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(54) **Shower cabin and cleaning device for the shower cabin**

(57) Shower cabin including a wall having an inner surface and a cleaning device for cleaning the inner surface including a dispenser for dispensing a cleaning fluid onto a target area on the inner surface, wherein the cleaning device further comprises a positioning element arranged for varying the target area.

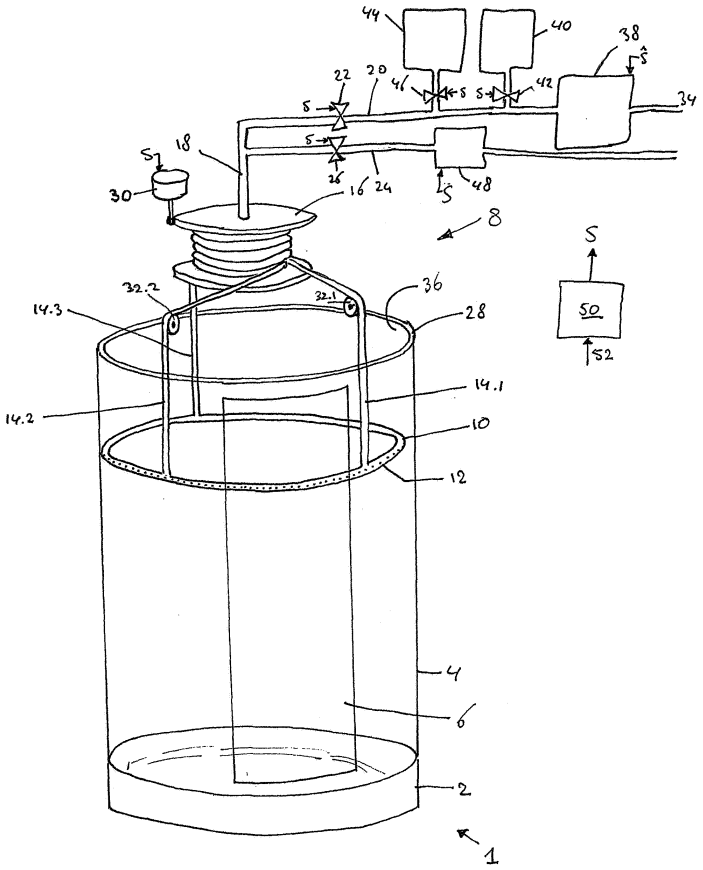

Fig. 1

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Description

[0001] The invention relates to a shower cabin including a wall having an inner surface and a cleaning device for cleaning the inner surface including a dispenser for dispensing a cleaning fluid onto a target area on the inner surface.

[0002] Shower cabins are well known. The shower cabin is used for personal sanitation, i.e. for washing a person. Thereto, the shower cabin may comprise a shower head for supplying washing water to the person using the shower cabin. In general the shower cabin comprises at least one wall. Usually the at least one wall is an upstanding wall. Sometimes the upstanding wall is a circumferential wall, e.g. provided with a door, although shower cabins having, in horizontal section, generally U-shaped or L-shaped section are also known. The upstanding wall may be rigid, e.g. comprising glass, plastics or ceramic material. The upstanding wall may also be, for instance partially, flexible, e.g. a shower curtain.

[0003] A commonly known problem of shower cabins is fouling.

Contaminants, such as residue of detergents used while using the shower, lime scale and dirt, may adhere to the inner surface of the wall. The prior practice for cleaning such shower cabins has usually been the application of a cleaner and scrubbing by hand. However, many attempts have been made to reduce the amount of manual labour required for cleaning the shower cabin by adding a cleaning device to the shower cabin.

[0004] One known shower cabin comprising such cleaning device is described in US 4,872,225. This known shower cabin comprises, besides the usual shower head, mounted in an upper portion of the shower cabin a cleaning device comprising a spray head of endless configuration having a plurality of discharge openings for directing a stream of water down at the inner surface of the wall.

[0005] The known shower cabin has the disadvantage that a level of cleanliness achieved by using that cleaning device may be poorer than desired. For instance, the lower part of the shower cabin and/or protruding items, such as a tap, integrated soap tray or shower basin may be insufficiently cleaned.

[0006] It is an object of the invention to improve the known shower cabin.

[0007] Thereto, according to the invention, the cleaning device further comprises a positioning element arranged for varying the target area. This provides the advantage that the dispenser may dispense the cleaning fluid onto different cleaning areas on the inner surface. The dispenser may e.g. dispense the cleaning fluid onto the target area coinciding with a first cleaning area (area to be cleaned), e.g. in an upper portion of the shower cabin, and, after varying the target area, onto the target area coinciding with a second cleaning area, e.g. in a lower portion of the shower cabin. Hence, the cleaning fluid may be dispensed onto a plurality of cleaning areas by varying the target area.

[0008] It will be appreciated that the dispenser may dispense the cleaning fluid onto a plurality of discrete cleaning areas. Alternatively, the dispenser may continuously dispense the cleaning fluid onto the target area while varying the target area. Hence the cleaning fluid, e.g. a jet of the cleaning fluid, may be swept along at least a portion of the inner surface of the wall.

[0009] Preferably the positioning element is arranged for varying the target area over a substantial part of the inner surface of the wall, such as more than 50%, preferably more than 70% of the inner surface. Thus, efficient cleaning of the inner surface may be obtained.

[0010] Preferably, the positioning element is arranged for varying the target area by moving the dispenser, e.g. in a direction substantially parallel to the inner surface. Hence, it is easily achieved that the target area is varied, here moved along the inner surface.

[0011] Preferably, the displacement element is arranged for lowering and/or raising the dispenser inside the shower cabin. Thus, the dispenser may be moved in a simple manner. Also the dispenser may thus be moved overhead when not in use, so as to avoid interference with normal use of the shower cabin and/or to avoid unpleasing appearance of the shower cabin.

[0012] Preferably, the positioning element is arranged for automatically varying the target area. Hence the ease of use is greatly improved, and the risk of poor cleaning is greatly reduced, since the way in which the target area is varied may be predetermined and optionally optimized for that specific shower cabin.

[0013] Preferably, the dispenser comprises at least one nozzle for dispensing the cleaning fluid onto the target area in the form of a fluid jet. Herein a nozzle may be a hole for generating a jet in the form of a beam of cleaning fluid, or a slit for generating a jet in the form of a sheet of cleaning fluid. Although it is possible to apply the cleaning fluid using other methods, e.g. using a wetting brush, it has been found that the fluid jet provides advantages.

[0014] Preferably, the cleaning device comprises a cleaning fluid supply control element for controlling the amount and/or rate of cleaning fluid supplied to the dispenser. Hence the amount of cleaning fluid supplied to the inner surface may be controlled, e.g. in dependence of the position on the inner surface where the cleaning fluid is supplied.

[0015] Preferably, the cleaning device comprises a control unit arranged for controlling the positioning element and the fluid supply control element.

Hence a cleaning operation comprising both varying the target area and controlling, e.g. switching on and off, the cleaning fluid supply may be automated. Preferably, the control unit is arranged for controlling the positioning element and the fluid supply control element such that the cleaning fluid is supplied onto the target area while the target area is varied.

[0016] In an embodiment the automated cleaning device is provided with a flexible supply tube for supplying

the cleaning fluid to the dispenser. Preferably, the dispenser is suspended from the supply tube and/or a wire. Hence, the dispenser may be mounted to a ceiling of the shower cabin and/or a ceiling over the shower cabin. Preferably, the cleaning device includes a reel arranged for reeling in and/or reeling out the flexible supply tube and/or the wire for moving the dispenser. Thus, the dispenser, suspended from the supply tube and/or wire, may be raised and/or lowered in a simple manner. It will be appreciated that, hence, no guide rails are necessary on the inner surface of the wall for guiding the cleaning device.

[0017] Preferably, the dispenser is arranged for dispensing the cleaning fluid in a plurality of dispensing directions. The dispenser may e.g. dispense the cleaning fluid over an area which, in a direction orthogonal to a direction in which the target area is varied, covers all or a large portion of the inner surface of the wall.

[0018] In an embodiment, the dispenser includes a hollow tube with holes for dispensing the cleaning fluid in the plurality of dispensing directions. Thus the simple dispenser may be provided. Preferably, the hollow tube has a shape generally corresponding with at least a portion of the shape of the wall. The hollow tube may e.g. have the shape of at least an arc of a ring for a substantially circular shower cabin.

[0019] Preferably, the cleaning fluid is a liquid such as water, e.g. comprising a detergent and/or a gas such as air or a vapour, such as steam. When the cleaning fluid is water the inner surface may be rinsed. When the cleaning fluid is water comprising a detergent the inner surface may be washed. When the cleaning fluid is gas, such as air, the inner surface may be dried. When the cleaning fluid is vapour, such as steam, the inner surface may be washed and/or disinfected.

[0020] In an embodiment, the cleaning device is arranged for automatically performing two cycles, wherein in a first cycle the dispenser dispenses a liquid, such as water, e.g. comprising a detergent, or a vapour, such as steam, onto the target area, and in a second cycle the dispenser dispenses a gas, such as air, onto the target area. Hence the shower cabin is rinsed or washed and dried. In a more elaborate embodiment, the cleaning device is arranged for automatically performing three cycles, wherein in a first cycle the dispenser dispenses a liquid comprising a detergent, onto the target area for washing the target area, in a second cycle the dispenser dispenses a liquid, such as water, or a vapour, such as steam, onto the target area for rinsing and/or disinfecting the target area, and in a third cycle the dispenser dispenses a gas, such as air, onto the target area for drying the target area.

[0021] In an embodiment the same dispenser is used for dispensing the liquid cleaning fluid, the vapour-phase cleaning fluid and/or the gas-phase cleaning fluid. This provides the advantage that a simple dispenser may be provided and e.g. less tubes are required. Further, dispensing air via the same dispenser as via which water has been dispensed provides the advantage that the dispenser is dried, so that the risk of contamination, e.g. microbial growth, is diminished.

[0022] In an embodiment. the cleaning device is further provided with a reservoir for the cleaning fluid or a constituent thereof, the reservoir being in fluid communication with the dispenser during and/or before dispensing of the cleaning fluid.

[0023] According to a separate aspect of the invention the shower cabin has a generally cylindrical shape. It will be appreciated that the generally cylindrical shower cabin, having a substantially circular horizontal cross section, can very easily be cleaned using the cleaning device, since no sharp internal corners are present in which dirt may accumulate.

[0024] According to a separate aspect of the invention, the shower cabin further has an outlet tube, e.g. for disposing of the cleaning fluid after it has cleaned the wall or water while taking a shower, wherein the outlet tube is provided with a filter, the filter being accessible from outside of the shower cabin. This provides the advantage that dirt and debris washed down the outlet tube will collect in the filter, while the filter can easily be cleaned due to its improved accessibility. Thus, in the event the outlet tube becomes clogged no aggressive and polluting chemicals need be used to remove the clogging, but the filter can simply be cleaned. Further, the filter may also be designed as, or comprise, a siphon to prevent egress of sewer odours.

[0025] According to an other separate aspect of the invention the shower cabin further comprises a shower basin and mounting means for moveably connecting the basin to a floor. The mounting means may comprise at least one guide rail. This provides the advantage that the shower basin, and optionally the entire shower cabin, can be moved relative to the floor, e.g. to allow maintenance or cleaning for which access is required to parts of the shower cabin normally inaccessible in the normal mounting position of the shower cabin, e.g. against a wall.

[0026] According to a separate aspect of the invention the shower cabin comprises a sliding door. The sliding door slides on guides mounted on the outside of the upstanding wall. This provides the advantage that the guides are not prone to fouling since they do not come into contact with washing water during use of the shower cabin.

[0027] The invention further relates to a cleaning device of the shower cabin according to the invention. It will be appreciated that the cleaning device may be designed to be retrofitted on an existing shower cabin and/or to be mounted over any shower cabin.

[0028] The invention further relates to a method for cleaning an inner surface of a wall of a shower cabin using a cleaning device according to the invention, including dispensing a cleaning fluid onto a target area on the inner surface using the dispenser, and varying the target area using the positioning element.

[0029] As already set out with respect to the shower

cabin, such method may include automatically varying the target area. Also, the method may comprise performing two cycles, wherein a first cycle comprises dispensing a cleaning fluid in the form of a liquid, such as water, e.g. comprising a detergent, and/or vapour, such as steam, onto the target area for cleaning the target area, and wherein a second cycle comprises dispensing a cleaning fluid in the form of a gas, such as air, onto the target area for drying the target area.

[0030] The invention will now be further elucidated by means of the following, non-limiting, examples referring to the drawing. Herein

Fig. 1 shows a schematic view of a first embodiment of a shower cabin according to the invention;
Fig. 2 shows a schematic view of a second embodiment of a shower cabin according to the invention;
Fig. 3 shows a schematic view of a third embodiment of a shower cabin according to the invention;
Fig. 4 shows an example of a shower basin according to a separate aspect of the invention;
Fig. 5a shows an example of a shower cabin door according to a separate aspect of the invention in combination with an upstanding shower wall;
Fig. 5b shows a partial plan view of the door hinge construction shown in Fig. 5a;
Fig. 5c shows a partial plan view of a second embodiment of a door hinge construction according to the invention;
Fig. 6a shows a schematic view of a fourth embodiment of a shower cabin according to the invention; and
Fig. 6b shows a schematic view of a fifth embodiment of a shower cabin according to the invention.

[0031] Fig. 1 shows a schematic view of a first embodiment of a shower cabin 1 according to the invention. In this example the shower cabin comprises a shower basin 2 and an upstanding wall 4. In this example the upstanding wall 4 is substantially rigid. The upstanding wall 4 may e.g. be constructed of glas or a plastics material and may be at least partially transparent or translucent. In this example the upstanding wall 4 is substantially cylindrical. In Fig. 1 the upstanding wall 4 comprises a door 6 to allow a person to enter the shower cabin 1.

[0032] The shower cabin 1 further comprises a cleaning device 8. In this example the cleaning device comprises a dispenser 10 designed as a ringshaped hollow tube. The dispenser 10 comprises a plurality of holes 12. In Fig. 1 the dispenser 10 is in fluid communication wit three flexible tubes 14.i (i=1,2,3). The flexible tubes 14.i extend upwardly from the dispenser 10. In Fig. 1 the flexible tubes 14.i are wound on a reel 16. Via the reel 16 the flexible tubes 14.i are in fluid communication with a cleaning fluid supply tube 18. In this example the fluid supply tube 18 is connected to a first feed tube 20 via a first valve 22 and a to second feed tube 24 via a second valve 26.

[0033] The shower cabin 1 as described up to here may be used as follows.

[0034] When using the shower cabin 1 for personal sanitation, a person may stand inside the shower cabin and wash himself or herself using water form a shower head (not shown) mounted in the upper part of the shower cabin.

[0035] When the shower cabin 1 is to be cleaned, the shower cabin is used as follows. Initially the dispenser 10 is located at a position adjacent an upper end 28 of the upstanding wall 4. Using a motor 30 the reel 16 is rotated. If the reel is rotated in clockwise direction (in top view) in fig. 1 the flexible tubes 14.i wound up on the reel 16 are unwound. The dispenser 10 will be lowered inside the shower cabin 1 due to the flexible tubes 14.i unwinding. Guides 32.i (i=1,2,3), here designed as rollers, may aid in directing the flexible tubes 14.i. It will be appreciated that the guides 32.i may be connected to a frame disposed stationary with respect to the wall 4. For clarity of the drawing such frame is not drawn.

[0036] In the example of Fig. 1, the motor 30 drives an outer perimeter of the reel 16. It will be appreciated that it is also possible to use a hollow shaft motor driving the reel 16 at the centre. The hollow shaft motor provides the advantage that a feed for the cleaning fluid and/or a feed for washing water to a conventional shower head (not shown) may be directed through the hollow shaft.

[0037] During unwinding of the flexible tubes 14.i, i.e. during lowering of the dispenser 10, first valve 22 is placed in its open position. In this example then water, under pressure, is forced through the first feed tube 20, the fluid supply tube 18, and the flexible tubes 14.i towards the dispenser 10. The water pressure may e.g. be obtained by connection to a water mains connection at 34. At the dispenser 10 the water is forced through the plurality of holes 12 forming nozzles. As a result a plurality of jets of water are dispensed onto an inner surface 36 of the upstanding wall 4. The jets remove dirt and residue which runs down the wall 4 into the shower basin 2. It will be appreciated that since the dispenser 10 is lowered during dispensing the water, the area on the inner surface 36 onto which the water is dispensed is lowered simultaneously. Thus it is possible to clean substantially the entire inner surface 36 of the wall 4. Optionally the water is heated prior to being dispensed using a boiler 38.

[0038] In the example of Fig. 1 cleaning device 8 further comprises two reservoirs 40,44. The first reservoir 40 contains a cleaning agent, such as a detergent. The second reservoir 44 contains an anti-fouling agent. During dispensing of the water it is possible to add the cleaning agent and/or the anti-fouling agent to the water by opening valves 42 and/or 46, respectively.

[0039] After the desired portion of the inner surface 36 has been cleaned the dispenser 10 may be raised again by reversing the rotation direction of the reel 16. The first valve 22 may be closed or open during raising of the dispenser 10.

[0040] In this example, after the dispenser 10 has been

raised the first valve 22 is closed or kept closed and the second valve 26 is opened. Now air, under pressure is forced through the second feed tube 24, the fluid supply tube 18, and the flexible tubes 14.i towards the dispenser 10. To obtain pressurized air a compressor 48 and/or ventilator may be connected to the second feed line 24. At the dispenser 10, the air is forced through the plurality of holes 12 forming air jets impinging onto the inner surface 36. The dispenser is again lowered while blowing the air onto the inner surface 36. As a result the inner surface is dried.

[0041] The shower cabin as shown in Fig. 1 may me used in an advanced mode in which, in a first cycle water containing cleaning agent is dispensed for cleaning the inner surface, in a second cycle water containing anti-fouling agent is dispensed for rinsing the inner surface, and in a third cycle air is dispensed for drying the inner surface.

[0042] In the Fig. 1 the cleaning device 8 comprises a control unit 50 which is arranged to emit control signals S. The control signals may de distributed towards the motor 30, first valve 22, second valve 26, valve 42, valve 46, boiler 38 and/or compressor 48. The control unit 50 may be arranged to control the process as described above. It is for instance possible that the control unit comprises an input 52, e.g. in the form of a push button. When the input 52 is activated the control unit may automatically coordinate the actions as described above for cleaning and drying the inner surface 36 of the wall 4.

[0043] Fig. 2 shows a schematic view of a second embodiment of a shower cabin 1 according to the invention. The shower cabin 1 shown in Fig. 2 functions substantially in the same way as the shower cabin shown in Fig. 1. In contrast to Fig. 1, in Fig. 2 the reel 16 is mounted stationary with respect to the wall 4 of the shower cabin 1. Thereto, the reel 16 may be mounted to a frame (not shown) disposed stationary with respect to the wall. In this example, the cleaning device 8 comprises a plate 54 connected to the motor 30. The plate 54 comprises the guides 32.i and is rotated, in the direction of the arrow R, for lowering and raising the dispenser 10. Here the dispenser is lowered by rotating the plate in counter-clockwise direction (in top view).

[0044] Fig. 3 shows a schematic view of a second embodiment of a shower cabin 1 according to the invention. The shower cabin 1 shown in Fig. 3 functions substantially in the same way as the shower cabin shown in Figs. 1 and 2. In contrast to Figs. 1 and 2, in Fig. 2 the dispenser 10 is suspended from wires 56.i (i=1,2,3). The dispenser 10 can be lowered and raised by operating winches 58.i (i=1,2,3) mounted to a support structure 60 which, in this example, is mounted stationary with respect to the wall 4.. In Fig. 3 a tube bucket 62 is connected to the dispenser 62. While raising the dispenser 10 the flexible tube 14 automatically coils up inside the tube bucket 62. A fluid connection 64 is provided between the flexible tube 14 and the dispenser 10.

[0045] It will be appreciated that the cleaning device 8 shown in Figs 1-3 may be mounted to an upper rim of the upstanding wall 4. Alternatively, or additionally, the cleaning device 8 may be mounted to a ceiling of a room in which the shower cabin is positioned. The cleaning device 8 may be mounted clear from the upstanding wall 4.

[0046] Fig. 4 shows an example of a shower basin 2 according to a separate aspect of the invention. The shower basin can be used in conjunction with the cleaning device 8 to provide a relatively maintenance free and maintenance friendly shower cabin 1. The shower basing comprises a drain 62. A first drain tube 64 extends from the drain 62 into a cavity 66. The cavity comprises a filter 68 downstream of the location where the first drain tube 64 opens into the cavity 66. Downstream of the filter 68 a second drain tube 70 extends towards a disposal facility, e.g. a sewer system. The filter 68 prevents debris from entering the second drain tube 70. The filter 68 does not per se prevent clogging of the drain system 62-70. The shower basin 2 is provided with a lid 72, in this example a screw lid, providing access to the cavity 66. Thus, when the drain system 62-70 is clogged, or at any desired moment, the lid can be opened, the filter can be taken from the cavity, cleaned, repositioned inside the cavity and the lid can be closed again. Thus, no hazardous chemicals are required for reopening a clogged drain system.

[0047] According to a further separate aspect of the invention, the shower basin 2 in Fig. 4 comprises guide rails 74 and grooves 76 designed for mating with the guide rails 74. In Fig. 4 the guide rails are drawn at a distance from the grooves 76, although it will be clear that in reality the guide rails are slidingly inserted into the grooves 76. The guide rails 74 are mounted fixedly to a ground on which the shower basin 2 is positioned. Thus, the guide rails 74 and grooves 76 provide mounting means for moveably connecting the shower basin to the floor. This provides the advantage that the shower basin (or even the entire shower cabin with an upstanding wall and possibly a cleaning device mounted on top of the shower basin) can be moved, e.g. away from a wall of the room in which the shower basin is positioned, to allow cleaning and or maintenance behind the shower basin 2.

[0048] Fig. 5a shows an example of a shower cabin door 6 according to a separate aspect of the invention in combination with an upstanding shower wall 4. The shower door 6 in Fig. 5a is designed as a sliding door. Thereto slide rails 78 are mounted to the outside of the wall 4, e.g. by gluing. This provides the advantage that the slide rails 78 are not susceptible to fouling, since they are not exposed to water and debris during use of the shower 1. Carriages 80 slidably connect the door 6 to the slide rails 78. The carriages 80 are also mounted on the outside of the wall 4 and door 6. The slide rail 78 may have any suitable form such as a T-shaped or U-shaped bar.

[0049] In this particular example, the carriage comprises a first hinge 82, a connection block 84 and a second

hinge 86. The hinges 82,86 are of the type that are biased in one direction, e.g. by spring force or gravity. The hinges 82,86 are in this example biased towards pushing the door 6 into a door opening. In this example, the second hinge 86 is connected to the door 6 via a mounting block. The mounting block may e.g. be glued or screwed to the door 6. Further, in this example the hinges 82,86 have a limited stroke. The stroke may e.g. be limited to 10 degrees or less. Fig. 5b shows a partial plan view of the door 6 and the wall 4 connected by the door hinge constructions described above. In Fig. 5b the connection block 84', the second hinge 86'and the section of the door 6', shown in phantom, display the slightly opened door. Thus, in use the door 6 may be opened a limited amount with an outward movement, e.g. just enough to provide clearance between the wall 4 and the door 6 to allow sliding of the door. Next, the door 6 may be slid away from the door opening in the direction of the arrow S. The limited stoke of the door 6 in the outward direction provides the advantage that the door 6 may be used in small spaces since it does not swing all the way open as a regular swinging door.

[0050] It will be appreciated that alternatively, or additionally, the carriage may comprise a pantograph construction for only allowing motion of the door 6 in a direction substantially perpendicular to the slide rail in addition to the sliding motion, as shown in Fig. 5c. It will be appreciated that in Fig. 5c also the stroke of the hinges of the pantograph construction is limited. In Fig. 5c the slightly opened door 6' ready to slide into the direction of the arrow S is shown in phantom.

[0051] Figs. 6a and 6b show schematic views of a fourth and fifth embodiment of a shower cabin 1 according to the invention, respectively. In these examples the cleaning device 8 is mounted in a top lid 88 of the shower cabin 1. The top lid 88 provides the cleaning device with protection against dust and dirt and provides the shower cabin with a more pleasing appearance. In the example of Fig. 6a a gap 89 is present between the top lid 88 and the upstanding wall 4. The gap 89 provides the user with communication with the outside environment of the shower cabin 1. It will be appreciated that it is also possible that the top lid 88 is mounted directly on top of the upstanding wall 4, e.g. without a gap, see Fig. 6b. The shower basin 2 comprises in this example a filter 68 and associated structure as described with respect to Fig. 4. The door 6 is mounted on slide rails 78 as described with respect to Figs. 5a and 5b.

[0052] In Figs. 6a and 6b the dispenser 10 is drawn at a lowered position. When not in use the dispenser is preferably positioned overhead, preferably at such position that the dispenser is hidden from view by the top lid 88.

[0053] In Figs. 6a and 6b the shower cabin 1 comprises a console 90. In this example, the console 90 houses the control unit 50. In this example the Input is designed as a push button. The control unit 50 further comprises a display 92 for displaying messages, e.g. fault messages or a warning that the cleaning agent and/or anti-fouling agent reservoir 40,44 is, almost, depleted.

[0054] In this example the console 90 further houses the valves 22,26,42,48, the reservoirs 40,44, the boiler 38 and the compressor 48. It will be appreciated that all or some of these components may also be housed in a back console 94.

[0055] In the foregoing specification, the invention has been described with reference to specific examples of embodiments of the invention. It will, however, be evident that various modifications and changes may be made therein without departing from the broader spirit and scope of the invention as set forth in the appended claims.

[0056] In the examples the dispenser is suspended from either wires or flexible tubes. It will be appreciated that the dispenser may also be suspended from a combination of wires and flexible tubes.

[0057] In the examples the openings in the dispenser are, e.g. round, holes.

It will be appreciated that the openings for dispensing the fluid may also be slits.

[0058] In the examples the dispenser dispenses water or air. It will be appreciated that the dispenser may also dispense other fluids such as nitrogen gas or steam.

[0059] In the examples, the input of the control unit is a push button. It will be appreciated that the control unit may also be provided with a user interface, such as a touch screen.

[0060] In the examples the upstanding wall of the shower cabin has a substantially circular cross section. It will be appreciated that other shapes are also possible, such as rectangular, square, triangular, semi-circular. Also in the examples the upstanding wall is endless. It will be appreciated that the upstanding wall may also be open to one side, e.g. having a U-shaped or L-shaped cross section. It will be appreciated that the dispenser may be shaped to generally conform to the upstanding wall.

[0061] However, other modifications, variations and alternatives are also possible. The specifications, drawings and examples are, accordingly, to be regarded in an illustrative rather than in a restrictive sense.

[0062] In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word 'comprising' does not exclude the presence of other features or steps then those listed in a claim. Furthermore, the words 'a' and 'an' shall not be construed as limited to 'only one', but instead are used to mean 'at least one', and do not exclude a plurality. The mere fact that certain measures are recited in mutually different claims does not indicate that a combination of these measures cannot be used to advantage.

Claims

1. Shower cabin including a wall having an inner surface and a cleaning device for cleaning the inner surface including a dispenser for dispensing a cleaning fluid onto a target area on the inner surface,

wherein the cleaning device further comprises a positioning element arranged for varying the target area.

2. Shower cabin according to claim 1, wherein the positioning element is arranged for varying the target area by moving the dispenser, e.g. in a direction substantially parallel to the inner surface.

3. Shower cabin according to claim 2, wherein the displacement element is arranged for lowering and/or raising the dispenser inside the shower cabin.

4. Shower cabin according to any one of claims 1-3, wherein the positioning element is arranged for automatically varying the target area.

5. Shower cabin according to any one of claims 1-4, wherein the dispenser comprises at least one nozzle for dispensing the cleaning fluid onto the target area in the form of a fluid jet.

6. Shower cabin according to any one of claims 1-5, wherein the cleaning device comprises a cleaning fluid supply control element for controlling the amount and/or rate of cleaning fluid supplied to the dispenser

7. Shower cabin according to claim 4 and 6, wherein the cleaning device comprises a control unit arranged for controlling the positioning element and the fluid supply control element.

8. Shower cabin according to claim 7, wherein the control unit is arranged for controlling the positioning element and the fluid supply control element such that the cleaning fluid is supplied onto the target area while the target area is varied.

9. Shower cabin according to any one of the preceding claims, wherein the dispenser is suspended from at least one wire and/or flexible supply tube for supplying the cleaning fluid to the dispenser.

10. Shower cabin according to claim 9, wherein the cleaning device includes a reel arranged for reeling in and/or reeling out the flexible supply tube and/or the wire for moving the dispenser.

11. Shower cabin according to any one of the preceding claims, wherein the dispenser includes a hollow tube, having a shape preferably generally corresponding with at least a portion of the shape of the wall, with holes for dispensing the cleaning fluid.

12. Shower cabin according to any one of the preceding claims, wherein the cleaning fluid is a liquid such as water, e.g. comprising a detergent and/or a gas such as air and/or a vapour, such as steam.

13. Shower cabin according to any one of the preceding claims, wherein the cleaning device is arranged for automatically performing two cycles, wherein in a first cycle the dispenser dispenses a liquid, such as water, e.g. comprising a detergent, or a vapour, such as steam, onto the target area, and in a second cycle the dispenser dispenses a gas, such as air, onto the target area.

14. Shower cabin according to any one of the preceding claims, further having an outlet tube for disposing of the cleaning fluid after it has cleaned the wall, wherein the outlet tube is provided with a filter, the filter being accessible from outside of the shower cabin.

15. Shower cabin according to any one of the preceding claims, further comprising a shower basin and mounting means, such as a guide rail, for moveably connecting the basin to a floor.

16. Shower cabin according to any one of the preceding claims, comprising a sliding door and guides for sliding the sliding door thereon, wherein the guides are mounted on an outer surface of the upstanding wall.

17. Cleaning device of the shower cabin of any one of claims 1-16.

18. Method for cleaning an inner surface of a wall of a shower cabin using a cleaning device according to claim 17, including

- dispensing a cleaning fluid onto a target area on the inner surface using the dispenser, and
- varying the target area using the positioning element.

19. Method according to claim 18, including automatically varying the target area.

20. Method according to claim 18 or 19, comprising performing two cycles, wherein a first cycle comprises dispensing a cleaning fluid in the form of a liquid, such as water, e.g. comprising a detergent, onto the target area for cleaning the target area, and wherein a second cycle comprises dispensing a cleaning fluid in the form of a gas, such as air, onto the target area for drying the target area.

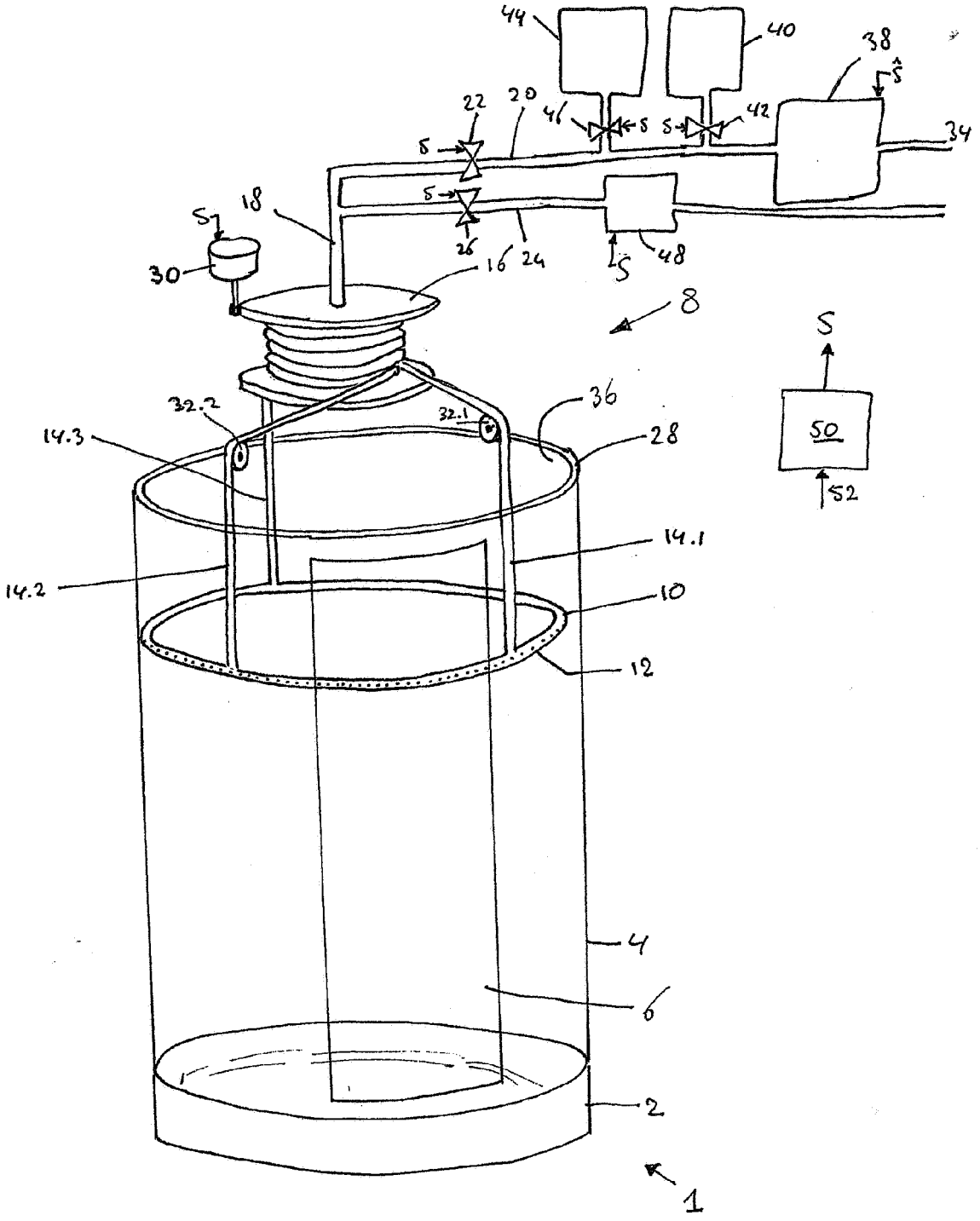
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Fig. 1

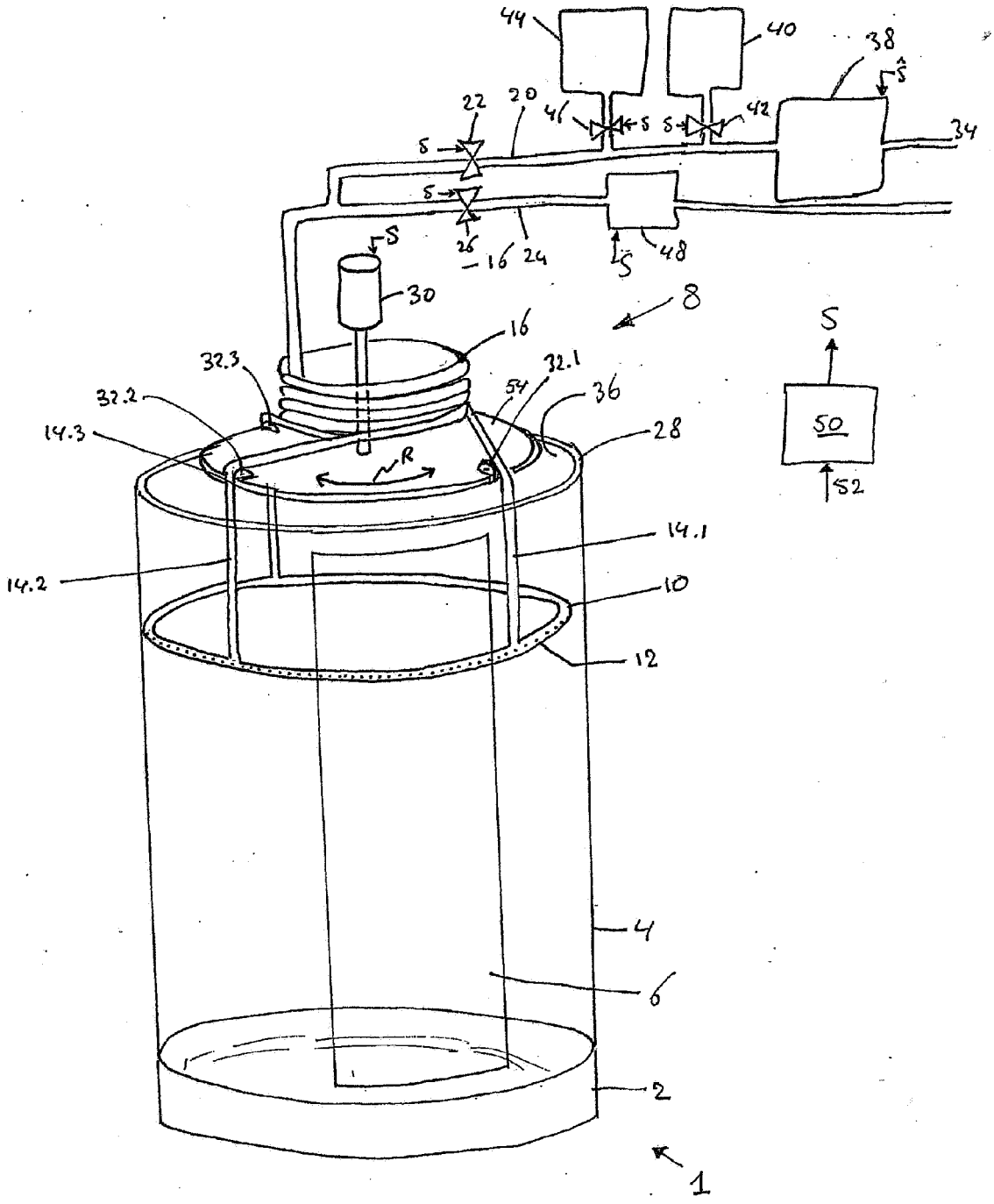
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Fig. 2

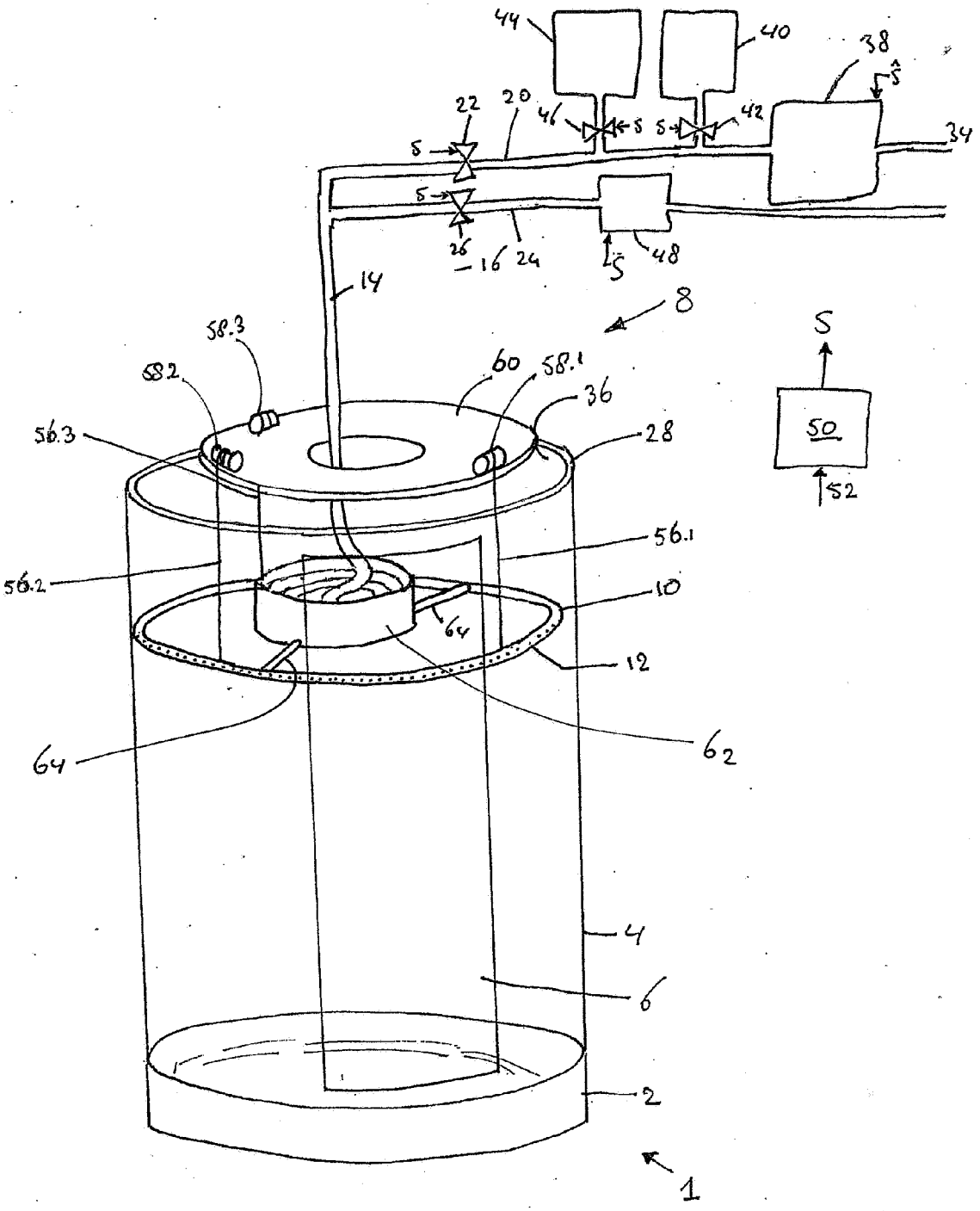
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Fig. 3

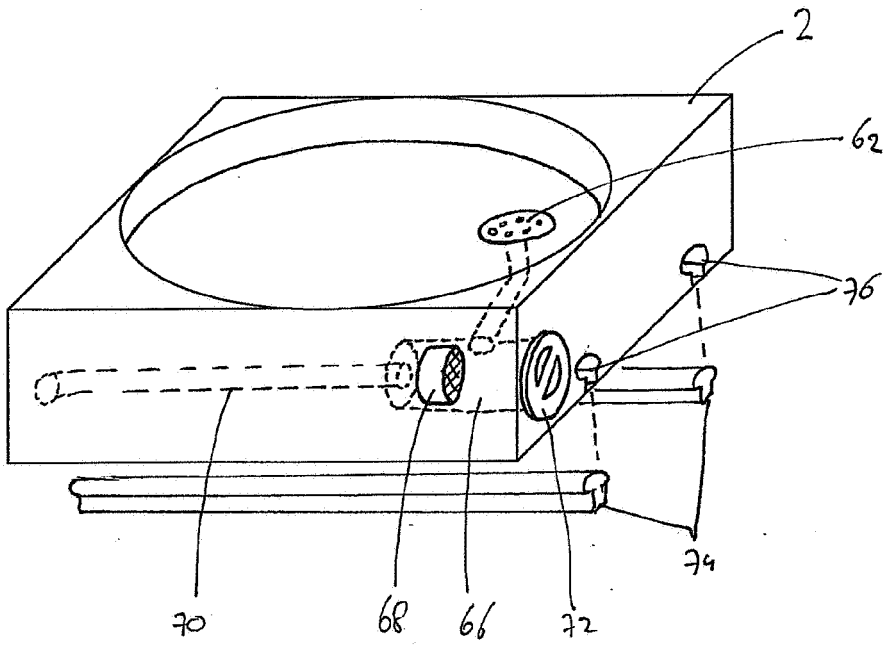

Fig. 4.

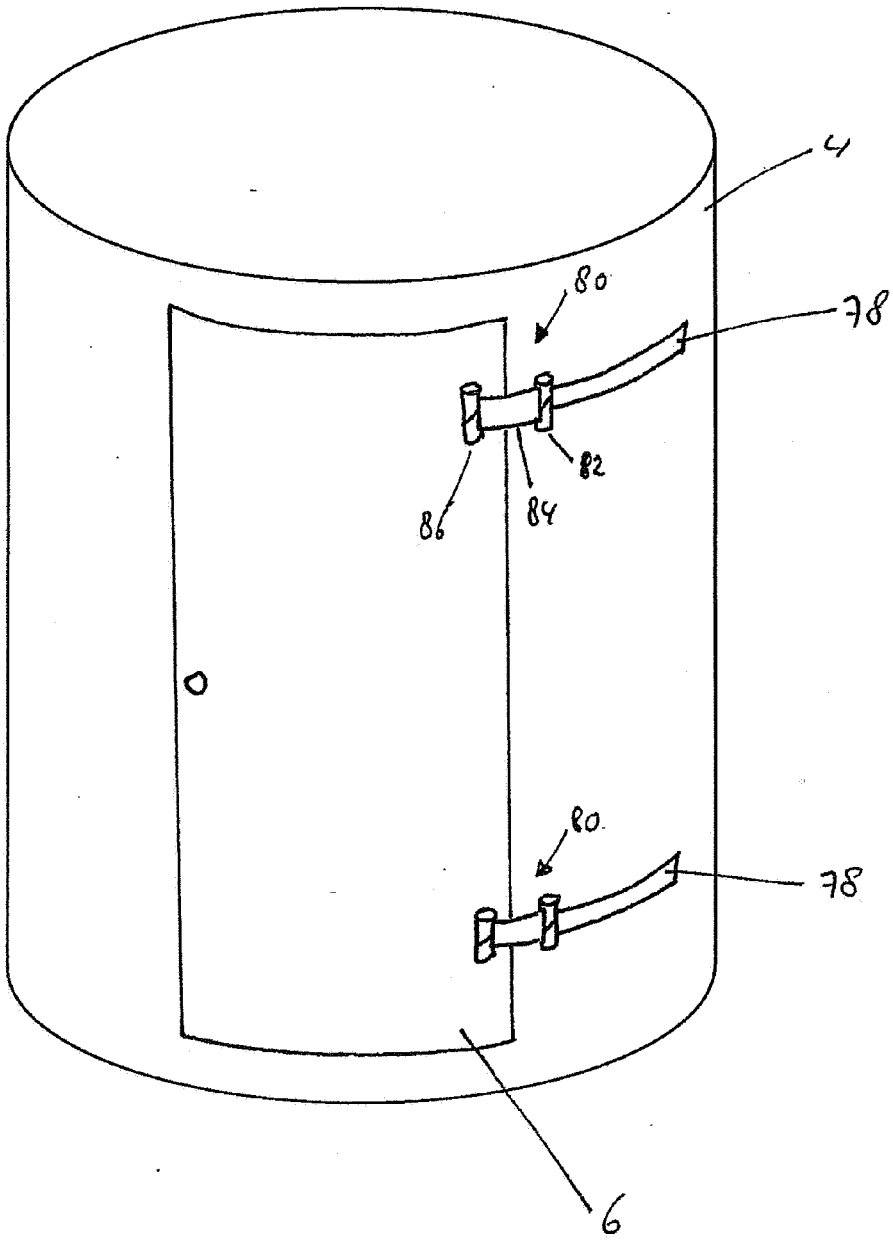

Fig. 5a

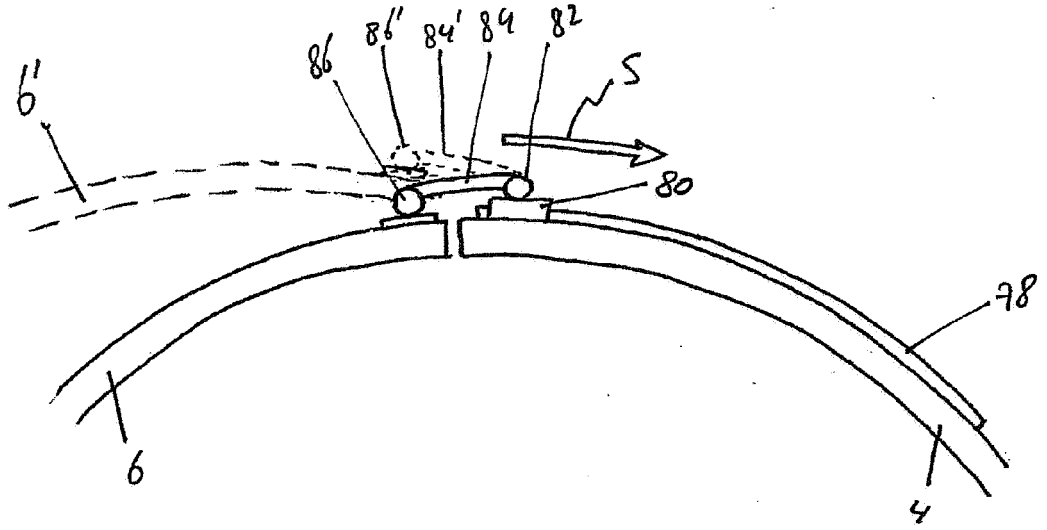

Fig. 5b

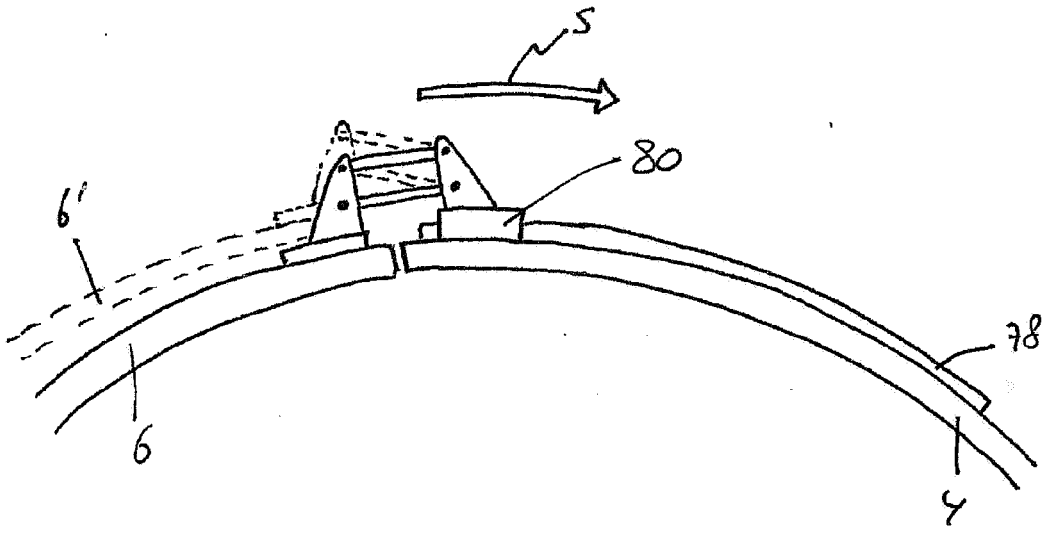

Fig. 5c

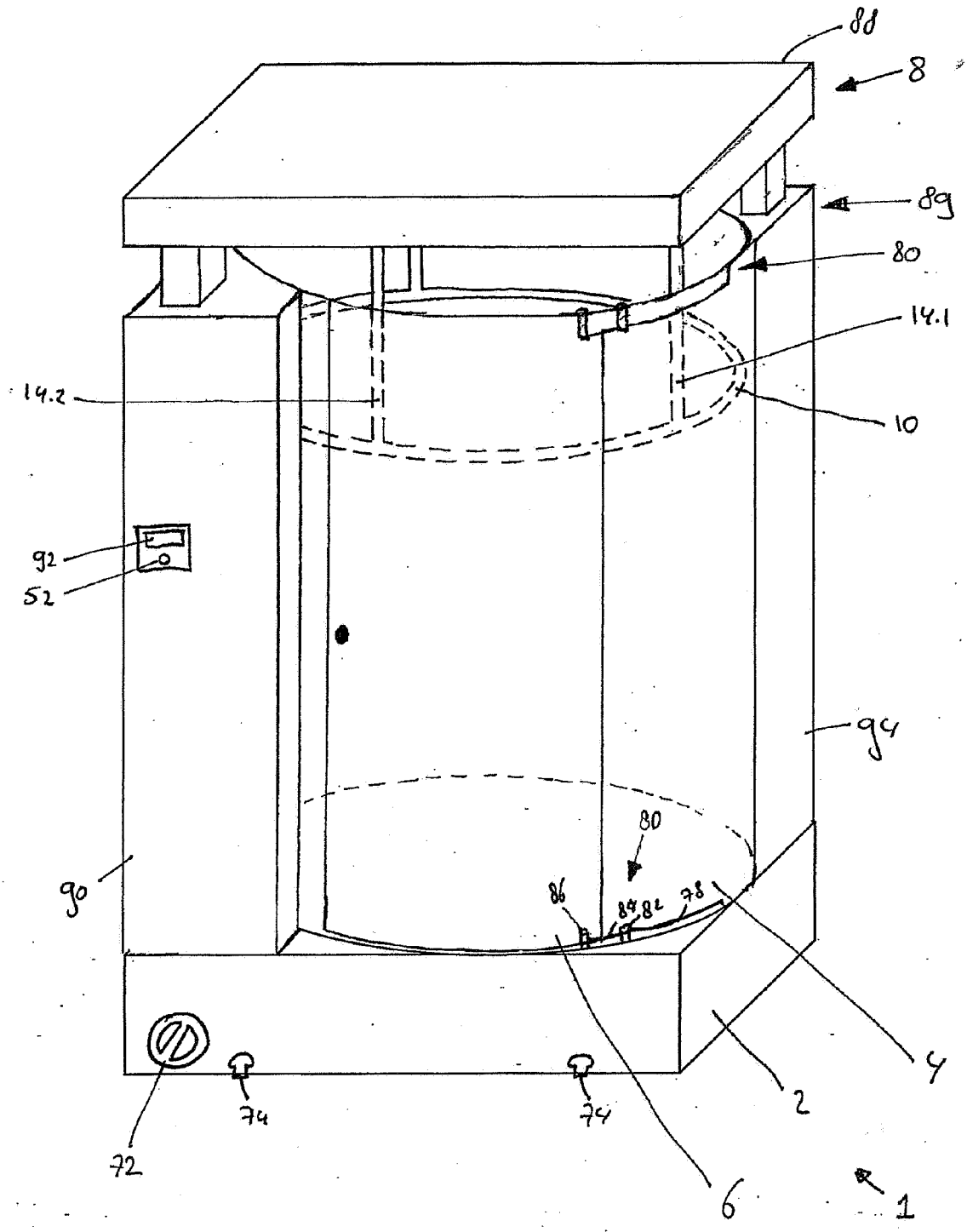

Fig. 6a

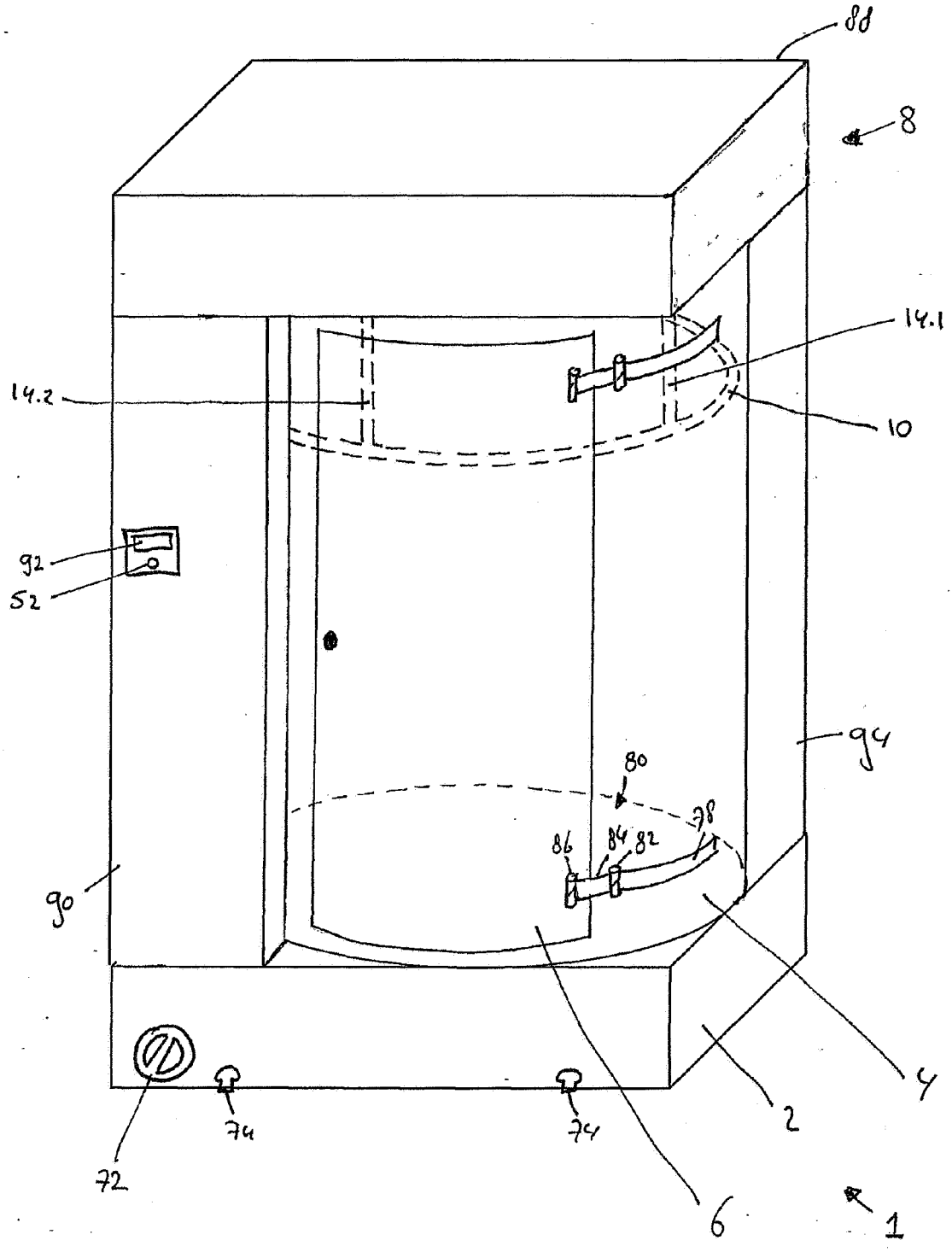

Fig. 6b

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EUROPEAN SEARCH REPORT

Application Number
EP 08 15 8630

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 452 485 A (ROSS LESLIE [US]) 26 September 1995 (1995-09-26) * column 3, line 9 - column 7, line 12; figures 1,2,13 *	1,2,4-8, 11,12, 17-19	INV. A47K3/28
X	GB 2 266 662 A (WALSH CATHERINE [GB]) 10 November 1993 (1993-11-10) * page 6, line 13 - page 8, line 11; figures 2,3 *	1-8,12, 13,17-20	
X	US 3 381 312 A (WHITLA DEAN K) 7 May 1968 (1968-05-07) * column 2, line 14 - column 4, line 22, paragraph 1-6 *	1-10,12, 17-19	
D,Y	US 4 872 225 A (WAGNER JOHN C [US]) 10 October 1989 (1989-10-10) * column 2, line 44 - column 3, line 45; figure 1 *	1-3, 9-12,17	
Y	FR 2 724 550 A (DAVOUDI FARHOOMAN [FR]) 22 March 1996 (1996-03-22) * page 5, line 14 - line 22 * * page 6, line 7 - line 10; figures 22-24 *	1-3, 9-12,17	TECHNICAL FIELDS SEARCHED (IPC) A47K E03D E03C

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
The Hague	17 November 2008	Porwoll, Hubert

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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European Patent Office
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Application Number
EP 08 15 8630

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-13, 17-20

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 08 15 8630

The Search Division considers that the present European patentapplication does not comply with the requirements of unity of invention and relates to severalinventions or groups of inventions, namely:

1. claims: 1-13,17-20

   Shower cabin equipped with a vertically moving cleaning device and corresponding cleaning device, for interference-free normal use of the cabin;

   ---

2. claims: 1,14

   Shower cabin with an water outlet with a filter, for easy removal of debris from the water outlet

   ---

3. claims: 1,15

   Shower cabin moveably mounted to the floor, for better access to parts of the shower normally inaccessible

   ---

4. claims: 1,16

   Shower cabin with door and door sliding guides mounted on the outside of the shower cabin, for low maintenance closure of the cabin

   ---

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 15 8630

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-11-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5452485 A	26-09-1995	NONE	
GB 2266662 A	10-11-1993	NONE	
US 3381312 A	07-05-1968	NONE	
US 4872225 A	10-10-1989	NONE	
FR 2724550 A	22-03-1996	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4872225 A **[0004]**