



- (51) International Patent Classification:  
A47K 3/00 (2006.01)
- (21) International Application Number:  
PCT/IB2015/054824
- (22) International Filing Date:  
26 June 2015 (26.06.2015)
- (25) Filing Language:  
Italian
- (26) Publication Language:  
English
- (30) Priority Data:  
TV2014A000094 27 June 2014 (27.06.2014) IT
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- (81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

— of inventorship (Rule 4.17(iv))

[Continued on next page]

(54) Title: BATH-TUB WITH AN EASY ENTRANCE

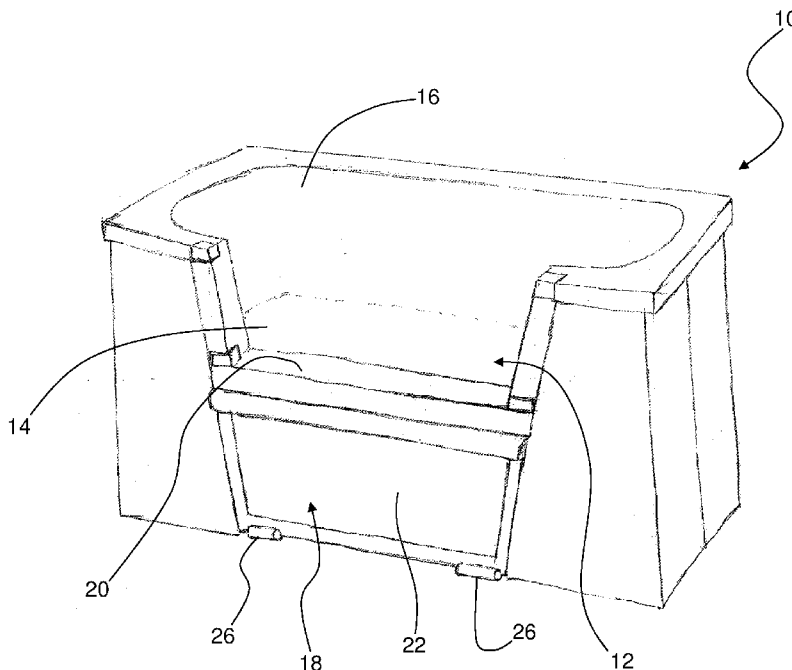


Fig. 1

(57) Abstract: A bath-tub (10) provided with an easy entrance (12) comprising a bottom (14), walls (16) which surround at least partly the peripheral edge of the bottom of the tank (14), and an entrance door. The bath-tub is wherein the bottom is in a raised position.

WO 2015/198280 A1

**Published:**

— *with international search report (Art. 21(3))*

"Bath-tub with an easy entrance"

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The present invention relates to a bath-tub with easy entrance.

According to the present state of the art many types of bath-tubs and showers with an easy entry system are known, these being designed to allow elderly people and disabled persons to use the bath-tub or shower in a completely autonomous manner.

In the description below reference will be made mainly to a bath-tub, but the technical solutions described may also be applied in a similar manner to a shower.

According to the present state of the art bath-tubs provided with an entry door, allowing a person to enter without having to step over the edge of the bath-tub or a raised edge which is too high are known. Generally, the door opens inwards and is kept in the closed position by means of a control device which can be operated from the inside or the outside of the bath-tub. A sealing gasket is positioned between door and bath-tub in order to prevent the water which fills the bath-tub from being able to seep outside.

The inside of the bath-tub may be provided with a seat which may be obtained by suitably modelling the inside of the bath-tub or may consist of a separate object.

Some types of bath-tub have devices designed to displace a seat from outside to inside the bath-tub so that the user may sit on the outside of the bath-tub and be transported inside it in a completely autonomous manner. The seat may be fixed to the ground or to a wall of a room by means of a support structure or be incorporated in the structure of the bath-tub.

Also known according to the present state of the art are bath-tubs which are provided with an internal seat which is raised and lowered in order to facilitate immersion and emersion of the person into/from the water of the bath-tub.

The bath-tubs with easy entry system according to the prior art, although they are widely used, are not without drawbacks.

For example, the ordinary maintenance and cleaning of these types of bath-tubs are complicated operations, in particular if they must be performed by an elderly person or disabled person, who normally uses the bath-tub.

The mechanical and electronic components (motor, transmission systems, control units, etc.) are very costly such that the initial installation cost, but also the maintenance cost in the event of one of the components breaking, are high.

The motors which are normally used to move the seat, since they must be low-cost, are often noisy and subject to wear and continuous maintenance.

Moreover, another aspect of importance is the visual impact which this type of bath-tub has on the user. In fact, the person who, through necessity, must use this type of bath-tub, often feels embarrassed, in particular with regard to other persons who normally use the

same bath.

A large number of persons who would need and gain benefit from the use of these bath-tubs avoid installing them in their home because of a sense of shame vis-à-vis other persons or because simply it is solution which is too costly.

The prior art has attempted to overcome these drawbacks by designing bath-tubs which have a more attractive aesthetic appearance similar to normal bath-tubs. For example, there exist bath-tubs where all the side walls are lowered (using a suitable drive system) so as to allow a person to enter and be able to use the bath-tub in a completely independent manner. However, their use is very limited because the drive system and the seals of the walls are particularly complex and very costly.

The object of the present invention is therefore to solve the drawbacks of the prior art.

In particular, a first task of the present invention is to devise a bath-tub provided with an easy entry system for elderly people or disabled persons, which is low-cost and can be installed in any bathroom.

Moreover, a task of the present invention is to provide a bath-tub which can be easily cleaned and maintained, also by elderly persons or persons with a disability.

A further task is to provide a bath-tub which has a pleasing aesthetic appearance and which does not always remind one of a physical disability of the user.

The object and tasks are achieved with a bath-tub according to Claim 1.

The idea which has occurred is to provide a bath-tub provided with an easy entry system, comprising a bottom, walls which surround at least partly the peripheral edge of the bottom of the bath-tub, and a door leaf. The bottom of the bath-tub is raised. Preferably, the height of the bottom of the bath-tub is greater than or equal to 35 cm. Advantageously, the height of the bottom of the bath-tub ranges between 35 cm and 45 cm.

The bath-tub is characterized in that the door leaf comprises two panels: a top panel and a bottom panel, which are connected together by hinge means. Moreover, the door leaf is movable between a closed position and an open position where:

- in the closed position, the top panel is positioned opposite the lowered part so as to cover at least partially the said lowered part, and

- in the open position, the top panel is positioned on a base portion of the bath-tub, situated underneath the lowered part.

In this description, "height of the bottom of the bath-tub" is understood as meaning the minimum height of the bottom of the bath-tub with respect to the surface on which the bath-tub rests, corresponding to the walking surface of the room inside which the bath-tub is located.

The characteristic features and advantages of a bath-tub according to the present

invention will become clearer from the description below of possible embodiments, provided solely by way of a non-limiting explanation, with reference to the accompanying drawings, in which:

Fig. 1 shows a schematic perspective view of a bath-tub according to the present invention;

Fig. 2 shows a schematic front view of a bath-tub according to the present invention;

Fig. 3 shows a schematic front view of a part of the bath-tub according to the present invention;

Fig. 4 shows a schematic cross-sectional side view of a bath-tub according to the present invention;

Figs. 5-8 show a schematic cross-sectional view of a bath-tub according to the present invention in a possible sequence for opening the door;

Figs. 9-12 show a schematic cross-sectional view of an alternative embodiment of a bath-tub according to the present invention in a possible sequence for opening the door;

Fig. 13 shows a detail of the door and the edge of the bath-tub according to the present invention;

Fig. 14 shows a detail of the bath-tub according to the present invention; and

Fig. 15 shows in schematic form a detail of the door according to the present invention.

Figure 1 shows a bath-tub according to the present invention, which is denoted generally by the reference number 10.

The bath-tub 10 provided with an easy entrance 12 comprises: a bottom 14, walls 16 which surround at least partly the peripheral edge of the bottom of the bath-tub 14, and a door leaf 18 opposite the easy entrance 12. The height of the bottom of the bath-tub 14 is greater than or equal to 35 cm. Preferably, the height, from the ground, of the bottom of the bath-tub may be between 35 cm and 45 cm. Even more preferably, the height of the bottom of the bath-tub is in the region of 40 cm.

As can be clearly seen in Figure 3, the front part of the walls 16 of the bath-tub may be provided with a lowered part 20. The lowered part 20 may have a trapezoidal form or other forms in order to favour the movement for opening and closing the door leaf. Advantageously, the smaller base may be directed downwards, as shown in the attached figures. In accordance with possible alternative embodiments of the present invention, the lowered part 20 may also have other forms, for example a rectangular form, or other form, in any case compatible with a door leaf 18 as will become clear from the continuation of the description.

In accordance with a possible embodiment of the present invention, the bottom edge of the lowered part 20 is advantageously in line with the bottom of the bath-tub 14 so that

there is no discontinuity between the bottom edge of the lowered part and the bottom of the bath-tub.

Advantageously, the door leaf 18 comprises two parts, a top panel 22 and a bottom panel 24 which are connected together by hinge means 26.

In accordance with a possible embodiment of the present invention, the hinge means 26 comprise two hinges positioned on the sides of the zone where the two parts of the door leaf are joined together. Each hinge comprises a first bracket 30 and a second bracket 32, which are connected by a hinge pin 34. Advantageously, both the brackets 30, 32 have an L-shaped form, as can be clearly seen in the attached figures, the reference numbers being indicated only in Figure 4. In accordance with a possible embodiment of the present invention, the first bracket 30 has a long part of the L connected to the hinge pin 34 and the short part of the L connected to the top panel 22 of the door leaf 18. In the same way, the second bracket 30 has the long part of the L connected to the hinge pin 34 and the short part of the L connected to the bottom panel 24 of the door leaf 18. As can be clearly seen in Figure 2, when the door leaf is in the closed position the hinge projects from the wall created by the door leaf and may assume advantageously a parallelepiped form.

As will be clear to the person skilled in the art in the light of the present description, the hinge may also have other configurations and for example could be provided only with a central hinge in the zone where the first part 22 and the second part 24 of the door leaf are joined together.

Advantageously, the door leaf 18 is movable between two positions: an open position (shown in Figure 1) and a closed position (shown in Figure 2).

Figures 5-8 show a possible sequence of the phases for opening of the door leaf 18 of the bath-tub 10.

In Figure 5 it can be seen that the door leaf 18 is of the type comprising a top panel 22 and a bottom panel 24. The top panel 22 is positioned opposite the lowered part 20 so as to cover at least partly the lowered part 20 itself. The bottom panel 24 covers a portion 28 of the base 25 of the bath-tub situated underneath the lowered part 20.

Figure 6 shows the phase where the top panel 22 disengages from the walls 16 of the bath-tub 12. As can be seen from the figure, the top panel shifts outwards from the bath-tub so as to allow the bottom panel 24 to be inclined with respect to the surface supporting the bath-tub, owing to the hinge means 26. Advantageously, guide means (not shown) may be provided between the bottom panel 24 of the door and the base 25 of the bath-tub, so as to guide the end of the bottom panel inside the base 25 of the bath-tub. The guide means may for example comprise pins projecting laterally from the door and guides provided on the base of the bath-tub. The guide means will not be further described since they may be easily imagined by the person skilled in the art in the light of the present description.

Figure 7 shows an intermediate phase of opening of the door leaf, where it can be seen that the top panel of the door leaf moves downwards in a substantially vertical direction, while the bottom panel assumes a horizontal configuration for insertion inside the base of the bath-tub.

Figure 8 shows a phase where the entrance door leaf is completely open. In particular, it can be noted that the top panel 22 of the door leaf 18 occupies the space previously occupied by the bottom panel 24 of the door leaf 18. Advantageously, the top panel 22 covers the portion 28 of the base 25 of the bath-tub, underneath the lowered part 20. The bottom panel 24 of the door leaf 18 assumes a substantially horizontal configuration in the vicinity of the bottom.

The series of Figures 9 to 12 shows an alternative embodiment of the bath-tub according to the present invention during the various operating phases described above.

A drawer 36 may in fact be provided in the region of the base 25 of the bath-tub 10. The front form of the drawer 25 is advantageously adapted to contain the bottom panel of the door leaf when the latter is in the open configuration.

In accordance with a possible embodiment of the present invention, in the configuration where the door leaf is open, the top panel of the door leaf is adapted to become the front of the drawer, while the bottom end of the bottom panel is inserted inside the front part of the drawer. Advantageously, when the door is open, the drawer is able to be moved by means of the top panel of the door leaf. The bottom end of the bottom panel of the door leaf may be adapted to engage with the drawer so that the door leaf and the drawer may move together. Advantageously, releasable engaging means of the type known per se to the person skilled in the art may be provided between the bottom end of the bottom panel and drawer.

In accordance with a possible embodiment of the present invention, the hinge may be provided with a torsion spring designed to move the two parts of the entrance door towards each other. Advantageously, once the door leaf has been disengaged from the closed position (as will be clarified below) the door leaf will automatically tend to fold up towards the open position shown in Figure 8 or in Figure 12.

In accordance with a possible embodiment of the present invention spring means may be provided, these being designed to be tensioned when the door leaf is opened and to release their energy when the door leaf is to be closed, bringing the door leaf back into the closed position or close to this position.

Figure 13 shows a detail of a door leaf and the corresponding contact edge of the bath-tub according to a possible embodiment of the present invention.

As can be clearly seen in the figure, a sealing gasket 38 may be provided along the edge part which comes into contact with the edge of the bath-tub. The seal may be of the known type and for example glued onto the edge of the door leaf. Advantageously the door

leaf may be provided with a groove for partially receiving the seal.

Figure 13 also shows a possible embodiment of the door leaf closing system. The door leaf 18 may be provided with lateral projecting elements 40 which are designed to move between a first projecting or engaging position and a second non-projecting or non-engaging position. Advantageously, the lateral projecting elements may be designed to cooperate with corresponding cavities 42 provided on the lowered part 20.

As shown in Figure 14, the cavities, and therefore the corresponding lateral projecting elements, may be two in number for each substantially vertical side of the lowered part 20.

In accordance with a possible embodiment of the present invention, the lateral projecting elements 40 may have a wedge-shaped form. Advantageously, the movement of the lateral projecting elements may be controlled by resilient means 46 (for example a spring) and by a handle 44. The resilient means 46 may be designed to keep the lateral projecting elements 40 in the extracted position, while the handle 44 may be designed to recall the lateral projecting elements 40 into the non-extracted position.

Figure 15 shows a possible embodiment of these elements, in which operation of the handle with an upwards rotation causes retraction of the lateral projecting elements 40.

The mechanism for movement of the lateral projecting elements 40 will not be further described since it may be easily imagined by the person skilled in the art.

In accordance with alternative embodiments of the present invention, the lateral projecting elements 40 may be provided on the substantially vertical walls of the lowered part 20, while the corresponding cavities may be provided on the lateral part of the door leaf 18.

The advantages offered by a bath-tub according to the present invention are now evident.

Firstly, the bath-tub offers a pleasing aesthetic appearance and does not remind the user of a disability condition, but instead conjures up a novel idea of convenience.

The bath-tub in fact has an appearance similar to that of a settee where a person can easily sit on the lowered part 20 and then lift up their legs so as to enter completely inside the bath-tub. Special seats (which may in any case be present inside the bath-tub) are therefore not required, and the bath-tub may be easily used by elderly people or by persons with a disability.

The bath-tub may also be provided with systems for dispensing hot water such as vaporizers or the like, situated for example along the side walls of the bath-tub, in such a way that the bath-tub is hot even when it does not contain any water. In this way the person, when sitting down and resting on the bath-tub, does not perceive an unpleasant sensation of cold. In addition or alternatively, hot water pipes may be provided underneath the bottom surface of the bath-tub. Advantageously, the bath-tub may also be used as a horizontal shower, that is without being filled in the manner of a traditional bath-tub.

The bottom part of the bath-tub, which in this description is referred to as "base", may be provided with a drawer, as described further above. Advantageously, the base may be provided also or alternatively with water tanks for fast filling and emptying of the bath-tub. In accordance with a possible embodiment of the present invention, these tanks (indicated by the reference number 50 in Figure 2) may be provided along the sides of the drawer. The figures do not show the pump required for operation of these tanks, but its constructional design may per se be easily understood by the person skilled in the art.

The person skilled in the art, in order to satisfy specific requirements, may make modifications to the embodiments described above and/or replace the parts described with equivalent parts, without thereby departing from the scope of the accompanying claims.

For example, different forms for the entrance door of the bath-tub or the door opening mechanism may be provided.

Also alternative embodiments may be envisaged where the bottom of the bath-tub 14 may be moved between a raised position, flush with lowered part 20, and a lowered position.

As mentioned further above the advantages of the present invention may be applied also to a shower, as is now clear to the person skilled in the art.

## CLAIMS

1. Bath-tub (10) provided with an easy entrance (12) comprising a bottom (14), walls (16) which surround at least partly the peripheral edge of the bottom of the bath-tub (14), and a door leaf (18) positioned at least opposite a lowered part (20) of the walls (16);

said bottom (14) being in a raised position;

characterized in that:

the door leaf (18) comprises two panels: a top panel (22) and a bottom panel (24), which are connected together by hinge means (26),

and in that

the door leaf (18) is movable between a closed position and an open position where:

- in the closed position, the top panel (22) is positioned opposite the lowered part (20) so as to cover at least partially the said lowered part (20), and

- in the open position, the top panel (22) is positioned on a base portion (28) of the bath-tub, situated underneath the lowered part (20).

2. Bath-tub (10) provided with an easy entrance (12), characterized in that the height of the bottom of the bath-tub (14) is greater than or equal to 35 cm.

3. Bath-tub (10) provided with an easy entrance (12) according to Claim 1 or 2, characterized in that the height of the bottom of the bath-tub (14) ranges between 35 cm and 45 cm.

4. Bath-tub (10) provided with an easy entrance (12) according to Claim 3, characterized in that the height of the bottom of the bath-tub (14) is in the region of 40 cm.

5. Bath-tub (10) provided with an easy entrance (12) according to any one of the preceding claims, characterized in that the front part of the walls (16) is provided with the lowered part (20) opposite which the door leaf (18) is positioned.

6. Bath-tub (10) provided with an easy entrance (12) according to Claim 5, characterized in that the lowered part (20) has a trapezoidal form, with the smaller base directed downwards.

7. Bath-tub (10) provided with an easy entrance (12) according to either one of Claims 5 or 6, characterized in that the bottom edge of the lowered part (20) is aligned with the bottom of the bath-tub (14), so that there is no discontinuity between the bottom edge of the lowered part and the bottom of the bath-tub.

8. Bath-tub (10) provided with an easy entrance (12) according to Claim 1, characterized in that said hinge means comprise at least one hinge comprising: a first bracket (30), and a second bracket (32), which are connected by a hinge pin (34).

9. Bath-tub (10) provided with an easy entrance (12) according to Claim 8, characterized in that the hinge may be provided with a torsion spring designed to move the two parts of the door leaf towards each other.

10. Bath-tub (10) provided with an easy entrance (12) according to either one of Claims 8 or 9, characterized in that the brackets (30, 32) have an L-shaped form, in which the first bracket (30) has the long part of the L connected to the hinge pin (34), and the short part of the L connected to the top panel (22) of the door leaf (18), and the second bracket (30) has the long part of the L connected to the hinge pin (34), and the short part of the L connected to the bottom panel (24) of the door leaf (18).

11. Bath-tub (10) provided with an easy entrance (12) according to Claim 1, characterized in that, when the door leaf (18) is in the closed position, the bottom panel (24) covers a portion (28) of the base (25) of the bath-tub situated underneath the lowered part (20).

12. Bath-tub (10) provided with an easy entrance (12) according to Claim 1, characterized in that, when the door leaf (18) is in the open position, the bottom panel (24) of the door leaf (18) assumes a substantially horizontal configuration in the vicinity of the bottom of the base.

13. Bath-tub (10) provided with an easy entrance (12) according to Claim 10, characterized in that it comprises a drawer (36) in the base (25).

14. Bath-tub (10) provided with an easy entrance (12) according to Claim 11, characterized in that, in the configuration where the door leaf is open, the top panel (22) of the door leaf (18) is adapted to become the front of the drawer (36).

15. Bath-tub provided with an easy entrance (12) according to any one of the preceding claims, characterized in that it comprises spring means designed to be tensioned when the door leaf (18) is opened, and to release their energy when the door is to be closed, bringing the door leaf (18) back into the closed position or close to this position.

16. Bath-tub (10) provided with an easy entrance (12) according to Claim 4, characterized in that a sealing gasket (38) is provided along the edge part of the door leaf (18) which makes contact the edge of the bath-tub.

17. Bath-tub (10) provided with an easy entrance (12) according to Claim 4, characterized in that the door leaf (18) is provided with lateral projecting elements (40) designed to move between a first projecting or engaging position and a second non-projecting or non-engaging position, said lateral projecting elements (40) being designed to cooperate with corresponding cavities (42) provided on the lowered part (20).

18. Bath-tub (10) provided with an easy entrance (12) according to any one of the preceding claims, characterized in that the base may be provided with water tanks for fast filling and emptying of the tank, by means of at least one pump.

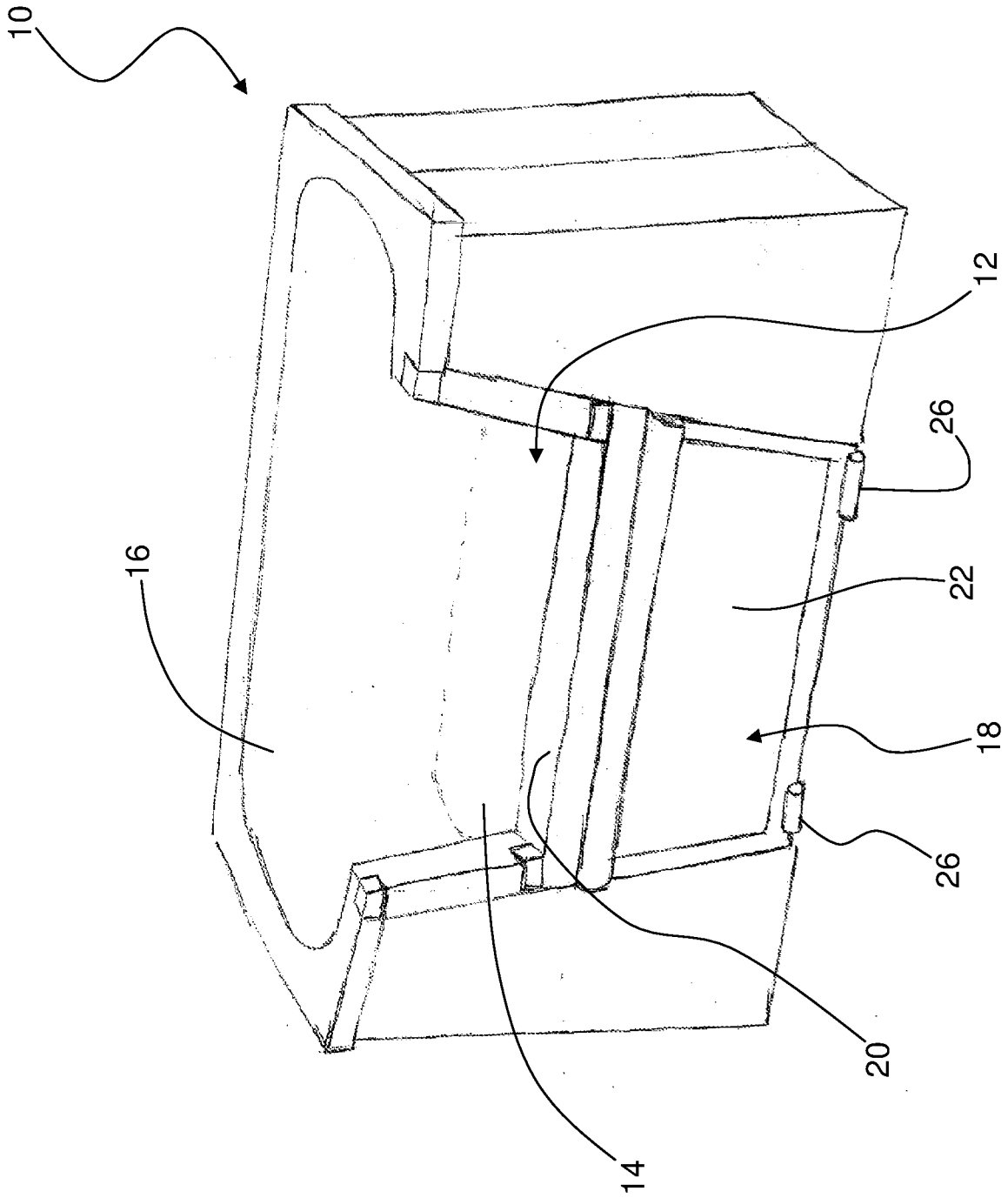


Fig. 1

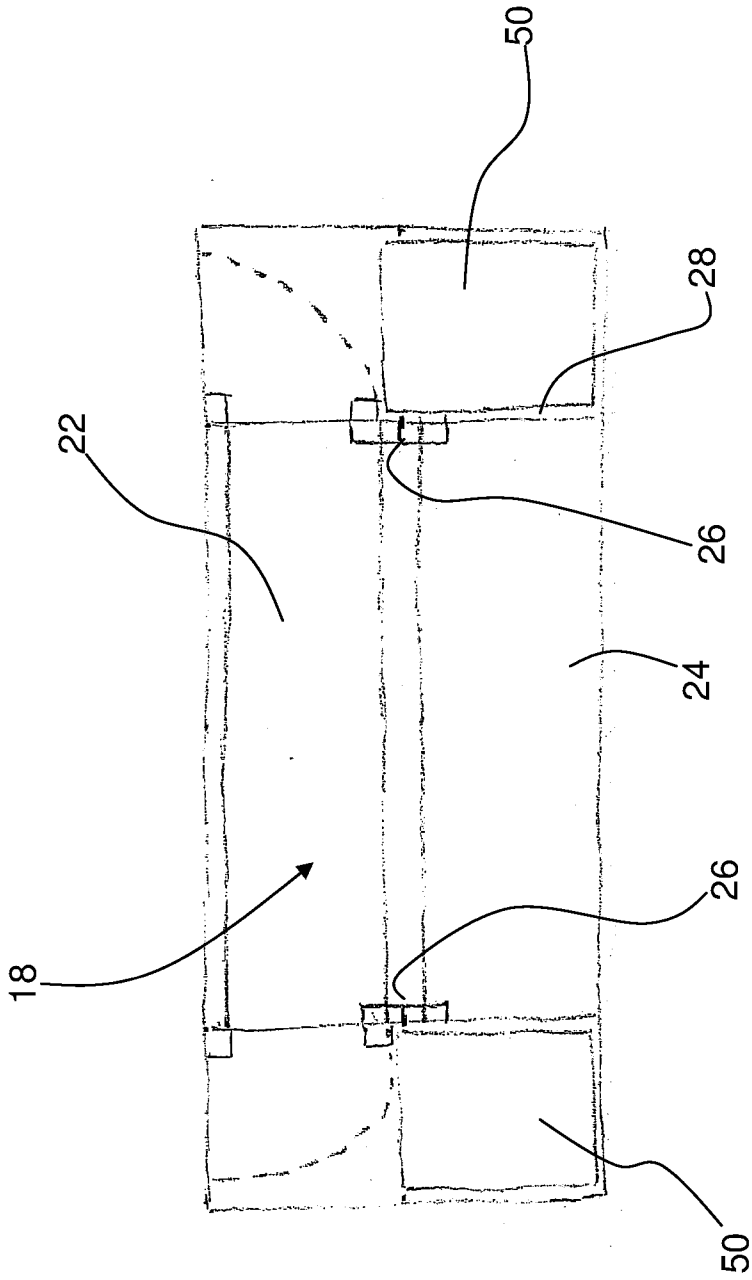


Fig. 2

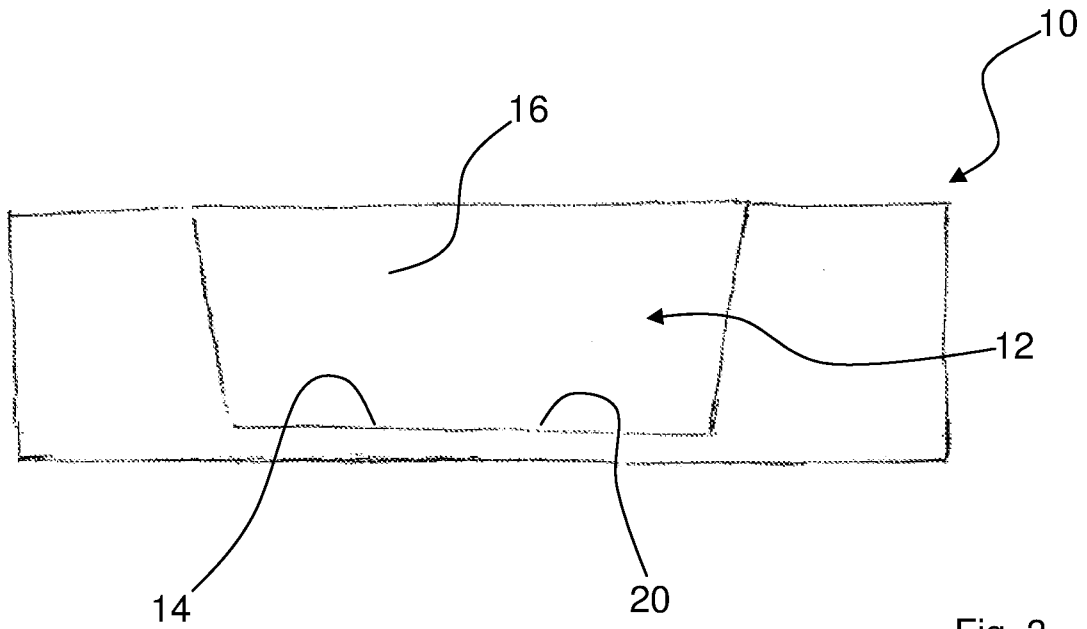


Fig. 3

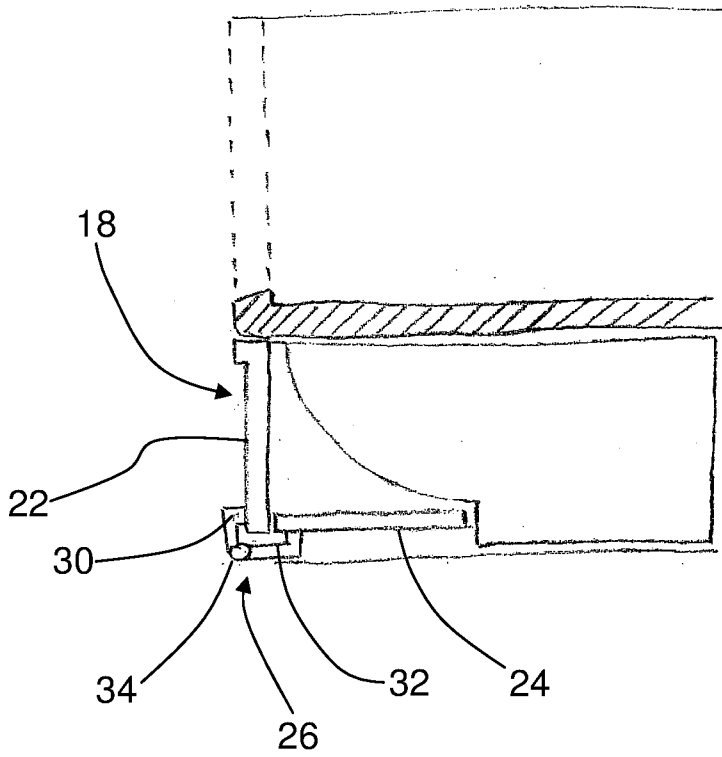
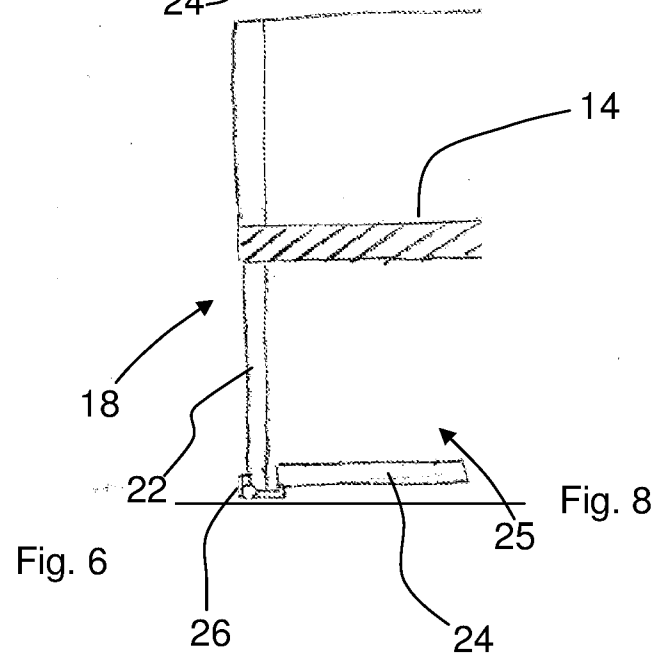
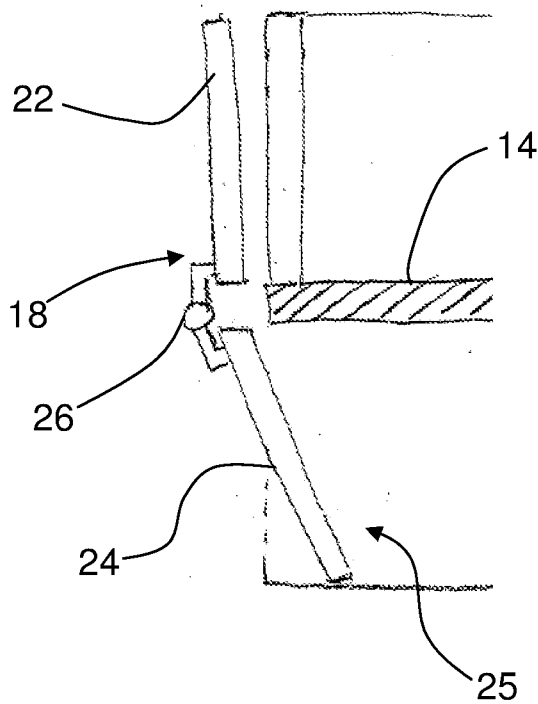
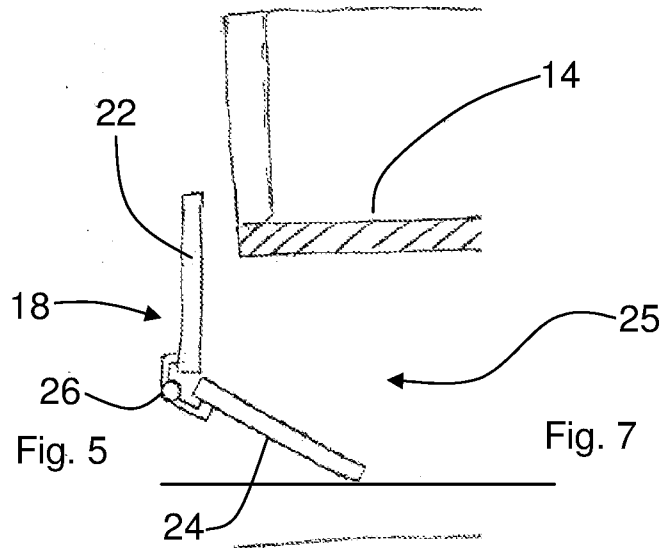
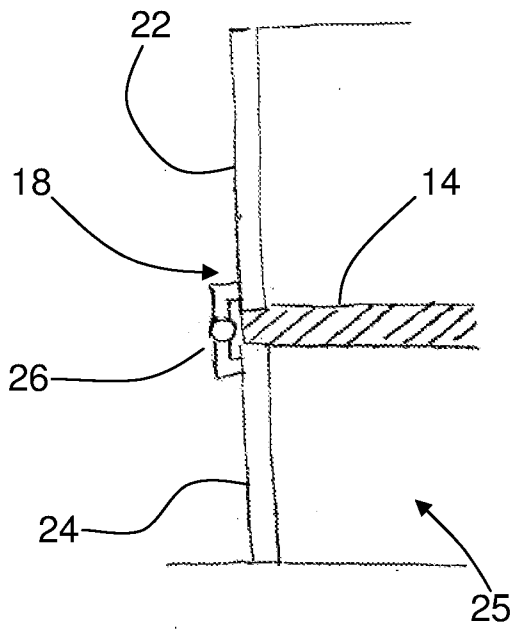
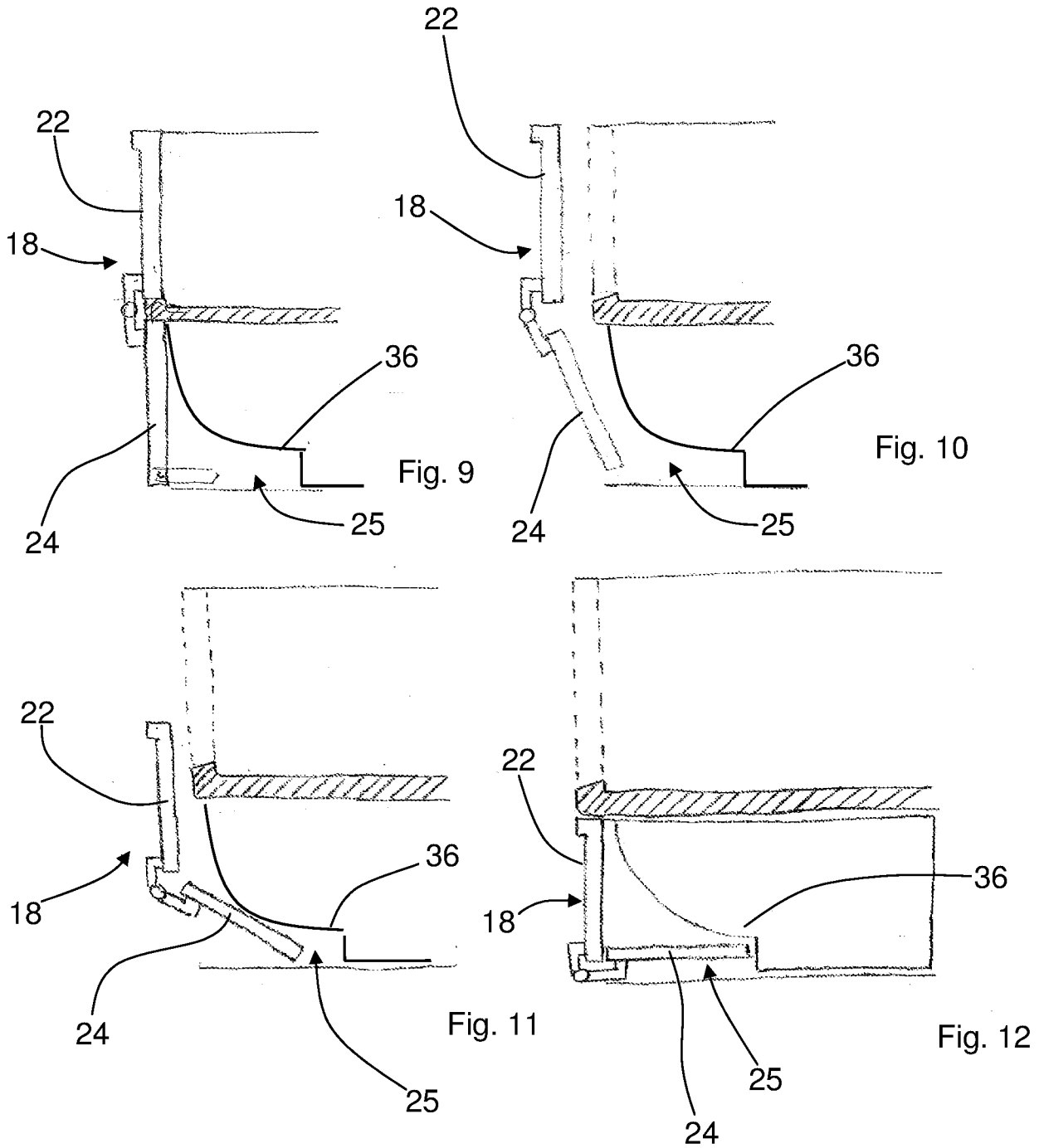


Fig. 4





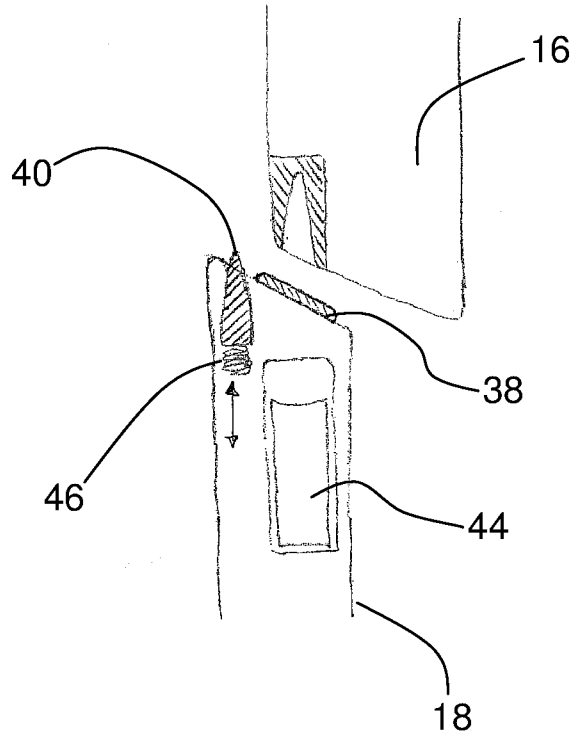


Fig. 13

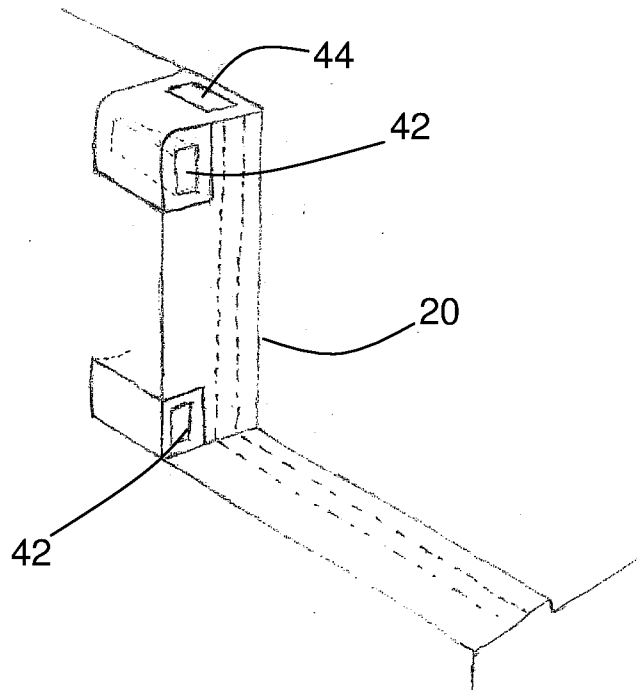


Fig. 14

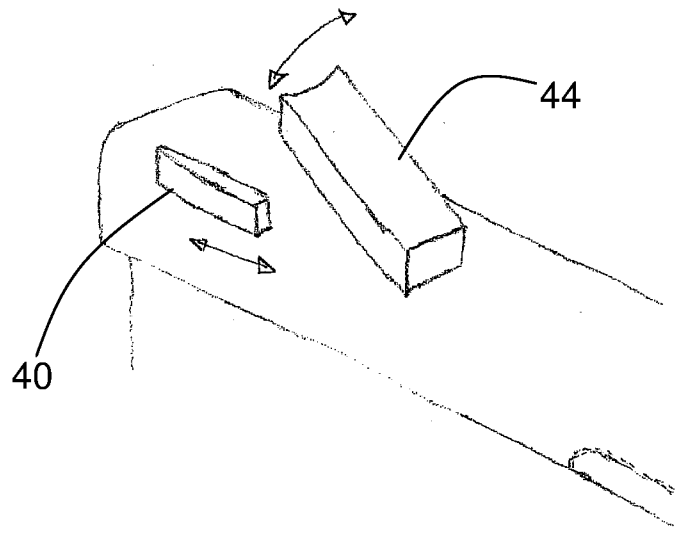


Fig. 15

# INTERNATIONAL SEARCH REPORT

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| International application No<br><b>PCT/IB2015/054824</b> |
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|--|--|-----------------------------------|
| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>INV. A47K3/00<br>ADD.  |  |                                   |
| According to International Patent Classification (IPC) or to both national classification and IPC  |  |                                   |
| <b>B. FIELDS SEARCHED</b>  |  |                                   |
| Minimum documentation searched (classification system followed by classification symbols)<br>A47K A61G A61H  |  |                                   |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  |  |                                   |
| Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)<br>EPO-Internal, WPI Data   |  |                                   |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>  |  |                                   |
| Category*  | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No.             |
| X<br>A   | US 2002/124305 A1 (JOHANSSON PAUL-JOHNNY [US]) 12 September 2002 (2002-09-12)<br>the whole document<br>-----   | 2-7,<br>15-17<br>8,11-14          |
| X<br>A   | US 5 351 345 A (SILLS ARTHUR A [US] ET AL) 4 October 1994 (1994-10-04)<br>the whole document<br>-----  | 1,5,6,<br>8-13,15,<br>16,18<br>14 |
| A  | DE 35 08 713 A1 (BERNHARDT HEINZ [DE]) 10 October 1985 (1985-10-10)<br>page 12, lines 30-34<br>figures 2-7<br>-----  | 1,5,7,<br>13,16,18                |
| A  | DE 20 2011 003682 U1 (ENGELMANN CARL WILHELM [DE]) 12 September 2011 (2011-09-12)<br>figures 2-6<br>-----  | 17                                |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.   |  |                                   |
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| Name and mailing address of the ISA/<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016   | Authorized officer<br><br>Boyer, Olivier   |                                   |

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