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(71) Applicant: **Betgem Holding B.V.**
1322 AB Almere (NL)

(72) Inventor: **Betgem, René Henri**
1322 AB Almere (NL)

(74) Representative: **Klavers, Cornelis**
Octrooibureau Klavers B.V.
Markerkant 1201.20
1314 AJ Almere (NL)

(54) Shower device with water recirculation and base section for such a shower device

(57) Shower device (1) with water recirculation, comprising a support surface (3) for supporting a person taking a shower, a reservoir (4) lower than the lowest support surface level for collecting water from the support surface (3), a pump (8) having a suction side (9) and a press side (10), at its suction side (9) provided with a first fluid channel (11) for taking in water from the reservoir (4), a water outlet (5) arranged to distribute water above the support surface (3), and via a second fluid channel (12) connected to the press side (10) of the pump (8), at least one supply line (13;16) for providing fresh water to the shower device (1), wherein the supply line(s) (13;16) for providing fresh water to the shower device is/are connected to the suction side (9) of the pump (8).

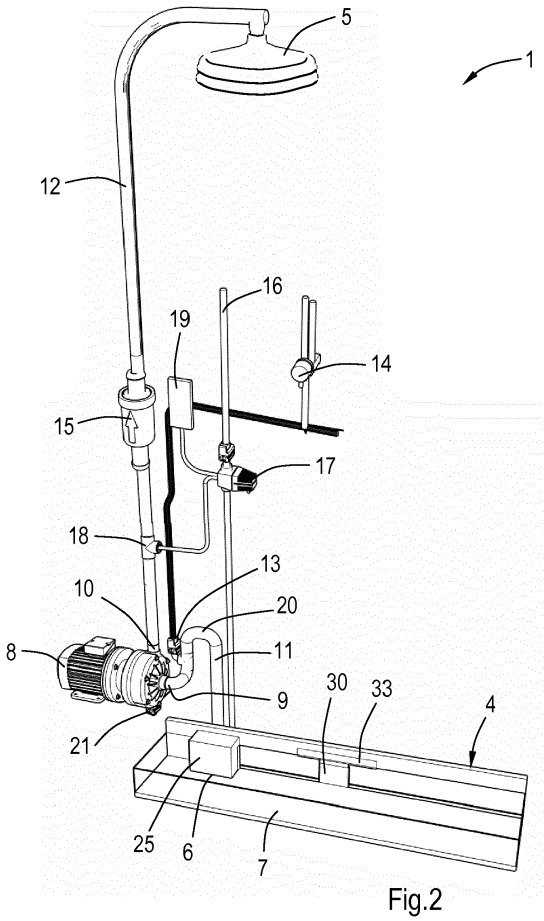

Fig.2

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Description

[0001] The invention relates to a shower device for recirculating water and a base section for such a shower device.

[0002] In particular, the invention relates to a shower device with water recirculation, comprising:

- a support surface for supporting a person taking a shower,
- a reservoir lower than the lowest support surface level for collecting water from the support surface,
- a pump having a suction side and a press side, at its suction side provided with a first fluid channel for taking in water from the reservoir,
- a water outlet arranged to distribute water above the support surface, and via a second fluid channel connected to the press side of the pump, and
- a supply line for providing fresh water to the shower device.

[0003] Such a shower is known, e.g. from the non-disclosed earlier application of the applicant, EP application number 13174038.3 filed June 27th 2013.

[0004] Such a device allows for a reduced consumption of water, due to the fact that water coming out of the water outlet is collected in the reservoir and then fed again to the water outlet, hence the water is recirculated instead of poored down the drain after a single pass through the water outlet. In addition to the recirculated water, some fresh water is also passed through the water outlet, in order to increase the temperature of the water mixture and/or to maintain sufficiently clean water; the water cools down during its journey from water outlet to the reservoir, since it then has a large surface area that may exchange heat with the air below the water outlet. The water also becomes contaminated on its journey. The fresh water may be purely hot water or any mixture of hot and cold water; in the known device it is a temperature-regulated mixture.

[0005] Although the shower device according to the preamble offers an improvement to the art, and has reduced water and energy consumption due to the recirculation of water, it has appeared that safety risks are still inherent to the design.

[0006] Therefore, the invention has as a goal to provide a shower device as described above, that offers improvements with respect to safety.

[0007] This goal is realized by a shower device according to claim 1.

[0008] Due to the fact that the supply line for providing fresh water to the shower device is connected to the suction side of the pump, for example to the first fluid channel, it is no longer necessary to mount valves in the pressure side of the pump for regulating the water temperature and/or for adding fresh water or for priming the pump. Therefore, a reduced amount of water will remain in the piping of the shower device. Moreover, it is no longer possible that 'grey water', being water that has been used at least one time, thus has probably been warm or hot and has passed along a person, leaks through valves or thermostats, due to failures of a valve or a thermostat, or due to the pressure of the fresh water supply being lower than that of the pump. As a result, the risk of diseases being spread via remaining water, especially water that has been warm and therefore has an increased chance of being infectious due to bacterial growth, is reduced.

[0009] Another, although related, advantage is that the absence of valves in the pressure side of the pump take away the risk of failure of such valves and thus also takes away the risk of sudden powerful exhaust of water through the water outlet, and thus prevents the user to be scared by such an exhaust, even when it may be harmless in itself.

[0010] An additional advantage of the shower device according to the invention is that it has further reduced energy consumption, due to the fact that no thermostat valve needs to be present in the pressure pipe between the pump and water outlet, where a relatively high pressure is maintained when the pump is in operation. The absence of a thermostat valve or other flow restriction device in the pressure side takes away the pressure losses in such devices, leaving only the relatively small pressure losses in the piping between the pump and the water outlet. This not only reduces energy consumption, but also allows for a pump operating on a low voltage, e.g. 24 Volts, instead of the usual 230 Volt AC of the main power supply. Such a low voltage pump allows for a safer shower device design by a reduced risk of exposure of the user to the mains power voltage.

[0011] A further advantage is that the construction of the shower device according to the invention is simplified, hence makes it possible to obtain a reduction in component costs and as a result also a reduction in the total costs of production. This simplification lies in the fact that valves are no longer needed in the pressure side of the pump, but they may be present in the suction side of the pump, and as a result they do not need to be capable of handling high pressures.

[0012] Preferably, the reservoir is provided with an outlet valve, allowing it to be filled with, advantageously hot, water during use of the shower, and to be emptied after use of the shower. Additionally, it may have an overflow, to prevent the support surface from being flooded when the valve is closed. Also preferably, the reservoir is open at its top side or partially open in order to allow a user to inspect visually with the bare eyes if the reservoir is clean.

[0013] In an advantageous embodiment, the first fluid channel is provided with a raised passage section for liquid of which the lowest side lies higher than the lowest side of the pump inlet, and the supply line for providing fresh water to the shower device is connected to the suction side of the pump between said raised passage section and the pump inlet.

[0014] Such a raised passage section prevents the

fresh water from leaking away to the reservoir, also during temporarily stops of the pump or reduced speed of the pump. It also allows for a smoother starting operation of the pump, because the area near the pump inlet will be flooded as soon as the supply of water through the supply line is started.

[0015] In another embodiment, a supply line ends at the reservoir to allow fresh water to flow into the reservoir. In this manner, it becomes possible to provide the reservoir with a flow of fresh, not re-circulated, water, preferably hot water, and thus becomes possible to flush the reservoir. As a result, the reservoir will remain clean from bacterial growth, especially in the embodiment where purely hot water is added in the reservoir.

[0016] Here the pump may be connected for fluid communication to the reservoir only via the first fluid channel and the first fluid channel may have no connections other than to the pump and to the reservoir. In this case, the first fluid channel from reservoir to pump need not have a connection to a fresh water supply, and hence needs no valves, and as a result has a far reduced risk of grey water remaining in the first fluid channel or in lines connected to it. This means that also in the suction side of the pump the risk of contamination, e.g. by bacterial growth, is reduced. The pump may be a self-priming pump, in order to allow for this configuration.

[0017] Moreover, the reservoir may be provided with a removable enclosure that is arranged to cover an entrance of the first fluid channel and may be provided with one or more openings, the openings being horizontally elongated or arranged in a horizontally elongated pattern, for passing water from the reservoir to the suction opening when the enclosure is mounted, and the enclosure may be provided with a filter, preferably a micro filter, for filtering the water before it flows into the first channel. The filter may be removable.

[0018] The presence of such an enclosure, or box, helps to establish the required vacuum for the self-priming function of the pump, and thus allows for a proper starting operation of the pump when the enclosure is fitted. However, it does not do this when it is dismounted, and thus provides a protection against operation of the pump without the enclosure mounted and possibly without the filter therein; in this manner, it serves to warn the user that a filter should be mounted.

[0019] With this enclosure, or at least the horizontal elongated opening or opening pattern thereof, for passing water from the reservoir to the suction opening, which horizontal elongated opening or pattern could also be mounted in the reservoir itself without the presence of an enclosure, it also becomes possible to use a reservoir having only a small height and hence a small content of water, in particular only approximately 3 liter, when in use, and then 1-2 liter fresh water may be added per minute, while providing a water flow through the water outlet of between 5-25 liter per minute.

[0020] Additionally, a temperature control unit may be provided, with a temperature sensor for measuring the water temperature anywhere between a supply line for fresh water and the water outlet, and the temperature control unit is arranged to control at least one of a flow rate and temperature of fresh water supplied by (one of) the supply line(s).

[0021] In a preferred embodiment, the shower device comprises a drain valve arranged for draining the pump, and the pump is arranged higher than the lowest support surface level.

[0022] The presence of the drain valve and the mounting height of the pump allow for fully draining the pump when the shower device is not in use, and thus for a further reduction of the risk of contamination of the piping of the shower device. The drain valve may be arranged in the pump housing, but also in the first channel or in the press line near the pump housing, or even in a separate pipe, as long as it is fit for the purpose of draining.

[0023] In a further embodiment, the shower device comprises a temperature sensor between the press side of the pump and the water outlet, the temperature sensor being connected to the thermostat and a water valve arranged in the supply line for the control of the water temperature towards a target temperature.

[0024] In this manner, the water temperature is controllable, without valves being necessary in the piping at the press side of the pump.

[0025] The invention also relates to a base section for a shower device with water recirculation, wherein the shower device comprises

- a support surface for supporting a person taking a shower,
- a reservoir below the lowest support surface level for collecting water from the support surface,
- a pump at its suction side provided with a first fluid channel for taking in water from the reservoir,
- a water outlet arranged to distribute water above the support surface, and via a second fluid channel connected to the press side of the pump,
- at least one supply line for introducing fresh water into the shower device,

wherein the base section comprises said support surface and said reservoir,

- and the reservoir comprises
    - ◦ an outlet opening for the reservoir, and
    - ◦ an outlet valve for at least partially closing the outlet opening.

[0026] Such a shower device allows for the recirculation of shower water, tends to have a base section that is relatively high, and therefore leaves less space for a person standing upright and is more difficult to access for disabled persons.

[0027] The invention has as a goal to provide a base section according to the preamble of claim 8 that solves

or reduces this disadvantage by allowing for a reduced height of that section.

[0028] This goal is realized by a base section according to claim 8.

[0029] A reduced height of the base section, and in particular of the support surface above the lowest part of the base section is made possible because the outlet opening is provided in a side wall part of the reservoir.

[0030] In this manner, it is possible to maintain the reservoir filled with water for recirculation when the shower device is in use, and to fully empty the reservoir when the shower device is not in use, and still have a height of the base section that is very low, in particular less than approximately 8 cm in a typical shower device.

[0031] Preferably, the support surface and reservoir are mutually adjacent, since this further reduces the amount of space required.

[0032] In a preferred embodiment, the valve is moveable between a first position and a second position, the first and second positions arranged at identical horizontal levels.

[0033] This may for instance be realized by a valve that is plane and moves in its own plane, or by a valve that moves perpendicular to its own plane. By such movement, the valve allows for a low construction height of the reservoir.

[0034] Preferably, the support has an overflow opening provided in the reservoir, at a level higher than the top level of the valve.

[0035] Additionally, in the base section a siphon may be provided for preventing odorous gases to escape from the outlet opening. Here, the siphon may comprise a siphon fluid channel with a supply side and a discharge side, and a lowered part of the siphon fluid channel comprises a liquid basin between said supply side and discharge side, the basin being dimensioned and oriented to hold an amount of liquid to block the cross section of the siphon fluid channel in a gas tight manner, and wherein the siphon fluid channel is oriented with its supply side and discharge side to obtain a horizontal flow through both these sides

[0036] Such a siphon allows for a limited height of the base section, even when dealing with tolerances and the required angle with respect to the horizontal as needed for obtaining a water flow when the siphon is in use.

[0037] In particular, the base section according may comprise

- a bottom section delimited by at least two walls,
- a first one of the walls having a top at a first level to allow water to flow into the siphon,
- a second one of the walls, different from the first one, having a top at a second level, which may be equal to the first level, to allow water to flow out of the siphon, and
- a partition arranged between said first and second walls, and having a lower edge at a level lower than the lowest of the first and second level.

[0038] This will result in a bath between the two walls and the partition creating a trap, thereby offering proper functioning while meanwhile offering low production costs and reliable functioning.

[0039] More in particular, an extension section may be arranged next to the second one of the walls, which extension section comprises a basin-shaped section provided with a drain opening in the side thereof.

[0040] On the side of the drain opening a connection part may be provided, arranged for connecting a drainage tube thereto.

[0041] Such an extension section offers the well-known and demanded function of a siphon while still allowing for a very limited height of the base section.

[0042] Here, the siphon may be adjacent to the valve and possible overflow, the first one of the walls of the siphon being directly below or next to the valve.

[0043] The invention will now be illustrated on the basis of the attached drawing, in which identical items are provided with identical reference numbers.

[0044] In the drawing:

Figure 1 shows a perspective view of a shower device according to the invention.

Figure 2 shows a schematic view of the shower device of Figure 1, showing the piping and components in detail.

Figure 3 shows a perspective view on the reservoir in the base section of the shower device of Figure 1.

Figure 4 shows a part of the reservoir of the shower device of Figure 1, with the enclosure shown in demounted state.

Figure 5a shows a perspective view on the siphon, valve and overflow of the shower device of Figure 1.

Figure 5b shows the perspective view of Figure 5a, with water added.

[0045] In Figure 1, a shower device 1 is shown, comprising a base section 2 comprising a support surface 3 and a reservoir 4.

[0046] A pillar rests on the base section 2 and supports a water outlet 5 and hides and protects the components and piping of the shower device 1. The water outlet 5 is arranged to spray water over a person (not shown) standing on the support surface 3 for taking a shower. The device 1 will generally include a conventional fresh water hand shower installed along the pillar too.

[0047] The reservoir 4 is open on its top side and lies entirely lower than the level of the lowest point of the support surface 2, in order to allow it to collect water flowing from the support surface 2, which support surface 2 is slightly sloped downward in the direction of the reservoir, in order to force water to flow towards the reservoir.

[0048] In Figure 2, the components and piping of the shower device of Figure 1 are shown that were hidden in Figure 1.

[0049] The reservoir 4 is partially shown; only one side

wall 7 of its four side walls is visible. Higher than the top edge of the shown side wall 7 of the reservoir 4, and higher than the support surface 2, a pump 8 is mounted having a suction side 9 and a press side 10, and at its suction side 9 provided with a first fluid channel 11 for taking in water from the reservoir 4 via a small opening 6 under a removable enclosure 25. The water outlet 5 is connected to the press side 10 of the pump 8 via a second fluid channel 12. A -first- fluid supply line 13 for providing fresh warm, temperature controlled water (by the thermostat valve 14) is connected to the first fluid channel 11, and hence to the suction side 9 of the pump 8. When the shower device 1 is operated, the pump 8 running, a constant supply of fresh water is realized via the supply line 13.

[0050] The second fluid channel 12 contains no valves of thermostats. Only a UV light 15 for disinfecting the water that goes towards the water outlet 5 may be present. As a result, no grey water will enter the fresh water supply line, or any other line.

[0051] A second fluid supply line 16 is present, providing hot water, via a second thermostat valve 17, to the reservoir 4 and hence to the first fluid channel 11 and subsequently to the pump 8 and the water outlet 5. The second thermostat valve 17 is controlled, i.e. opened and closed in order to raise the temperature of the water in the water outlet 5 to a variable degree, with the aid of the temperature sensor 18 arranged in the second fluid channel 12, between the pump 8 and the water outlet 5, and a user interface 19 that allows for setting a desired water temperature of the water outlet 5. The second fluid supply line 16 helps to obtain a disinfected shower device 1, especially it helps in keeping the reservoir 4 disinfected. The fact that the reservoir 4 in this example has a small water volume, of 3 liter, also helps in keeping the reservoir 4 disinfected, since the reservoir is flushed more often in that manner.

[0052] The first fluid channel 11 is provided with a raised passage section 20, that has a lowest side that lies higher than the lowest side of the pump inlet 9, and the supply line 13 for providing fresh water to the shower device is connected to the suction side of the pump, between said raised passage section 20 and the pump inlet 9. As a result thereof, the pump will be flooded first as soon as fresh water is allowed to enter the supply line 13, thus allowing for a smooth and self-starting operation of the pump 8, even when it is already self-priming. The pump 8 is provided with a drain valve 21 that is opened by control electronics (not shown) when the pump 8 and the shower device 1 are switched off. After the pump 8 is filled with fresh water the reservoir 4 is filled through section 20 and enclosure 25. When the reservoir 4 is filled to the level of an overflow opening 33 the pump 8 will start automatically to pump water to outlet 5.

[0053] In figure 3, a part of the base section 2 is shown with the support surface 3 left away, in order to show its reservoir 4 clearly. In the reservoir 4, an outlet opening 22 of channel 11 (see Figure 4) is covered by a filter screen 23' under the removed enclosure 25. Also the filter 23' is removable for cleaning or replacement purposes. In the reservoir 4, the first fluid channel 11 ends with the second fluid supply line 16, as also visible in Figure 4. Behind the enclosure 25 shown left in fig. 3 and being removed at the right side in reservoir 4 in fig. 2, a reservoir drain 23 with a siphon 24 is present, as is shown in Figures 5a and 5b. The enclosure(s) 25 fit(s) on the side wall 27 of the reservoir 4 by means of a V-shaped groove on that side wall 27 that allows it to slide upwards for removal.

[0054] In Figures 5a and 5b the reservoir drain 23 with siphon 24 is shown. The reservoir drain 23 comprises a box 28 that is provided with an outlet opening 29. Behind the outlet opening 29, a valve plate 30 is retractably mounted on an electrical actuator 31 and arranged to have a closed position, in which it closes the outlet opening 29 and an open position, in which it is retracted and leaves outlet opening 29 open in order to allow water to flow out of the reservoir 4 through the outlet opening 29 through the siphon 24 to the drain pipe 32 and dispose of the water. In an alternative embodiment, not shown, the actuator 31 may be manually operated, instead of electrically.

[0055] Located above the outlet opening 29 is an overflow opening 33. The outlet opening 29 is provided in a side wall part of the reservoir with the lowest edge 34, or part, of the outlet opening 29 at the same vertical level as the lowest part of the reservoir 4 inside its bottom 35 adjacent to it (but not shown in Figure 5a). Due to this position of the outlet opening 29 with the valve plate 30, and the horizontal movement of the valve plate 30, it becomes possible to obtain a reservoir drain 23 that is desirably very low, and thus also a base section 2 that has a reduced height.

[0056] The siphon 24 comprises a siphon bottom section 36 delimited by four siphon walls 37-40. The siphon wall 39 has an upper edge at a first level to allow water to flow over it, into the siphon, and the siphon wall 40 has an upper edge at a second level, which is slightly lower than the first level, to allow water to flow out of the siphon. The siphon 23 also has a partition wall 41 arranged between the siphon walls 39 and 40 that has a lower edge that lies lower than the upper edges of siphon walls 39 and 40, hence lower than the lowest of the first and second level.

[0057] As a result of this layout of the siphon 24, it created a siphon fluid channel with a supply side near siphon wall 39 and a discharge side at the siphon wall 40. A lowered part of the siphon fluid channel comprises a liquid basin between the siphon bottom section 36 and the siphon walls 37-40. The basin serves to hold an amount of water and to block the cross section of the siphon fluid channel in a gas tight manner by means of the water. The siphon fluid channel is oriented with its supply side and discharge side to obtain a horizontal flow through both these sides, due to the fact that the siphon bottom section 36 is horizontally mounted in the base

section 2 of the shower device 1.

[0058] Additionally, an extension section 41 is arranged next to the second one of the walls, which extension section 41 is basin-shaped and is provided with a drain opening 42 in the side thereof to which the drain pipe 32 is connected. Because the drain pipe 32 and the extension section 41 are located next to the siphon 24, these components take up only little height.

[0059] In Figure 5a, water is shown in the basin. In Figure 5b, water is shown with a higher level (schematically drawn as a box), in the reservoir 4, behind the outlet opening 29 and in the siphon 24. The valve plate 30 is closed in Figures 2 and 5b, and the water flows over the overflow opening 33 and also passes through the siphon 24 to the extension section 41 and through the drain opening 42 to the drain pipe 32.

[0060] The pump 8 is self-priming, of a well-known impeller type operating at 24 Volts, and the first fluid channel 11 has no other connections than to the reservoir 4 at one end and to the pump 8 at the other end. This layout is highly safe with respect to contamination.

[0061] Moreover, the siphon 24 in combination with the reservoir 4, part of the base section 2 in this example, may be applied together in other shower devices with or without recirculation, and still offer the advantage of a low construction height of these components and hence a low construction height of a base section.

Claims

1. Shower device with water recirculation, comprising

- a support surface for supporting a person taking a shower,
- a reservoir lower than the lowest support surface level for collecting water from the support surface,
- a pump having a suction side and a press side, at its suction side provided with a first fluid channel for taking in water from the reservoir,
- a water outlet arranged to distribute water above the support surface, and via a second fluid channel connected to the press side of the pump,
- at least one supply line for providing fresh water to the shower device,

characterized in that
the supply line(s) for providing fresh water to the shower device is/are connected to the suction side of the pump.

2. Shower device according to claim 1, wherein
the first fluid channel is provided with a raised passage section for liquid of which the lowest side lies higher than the lowest side of the pump inlet, and
the supply line for providing fresh water to the shower device is connected to the suction side of the pump between said raised passage section and the pump inlet.

3. Shower device according to claim 1 or claim 2, wherein at least one supply line ends at the reservoir to allow fresh water to flow into the reservoir.

4. Shower device according to one of the claims 1-3, wherein the pump is connected for fluid communication to the reservoir only via the first fluid channel and the first fluid channel has no fluid connections other than to the pump and to the reservoir.

5. Shower device according to one of the claims 1-4, wherein the reservoir is provided with a removable box that is arranged to cover an entrance of the first fluid channel and is provided with one or more openings, the openings being horizontally elongated or arranged in a horizontally elongated pattern, for passing water from the reservoir to the suction opening when the box is mounted, and the box is provided with a filter for filtering the water before it flows into the first channel.

6. Shower device according to one of the claims 1-5, wherein a temperature control unit is provided and a temperature sensor is provided for measuring the water temperature anywhere between a supply line for fresh water and the water outlet, and the temperature control unit is arranged to control at least one of a flow rate and a temperature of fresh water supplied by (one of) the supply line(s).

7. Shower device according to one of the preceding claims, comprising a drain valve arranged for draining the pump and wherein the pump is arranged higher than the lowest support surface level.

8. Base section for shower device with recirculation of shower water,
wherein the shower device comprises

- a support surface for supporting a person taking a shower,
- a reservoir below the lowest support surface level for collecting water from the support surface,
- a pump at its suction side provided with a first fluid channel for taking in water from the reservoir,
- a water outlet arranged to distribute water above the support surface, and via a second fluid channel connected to the press side of the pump,
- at least one supply line for introducing fresh water into the shower device, wherein the base section comprises said support surface and said

reservoir,
- and the reservoir comprises

  ◦ an outlet opening, and
  ◦ an outlet valve for at least partially closing the outlet opening.

characterized in that
the outlet opening is provided in a side wall part of the reservoir.

9. Base section according to claim 8, wherein the outlet opening at the lowest part thereof is at the same vertical level as the lowest part of the reservoir inside bottom.

10. Base section according to claim 8 or claim 9, wherein the outlet valve is moveable between a first position and a second position, the first and second positions arranged at identical horizontal levels.

11. Base section according to one of the claims 8-10, wherein an overflow opening is provided in the reservoir, at a level higher than the top level of the valve.

12. Base section according to one of the claims 8-11, wherein a siphon is provided for preventing odorous gases to escape from the outlet opening.

13. Base section according to claim 12, wherein the siphon comprises a siphon fluid channel with a supply side and a discharge side, and a lowered part of the siphon fluid channel comprises a liquid basin between said supply side and discharge side, the basin being dimensioned and oriented to hold an amount of liquid to block the cross section of the siphon fluid channel in a gas tight manner, and wherein the siphon fluid channel is oriented with its supply side and discharge side to obtain a horizontal flow through both these sides.

14. Base section according to claim 12 or claim 13, wherein the siphon comprises

- a bottom section delimited by at least two walls,
- a first one of the walls having a top at a first level to allow water to flow into the siphon,
- a second one of the walls, different from the first one, having a top at a second level, which may be equal to the first level, to allow water to flow out of the siphon, and
- a partition arranged between said first and second walls, and having a lower edge at a level lower than the lowest of the first and second level.

15. Base section according to claim 14, wherein an extension section is arranged next to the second one of the walls, which extension section comprises a basin-shaped section provided with a drain opening in the side thereof.

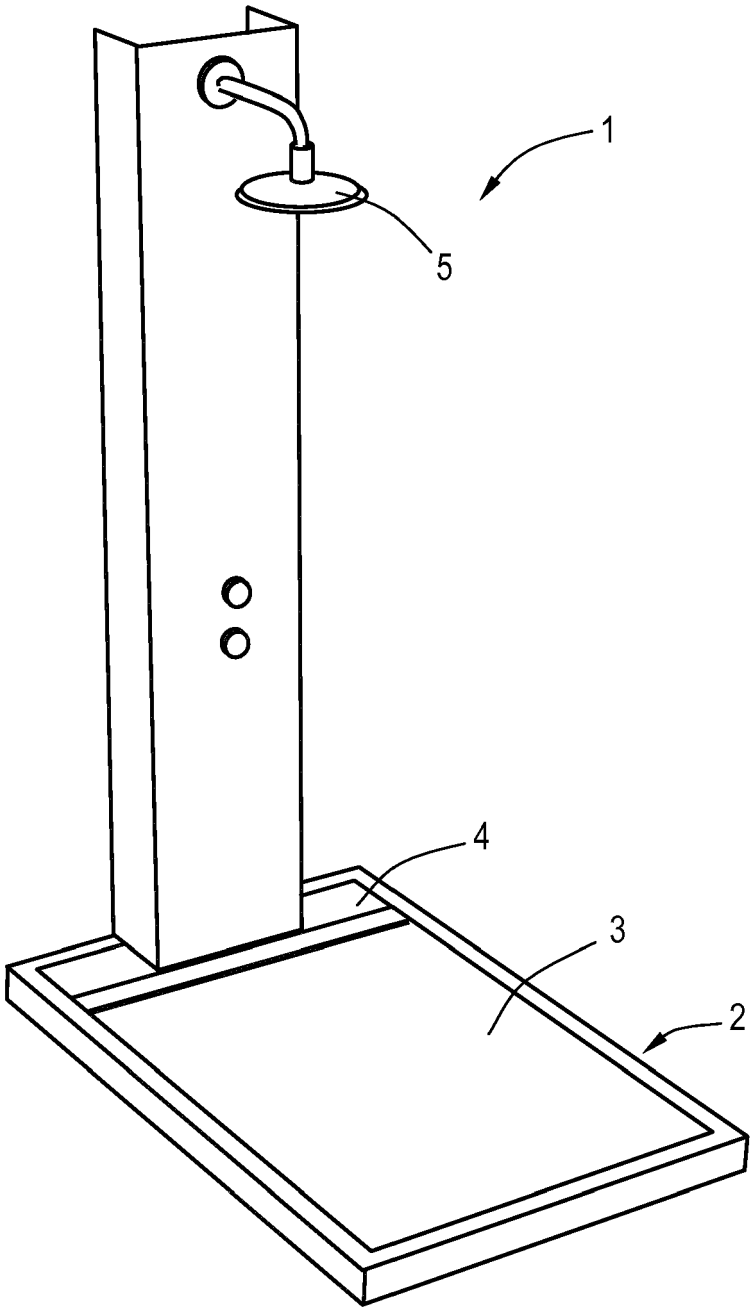

Fig.1

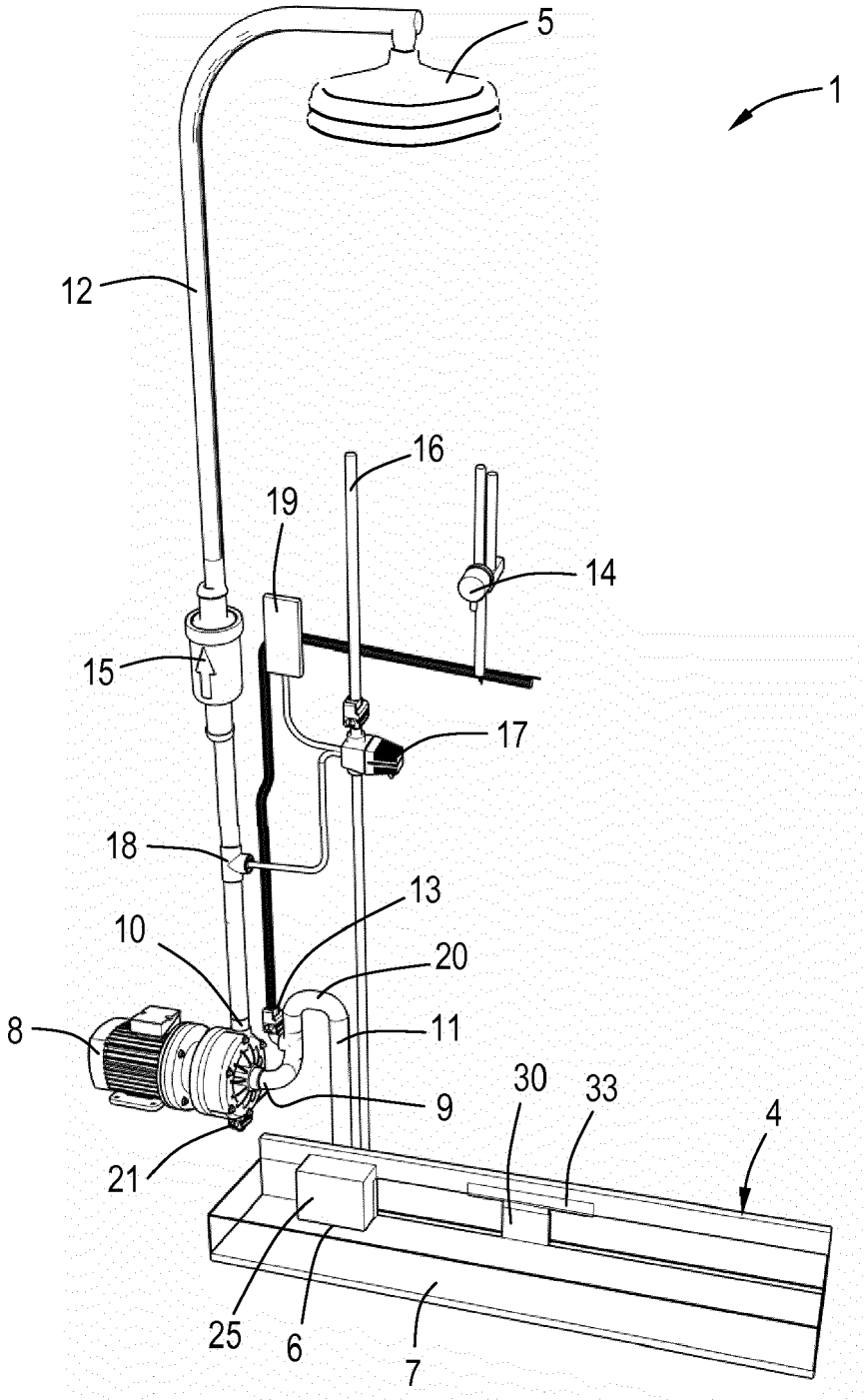

Fig.2

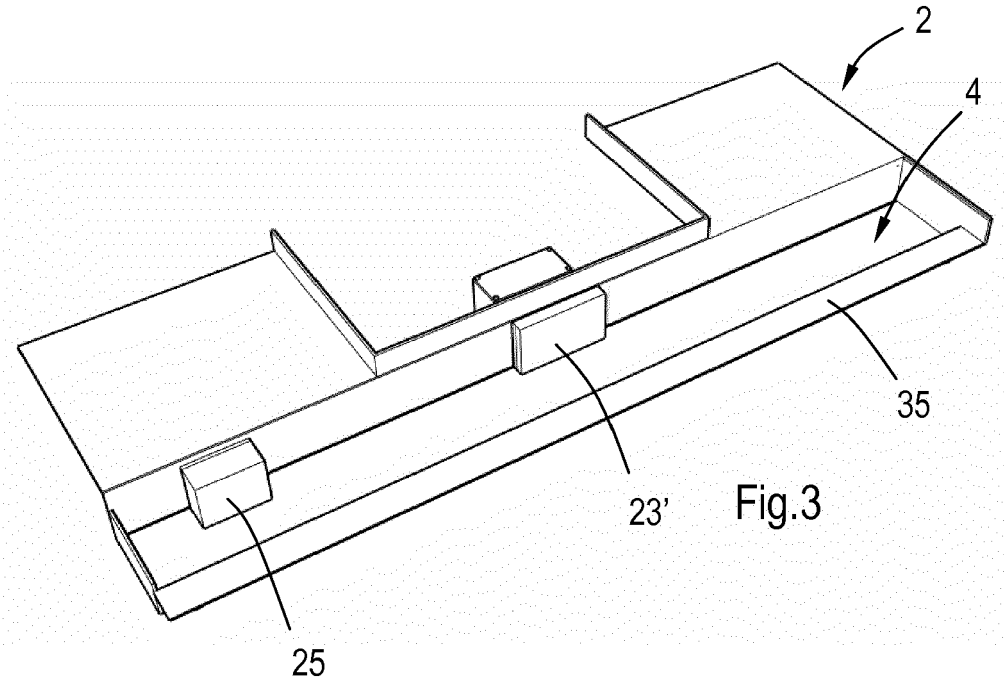

Fig.3

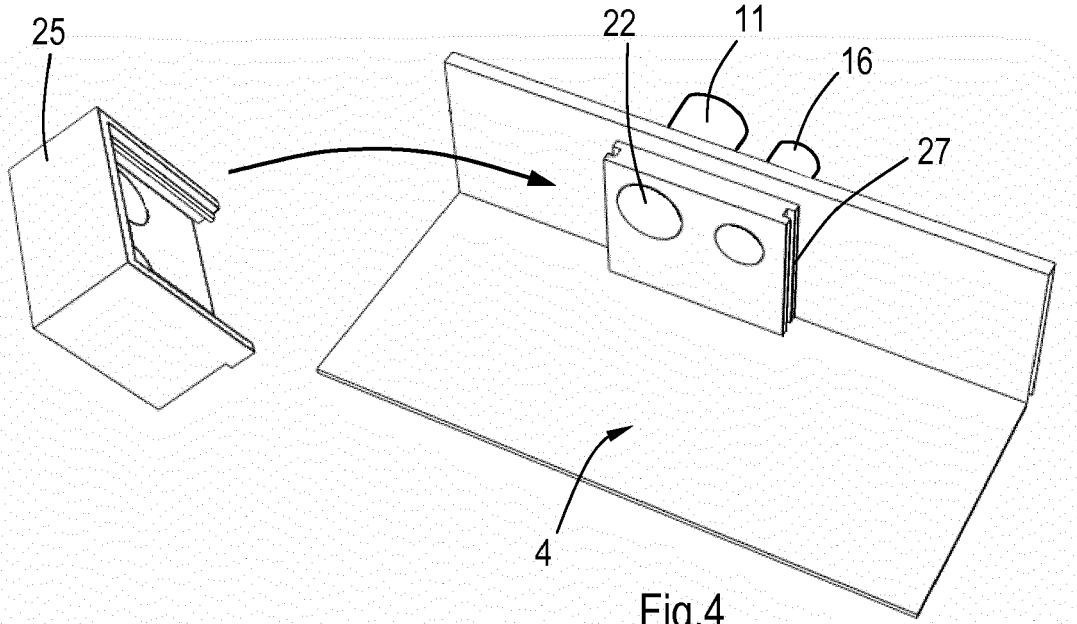

Fig.4

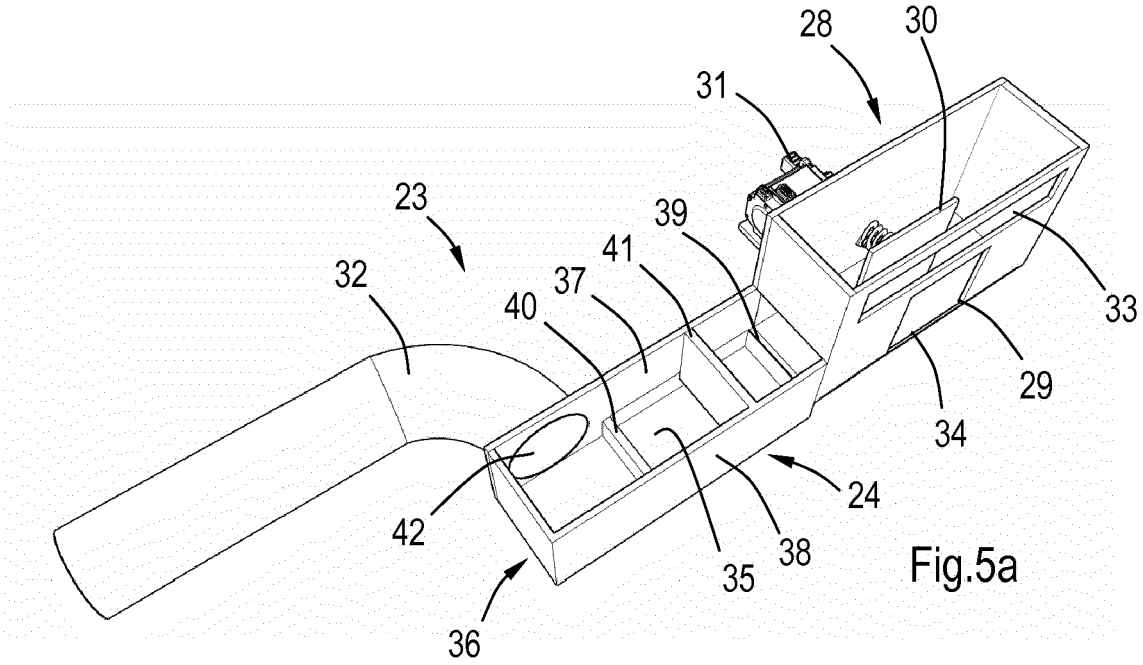
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Fig.5a

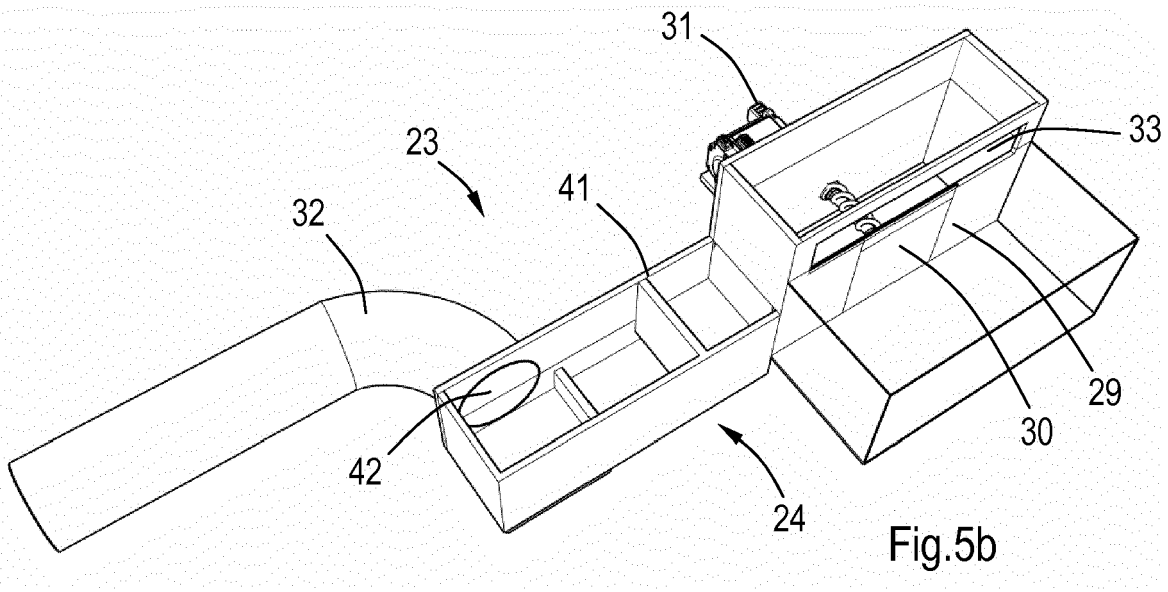
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Fig.5b

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EUROPEAN SEARCH REPORT

Application Number
EP 14 17 5247

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2002/158138 A1 (YEKUTIELY DAVID [IL] ET AL) 31 October 2002 (2002-10-31) * paragraphs [0032] - [0034], [0036], [0041]; figures 1,2 * -----	1-7	INV. A47K3/40 E03C1/04 E03F5/04 E03C1/00
Y	GB 2 248 390 A (OAKLEY DAVID CHARLES OAKLEY DAVID CHARLES [GB]) 8 April 1992 (1992-04-08) * figures * -----	1-7	E03B1/04
Y	US 5 209 254 A (ANCSELOVICS SLOMO [US]) 11 May 1993 (1993-05-11) * figure 1 * -----	3	
A	FR 2 907 145 A1 (FORIEN DAVID [FR]) 18 April 2008 (2008-04-18) * figure 4 * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)

A47K
E03C
E03F
E03B

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

Place of search	Date of completion of the search	Examiner
Munich	27 October 2014	Isailovski, Marko

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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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:

1-7

☐ 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 14 17 5247

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:

1. claims: 1-7

A shower device with water recirculation, comprising: a support surface for supporting a person taking a shower; a reservoir lower than the lowest support surface level for collecting water from the support surface; a pump having a suction side and a press side, at its suction side provided with a first fluid channel for taking in water from the reservoir; a water outlet arranged to distribute water above the support surface, and via a second fluid channel connected to the press side of the pump; at least one supply line for providing fresh water to the shower device, wherein the supply line(s) for providing fresh water to the shower device is/are connected to the suction side of the pump.

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2. claims: 8-15

A base section for shower device with recirculation of shower water, wherein the base section comprises a support surface and a reservoir, the reservoir comprises an outlet opening, and an outlet valve for at least partially closing the outlet opening; the outlet opening being provided in a side wall part of the reservoir.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 17 5247

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.

27-10-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002158138 A1	31-10-2002	NONE	
GB 2248390 A	08-04-1992	NONE	
US 5209254 A	11-05-1993	NONE	
FR 2907145 A1	18-04-2008	EP 2087179 A2	12-08-2009
		FR 2907145 A1	18-04-2008
		WO 2008046992 A2	24-04-2008

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