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(54) **HANDLE-OPERATED MECHANISM FOR TILTING AN IRONING BOARD**

(57) The invention relates to a handle-operated mechanism (18) for permitting an ironing board (10), supported by a pole assembly, to be tilted and fixed at different angles. The handle-operated mechanism comprises a pole mounting assembly (20) for securing to the pole assembly. The pole mounting assembly comprises at least one shaft surface (22, 24) and a first engagement assembly (26). The handle-operated mechanism further comprises a board mounting assembly (30) for securing to the ironing board. The board mounting assembly comprises at least one engagement surface (32, 34) contacting whilst being slidable around the at least one shaft

surface to enable tilting of the ironing board. The board mounting assembly comprises a second engagement assembly (36) for releasably engaging with the first engagement assembly to allow and restrict said tilting of the ironing board. The handle-operated mechanism has a handle (40) rotatable by a user, and a shaft (42) arranged to be rotated when the user turns the handle to enable the first and second engagement assemblies to engage with, or be released from, each other. Further provided is a support assembly (16) comprising the handle-operated mechanism, and a steaming device comprising the handle-operated mechanism or the support assembly.

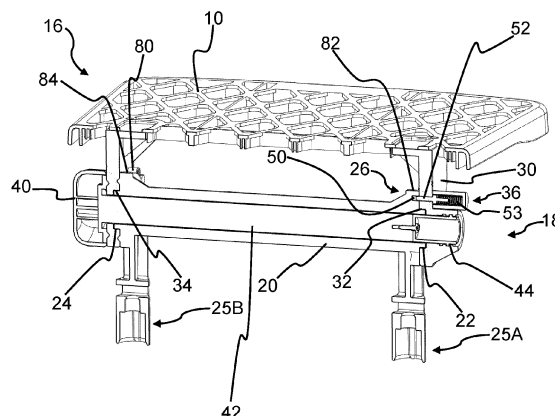


FIG.2C

## Description

### FIELD OF THE INVENTION

[0001] The invention relates to a handle-operated mechanism for permitting an ironing board, supported by a pole assembly, to be tilted and fixed at different angles.

[0002] The invention also relates to a support assembly comprising the handle-operated mechanism and one or both of the ironing board and the pole assembly.

[0003] The invention further relates to a steaming device comprising the handle-operated mechanism or the support assembly, and a steam generator for generating steam for delivery to a garment.

[0004] The invention may be used in the field of garment care.

### BACKGROUND OF THE INVENTION

[0005] Various devices are known for ironing or steaming garments to remove creases. One type of steaming device is a so-called stand garment steamer that comprises a support base, which support base houses a water reservoir. A steamer head is connected to the support base by a flexible hose through which steam and/or water is or are delivered to the steamer head. The steam may be generated in the base and/or in the steamer head. The steamer head is provided with a steam plate, also known as a soleplate, delimiting one or more steam vents through which steam is discharged onto a fabric being treated.

[0006] Steaming devices, in particular stand garment steamers, tend to be supplied together with an ironing board, for example an ironing board that can be orientated in both vertical and horizontal orientations to facilitate vertical steaming or horizontal ironing of garments.

[0007] Various mechanisms for permitting tilting of such an ironing board at various angles, including angles between horizontal and vertical, have been proposed. However, challenges remain in terms of providing a mechanism that is safe and convenient to use, whilst also having a relatively simple, sleek and low-cost design.

### OBJECT AND SUMMARY OF THE INVENTION

[0008] It is an object of the invention to propose a handle-operated mechanism, suitable for permitting an ironing board, supported by a pole assembly, to be tilted and fixed at different angles, that avoids or mitigates one or more of the above-mentioned problems.

[0009] The invention is defined by the independent claims. The dependent claims define advantageous embodiments.

[0010] To this end, the handle-operated mechanism according to the invention comprises:

- a pole mounting assembly for securing to the pole

assembly, the pole mounting assembly comprising at least one shaft surface and a first engagement assembly,

- a board mounting assembly for securing to the ironing board, the board mounting assembly comprising at least one engagement surface contacting and being slidable around the at least one shaft surface to enable tilting of the ironing board, the board mounting assembly comprising a second engagement assembly for releasably engaging with the first engagement assembly to allow and restrict said tilting of the ironing board,
- a handle rotatable by a user, and
- a shaft arranged to be rotated when the user turns the handle, the shaft being coupled via a threaded connection to one of the first and second engagement assemblies, said one of the first and second engagement assemblies being moveable while the other of the first and second engagement assemblies and the shaft are fixed in position such that turning of the handle causes said one of the first and second engagement assemblies to be moved by the threaded connection towards, or away from, the other of the first and second engagement assemblies to enable the first and second engagement assemblies to engage with, or be released from, each other.

[0011] Thus, turning of the handle enables the first and second engagement assemblies to engage with, and be released from, each other. When released from each other, the ironing board's tilt angle can be selected, and the first and second engagement assemblies can be re-engaged with each other in order to fix the ironing board at the selected tilt angle.

[0012] This provides a relatively convenient and intuitive way of enabling selection of the ironing board's tilt angle.

[0013] For example, rotation of the handle by the user in a first direction enables the first and second engagement assemblies to engage with each other to restrict tilting of the ironing board, and rotation of the handle by the user in a second direction opposite to the first direction enables the first and second engagement assemblies to be released from each other to allow tilting of the ironing board.

[0014] In some embodiments, one of the first and second engagement assemblies comprises a plurality of recesses, and the other of the first and second engagement assemblies comprises a fastening element releasably locatable in each of the plurality of recesses, wherein each recess of the plurality of recesses corresponds to one of said different angles of the ironing board. This provides a relatively mechanically robust way of selecting the ironing board's tilt angle.

[0015] For example, the recesses include a first recess corresponding to a horizontal orientation of the ironing board, a second recess corresponding to a vertical or-

ientation of the ironing board, and one or more third recesses corresponding to intermediate orientation(s) of the ironing board between the horizontal orientation and the vertical orientations.

**[0016]** In some embodiments, the handle-operated mechanism includes a resilient element, e.g. a spring, arranged to bias the fastening element into being located in one of said recesses with which the fastening element is aligned.

**[0017]** In some embodiments, the fastening element is arranged to remain partially protruding into the recess in which the fastening element is located when the handle has been turned to release the first and second engagement assemblies from each other, with the fastening element being resilient and/or resiliently mounted, e.g. via the resilient element, to enable complete release of the partially protruding fastening element from the recess during tilting of the ironing board.

**[0018]** This can assist the user to keep control over movement of the ironing board when the first and second engagement assemblies are disengaged from each other, as well as providing, for instance, tactile and/or audible feedback for assisting the user to identify when the ironing board is at one of the selectable tilt angles. The latter can be provided by the feel and/or sound associated with the fastening element partially protruding into a(nother) recess of the plurality of recesses during tilting of the ironing board.

**[0019]** In some embodiments, the pole mounting assembly is adapted to connect a pair of spaced-apart poles of the pole assembly to each other. Thus, the pole mounting assembly can fulfil a dual purpose: (i) facilitating tilting of the ironing board, and (ii) providing structural reinforcement by connecting the pole assembly's pair of poles to each other.

**[0020]** The handle is preferably arranged at a first side of the handle-operated mechanism so as to be proximal to one of the pair of poles, with the shaft extending from the first side across the pole mounting assembly so that the threaded connection is positioned at a second side of the handle-operated mechanism so as to be proximal to the other of the pair of poles. This may represent a straightforwardly manufacturable design that is convenient and intuitive for the user to operate.

**[0021]** Said one of the first and second engagement assemblies can be arranged in any suitable manner in order to be moveable by the threaded connection when the user rotates the handle. In some embodiments, part of the handle-operated mechanism that includes or supports said one of the first and second engagement assemblies is adapted to flex, slide or pivot when said one of the first and second engagement assemblies is moved by the threaded connection away from or towards the other of the first and second engagement assemblies whose position is fixed. It is noted that the term "away from or towards" in this context depends on whether movement of the ironing board is being allowed or restricted.

**[0022]** In some embodiments, said one of the first and

second engagement assemblies, that is connected via the threaded connection to the shaft, is included in the board mounting assembly. In alternative embodiments, said one of the first and second engagement assemblies is included in the pole mounting assembly.

**[0023]** In some embodiments, the handle-operated mechanism comprises stopper elements arranged on the board mounting assembly and on the pole mounting assembly for limiting an angular range of tilting of the ironing board. Limiting the angular range of tilting of the ironing board in this manner can help to enhance convenience of use and safety, since the ironing board can be prevented by the stopper elements from tilting too much, for instance should the user accidentally let go of the ironing board while the first and second engagement assemblies are released from each other.

**[0024]** Preferably, the stopper elements are arranged to limit tilting of the ironing board between a horizontal orientation and a vertical orientation. This can provide enhanced user-convenience because the limits defined by the stopper elements can be used by the user as a tactile guide that can inform them of when the ironing board is in the horizontal and vertical orientations.

**[0025]** In some embodiments, the pole mounting assembly comprises at least one further shaft surface extending between first stopper elements of the pole mounting assembly, with second stopper element(s) of the board mounting assembly being slidable on the at least one further shaft surface between the first stopper elements during tilting of the ironing board.

**[0026]** This benefits from being a relatively straightforwardly implementable way of limiting the angular range of tilting of the ironing board.

**[0027]** The pole mounting assembly can be secured or is securable to the pole assembly in any suitable manner. In some embodiments, the pole mounting assembly is detachably securable to the pole assembly. By the pole mounting assembly being detachable from the pole assembly, storage and/or transportation of a support assembly or a steaming device comprising the pole assembly and the pole mounting assembly can be facilitated because of the pole assembly and the pole mounting assembly being more easily storable/packable when detached from each other.

**[0028]** According to another aspect there is provided a support assembly comprising the handle-operated mechanism according to any of the embodiments described herein, and one or both of:

- an ironing board for securing to the board mounting assembly, and
- a pole assembly for supporting the ironing board, the pole assembly being for securing to the pole mounting assembly.

**[0029]** In some embodiments, the support assembly comprises a support base adapted to support the pole assembly such that the pole assembly upstands from the

support base.

**[0030]** According to a further aspect there is provided a steaming device comprising: the handle-operated mechanism according to any of the embodiments described herein or the support assembly according to any of the embodiments described herein, and a steam generator for generating steam for delivery to a garment.

**[0031]** In some embodiments, the steaming device comprises a support base and a water reservoir for containing water for supplying to the steam generator, with the water reservoir being included in the support base.

**[0032]** The steaming device can also include a steamer head and a flexible hose for connecting the steamer head to the support base, with steam and/or water being deliverable from the support base to the steamer head via the flexible hose.

**[0033]** It is noted that the steaming device's steam generator can be included in the support base and/or the steamer head.

**[0034]** In some embodiments, the steaming device comprises a support base adapted to support the pole assembly such that the pole assembly upstands from the support base. This pole assembly support function is, for example, an alternative or in addition to the support base comprising the water reservoir.

**[0035]** Detailed explanations and other aspects of the invention will be given below.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0036]** Particular aspects of the invention will now be explained with reference to the embodiments described hereinafter and considered in connection with the accompanying drawings, in which identical parts or sub-steps are designated in the same manner:

Fig.1 schematically depicts a steaming device whose ironing board can be tilted at various angles, Fig.2A provides a cutaway view showing part of an interior of a handle-operated mechanism according to an example, with the handle-operated mechanism being shown in an engaged configuration in which tilting of the ironing board is restricted, Fig.2B provides a similar cutaway view to that provided in Fig.2A but shows the handle-operated mechanism in a released configuration in which tilting of the ironing board is allowed, Fig.2C provides another cutaway view showing the interior of the handle-operated mechanism shown in Figs.2A and 2B, Figs.2D and 2E provide enlarged views of the handle-operated mechanism in the engaged configuration shown in Fig.2A, Fig.2F provides an enlarged view of the handle-operated mechanism in the released configuration shown in FIG.2B, Figs.3A and 3B provide views of the ironing board

tilted and fixed by the handle-operated mechanism shown in Figs.2A to 2F, and

Figs.4A and 4B provide views showing stopper elements of the handle-operated mechanism shown in Figs.2A to 2F.

## DETAILED DESCRIPTION OF THE INVENTION

**[0037]** The invention relates to a handle-operated mechanism for permitting an ironing board, supported by a pole assembly, to be tilted and fixed at different angles. The handle-operated mechanism comprises a pole mounting assembly for securing to the pole assembly. The pole mounting assembly comprises at least one shaft surface and a first engagement assembly. The handle-operated mechanism further comprises a board mounting assembly for securing to the ironing board. The board mounting assembly comprises at least one engagement surface contacting whilst being slidable around the at least one shaft surface to enable tilting of the ironing board. The board mounting assembly comprises a second engagement assembly for releasably engaging with the first engagement assembly to allow and restrict said tilting of the ironing board. The handle-operated mechanism has a handle rotatable by a user, and a shaft arranged to be rotated when the user turns the handle to enable the first and second engagement assemblies to engage with, or be released from, each other. Further provided is a support assembly comprising the handle-operated mechanism, and a steaming device comprising the handle-operated mechanism or the support assembly.

**[0038]** Fig. 1 depicts a steaming device 1 according to an example. The steaming device 1 comprises an ironing board 10 and a pole assembly 12 for supporting the ironing board 10.

**[0039]** The steaming device 1 preferably comprises a support base 14 adapted to support the pole assembly 12 such that the pole assembly 12 upstands from the support base 14. The support base 14 can be alternatively termed a "stand assembly".

**[0040]** The support base 14, in other words stand assembly, can rest on a stable external surface, e.g. a floor.

**[0041]** The pole assembly 12 can have any suitable design provided that the pole assembly 12 is capable of supporting the ironing board 10, particularly when the ironing board 10 is tilted at different angles. In some embodiments, the pole assembly 12 comprises a pair of poles that are each supported by, and upstand from, the support base 14.

**[0042]** In some embodiments, the support base 14 includes a water reservoir for containing water for supplying to a steam generator (not visible). The steam generator can be included in the support base 14 and/or in a steamer head (also not visible) included in the steaming device 1.

**[0043]** A steam plate included in the steamer head can

delimit one or more steam vents through which steam is discharged onto a fabric being treated. A flexible hose connecting the steamer head and the support base 14 can carry steam and/or water from the support base 14 to the steamer head.

**[0044]** The ironing board 10, while being supported by the pole assembly 12, can be tilted and fixed at different angles. This gives enhanced flexibility to the user in terms of selecting a suitable position for ironing and/or steaming their garments. For example, the ironing board 10 is tiltable into a vertical orientation, as shown in the left hand image of Fig. 1, a horizontal orientation, as shown in the middle image of Fig.1, and intermediate orientation(s) between the horizontal and vertical orientations, as schematically shown in the right hand image of Fig. 1.

**[0045]** To this end, and referring to Figs.1 and 2A to 2C, the steaming device 1, or a support assembly 16 comprising the ironing board 10, the pole assembly 12 and optionally the support base 14, further comprises a handle-operated mechanism 18. The handle-operated mechanism 18 couples the ironing board 10 to the pole assembly 12 in a way that enables the user to change the angle of the ironing board 10, while the pole assembly 12 is preferably supported by the support base 14.

**[0046]** In other words, the handle-operated mechanism 18 permits the ironing board 10 to be tilted and fixed at different angles, as described in more detail herein below.

**[0047]** Referring to Figs.2A to 2C, the handle-operated mechanism 18 comprises a pole mounting assembly 20 for securing to the pole assembly 12. The pole mounting assembly 20 has at least one shaft surface 22, 24.

**[0048]** In some embodiments, such as shown in Fig.2A to 2C, the pole mounting assembly 20 is adapted to connect a pair of spaced-apart poles of the pole assembly 12 to each other. Thus, the pole mounting assembly 20 can fulfil a dual purpose: (i) facilitating tilting of the ironing board 10, and (ii) providing structural reinforcement by connecting the pole assembly's 12 pair of poles to each other.

**[0049]** The pole mounting assembly 20 can be secured or is securable to the pole assembly 12 in any suitable manner. For example, the pole mounting assembly 20 comprises a connector assembly for securing the pole mounting assembly 20 to the pole assembly 12.

**[0050]** In some embodiments, such as shown in Figs.2A to 2C, the connector assembly comprises a first connector 25A for securing the pole mounting assembly 20 to one of the pair of poles included in the pole assembly 12, and a second connector 25B for securing the pole mounting assembly 20 to the other of the pair of poles included in the pole assembly 12.

**[0051]** Connector(s) 25A, 25B of the connector assembly can be designed in any suitable manner provided that the connector(s) 25A, 25B enable the pole mounting assembly 20 to be secured to the pole(s) of the pole assembly 12. In some embodiments, such as shown in Figs.2A to 2C, the connector(s) 25A, 25B each include a socket for receiving and engaging with a respective pole

of the pole assembly 12.

**[0052]** In some embodiments, the connector assembly is adapted to enable detachment of the pole mounting assembly 20 from the pole assembly 12, for example by the socket(s) being adapted to enable removal of the pole(s) received therein. In more general terms, the pole mounting assembly 20 is preferably detachably securable to the pole assembly 12. This can facilitate storage and/or transportation of the support assembly 16 or the steaming device 1 because of the pole assembly 12 and the pole mounting assembly 20 being more easily storable/packable when detached from each other.

**[0053]** The pole mounting assembly 20 can be formed from any suitable mechanically robust material. In some embodiments, the pole mounting assembly 20 is formed from a plastic material and/or a metallic material.

**[0054]** Referring to Figs.2A to 2F, the pole mounting assembly 20 comprises a first engagement assembly 26 that contributes to releasable fixing of the ironing board 10 at different angles, as explained in more detail herein below.

**[0055]** The handle-operated mechanism 18 also comprises a board mounting assembly 30 for securing to the ironing board 10. The board mounting assembly 30 comprises at least one engagement surface 32, 34 that contacts and slides around the at least one shaft surface 22, 24 to enable tilting of the ironing board 10, for example between the vertical, horizontal and intermediate orientation(s) shown in Fig.1.

**[0056]** The board mounting assembly 30 can be secured or can be securable to the ironing board 10 in any suitable manner. In some embodiments, the board mounting assembly 30 is an integral part of the ironing board 10, for instance due to at least part of the ironing board 10 and the board mounting assembly 30 being moulded, e.g. injection moulded, as a single piece.

**[0057]** Alternatively, the boarding mounting assembly 30 and the ironing board 10 can be distinct components secured or securable to each other using adhesive and/or one or more fasteners, e.g. screw(s).

**[0058]** It is noted at this point that the present disclosure relates to the handle-operated mechanism 18 per se, since the handle-operated mechanism 18 can in principle be supplied to the user separately from one or both of the ironing board 10 and the pole assembly 12.

**[0059]** In some embodiments, and as best shown in Fig.2C, the at least one shaft surface 22, 24 comprises a first shaft surface 22 and a second shaft surface 24, with the first and second shaft surfaces 22, 24 being coaxial but spaced apart from each other. In such embodiments, the at least one engagement surface 32, 34 comprises a first engagement surface 32 and a second engagement surface 34, with the first engagement surface 32 contacting and being slidable around the first shaft surface 22 while the second engagement surface 34 is contacting and slidable around the second shaft surface 24.

**[0060]** The first and second shaft surfaces 22, 24, and correspondingly the first and second engagement sur-

faces 32, 34, being spaced apart from each other can assist to ensure stable mounting of the ironing board 10. For example, the first shaft surface 22 and the first engagement surface 32 are arranged to support the ironing board 10 at a first position, with the second shaft surface 24 and the second engagement surface 34 being arranged to support the ironing board 10 at a second position that is spaced apart from the first position across a width of the ironing board 10.

**[0061]** Alternatively or additionally, the first shaft surface 22 and the first engagement surface 32 are preferably arranged proximal to one of the pair of poles of the pole assembly 12, with the second shaft surface 24 and the second engagement surface 34 being arranged proximal to the other of the pair of poles.

**[0062]** The board mounting assembly 30 can be formed from any suitable mechanically robust material. In some embodiments, the board mounting assembly 30 is formed from a plastic material and/or a metallic material.

**[0063]** More generally, the board mounting assembly 30 comprises a second engagement assembly 36 for releasably engaging with the first engagement assembly 26 to allow and restrict tilting of the ironing board 10.

**[0064]** Moreover, the handle-operated mechanism 18 comprises a handle 40 rotatable by the user to enable the first and second engagement assemblies 26, 36 to engage with each other to restrict tilting of the ironing board 10, and be released from each other to allow tilting of the ironing board 10.

**[0065]** For example, rotation of the handle 40 by the user in a first direction enables the first and second engagement assemblies 26, 36 to engage with each other to restrict tilting of the ironing board 10, and rotation of the handle 40 by the user in a second direction opposite to the first direction enables the first and second engagement assemblies 26, 36 to be released from each other to allow tilting of the ironing board 10.

**[0066]** The handle 40 can have any suitable design. Preferably, the handle 40 is in the form of a knob that is twistable by the user to enable the first and second engagement assemblies 26, 36 to engage with each other to restrict tilting of the ironing board 10, and be released from each other to allow tilting of the ironing board 10.

**[0067]** The handle 40, e.g. knob, can be formed from any suitable material, such as a plastic material and/or a metallic material.

**[0068]** In some embodiments, and as best shown in Figs.2A and 2B, the handle 40, e.g. knob, comprises a textured surface 41 for assisting the user to grip and rotate the handle 40.

**[0069]** The textured surface 41 can take any suitable form. In some embodiments, such as shown in Figs.2A and 2B, the textured surface 41 comprises a ridged portion provided around a periphery of the handle 41, e.g. knob.

**[0070]** As best shown in Figs.2A to 2C, the handle-

operated mechanism 18 comprises a shaft 42 arranged to be rotated when the user turns the handle 40. The shaft 42 is coupled via a threaded connection 44 to one of the first and second engagement assemblies 26, 36. In the depicted example, the threaded connection couples the shaft 42 to the second engagement assembly 36.

**[0071]** For example, and referring to Figs.2E and 2F, the threaded connection 44 comprises a helical groove 45A defined in said one of one of the first and second engagement assemblies 26, 36 and a helical protrusion 45B arranged on the shaft 42, with the helical protrusion 45B being received in and being adapted to follow the path of the helical groove 45A.

**[0072]** In some embodiments, and as best shown in Fig.2D, the helical protrusion 45B is provided on a cap member 47A mounted at an end of the shaft 42 via a suitable fastener 47B, e.g. a screw.

**[0073]** In alternative embodiments, the threaded connection 44 comprises a helical protrusion arranged on said one of the first and second engagement assemblies 26, 36, and a helical groove is defined in the shaft 42, with the helical protrusion being received in and being adapted to follow the path of the helical groove.

**[0074]** More generally, said one of the first and second engagement assemblies 26, 36, to which the threaded connection 44 is made, is moveable when the handle 40 is turned to rotate the shaft 42 while the other of the first and second engagement assemblies 36, 26 and the shaft 42 are fixed in position.

**[0075]** Thus, turning of the handle 40 causes said one of the first and second engagement assemblies 26, 36 to be moved by the threaded connection 44 towards, or away from, the other of the first and second engagement assemblies 36, 26 to enable the first and second engagement assemblies 26, 36 to engage with, and be released from, each other. This provides a relatively convenient and intuitive way of enabling selection of the ironing board's 10 tilt angle.

**[0076]** Figs.2A, 2C, 2D and 2E show the first and second engagement assemblies 26, 36 being engaged with each other to restrict tilting of the ironing board 10. Rotation of the handle 40, e.g. twisting of the handle 40 in the form of the knob, causes release of the first and second engagement assemblies 26, 36 from each other to allow tilting of the ironing board 10, as shown in Figs.2B and 2F.

**[0077]** For example, movement of said one of the first and second engagement assemblies 26, 36 away from the other of the first and second engagement assemblies 36, 26 provides a gap 43 between the first and second engagement assemblies 26, 36, which gap 43 is sufficient to allow tilting of the ironing board 10.

**[0078]** Said one of the first and second engagement assemblies 26, 36 can be arranged in any suitable manner in order to be moveable by the threaded connection 44 when the user rotates the handle 40. In some embodiments, part of the handle-operated mechanism 18 that includes or supports said one of the first and second

engagement assemblies 26, 36 is adapted to flex, slide or pivot when said one of the first and second engagement assemblies 26, 36 is moved by the threaded connection 44 away from or towards the other of the first and second engagement assemblies 36, 26 whose position is fixed.

**[0079]** In embodiments in which the part of the handle-operated mechanism 18 that includes or supports said one of the first and second engagement assemblies 26, 36 is adapted to flex when said one of the first and second engagement assemblies 26, 36 is moved by the threaded connection 44 away from the other of the first and second engagement assemblies 36, 26, the part may be formed from any suitable material capable of flexing in this manner.

**[0080]** In some embodiments, the part is formed from a plastic material, for example polycarbonate or polypropylene, e.g. glass-filled polypropylene.

**[0081]** For example, and referring to Figs.2B and 2F, when the first and second engagement assemblies 26, 36 are released from each other, e.g. before the handle/knob 40 is tightened, the second engagement assembly 36 connected to the ironing board 10 is slightly slanted/angled to provide the gap 43 between the second engagement assembly 36 and the first engagement assembly 26 connected to the pole assembly 12. In this example, subsequent tightening of the handle/knob 40 causes the second engagement assembly 36 to be pulled towards, and ultimately into engagement with, the first engagement assembly 26.

**[0082]** In principle, said one of the first and second engagement assemblies 26, 36, e.g. the second engagement assembly 36, that is moveable by the threaded connection 44 can alternatively be made to slide or rotate in order to implement the release and engagement of the first and second engagement assemblies 26, 36. In the specific case of the second engagement assembly 36 being moveable by the threaded connection, the sliding or rotating can be at the connection of the second engagement assembly 36 with the ironing board 10.

**[0083]** The handle 40, e.g. knob, is preferably arranged at a first side of the handle-operated mechanism 18 proximal to one of the pair of poles, with the shaft 42 extending from the first side across the pole mounting assembly 20 so that the threaded connection 44 is positioned at a second side of the handle-operated mechanism 18 proximal to the other of the pair of poles. This may represent a straightforwardly manufacturable design that is convenient and intuitive for the user to operate.

**[0084]** The first and second engagement assemblies 26, 36 can releasably engage each other in any suitable manner. In some embodiments, and as best shown in Figs.2D to 2F, 3A and 3B, one of the first and second engagement assemblies 26, 36 comprises a plurality of recesses 50, and the other of the first and second engagement assemblies 36, 26 comprises a fastening element 52 releasably locatable in each of the plurality of recesses 50, wherein each recess 50 of the plurality of recesses corresponds to one of said different angles of

the ironing board 10. This provides a relatively mechanically robust way of selecting the ironing board's 10 tilt angle.

**[0085]** For example, the recesses 50 include a first recess 50 corresponding to the horizontal orientation of the ironing board 10, a second recess 50 corresponding to the vertical orientation of the ironing board 10, and one or more third recesses 50 corresponding to the intermediate orientation(s) of the ironing board 10 between the horizontal orientation and the vertical orientations.

**[0086]** In the non-limiting example shown in the Figures, the first engagement assembly 26 comprises the plurality of recesses 50, and the second engagement assembly 36 comprises the fastening element 52 releasably locatable in each of the recesses 50 of the first engagement assembly 26.

**[0087]** In alternative embodiments, the second engagement assembly 36 comprises the plurality of recesses, and the first engagement assembly 26 comprises the fastening element releasably locatable in each of the recesses of the second engagement assembly 36.

**[0088]** The fastening element 52 can have any suitable design. In some embodiments, and as best shown in Figs.2D to 2F, the fastening element 52 comprises a pin that is receivable in, and engagement with surface(s) delimiting, each of the recesses 50.

**[0089]** The fastening element 52, e.g. pin, is preferably biased into being located in one of said recesses 50 with which the fastening element 52 is aligned.

**[0090]** In some embodiments, the handle-operated mechanism 18 includes a resilient element 53, e.g. a spring, arranged to bias the fastening element 52 into being located in one of said recesses 50 with which the fastening element 52 is aligned.

**[0091]** It is noted, for the avoidance of any doubt, that use of the terms "recess" and "recesses" in this context is not intended to exclude a through-hole/through-holes. Thus, the term covers any type of female portion, e.g. hole, indentation, etc., in which the fastening element 52 is locatable in order for the first and second engagement assemblies 26, 36 to be engaged with each other to fix the ironing board 10 at a tilt angle defined by the selected recess 50 in which the fastening element 52 is located.

**[0092]** In some embodiments, and as best shown in Figs.2B and 2F, the fastening element 52 is arranged to remain partially protruding into the recess 50 in which the fastening element 52 is located when the handle 40 has been turned to release the first and second engagement assemblies 26, 36 from each other, with the fastening element 52 being resilient and/or resiliently mounted, e.g. via the resilient element 53, to enable complete release of the partially protruding fastening element 52 from the recess 50 during tilting of the ironing board 10.

**[0093]** This can assist the user to keep control over movement of the ironing board 10 when the first and second engagement assemblies 26, 36 are disengaged from each other, as well as providing, for instance, tactile

and/or audible feedback for assisting the user to identify when the ironing board 10 is at one of the selectable tilt angles. The latter can be provided by the feel and/or sound associated with the fastening element 52 partially protruding into a(nother) recess 50 of the plurality of recesses 50 during tilting of the ironing board 10.

**[0094]** For example, when the first and second engagement assemblies 26, 36 disengage, the fastening element 52 moves with the first engagement assembly 26 or the second engagement assembly 36 from the recess 50 and only its rounded end remains in the recess 50, which allows it to move further backwards via compression of the resilient element 50, e.g. spring, during tilting of the ironing board 10. In this manner, the fastening element 52 is able to slide out of the recess 50 when the ironing board 10 is tilted.

**[0095]** In this example, when the desired angle of the ironing board 10 is reached, and the fastening element 52 is seated inside the respective recess 50, the handle 40, e.g. knob, can be tightened by turning the handle 40. Once the handle 40 is tightened, there may be near zero gap between the first and second engagement assemblies 26, 36, with the fastening element 52 being fully located in the recess 50. This engagement between the fastening element 52 and surface(s) delimiting the recess 50 retains the ironing board 10 locked in position.

**[0096]** In some embodiments, and as best shown in Figs. 2D and 2F, an end 54 of the fastening element 52, e.g. pin, that is receivable in each of the recesses 50 comprises a curved surface for assisting the complete release of the partially protruding fastening element 52 from the recess 50 during tilting of the ironing board 10.

**[0097]** In some embodiments, and as best shown in Figs. 4A and 4B, the handle-operated mechanism 18 comprises stopper elements 70, 72, 74, 76, 78, 80 arranged on the board mounting assembly 30 and on the pole mounting assembly 20 for limiting an angular range of tilting of the ironing board 10. Limiting the angular range of tilting of the ironing board 10 in this manner can help to enhance convenience of use and safety, since the ironing board 10 can be prevented by the stopper elements 70, 72, 74, 76, 78, 80 from tilting too much, for instance should the user accidentally let go of the ironing board 10 while the first and second engagement assemblies 26, 36 are released from each other.

**[0098]** Preferably, the stopper elements 70, 72, 74, 76, 78, 80 are arranged to limit tilting of the ironing board 10 between the horizontal orientation shown in the middle image of Fig. 1 and the vertical orientation shown in the left hand image of Fig. 1. This can provide enhanced user-convenience because the limits defined by the stopper elements 70, 72, 74, 76, 78, 80 can be used by the user as a tactile guide that can inform them of when the ironing board 10 is in the horizontal and vertical orientations.

**[0099]** In some embodiments, the pole mounting assembly 20 comprises at least one further shaft surface 82; 84 extending between first stopper elements 70, 72;

74, 76 of the pole mounting assembly 20, with second stopper element(s) 78; 80 of the board mounting assembly 30 being slidable on the at least one further shaft surface 82; 84 between the first stopper elements 70, 72; 74, 76 during tilting of the ironing board 10.

**[0100]** This benefits from being a relatively straightforwardly implementable way of limiting the angular range of tilting of the ironing board 10.

**[0101]** The above embodiments as described are only illustrative, and not intended to limit the technique approaches of the present invention. Although the present invention is described in details referring to the preferable embodiments, those skilled in the art will understand that the technique approaches of the present invention can be modified or equally displaced without departing from the protective scope of the claims of the present invention. In particular, although the invention has been described in the context of a tiltable ironing board, it can be applied to any household device that is tiltable or has a tiltable component. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. Any reference signs in the claims should not be construed as limiting the scope.

## Claims

1. A handle-operated mechanism (18) for permitting an ironing board (10), supported by a pole assembly (12), to be tilted and fixed at different angles, the handle-operated mechanism comprising:

- a pole mounting assembly (20) for securing to the pole assembly, the pole mounting assembly comprising at least one shaft surface (22, 24) and a first engagement assembly (26),
- a board mounting assembly (30) for securing to the ironing board, the board mounting assembly comprising at least one engagement surface (32, 34) contacting and being slidable around the at least one shaft surface to enable tilting of the ironing board, the board mounting assembly comprising a second engagement assembly (36) for releasably engaging with the first engagement assembly to allow and restrict said tilting of the ironing board,
- a handle (40) rotatable by a user, and
- a shaft (42) arranged to be rotated when the user turns the handle, the shaft being coupled via a threaded connection (44) to one of the first and second engagement assemblies, said one of the first and second engagement assemblies being moveable while the other of the first and second engagement assemblies and the shaft are fixed in position such that turning of the handle causes said one of the first and second engagement assemblies to be moved by the



- threaded connection towards, or away from, the other of the first and second engagement assemblies to enable the first and second engagement assemblies to engage with, or be released from, each other.
2. The handle-operated mechanism (18) according to claim 1, wherein one of the first and second engagement assemblies (26, 36) comprises a plurality of recesses (50), and the other of the first and second engagement assemblies comprises a fastening element (52) releasably locatable in each of the plurality of recesses, wherein each recess of the plurality of recesses corresponds to one of said different angles of the ironing board (10).
  3. The handle-operated mechanism (18) according to claim 2, wherein:
    - the fastening element (52) is arranged to remain partially protruding into the recess (50) in which the fastening element is located when the handle (40) has been turned to release the first and second engagement assemblies (26, 36) from each other, and
    - the fastening element is resilient and/or resiliently mounted to enable complete release of the partially protruding fastening element from the recess during tilting of the ironing board (10).
  4. The handle-operated mechanism (18) according to any one of claims 1 to 3, wherein the pole mounting assembly (20) is adapted to connect a pair of spaced-apart poles of the pole assembly (12) to each other.
  5. The handle-operated mechanism (18) according to claim 4, wherein the handle (40) is arranged at a first side of the handle-operated mechanism so as to be proximal to one of the pair of poles, and the shaft (42) extends from the first side across the pole mounting assembly (20) so that the threaded connection (44) is positioned at a second side of the handle-operated mechanism so as to be proximal to the other of the pair of poles.
  6. The handle-operated mechanism (18) according to any one of claims 1 to 5, wherein part of the handle-operated mechanism that includes or supports said one of the first and second engagement assemblies (26, 36) is adapted to flex, slide or pivot when said one of the first and second engagement assemblies is moved by the threaded connection away from or towards the other of the first and second engagement assemblies whose position is fixed.
  7. The handle-operated mechanism (18) according to any one of claims 1 to 6, wherein said one of the first
- and second engagement assemblies (26, 36), that is connected via the threaded connection (44) to the shaft (42), is included in the board mounting assembly (30).
8. The handle-operated mechanism (18) according to any one of claims 1 to 7, comprising stopper elements (70, 72, 74, 76, 78, 80) arranged on the board mounting assembly (30) and on the pole mounting assembly (20) for limiting an angular range of tilting of the ironing board (10).
  9. The handle-operated mechanism (18) according to claim 8, wherein the stopper elements (70, 72, 74, 76, 78, 80) are arranged to limit tilting of the ironing board (10) between a horizontal orientation and a vertical orientation.
  10. The handle-operated mechanism (18) according to claim 8 or claim 9, wherein:
    - the pole mounting assembly (20) comprises at least one further shaft surface (82; 84) extending between first stopper elements (70, 72; 74, 76) of the pole mounting assembly, and
    - second stopper element(s) (78; 80) of the board mounting assembly (30) being slidable on the at least one further shaft surface between the first stopper elements during tilting of the ironing board (10).
  11. The handle-operated mechanism (18) according to any one of claims 1 to 10, wherein the pole mounting assembly (20) is detachably securable to the pole assembly (12).
  12. A support assembly (16) comprising the handle-operated mechanism (18) according to any one of claims 1 to 11, and one or both of:
    - an ironing board (10) for securing to the board mounting assembly (30), and
    - a pole assembly (12) for supporting the ironing board, the pole assembly being for securing to the pole mounting assembly (20).
  13. A steaming device (1) comprising:
    - the handle-operated mechanism (18) according to any one of claims 1 to 11 or the support assembly (16) according to claim 12, and
    - a steam generator for generating steam for delivery to a garment.
  14. The steaming device (1) according to claim 13, comprising a support base (14) and a water reservoir for containing water for supplying to the steam generator, the water reservoir being included in the support

base.

15. The steaming device (1) according to claim 14, wherein the support base (14) is adapted to support the pole assembly (12) such that the pole assembly upstands from the support base. 5

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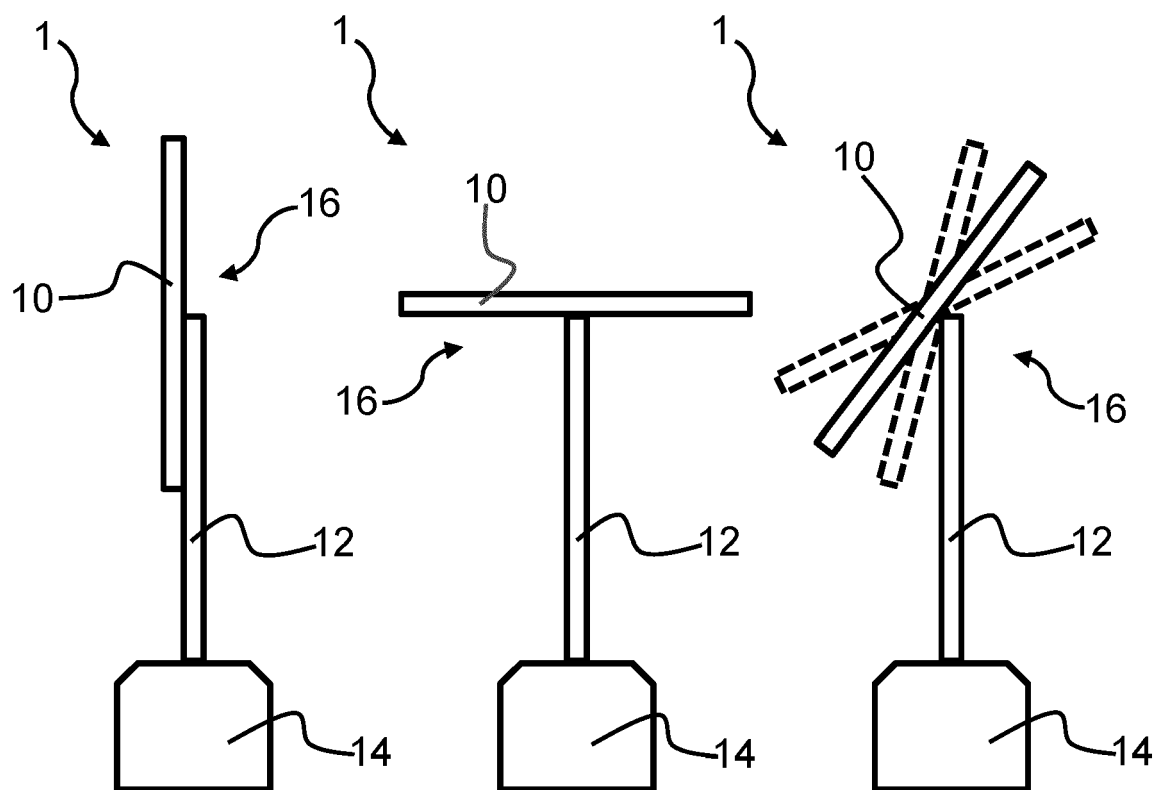


FIG.1

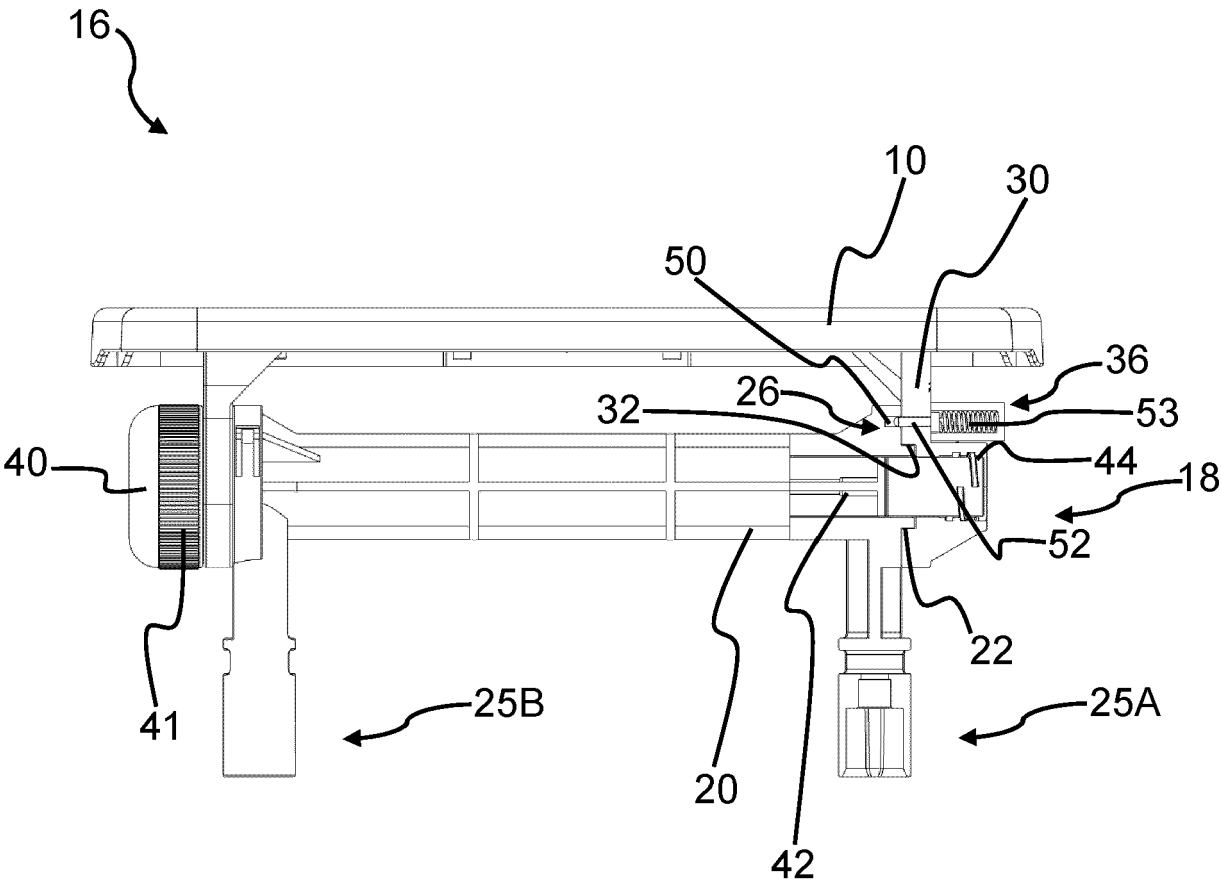


FIG.2A

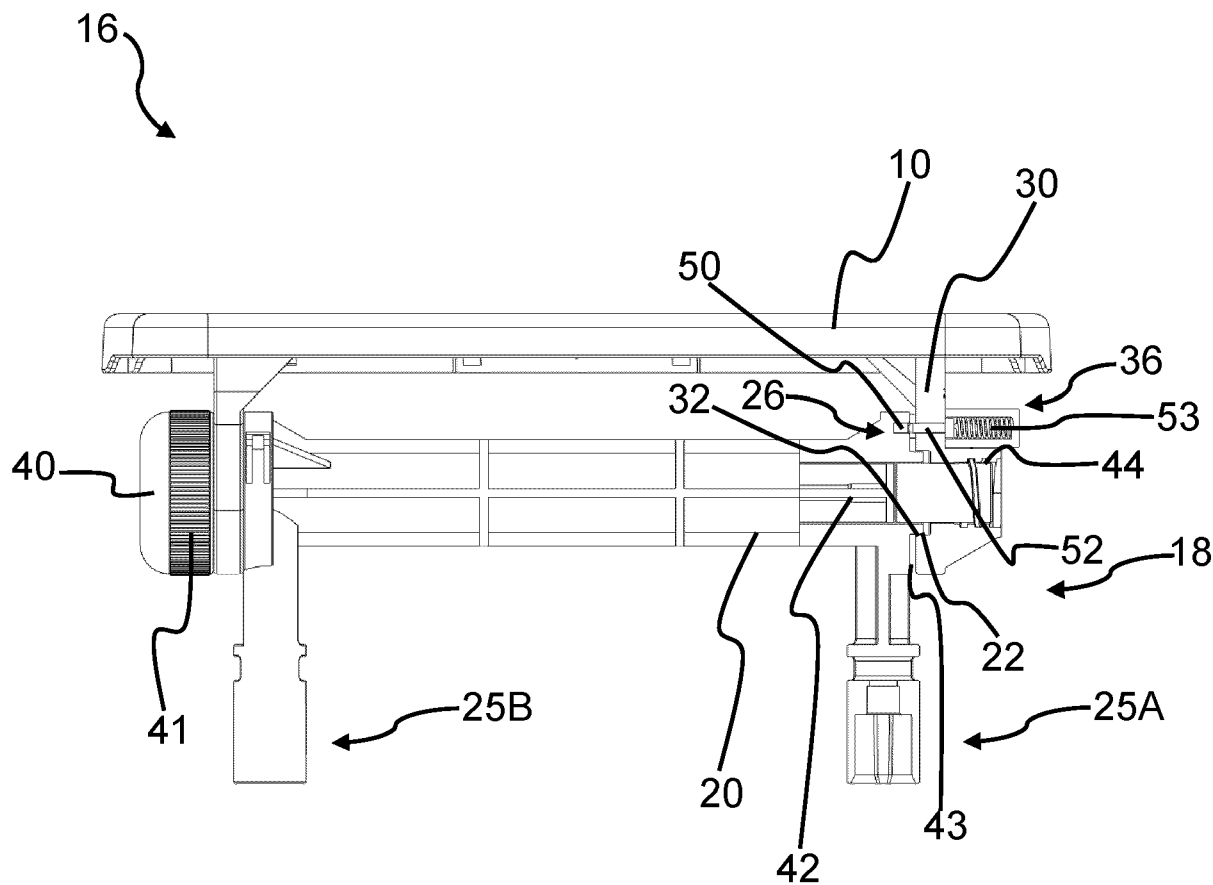


FIG.2B

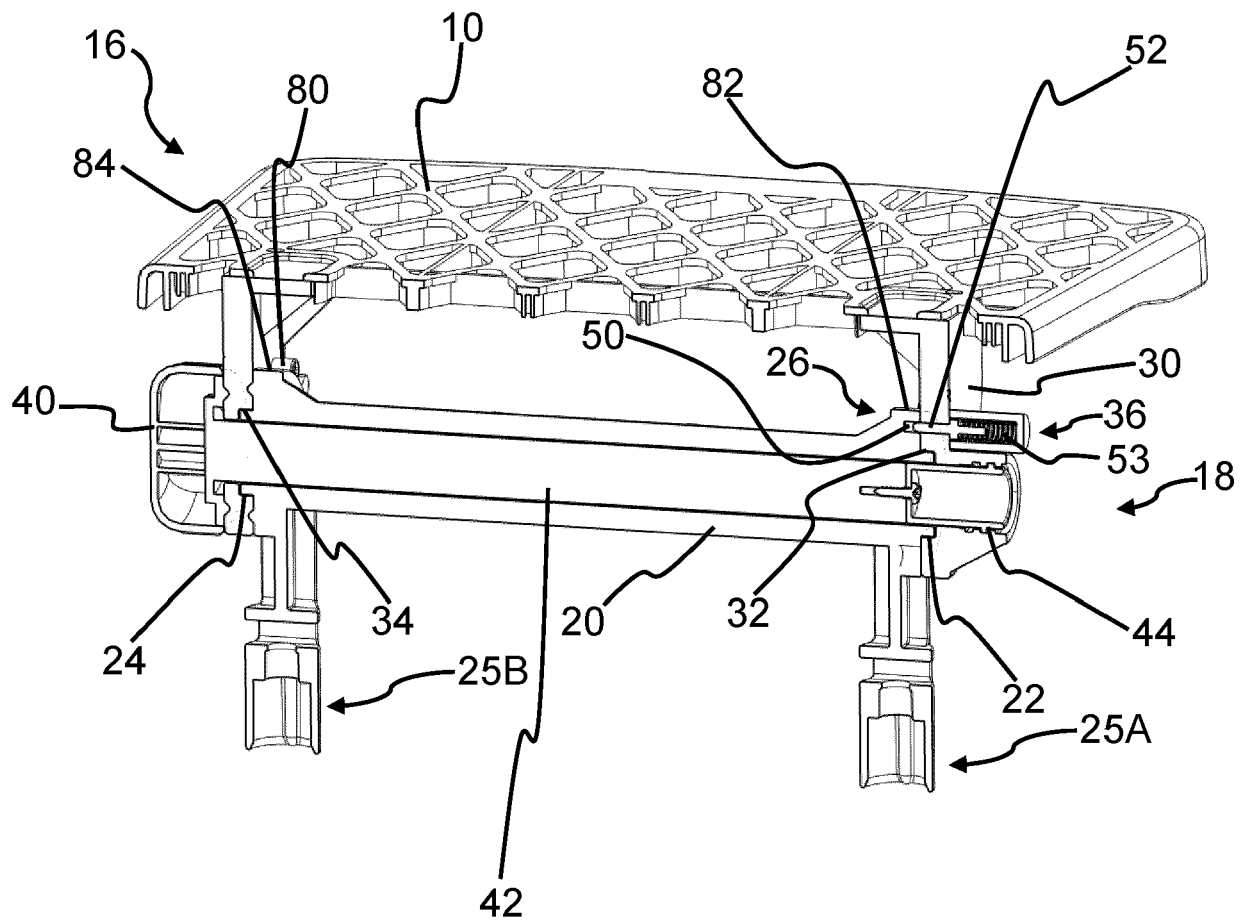


FIG.2C

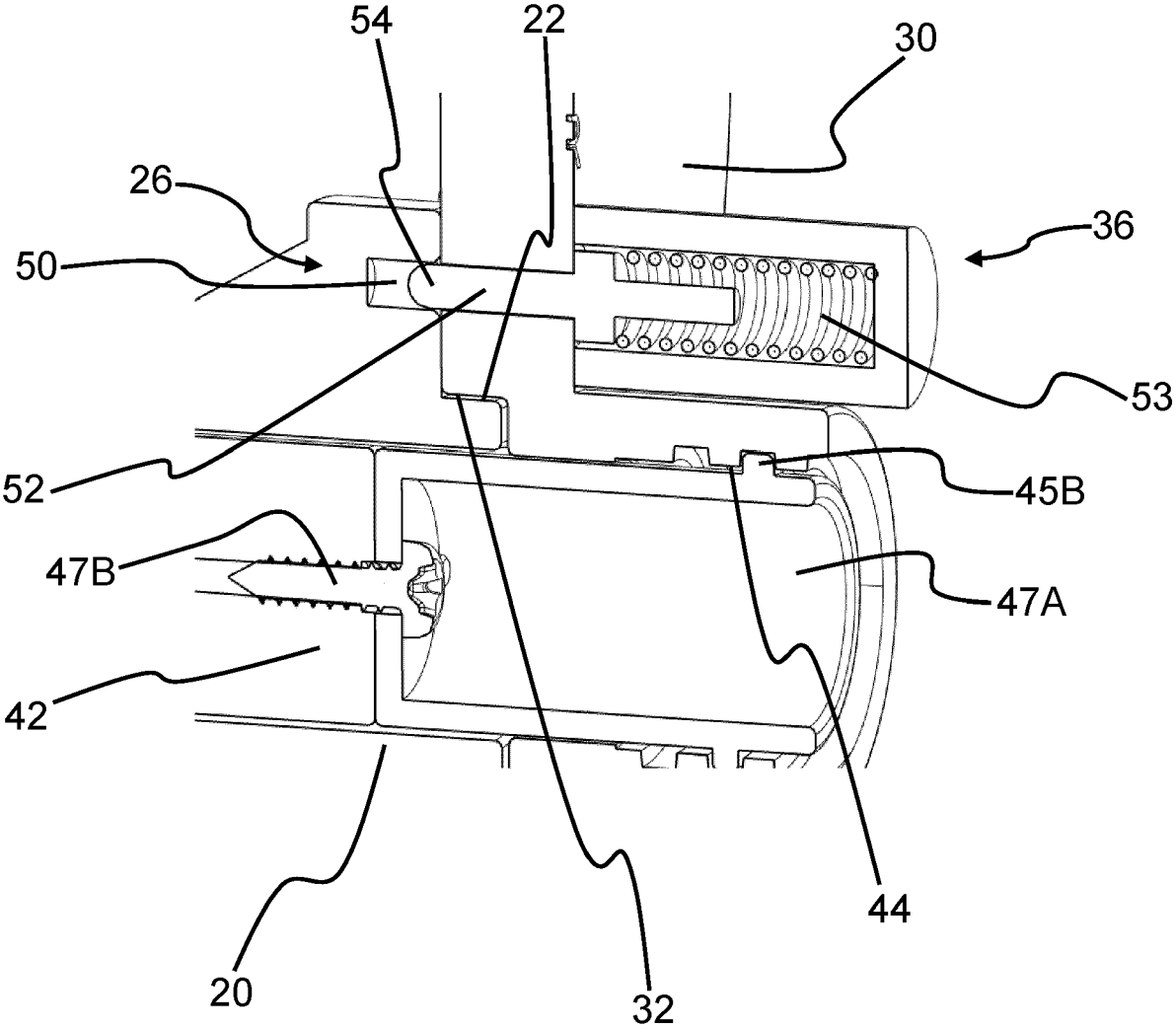


FIG.2D

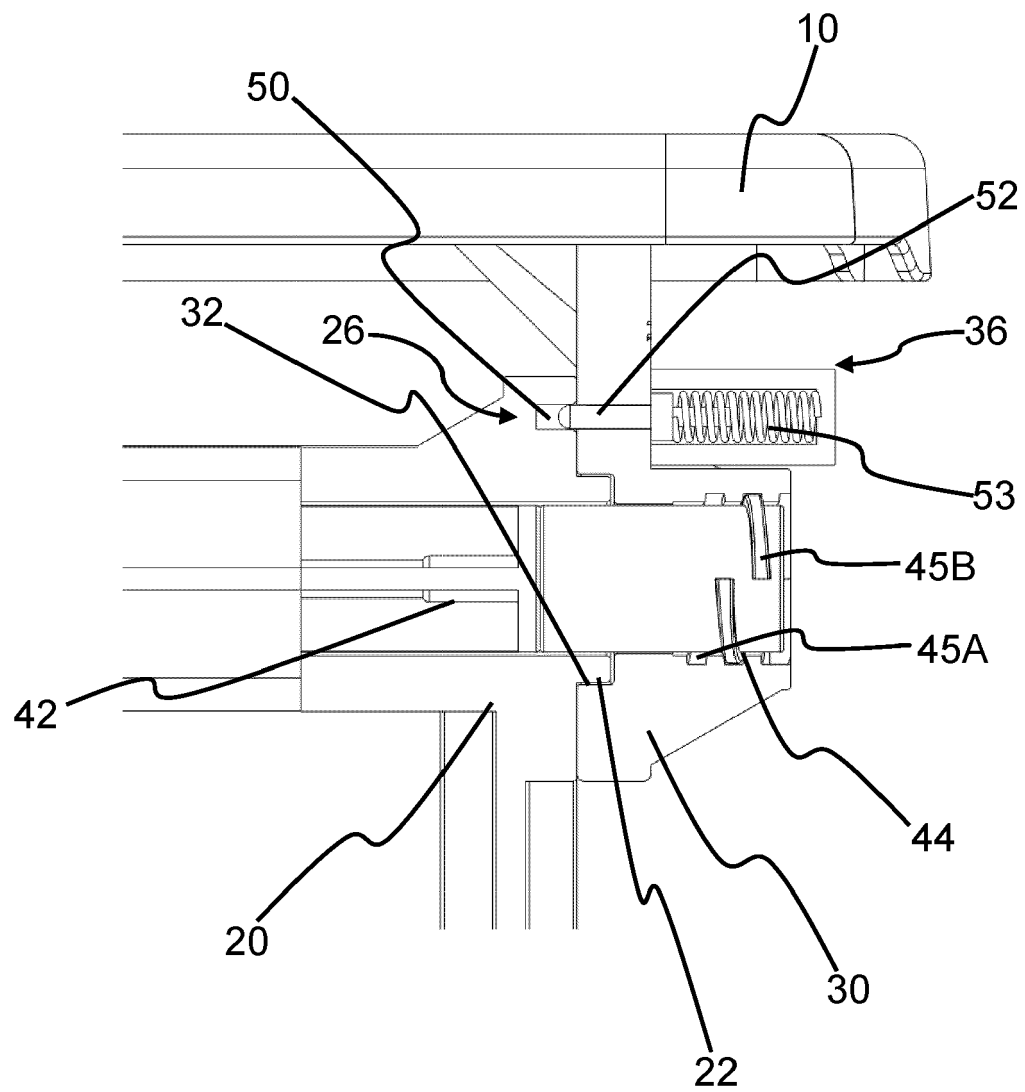


FIG.2E



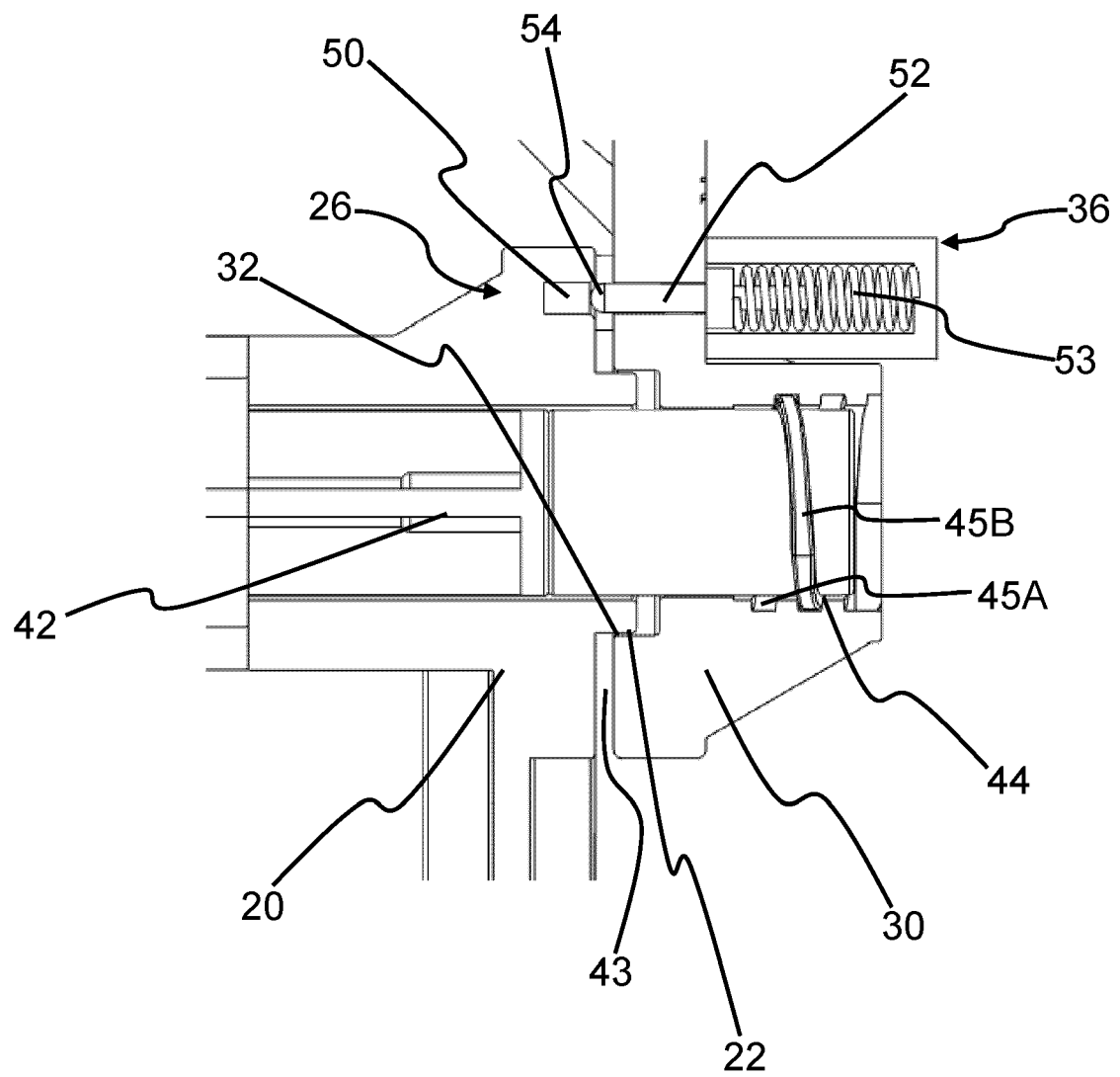


FIG.2F

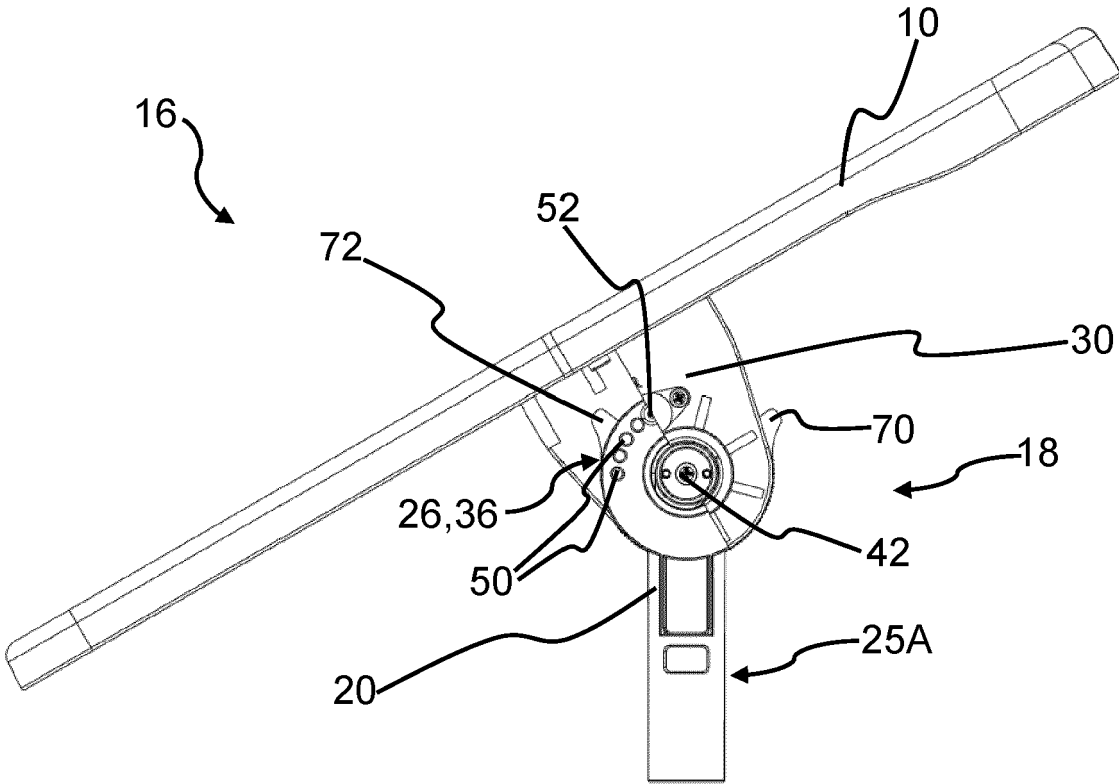


FIG.3A

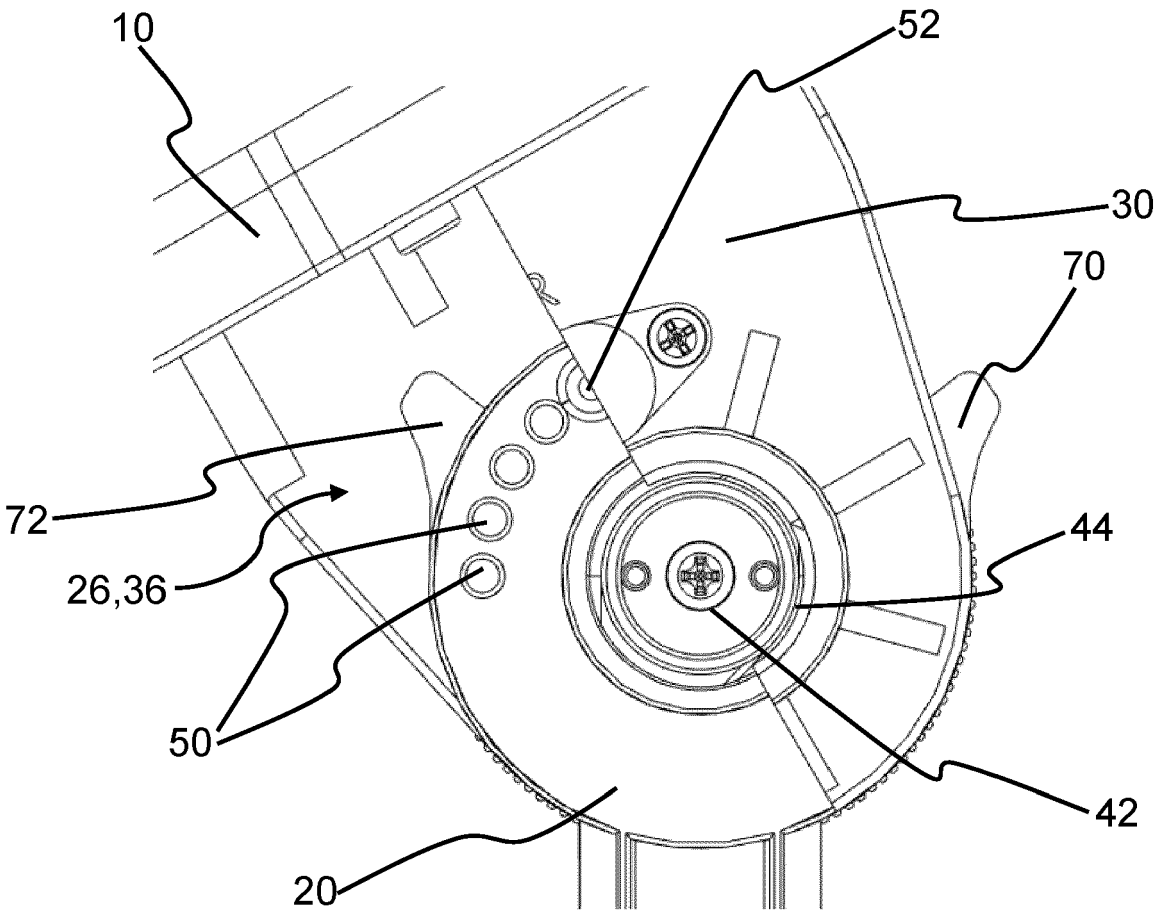


FIG.3B

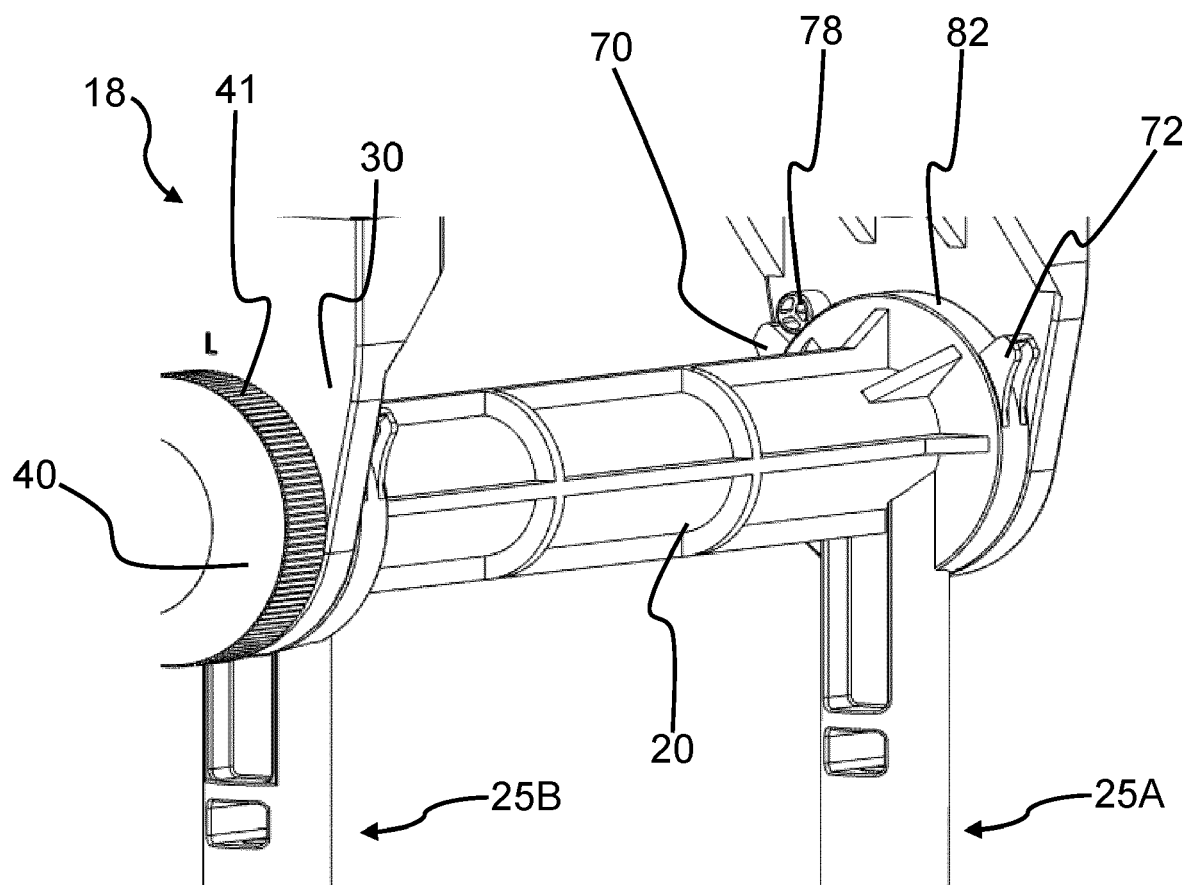


FIG.4A

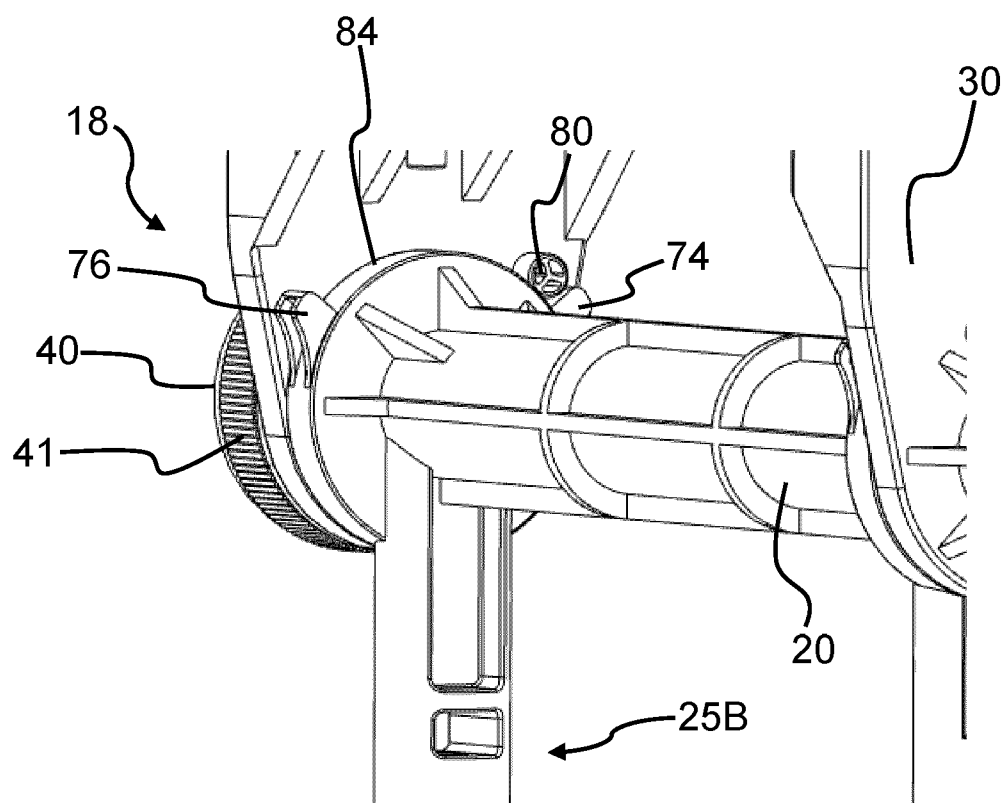


FIG.4B



## EUROPEAN SEARCH REPORT

Application Number

EP 24 15 0206

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| Place of search<br><b>Munich</b>                                                                                                                                                                                                                       |                                                                                                                                                 | Date of completion of the search<br><b>22 May 2024</b>                                                                                                                                                                                                                       | Examiner<br><b>Prosig, Christina</b>    |
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## EUROPEAN SEARCH REPORT

Application Number  
EP 24 15 0206

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| The present search report has been drawn up for all claims                                                                                                                                                                                                                            |                                                                                                                                             |                                                        |                                         |
| Place of search<br><b>Munich</b>                                                                                                                                                                                                                                                      |                                                                                                                                             | Date of completion of the search<br><b>22 May 2024</b> | Examiner<br><b>Prosig, Christina</b>    |
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| T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                                                                                                                             |                                                        |                                         |

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EP 24 15 0206

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