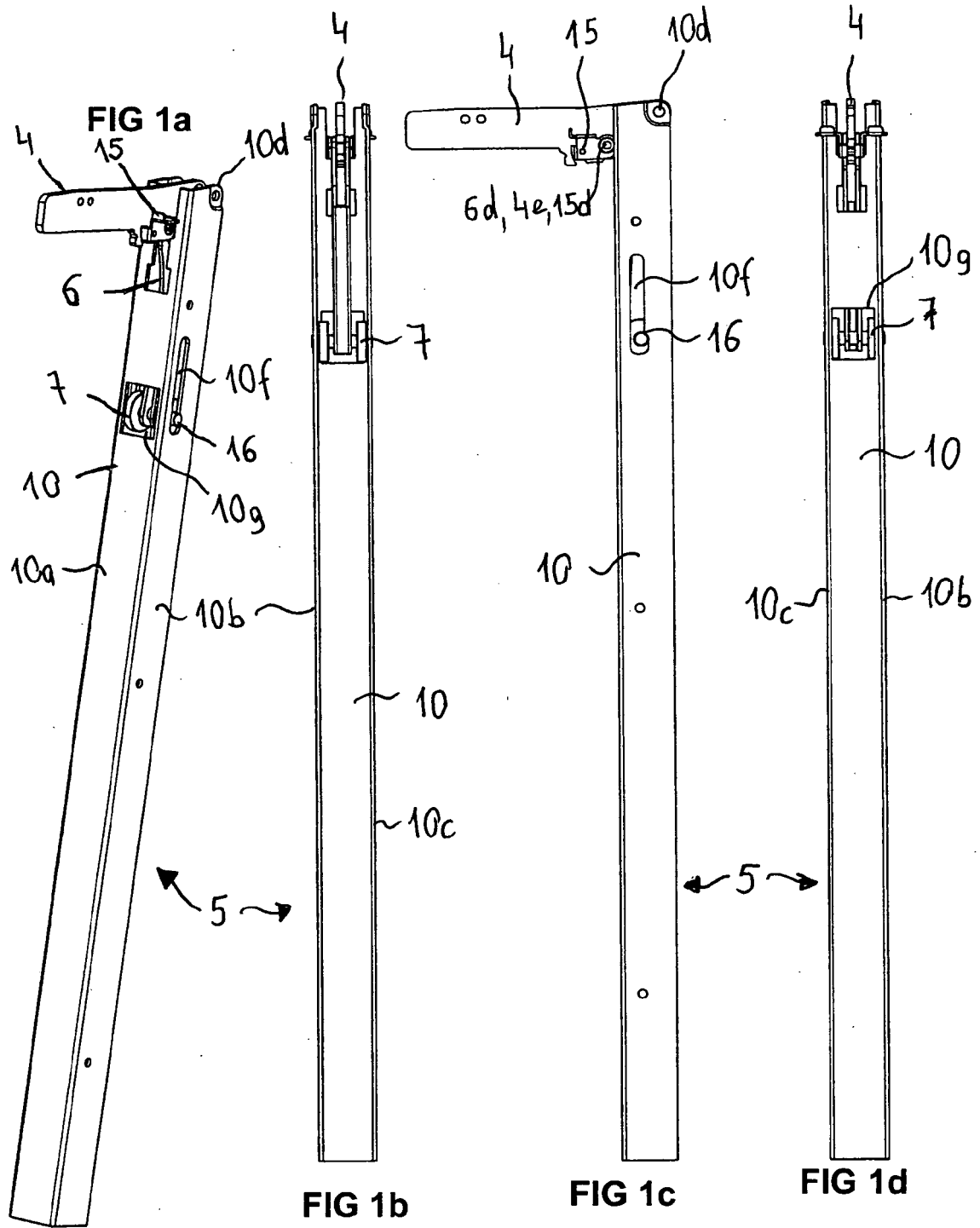


FIG 2a

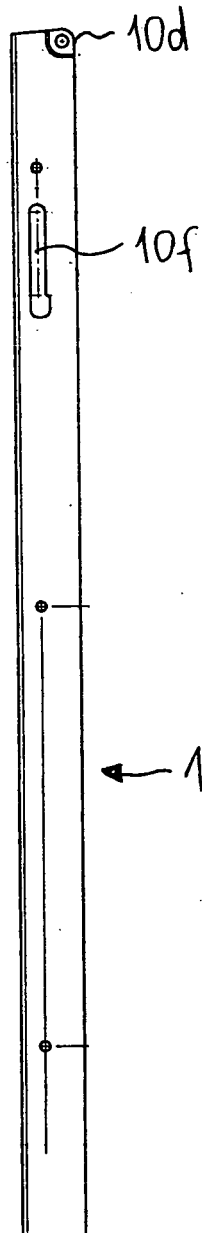


FIG 2b

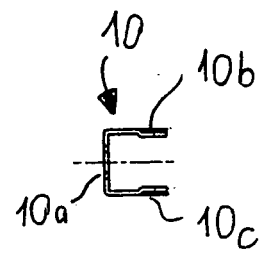
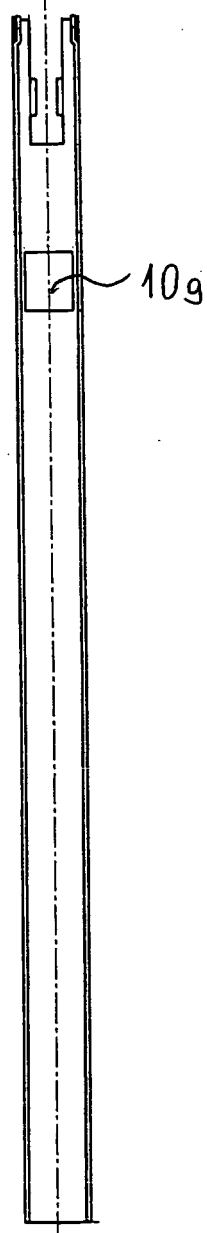


FIG 2c

← 10 →

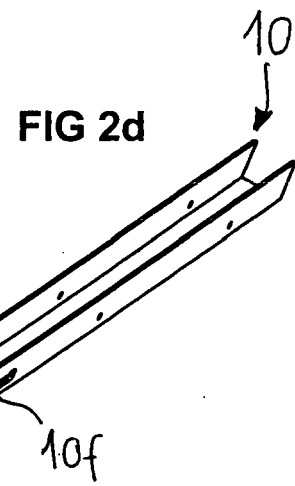


FIG 2d

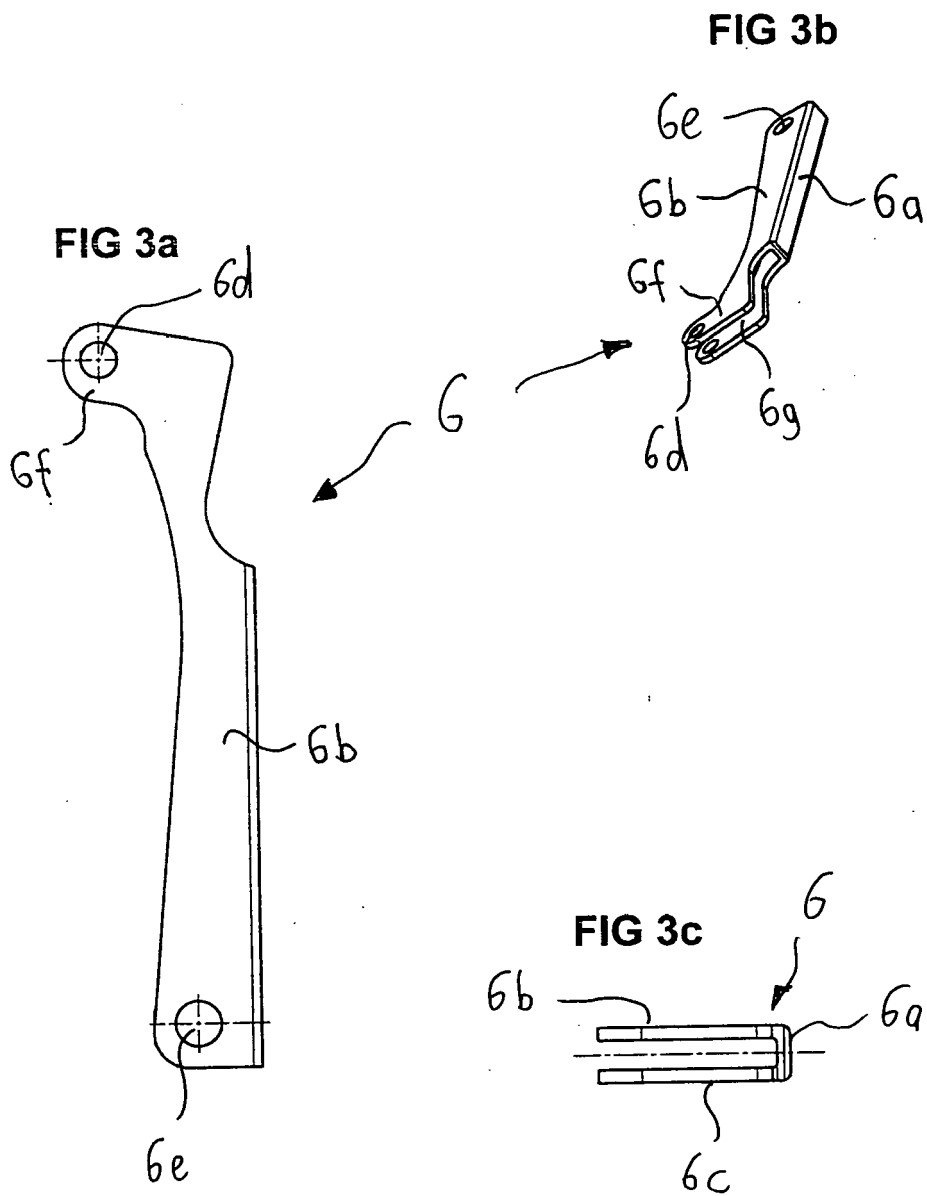


FIG 4a

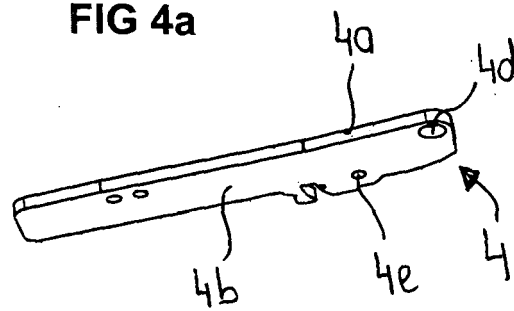


FIG 4b

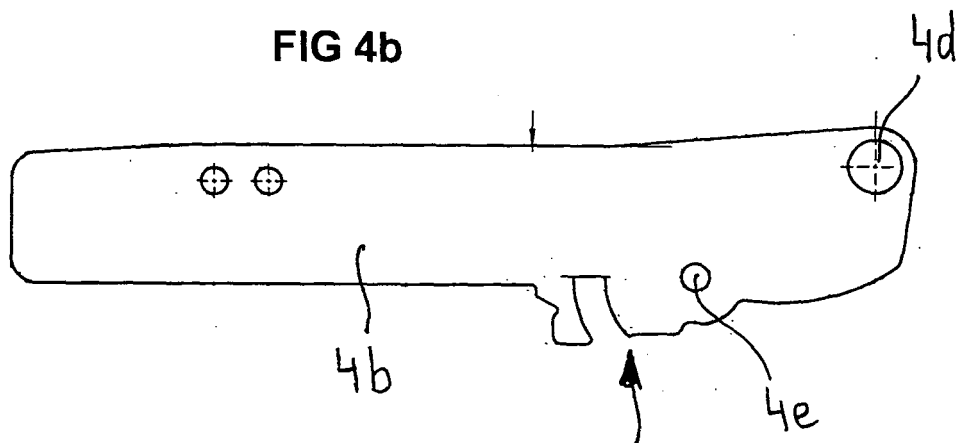
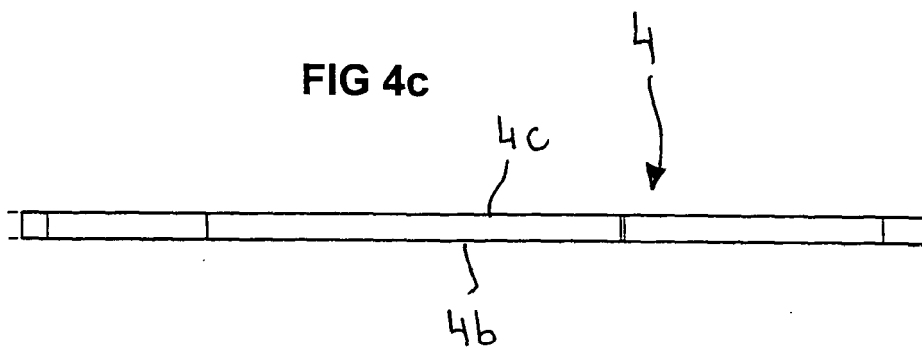
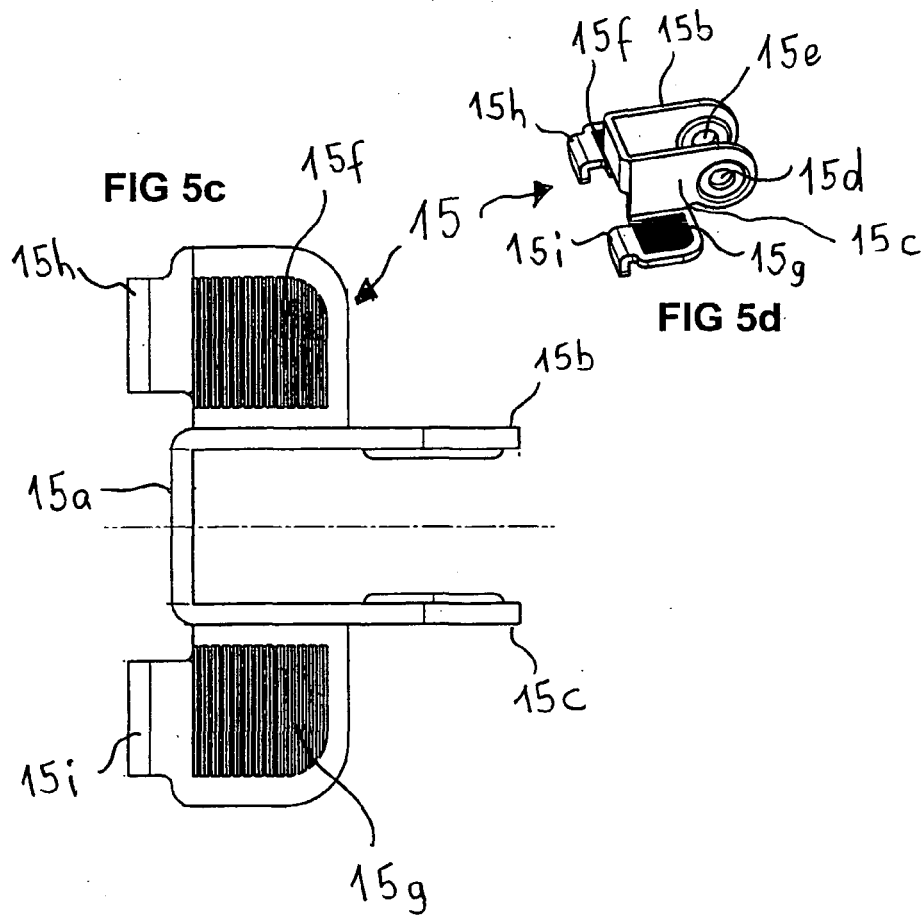
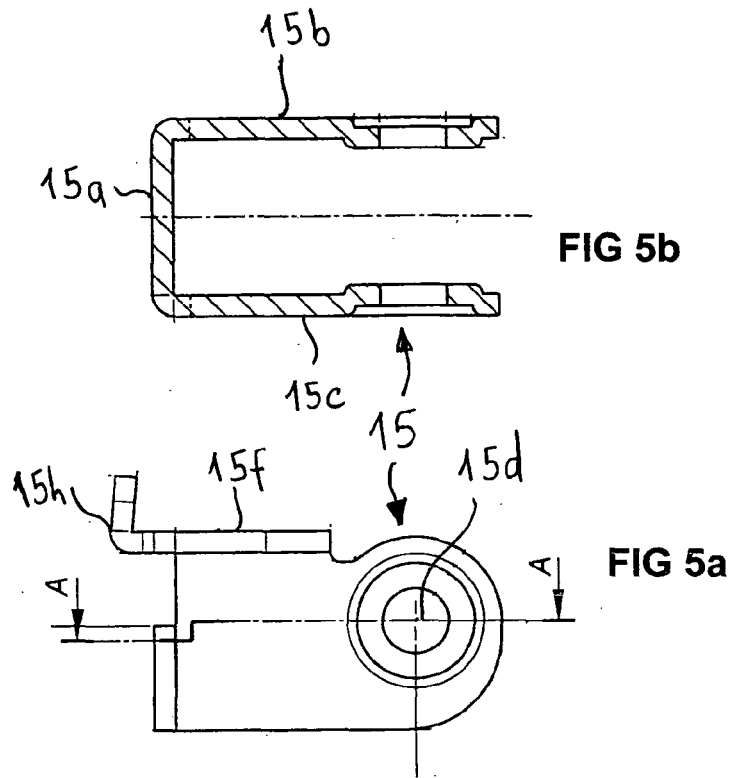


FIG 4c





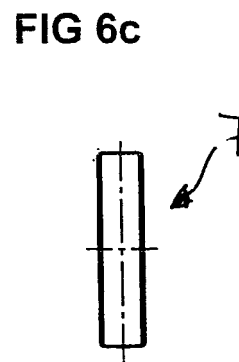
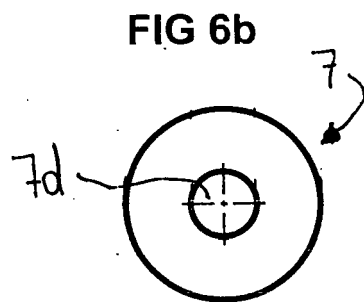
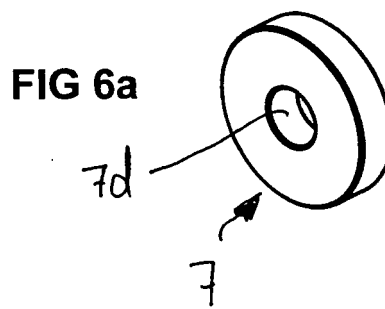


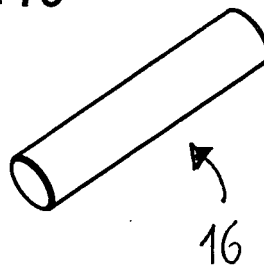
FIG 7a



FIG 7b



FIG 7c



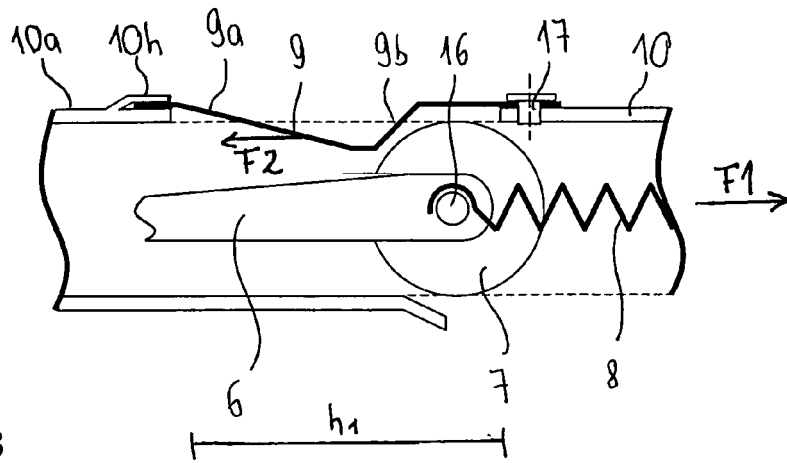


FIG 8

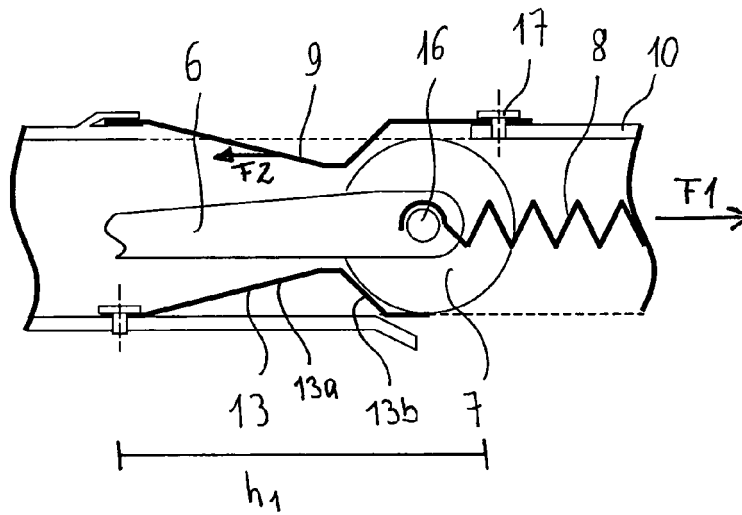


FIG 9

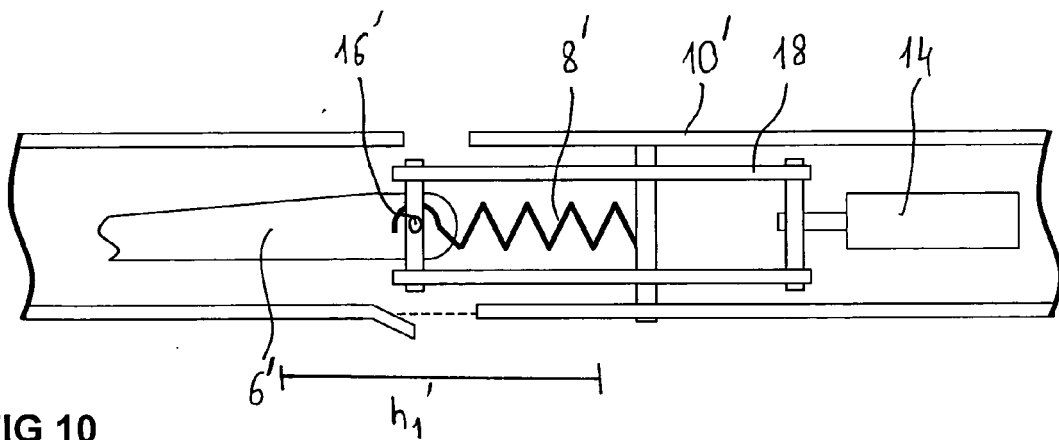


FIG 10

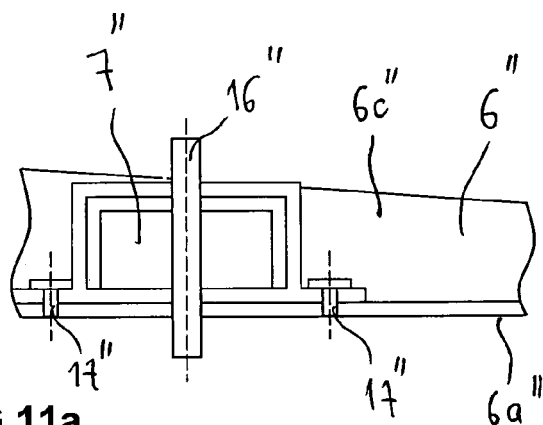


FIG 11a

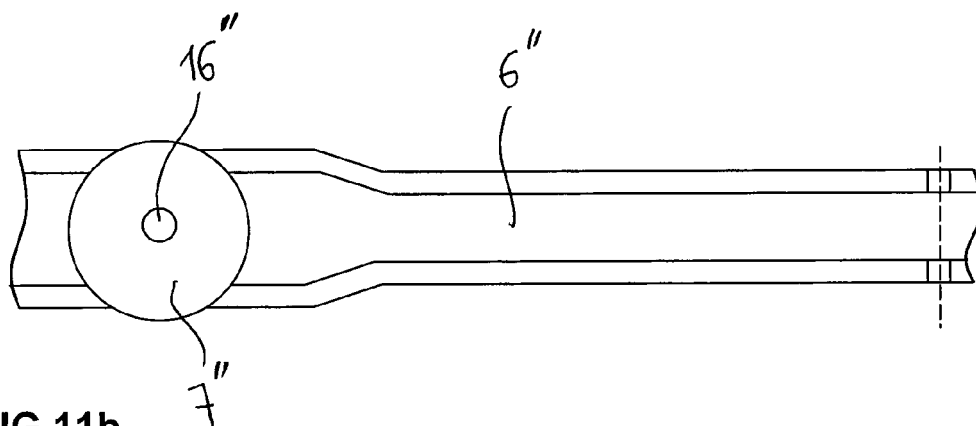


FIG 11b

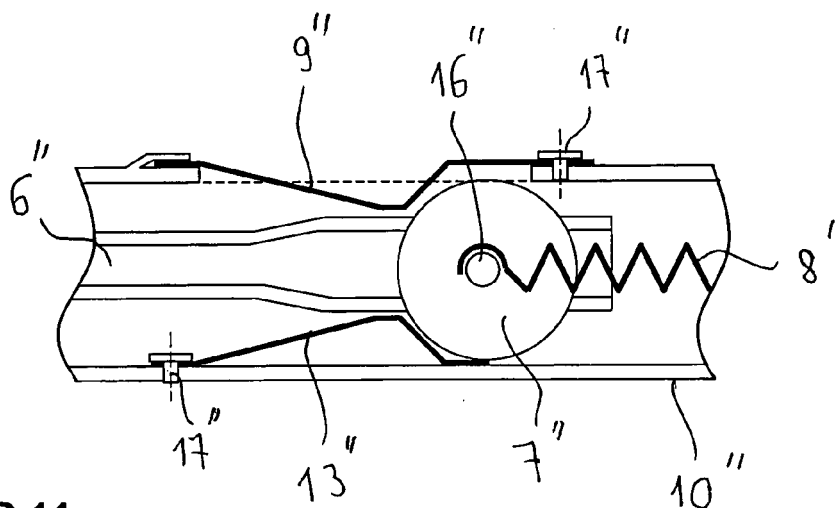


FIG 11c



EUROPEAN SEARCH REPORT

Application Number
EP 07 02 2280

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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