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(71) Applicant: **Van Kerckhove, Dimitri**
2230 Herselt (BE)

(72) Inventor: **Van Kerckhove, Dimitri**
2230 Herselt (BE)

(74) Representative: **Sarlet, Steven Renaat Irène et al**
Gevers
Intellectual Property House
Holidaystraat 5
1831 Diegem (BE)

(54) **Walk-in shower**

(57) The invention relates to a walk-in shower (30) having a tub (1) which includes first support ribs (3) for carrying a first tiled plate (4) and for forming a first ventilated cavity (7) below the first plate. The walk-in shower further has a water-impermeable wall (20) with second support ribs (14) for mounting a second tiled plate (14) and for forming a second ventilated cavity (17) behind the second plate. The invention also relates to the tub (1) with first support ribs (3) and the second plate (13) with second support ribs (14).

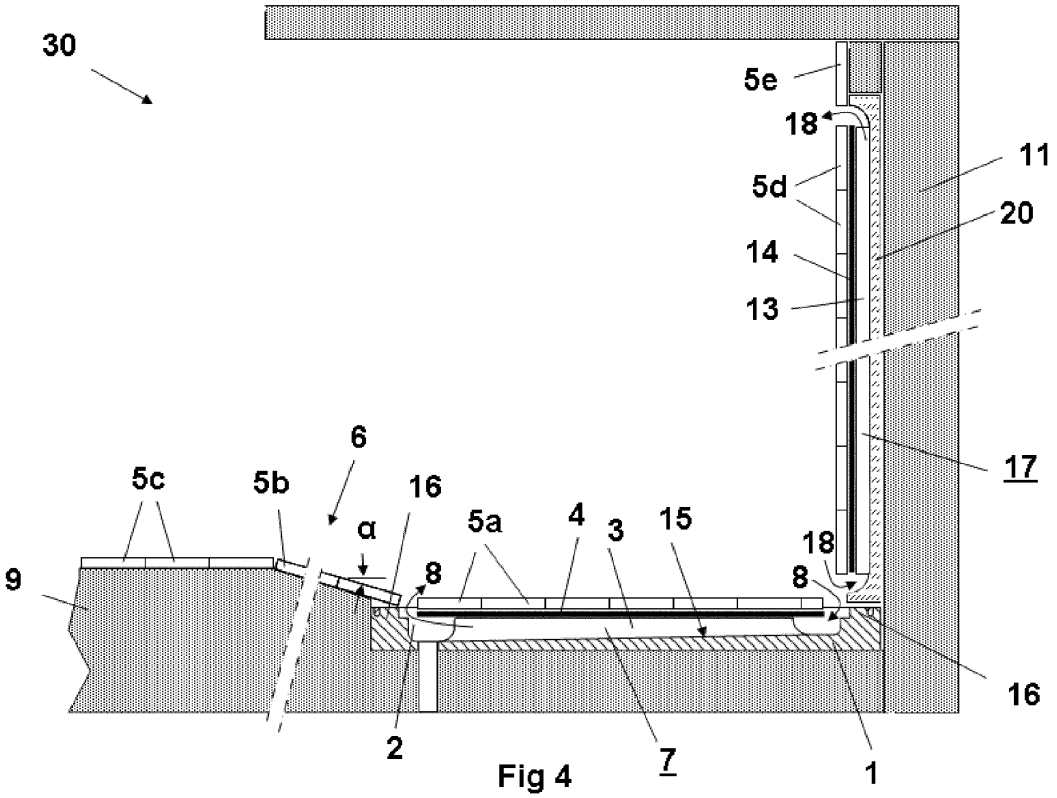

Fig 4

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a walk-in shower.

PRIOR ART

[0002] Showers are commonly known. There are various embodiments, such as e.g. a stall shower with a ceramic or metal tub and with metal or plastic side walls and a glass door, or a walk-in shower with a tiled floor without a step, a tiled wall, two glass side walls and a glass door. Walk-in showers have the advantage that the installation thereof requires less consideration for the height of the final floor below or around the shower, and that they can be installed e.g. after the bathroom has been tiled, or that they can be installed afterwards without breaking up the floor, but they have the disadvantage of a step of e.g. 20 cm, which is a problem for older people. Walk-in showers avoid such a step, and usually have a floor with the same tiles as used around the walk-in shower, which is aesthetically very attractive, hence their increasing popularity in recent years. One problem with such walk-in showers is that they often exhibit moisture problems, such as leakage and/or mould formation.

DISCLOSURE OF THE INVENTION

[0003] It is an object of the present invention to provide a walk-in shower in which the moisture problems are reduced or even completely avoided.

[0004] This object is achieved by a walk-in shower which exhibits the technical features of the first independent claim. To this end, the shower according to the present invention comprises:

- a water-impermeable tub having a bottom and a raised edge for the collection of shower water, wherein the bottom exhibits a slope for the drainage of the shower water towards a drain opening of the tub;
- at least one water-impermeable upright wall positioned above the tub for collecting shower water and for guiding it to the tub;

wherein second spacers are attached to the at least one water-impermeable upright wall for mounting a second plate at a distance from the impermeable upright wall to form a second cavity;
wherein openings are provided on a bottom and a top of the second plate for allowing air circulation through the second cavity;
wherein the second plate is at least partially covered with tiles.

[0005] Because the walk-in shower has a water-impermeable upright wall (e.g. at a side face or at the back), seeping of water through the side wall or back wall is avoided.

[0006] By providing a second plate which is covered by upright tiles, the walk-in shower is provided with tiles along the side (or back). These upright tiles can abut the walls in an aesthetically beautiful way.

[0007] By placing the second plate at a distance from the upright wall, a second cavity is created, in which air circulation is possible through the openings. Due to this air circulation, shower water possibly remaining in the second cavity behind the second plate will evaporate, avoiding formation of mould between and behind the upright tiles.

[0008] In one embodiment, the second plate is a water-permeable plate, such that moisture situated behind the upright tiles, or in the joints between the tiles, may dry up quicker, such that mould formation and/or growth is prevented, or at least heavily reduced.

[0009] In one embodiment, the second spacers are elongated second support ribs for mounting the second plate, and for guiding the shower water behind the second plate in the direction of the tub, and for forming second circulation channels for the air circulation behind the second plate. For example, the second support ribs are an integral part of the water-impermeable upright wall, such that the installation time of the walk-in shower is greatly reduced and the finishing is improved.

[0010] In one embodiment, the impermeable upright wall and the second plate are connected by means of a second hinged connection for tilting the second plate for cleaning the second cavity. In this way, the second cavity is more accessible, and can (if desired) even be opened completely to promote drying.

[0011] In one embodiment of the invention, the tub has first spacers, mounted on the bottom, for supporting a first plate at a distance above the bottom to form a first cavity between the bottom and the first plate; wherein the first plate has a circumference with outer dimensions that are smaller than the inner dimensions of the raised edge of the tub to form a gutter along at least a portion of the circumference, for drainage of the shower water and for allowing air circulation below the first plate; and wherein the first plate is at least partially covered with tiles.

[0012] Because the walk-in shower in this embodiment has a water-impermeable tub at the bottom for collecting the shower water, seepage of water through the floor (and possibly the ceiling below) is avoided. As far as known to the inventor, a walk-in shower never uses a tub; foils and the like are used, of which it is the intention that they are connected watertight to each other and to the drain opening, but they are often not watertight.

[0013] By providing a first plate which is covered with tiles, the walk-in shower is provided on its bottom with tiles on which one can stand. These laying tiles can abut in an aesthetically beautiful way the tiles around the shower (except for the gutter).

[0014] By providing a bottom with a slope, the drainage of shower water is promoted, preventing stagnation of

the shower water as well as the concomitant accumulation of soap residues.

[0015] By positioning the first plate at a distance above the bottom of the tub, and by choosing the outer dimensions of the first plate to be smaller than the inner dimensions of the raised edge of the tub, a first cavity is created below the first plate, and a gutter is created along the circumference of the first plate such that air circulation is possible in the first cavity below the first plate via the gutter. Due to this air circulation, the possibly remaining shower water will evaporate in the first cavity below the first plate, such that mould formation below and between the laying tiles is avoided.

[0016] In one embodiment, the first plate is a water-permeable plate, such that moisture that is situated below the laying tiles, or in the joints between the tiles, can dry up faster (e.g. order of magnitude of several hours), such that mould formation and/or growth is prevented, or at least greatly reduced.

[0017] With 'water-permeable material' a porous material is meant.

[0018] In one embodiment, the first plate has a convex shape for the drainage of the shower water to the gutter, for example a substantially spherical shape. By shaping the first plate not into a flat shape but into a slightly curved shape, sloping down in the direction of the gutter, stagnation of shower water on the laying tiles is prevented, and the drainage of shower water to the gutter is promoted, which contributes to the reduction of the moisture problems. An additional advantage is that the bottom surface is less slippery during showering, such that slipping of barefoot people is avoided.

[0019] In one embodiment, the first spacers are elongated first support ribs for supporting the first plate, for guiding the shower water in the direction of the drain opening, and for forming the first circulation channels for the air circulation below the first plate. The first support ribs are for example an integral part of the water-impermeable tub, such that the assembly time of the shower is greatly reduced and the finishing is improved.

[0020] In one embodiment, the first support ribs have rounded edges for avoiding corners in which soap residues or other dirt can accumulate. Avoiding remaining soap residues that may prevent an easy drainage contributes to avoiding moisture problems. In addition, the tub can be cleaned faster, easier and more thoroughly, contributing to the hygiene in the bathroom.

[0021] In one embodiment, the tub and the first plate are connected by means of a first hinged connection for tilting the first plate for cleaning the first cavity. In this way, the first cavity is more accessible, and can (if desired) even be opened completely to promote drying.

[0022] In one embodiment, the first plate consists of two sections, each of which are connected to the tub by means of a hinged connection, for tilting the sections. In this way, one can stand on one section during cleaning of the other opened section.

[0023] The invention also focuses on the water-impermeable tub with a bottom and an edge and with first supporting ribs, as an element of the above-described walk-in shower.

[0024] The invention is also directed to the water-impermeable wall with second support ribs, as an element of the above described walk-in shower.

BRIEF DESCRIPTION OF THE FIGURES

[0025] The invention is further elucidated by means of the following description and the accompanying figures. Note that the figures are not necessarily drawn to scale and that the ratios of the components do not necessarily correspond to reality. The figures serve to describe the principles of the invention. Same elements are numbered alike in the various drawings.

Fig 1 shows a portion of an embodiment of the walk-in shower according to the invention in perspective view.

Figures 2A-2C show an embodiment of a tub that can be used in the walk-in shower according to the invention, respectively in top view, in cross section along section line A-A, and in cross section along section line B-B.

Fig 3 shows the walk-in shower of Fig 1 in top view, along section line D-D.

Fig 4 shows the walk-in shower of Fig 1 in cross section, along section line C-C.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0026] The present invention will be described with respect to particular embodiments and with reference to certain drawings, however the invention is not limited thereto and is only defined by the claims. The described drawings described are only schematic and are non-limiting. In the drawings, the size of some elements may be exaggerated and not drawn to scale for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual practical embodiments of the invention.

[0027] Furthermore, the terms first, second, third and the like in the description and in the claims are used for distinguishing between similar elements and not necessarily to describe a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the invention may be applied in other sequences than described or illustrated herein.

[0028] The term "comprising", used in the claims, should not be interpreted as being restricted to the means listed thereafter and does not exclude other elements or steps. The term is to be interpreted as specifying the presence of the stated features, elements, steps or components that are referred to, but does not exclude the presence or addition of one or more other features, ele-

ments, steps or components, or groups thereof. The scope of the expression "a device comprising means A and B" should not be limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

REFERENCES:

[0029]

1	water-impermeable tub
2	drain opening
3	first spacers, first ribs
4	first plate
5	tiles
6	slope
7	first cavity
8	gutter
11	top floor
12	wall
13	second spacers, second ribs
14	second plate
15	bottom
16	edge
17	second cavity
18	second openings
20	water-impermeable wall
30	walk-in shower
α	slope of the floor near the walk-in shower
β	slope of the bottom of the tub

[0030] Fig 1 shows a portion of an embodiment of a walk-in shower 30 according to the present invention in perspective view and from a distance. Visible are tiles 5a at the bottom of the walk-in shower 30 on which a person can stand, and tiles 5d against at least one upright wall are provided, in this example on the back wall. The sides of the walk-in shower 30 may be open, or may e.g. be two transparent side walls, and may e.g. be made of a plastic material or of glass or Plexiglas, or any other material deemed suitable by a person skilled in the art. But a walk-in shower 30 according to the invention may also contain more than one tiled side wall, e.g. two or three. Optionally, the walk-in shower 30 also has an entrance door, for example made from glass.

[0031] The walk-in shower 30 according to the invention has a water-impermeable tub 1 which is generally incorporated in the top floor (also known as "screed"), as shown in Fig 4. Fig 4 shows the tub 1 of Fig 1 in cross section along section line C-C. The dimensions of the walk-in shower 30 may be selected such that the top of the tiles 5a on the first plate 4 lie at substantially the same height as the tiles 5c next to the walk-in shower. The floor tiles 5b may be placed at a short distance (e.g. 1 m) from the walk-in shower 30 at a small decline, e.g. a decline of 1-3 cm over a distance of 1 m in length, to direct the shower water that falls next to the tub back to the tub 1. The tiles 5b are for example placed up to the edge 16 of the tub, such that shower water that falls on the tiles 5b flows into the tub 1, and not next to the tub, to avoid moisture problems.

[0032] Fig 2A shows an embodiment of a tub 1 according to the invention in top view, and also indicates the position of the first plate 3, wherein a portion of the first plate has been cut away for illustrative purposes. Fig 2B shows the tub in cross section along section line A-A, Fig 2C shows the tub in cross section along section line B-B. The figures 2A-2C show a water-impermeable tub 1 with a bottom 15 and an raised edge (or border) 16. The bottom 15 exhibits a slope towards a drain opening 2 for the drainage of the shower water. The slope angle β is typically 1-3 degrees. The tub 1 has first spacers 3, located on or applied to the bottom 1 for supporting a first plate 4 at a distance (of e.g. 1 - 5 cm) above the bottom 15 to form a first cavity 7 between the bottom 15 and the first plate 4. This first cavity 7 serves as a drain channel for the shower water, as well as a circulation channel for the space below the first plate 4. In one embodiment, the first spacers 3 are at least two elongated first support ribs by which the first plate 4 can be supported. In one embodiment, the first support ribs 3 are an integral part of the tub 1, and are for example formed together during the manufacture of the tub. This also provides a better finishing, less work to install the walk-in shower, and an increased hygiene. The tub of Fig 2A has three substantially parallel first support ribs 3, with rounded edges to avoid remaining soap residues, and to ease the cleaning process. (Corners are indeed difficult to clean). Optionally, a rubber strip (not shown) may be applied to the first supporting ribs 3, by which the first plate 4 can be supported. The portion of the first support ribs by which the first plate 4 will be supported will for example be placed substantially level. The drain opening 2 in the tub of Fig 2 is located in the middle of one side of the tub 1, and the first support ribs 3 run substantially parallel in the direction of the drain opening 2, however other topologies are also possible. For example, the drain opening may also be located in one of the corners of the tub, or substantially in the middle of the tub, wherein for example each of the first support ribs 3 is positioned in such a way that their carriers (or extensions thereof) intersect in a point substantially in the drain opening 2. In this way, the first support ribs 3 help to guide the shower water to the drain opening 2.

[0033] The first plate 4 is for example rectangular or square, but other shapes are also possible. The outer dimensions w, y of the first plate 4 are smaller, e.g. 1 to 10 cm smaller, for example 2 to 8 cm, or 2 to 6 cm smaller than the inner dimensions W, Y of the edge 16 of the tub 1, such that an opening is created (between the first plate 4 and the edge 16), which acts as a gutter 8 along at least a portion of the circumference of the first plate 4. Along this gutter 8, the shower water that falls on the tiled first plate 4 is directed to the drain opening 2. This opening or gutter 8 also allows air circulation in the first cavity 7

below the first plate 4, for evaporation of the shower water that is not drained away, and for evaporation of the moisture that has seeped in between and under the tiles 5a of the first plate 4. By analyzing the problems of the prior art, the inventor has come to realize that the more water-impermeable the grout between the tiles 5a is, the less moisture gets below the tiles 5a, but if there is a leakage, the moisture also cannot get out. This problem is avoided by choosing a first plate 4 which is sufficiently porous, such that any moisture that might get under the tiles 5a can evaporate easily, avoiding moisture problems such as mould. The porosity is, for example, such that the permeability of the plate is at least 1.0 cm^3 per m^2 of surface area and per hour under atmospheric pressure, or at least 5.0 cm^3 per m^2 and per hour.

[0034] Figure 3 is a cross section of the walk-in shower along section line D-D of Fig 1. Fig 3 and Fig 4 show that the embodiment of the walk-in shower 30 according to the invention has at least one water-impermeable upright wall 20, on which second spacers 13 are attached. In one embodiment, these are at least two elongated second support ribs 13 which are positioned upright, for example vertical. This has the advantage that seepage water is drained quickly. In one embodiment, the second spacers 13 are part of the water-impermeable upright wall 20, and are for example formed at the same time during the manufacture of the wall 20. In one embodiment, the second spacers 13 show rounded corners where joining the impermeable wall 20 because of the same advantages as mentioned for the first support ribs 3 and the tub 1. Against the second support ribs 13, a second plate 14 is mounted, at a distance from the impermeable upright wall 20 to form a second cavity 17. The second plate 14 of Fig 4 is rectangular, and a bottom and a top thereof are provided with openings 18 (e.g. a bottom and a top slit) for allowing air circulation through the second cavity 17. To obtain the look of a walk-in shower, the second plate 14 is at least partially covered with tiles 5d. In this way, the space behind the second plate 14 is ventilated, and water that has seeped through between the tiles 5d or through the second plate 14 can evaporate, such that moisture problems between and behind the upright tiles 5d are avoided. The elongated second support ribs thus have the following functions: fixing the second plate 14 suspended above the tub 1, guiding the shower water behind the second plate 14 in the direction of the tub 1, and forming second circulation channels for the air circulation behind the second plate 14.

[0035] The water-impermeable plate 20 may occupy the entire height of the space, or it may occupy a portion thereof as shown in the example of Fig 4. In that case, the opening 18 at the top of the second plate 14 will not be located against the ceiling of the bathroom, but a lower distance. Over this distance then e.g. tiles 5e can be applied to the wall 11 (or to the stucco).

[0036] The upright impermeable wall 20 with the second support ribs 13 is for example positioned in such a way with respect to the second plate 14, that shower water that flows down along the upright tiles 5d, for example ends up directly in the gutter 8. By an appropriate curvature of the gutter 8 at a position under these tiles 5d, this shower water is guided to the drain opening 2, and in this way takes with it as much as possible of the shower water and soap residues or other dirt.

[0037] In one embodiment, the first plate 4 has a convex shape for the drainage of the shower water that falls on the first plate 4 to the gutter 8, for example a substantially spherical shape, with the highest point at substantially the centre of the first plate 3. Because of this, it can be avoided that the first plate 4 itself has to be placed at an angle, which makes it difficult to stand on. Because of this, it is also possible to position the circumference of the first plate 4 is substantially level, which greatly simplifies the tiling along the tub 1 (and on the edge 16). By using the tub 1 and the first plate 4 with a convex shape, the drainage does not have to be worked out in the floor tiles 5a, as is the case in known embodiments of walk-in showers. In this way, a lot of time can be gained during the assembly of the walk-in shower.

[0038] As already mentioned, the first and the second plate 4, 14 are made of a porous material, and are thus water-permeable. This not only promotes drying of the fluid behind/below/in between the tiles 5, but also the adhesion of the tiles 5 to the first and second plate (because of the improved adhesion in the pores of the first resp. second plate). A suitable material is a fibre cement board.

[0039] In one embodiment, the tub 1 and the water-impermeable wall 20 are made of a plastic material, e.g. an acrylic. But other materials may also be used, e.g. an aluminium plate of which at least one side is coated with plastic. The aluminium plate provides the strength, the coating provides the contact medium with the shower water.

[0040] The first plate 4 can be removably attached. Optionally, the first plate 4 is attached to the tub 1 by means of a first hinged connection (not shown), such that it can be tilted for cleaning the first cavity 7 below the first plate 4. Optionally, a hydraulic pump or an air pump (not shown) may be provided to help the first plate 4 to tilt against the weight of the first plate 4. A locking mechanism ensures that the first plate 4 remains in a flat position during normal use of the walk-in shower 30.

[0041] The second plate 14 can be permanently mounted to the second support ribs 14 by means of adhesive, but the second plate may also be removably attached e.g. by means of a second hinged connection (not shown) for rotation of the second plate 14 for cleaning of the second cavity 17. Obviously, rust free hinged connections are used, e.g. from plastic or from stainless steel or aluminium.

[0042] In one embodiment (not shown), the first plate 4 consists of two parts, e.g. from two substantially equal halves, wherein both halves are connected to the tub 1 by means of hinged connections, such that they can both at the same time or separately be opened outwardly. This

allows e.g. to stand on one part while the other part is opened during the cleaning process.

[0043] Optionally, lighting may also be provided below the first plate 4, e.g. LED lighting, or lighting on the basis of an optical fibre. The light will then be visible through the gutter 8 between the edge 16 of the tub 1 and the tiled first plate 4. This is both aesthetically pleasing and practical, because the light indicates the area where the person who wants to shower, should stand most appropriately.

Claims

1. A walk-in shower (30), comprising:

- a water-impermeable tub (1) having a bottom (15) and a raised edge (16) for the collection of shower water, wherein the bottom (15) exhibits a slope (β) for the drainage of the shower water towards a drain opening (2) of the tub (1);
- at least one water-impermeable upright wall (20) positioned above the tub (1) for collecting shower water and guiding it to the tub;

wherein second spacers (13) are attached to the at least one water-impermeable upright wall (20) for mounting a second plate (14) at a distance from the impermeable upright wall (20) to form a second cavity (17) ;
and wherein openings (18) are provided at a bottom and a top of the second plate (14) for allowing air circulation through the second cavity (17);
and wherein the second plate (14) is at least partially covered with tiles (5d).

2. The walk-in shower (30) according to claim 1, wherein the second spacers (13) are elongated second support ribs for mounting the second plate (14), and for guiding the shower water behind the second plate in the direction of the tub (1), and for forming second circulation channels for the air circulation behind the second plate (14).

3. The walk-in shower (30) according to any one of claims 1-2, wherein the first and/or the second support ribs (3, 13) have rounded edges for avoiding corners in which soap residues can accumulate.

4. The walk-in shower (30) according to any one of claims 1-3, wherein the second plate (14) is connected to the impermeable upright wall (20) by means of adhesive.

5. The walk-in shower (30) according to any one of claims 1-4, wherein the impermeable upright wall (20) and the second plate (14) are connected by means of a second hinged connection for tilting the second plate (14) for cleaning the second cavity (17).

6. The walk-in shower (30) according to any one of claims 1-5, wherein the tub (1) and/or the water-impermeable upright wall (20) is made of a plastic material, for example an acrylic.

7. The walk-in shower (30) according to any one of the preceding claims,
wherein the tub has first spacers (3), attached to the bottom (1), for supporting a first plate (4) at a distance above the bottom for the formation a first cavity (7) between the bottom (1) and the first plate (4);
wherein the first plate (4) has a circumference with outer dimensions (w, y) which are smaller than the inner dimensions (W, Y) of the raised edge (16) of the tub for the formation of a gutter (8) along at least a portion of the circumference, for drainage of the shower water, and for allowing air circulation below the first plate (4);
and wherein the first plate (4) is at least partially covered with tiles (5a).

8. The walk-in shower (30) according to claim 7, **characterized in that** the first plate (4) and/or the second plate (14) is/are water-permeable.

9. The walk-in shower (30) according to claim 7 or 8, wherein the first plate (4) and/or the second plate (14) is/are fibre cement board.

10. The walk-in shower (30) according to any one of claims 7-9, wherein the first plate (4) has a convex shape for the drainage of shower water to the gutter (8), for example a substantially spherical shape.

11. The walk-in shower (30) according to any one of claims 7-10, wherein the first spacers (3) are elongated first support ribs for supporting the first plate (4), and for guiding the shower water in the direction of the drain opening (2), and for forming the first circulation channels for the air circulation below the first plate (4).

12. The walk-in shower (30) according to any one of claims 7-11, wherein the tub (1) and the first plate (4) are connected by means of a first hinged connection for tilting the first plate (4) for cleaning the first cavity (7).

13. The walk-in shower (30) according to any one of claims 7-12, wherein the first plate (4) consists of two parts each of which are connected to the tub (1) by means of a hinged connection, for tilting the parts.

14. The walk-in shower (30) according to any one of the preceding claims, wherein the tub (1) is further provided with lighting below the first plate (4).

15. The water-impermeable wall (20) with the second

support ribs (13), as an element of the walk-in shower (30) according to any one of claims 1-14.

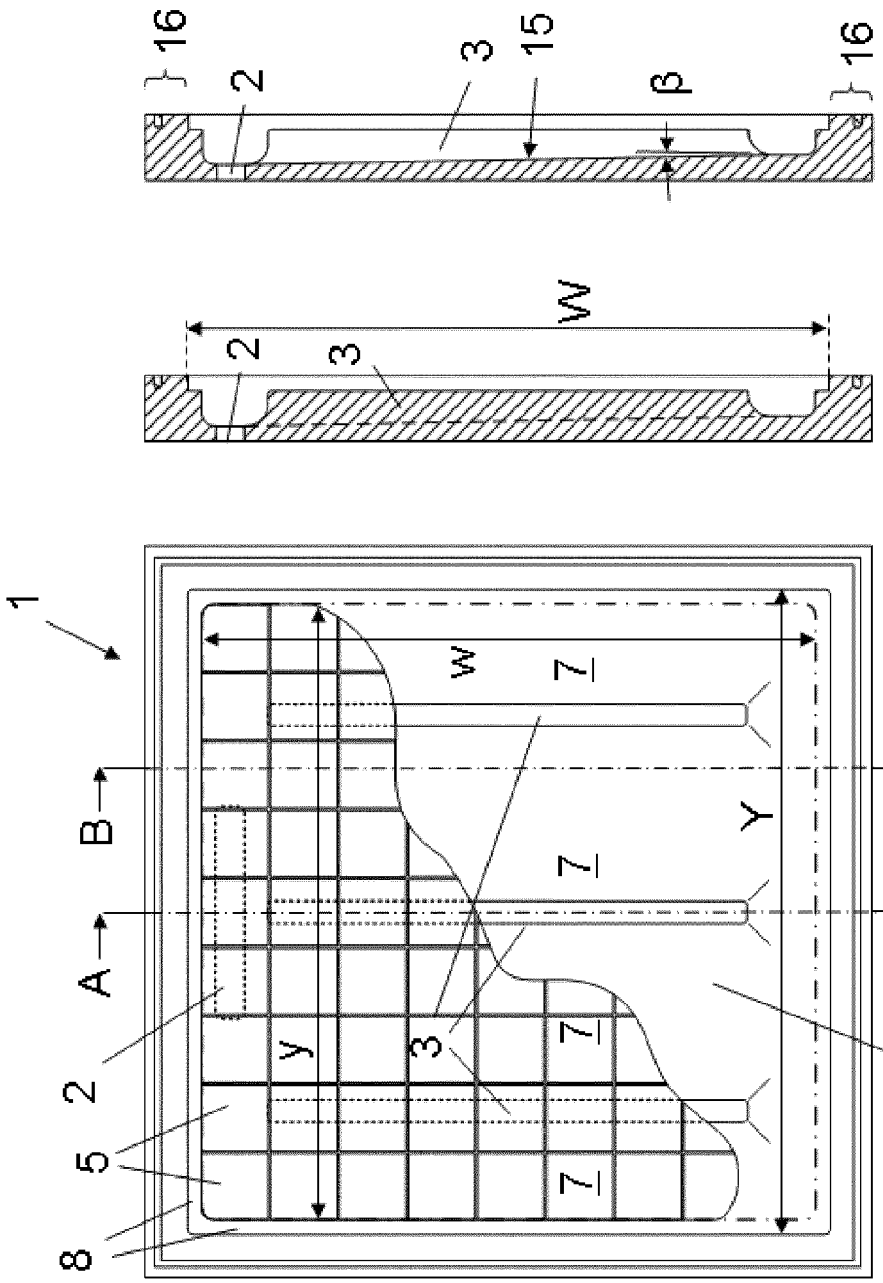

Fig 2C

Fig 2B

Fig 2A

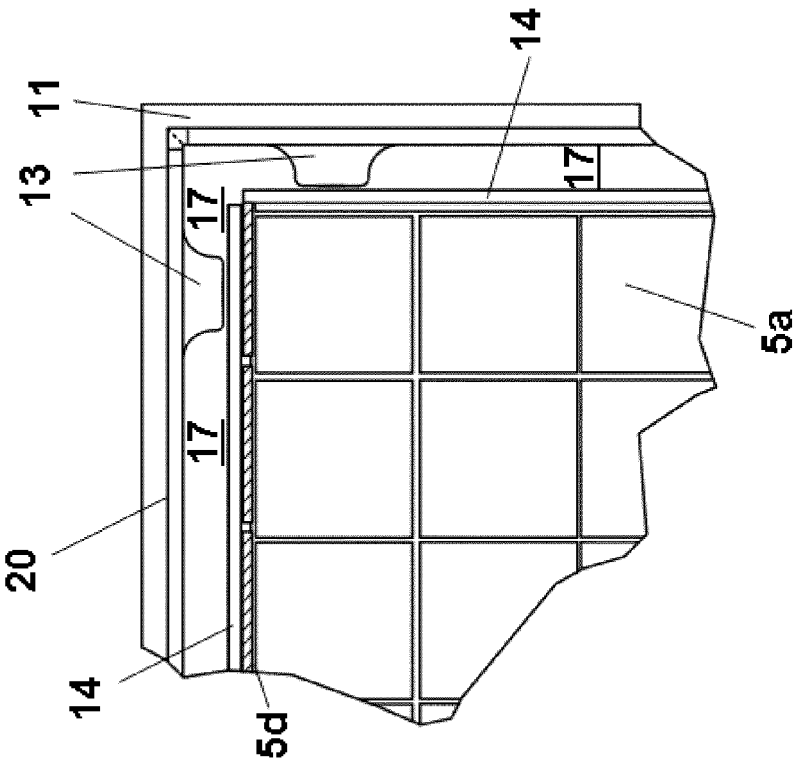

Fig 3

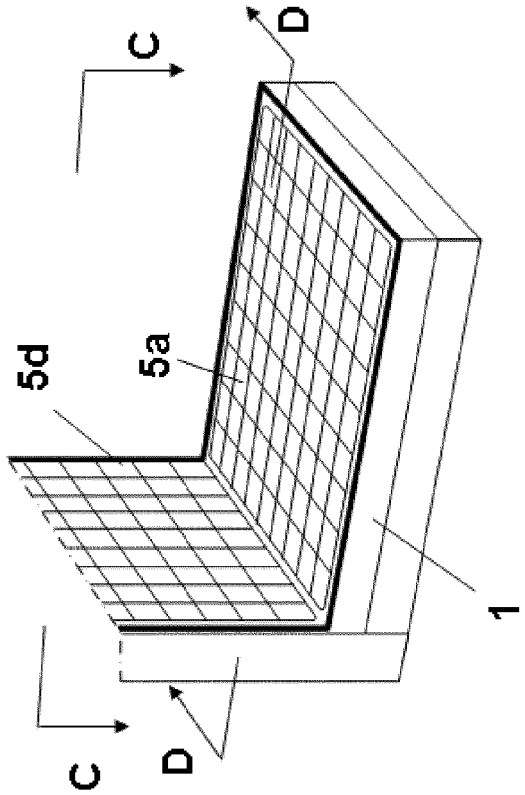

Fig 1

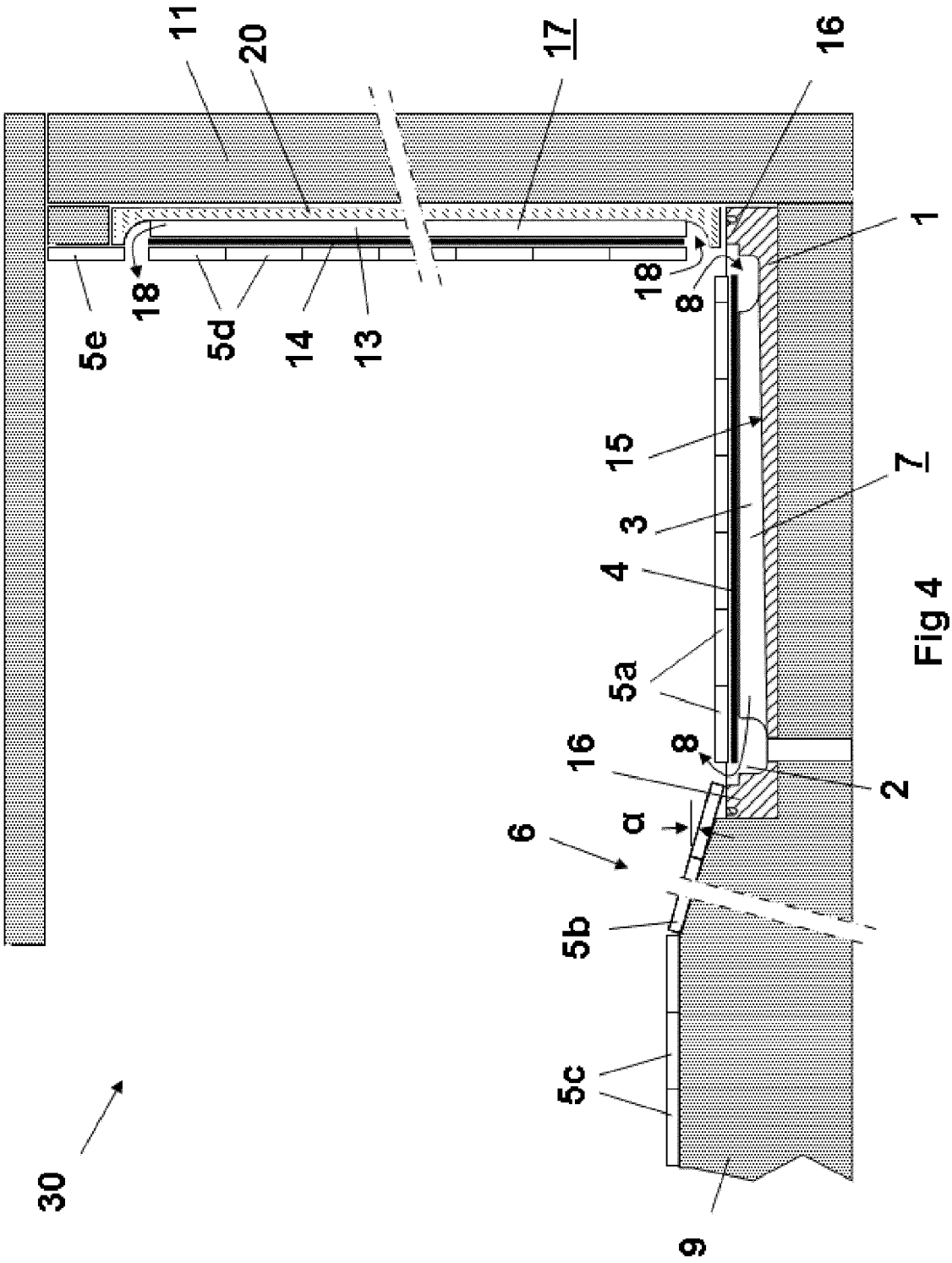

Fig 4