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(54) **Device for creating a water shower**

(57) The invention relates to a device for creating a water shower, which includes at least one suction hose (1.1, 4.1) for sucking water, a hand-operated pump (8), comprising a suction side and a pressure side, to create suction in the suction hose (1.1, 4.1) and to create pressure to move the water flow to the pressure side of the said pump (8), to the suction side of which pump (8) the suction hose (1.1, 4.1) is connected, as well as a shower nozzle (16), for creating a shower from the water flow, connected to the pressure side of the pump (8). The device (100) includes, in addition, a tank (13) for storing the pumped water, situated above the said shower nozzle (16), to which tank (13) the said shower nozzle (16) is connected, in order to create a shower by gravity.

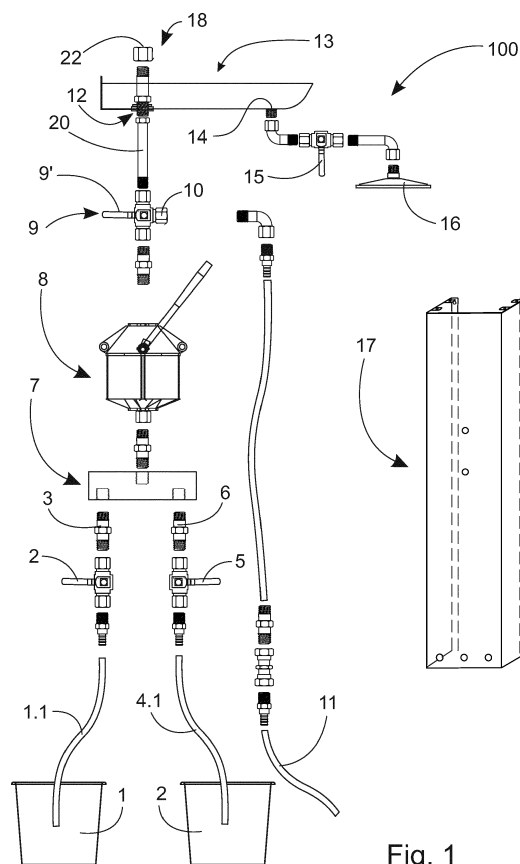


Fig. 1

Description

[0001] The present invention relates to a device for creating a water shower, which includes at least one suction hose for sucking water, a hand-operated pump, comprising a suction side and a pressure side, to create suction in the suction hose and to create pressure to move the water flow to the pressure side of the said pump, to the suction side of which pump the suction hose is connected, as well as a shower nozzle, for creating a shower from the water flow, connected to the pressure side of the pump.

[0002] In Finland and elsewhere in the world there are many saunas or other similar bathrooms, to which a pressurized water line has not been laid, which are, in other words, dependent on carried water. The water needed for washing is mixed by combining cold and hot water in suitable proportions, for example, in a washbasin or vessel. The washing water can be poured from the washbasin over oneself either directly or with the aid of a bucket or ladle. A problem with a traditional manner like this is the mixing of the hot water with the cold, in which accidents can easily occur with boiling water. The bather can scald themselves when taking water, for example, from the bottom of a hot built-in cauldron or when pouring water into the washbasin. In addition, when pouring water from a washbasin or bucket it is difficult to regulate the water, which flows away rapidly, so that the bather cannot wash properly. Thus water consumption also increases when bathing.

[0003] Publication JP2000217735 A is known from the prior art, which discloses a pump, by means of which water can be pumped from two tanks to a shower head. A drawback of such a solution is, however, that it is not suitable for a bathroom without electricity, as the solution uses electrical components. An electric pump is also exposed to cold and damp, as many summer-cottage saunas are left cold over the winter. Another drawback is that siphonage can occur with the aid of the combined suction hoses and will easily empty the contents of one tank into the other tank.

[0004] Publication FR 1453606 A, which discloses a hand-operated device for creating a shower, is also known from the prior art. A problem with such a device is, however, that the user must continuously pump water in order to create the shower.

[0005] The invention is intended to create a better device than solutions of the prior art for creating a water shower, with the aid of which device an even shower of water is obtained without electrical components. The characteristic features of this invention are stated in the accompanying Claim 1.

[0006] This intention can be achieved by means of a device for creating a water shower, which includes at least one suction hose for sucking water, a hand-operated pump, comprising a suction side and a pressure side, to create suction in the suction hose and to create pressure on the pressure side of the pump to move the

water flow, to the suction side of which pump the suction hose is connected. In addition, the device includes a shower nozzle connected to the pressure side of the pump, for creating a shower from the water flow, and a tank for storing the pumped water, located above the shower nozzle, to which tank the shower nozzle is connected in order to create a shower by gravity. By means of such a solution, a water shower can be created without electricity and pressurized water safely, and an even water shower obtained. The user also need not operate the pump while showering.

[0007] The device preferably includes at least two suction hoses for sucking water of two different temperatures and means for connecting together, to form one water flow, the water sucked through the suction hoses, to which means the suction hoses are connected, the means being also connected to the suction side of the pump. Thus, the device can be used to achieve the secondary intention of the invention to create a device, by means of which cold and hot water can safely mixed to create a shower, without using electrical components.

[0008] The device preferably includes a flow channel from the pressure side of the pump to a tank. With the aid of the flow channel, the pumped water is supplied to the tank, from which it can later be allowed to flow by gravity as a shower.

[0009] The device preferably includes at least one flow restrictor for limiting or preventing the flow of at least one suction hose. With the aid of the flow restrictor, the ratio of pumped hot and cold water can be adjusted, thus achieving the final result of suitably warm shower water.

[0010] The device preferably includes at least one one-way valve connected to at least one suction hose, for preventing back-flow. Using such a solution, water can be pressurized safely without electricity and without the drawbacks of siphonage to create a water shower.

[0011] The pump is preferably a piston pump. A piston pump has a very high output, thanks to which the pumping of water up to the tank for a shower takes only 10 - 20 seconds. In addition, a piston pump is a very durable and functional solution for water of varying temperatures and for different operating conditions.

[0012] Between the pump and the tank there are preferably adjustable bypass-flow means. With the aid of the bypass-flow means, the water being pumped can be guided first of all to a floor drain, making it possible to check that the shower water is at a safe temperature. In addition, the bypass-flow means can be used as a separate shower head or washing hose.

[0013] A flexible hose with a second shower nozzle at the end of the hose can be connected to the bypass-flow means. With the aid of the second shower nozzle, the device can be used as a hand shower.

[0014] Means for evenly distributing the water flow coming from the pump to the tank can be included in connection with the tank. Thus, the water flow produced by the pump and coming at a relatively high flow velocity can be guided rapidly without splashing into the tank.

[0015] According to one embodiment, the end of the flow channel at the tank is arranged above the edges of the tank and the means are a cap installed on the end of the flow channel to guide the flow into the tank in a controlled manner. The cap acts as an obstacle to the flow, dividing the flow evenly to the sides.

[0016] Both suction hoses preferably include flow restrictors. The flow restrictors permit both the cold and hot water flows to be regulated separately, so that the device can also be used, for example, to empty a built-in cauldron. A flow restrictor is preferably a valve or a throttle.

[0017] The suction hoses are preferably essentially of equal length. Thus, a similar control logic can be used in regulating the flow of both the cold and the hot water, the suction resistances being equal. The word essentially refers to the fact that the lengths of the hoses can differ by less than 5 cm.

[0018] The device preferably includes a frame for mounting at least the pump, the means, and the tank. With the aid of the frame the device can be supplied as a ready-to-use totality, which can easily be hung from, or supported on, for example, the wall of the sauna.

[0019] There can preferably be a shut-off valve in connection with the shower nozzle for preventing the flow of water from the tank by gravity. Thanks to the shut-off means, the tank can first of all be pumped full of water, after which the user can take a shower as they please without operating the pump.

[0020] According to one embodiment, the frame includes attachment slots, with the aid of which the device can be attached, for example, to attachment bolts installed on the wall of the sauna.

[0021] The shower nozzle can include a built-in shut-off valve. The built-in shut-off valve allows the device to be implemented without a separate shut-off valve before the shower nozzle.

[0022] The tank is preferably tilted towards the shower nozzle in order to guide the water to the shower nozzle. This makes it possible to ensure the complete emptying of the tank when the shower nozzle is open.

[0023] The device preferably includes flow channels for connecting to each other the pump, the means intended to connect the water of the suction hoses, the shower nozzle, and the valves of the suction hoses.

[0024] According to one embodiment, a shut-off valve is integrated in the shower nozzle. Thus the device can be implemented without a separate shut-off valve, which would complicate the construction of the device and make it aesthetically poorer.

[0025] According to one embodiment, the device includes shut-off means, which are arranged to prevent the flow of water from the tank to the shower nozzle when the water in the tank exceeds a preset temperature. This prevents the user from accidentally pouring on themselves water that has heated while they were in the sauna.

[0026] The shut-off means are preferably of a bimetallic plate construction. When the plate construction warps

due to the effect of the temperature of the water a plug automatically closes the flow channel leading from the tank to the shower nozzle, thus preventing the hot water from entering the shower nozzle.

[0027] The present temperature can be in the range 38 - 45 °C, preferably 42 °C. The water coming from the shower nozzle will then be safe for use.

[0028] In the following, the invention is described in detail with reference to the accompanying drawings showing some embodiments of the invention, in which

Figure 1 shows a schematic exploded view of the device according to the invention,
 Figure 2 shows an axonometric view of one embodiment of the device according to the invention, seen at an angle from above,
 Figure 3a shows a side view of one embodiment of the device according to the invention,
 Figure 3b shows a front view of one embodiment of the device according to the invention,
 Figure 4 shows an axonometric view of one embodiment of the device according to the invention, seen at an angle from below,
 Figure 5 shows in greater detail the shower nozzle and shut-off means of one embodiment.

[0029] Hereinafter, the device according to the invention is referred to as a summer-cottage shower, according to one preferred embodiment, but it should be understood that the device can also be used in other operating environments and for other purposes than in a summer cottage or sauna. The device is, however, preferably intended to be used, for example, in a summer cottage, in which there is a non-pressurized water system, i.e. the domestic water is carried by hand. The device operates without electricity and for that reason can be used almost everywhere a shower, water of mixed temperature, or only water pumping is needed. The present practice is that water of the desired temperature is mixed using a sauna ladle and then the ladle is used to pour the water over the bather. The device according to the invention is intended to make the mixing of cold and hot water safer and to facilitate showering.

[0030] Figure 1 shows one preferred form of implementation of the device 100. The operating principle of the device is as follows: when pumping is started using the pump 8 of Figure 1 and the ball valves acting as flow restrictors 2 and 5 are fully open, the T-shaped drill hole inside the three-way valve 9' is turned to point towards the angle joint 10, so that water begins to flow through the hose 11. The three-way valve 9', the angle joint 10, and the hose 11 in this connection form the bypass-flow means 9. When the cold water is 1 °C and the hot water is 100 °C, 50-°C water comes from the hose 11. After this, by turning the valve acting as a flow restrictor 5 in the closed direction, the flow of hot water diminishes if pumping with the pump 8 is continued. Alternatively, the flow of cold water can be increased by opening the cold-

water flow restrictor 2, or by adjusting both flow restrictors simultaneously. By acting in this way water of the desired temperature is obtained from the hose 11. After this, the t-shaped drill hole inside the three-way ball valve 9' is turned to point towards the feed-through component 12, when the water will flow to the water reservoir 13, i.e. the tank. After sufficient pumping, the tank 13 will be full of water at the desired temperature, so that pumping can be stopped. After this, by turning the shut-off valve 15 open, water will begin to flow through the feed-through component 14 through the shut-off valve 15 to the shower nozzle 16 and through it over the person in the shower. When it is wished to stop showering, the shut-off valve 15 is turned shut. The shut-off valve can be a ball valve.

[0031] The operating principles of the device according to the invention is as follows. The cold and hot-water suction circuits (suction hoses 1.1 and 4.1) must be preferably of the same dimensions, so that suction is implemented through the ball valves and anti-siphonage valves 3, 6 acting as flow restrictors 2, 5 and the means 7, i.e. the header, intended to merge the water flows logically to the pump 8 and from there in either direction. The level of cold and hot water may vary at different heights, which will create siphonage. The formation of siphonage is prevented by the one-way valves 3 and 6 advantageously acting as anti-siphonage valves. The device also operates with the aid of a single one-way valve. By turning the flow restrictor 2 to the closed position, the hot-water vessel can also be emptied safely directly to a floor drain. The cold-water vessel can also be emptied in this way. By turning the flow restrictors 2 and 5 to suitable positions, the sauna benches and floor can also be washed with water of the desired temperature. The device according to the invention can also preferably be used in such a way that water is pumped into the tank, after which the bypass-flow means 9 are opened, when the water will be free to flow by gravity from the tank 13 to the hose 11 belonging to the bypass-flow means 9 and to the second shower head possibly at the end of it. For this implementation, the end 21 of the flow channel 20 should be at the level of the bottom of the tank 13, so that water will be able to flow back to the flow channel 20 from under the hat 22.

[0032] The operating principle of the feed-through component 12 is that, with the aid of two flanges and a tightening nut, a watertight joint is obtained between the water tank 13 and the flow channel 20 coming from the three-way valve 9'. The output of water of the feed-through component 12 is forced downwards towards the bottom of the water tank 13, with the aid of openings in the end and a loosely-fitting cap 22 with a thread. In other words, the loosely-fitting cap 22 and thread form means 18 for distributing the water flow coming from the pump 8 evenly to the tank 13. This is implemented in this way, because otherwise pumping with the pump 8, when the three-way valve 9 is oriented towards the feed-through component 12, the water would achieve such a velocity that it would be thrown out of the water tank 13. The T-

shaped drill hole in the three-way valve 9' is safe, because when the valve is in any position whatever, the water flow is implemented in one or other direction, which prevents overloading of the pump 8 due to a pressure rise. The tank 13 and the frame 17 can be at an angle of 87.5° to each other, which means that the water tank 13 will empty itself of water when the shut-off valve 15 remains completely open. This will prevent it from freezing in winter. The freezing of the pump 8 is prevented by taking the hoses 1.1 and 4.1 out of the water vessels and pumping air through them a few times. Alternatively, on the bottom of the tank at the feed-through going to the shower nozzle, there can be a drainage recess into which the water flows, in which case the tank can be level. According to one embodiment, the tank can also be located separately from the frame, for example, in the attic of a sauna, as long as the tank is higher than the shower nozzle.

[0033] The frame 17 preferably also forms the structure of the device, on top of which the tank 13 is attached. In addition, the external casing plate 17.1 forming the frame can include attachment slots, with the aid of which the external casing plate and the components of the device inside it are attached with bolts or screws screwed into the wall. The device according to the invention also has a first-class external appearance, as the frame forms the external casing, which covers the components of the device, except for the operating handle of the pump and the regulating handles of the flow restrictors. At the same time, the frame protects the user, for example, from the valves of the suction hose heated by the hot water, on which the user can burn their hand.

[0034] The pump used in the device can be a hand-operated piston pump manufactured from stainless steel or aluminium. The pump can momentarily produce a pressure of as much as 3 bar. Nitrile-rubber is preferably used for the seals in the pump, by means of which excellent temperature resistance is achieved of up to -40 °C to +120 °C. The output achieved with the pump can be, for example, in the order of 10 - 60 l/min and the continuous pressure level in the order of 1 bar.

[0035] Figure 2 shows a second embodiment of the device according to the invention, seen from different directions. In this embodiment the shut-off valve is combined with the shower nozzle 16, so that the device 100 can be manufactured in a simpler form. The valve combined with the shower nozzle can operate in such a way that the user can press or pull a button below the shower nozzle, when the valve will be released. In addition, the cap 22 can be clearly seen in Figure 2. Figures 3a - 4 show a third form of implementation of the device according to the invention. According to Figure 4, the device 100 can, in addition, include a water-level metre 24, which shows the user the amount of water in the tank 13.

[0036] Figure 5 shows one embodiment of the device according to the invention as an enlargement in the case of the shower nozzle 16. In this embodiment, the shower nozzle 16 can be a structure, to which both the nozzle

component and the shut-off valve in the same shower nozzle 16 are connected. In the shower nozzle 16 there can be a vertical pin 40, with the aid of which the input pipe of the shower nozzle can be blocked by pressing the pin upwards. When the pin is pulled down, the input pipe opens and water can again flow through the nozzle component of the shower nozzle 16.

[0037] According to Figure 5, the device can also include shut-off means 31, which are arranged to prevent the flow of water from the tank 13 to the shower nozzle 16 when the water in the tank 13 exceeds a preset temperature. In this way it is possible to prevent the user from accidentally pouring over themselves water that heated up while they were in the sauna. The shut-off means are preferably a bimetallic plate structure 30, to which a plug 36 is attached. When the plate structure 30 warps due to the temperature of the water, the plug 36 automatically closes the flow channel leading from the tank 13 to the shower nozzle 16, preventing the hot water from gaining access to the shower nozzle 16. The idea of the bimetallic plate structure is that two plates of different metals attached to each other expand with different coefficients of thermal expansion. Thus, when the temperature varies, the bimetallic plate warps and automatically closes the flow channel. Some other corresponding shut-off means based on thermal expansion can also be used as the shut-off means. The shut-off means can be arranged to close the flow channel at a temperature of 38 - 45 °C, preferably 42 °C.

[0038] According to Figure 5, a channel 38 can run through the plug, with the aid of which replacement air is obtained for the shower nozzle when the shut-off means have closed the flow channel. This ensures that water in the shower nozzle will run out of the shower nozzle and not remain there to heat up. The channel 38 preferably runs through the pin 34 to a point above the maximum height of the water level. The maximum height of the water level in the tank is defined by having an overflow slot in the edge of the tank on the side next to the wall, through which water pumped into the tank can safely leave the tank between the wall and the device if excess water is pumped into the tank.

[0039] At this stage, it should be understood that the embodiments of Figures 2 - 4 show mainly the totality of the device according to the invention and can differ in detail from the embodiment of Figure 1, which is the preferred manner of implementation of the invention.

[0040] The device according to the invention can also be used, for example, for mixing dishwashing water, in such a way that the mixed water is taken to a basin with the aid of the bypass-flow means, without it travelling through the tank or shower head of the device.

Claims

1. Device for creating a water shower, which includes at least one suction hose (1.1, 4.1) for sucking water,

a hand-operated pump (8), comprising a suction side and a pressure side, to create suction in the suction hose (1.1, 4.1) and to create pressure to move the water flow to the pressure side of the said pump (8), to the suction side of which pump (8) the suction hose (1.1, 4.1) is connected, as well as a shower nozzle (16), for creating a shower from the water flow, connected to the pressure side of the pump (8), **characterized in that** the said device (100) includes, in addition, a tank (13) for storing the pumped water, situated above the said shower nozzle (16), to which tank (13) the said shower nozzle (16) is connected, in order to create a shower by gravity.

2. Device according to Claim 1, **characterized in that** the device (100) includes at least two suction hoses (1.1, 4.1) for sucking water of two different temperatures and means (7) for combining the water sucked through the suction hoses (1.1, 4.1) to form one water flow, to which said means (7) the said suction hoses (1.1, 4.1) are connected, and which said means (7) are connected to the suction side of the said pump (8).
3. Device according to Claim 1 or 2, **characterized in that** the device (100) includes a flow channel (20) from the pressure side of the said pump (8) to the tank (13).
4. Device according to Claim 2 or 3, **characterized in that** the device (100) includes at least one flow restrictor (2, 5) for restricting or preventing the flow of at least one suction hose (1.1, 4.1).
5. Device according to any of Claims 2 - 4, **characterized in that** the device (100) includes at least one one-way valve (3, 6) connected to at least one suction hose (1.1, 4.1), in order to prevent back flow.
6. Device according to any of Claims 1 - 5, **characterized in that** the said pump (8) is a piston pump.
7. Device according to any of Claims 1 - 6, **characterized in that** the flow channel (20) between the said pump (8) and tank (13) includes adjustable bypass-flow means (9).
8. Device according to Claim 7, **characterized in that** a flexible hose is connected to the said bypass-flow means (9) and a second shower nozzle to the end of the said hose.
9. Device according to any of Claims 1 - 8, **characterized in that** in connection with the tank (13) there are means (18) for distributing the water flow coming from the pump (8) evenly to the tank (13).
10. Device according to Claim 9, **characterized in that**

the end (21) of the flow channel (20) on the tank (13) side is arranged above the edges of the tank (13) and the said means (18) are a cap (22) installed on the end (21) of the flow channel (20), for guiding the flow to the tank (13) in a controlled manner.

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11. Device according to any of Claims 1 - 10, **characterized in that** the device (100) includes a frame (17) for hanging at least the said pump (8), means (7), and tank (13).

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12. Device according to any of Claims 1 - 11, **characterized in that** in connection with the said shower nozzle (16) there is a shut-off valve (15) for preventing a flow coming by gravity from the tank (13).

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13. Device according to Claim 12, **characterized in that** the said shut-off valve (15) is built into the shower nozzle (16).

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14. Device according to any of Claims 1 - 13, **characterized in that** the device includes shut-off means (31) for the tank (13), which are arranged to prevent the flow of water from the tank (13) to the shower nozzle (16) when the water in the tank (13) exceeds the temperature specified for the shut-off means (31).

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15. Device according to Claim 14, **characterized in that** the shut-off means (31) are a bimetallic plate structure (30) arranged to close the tank (13) when the temperature specified for the shut-off means (31) is exceeded.

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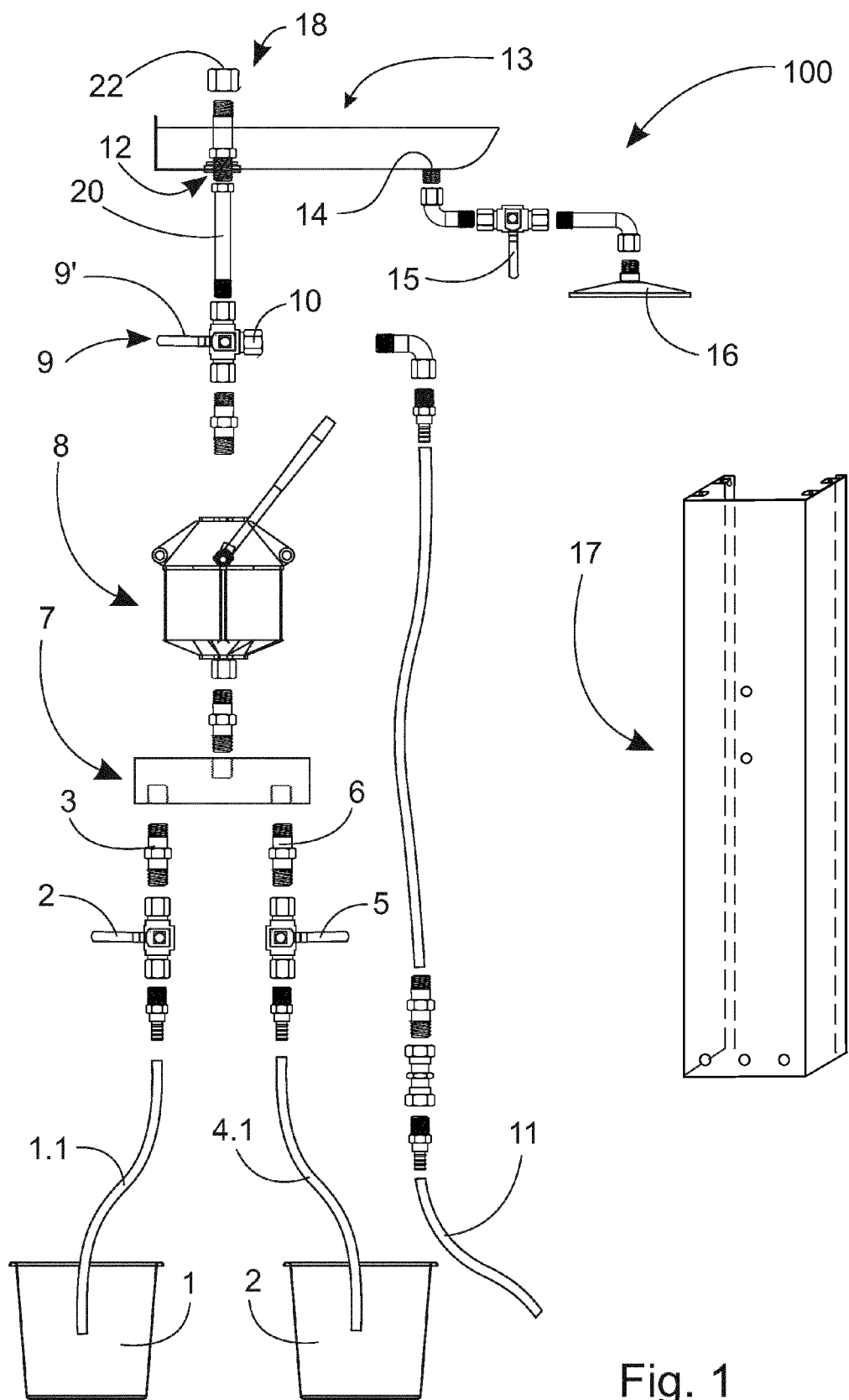
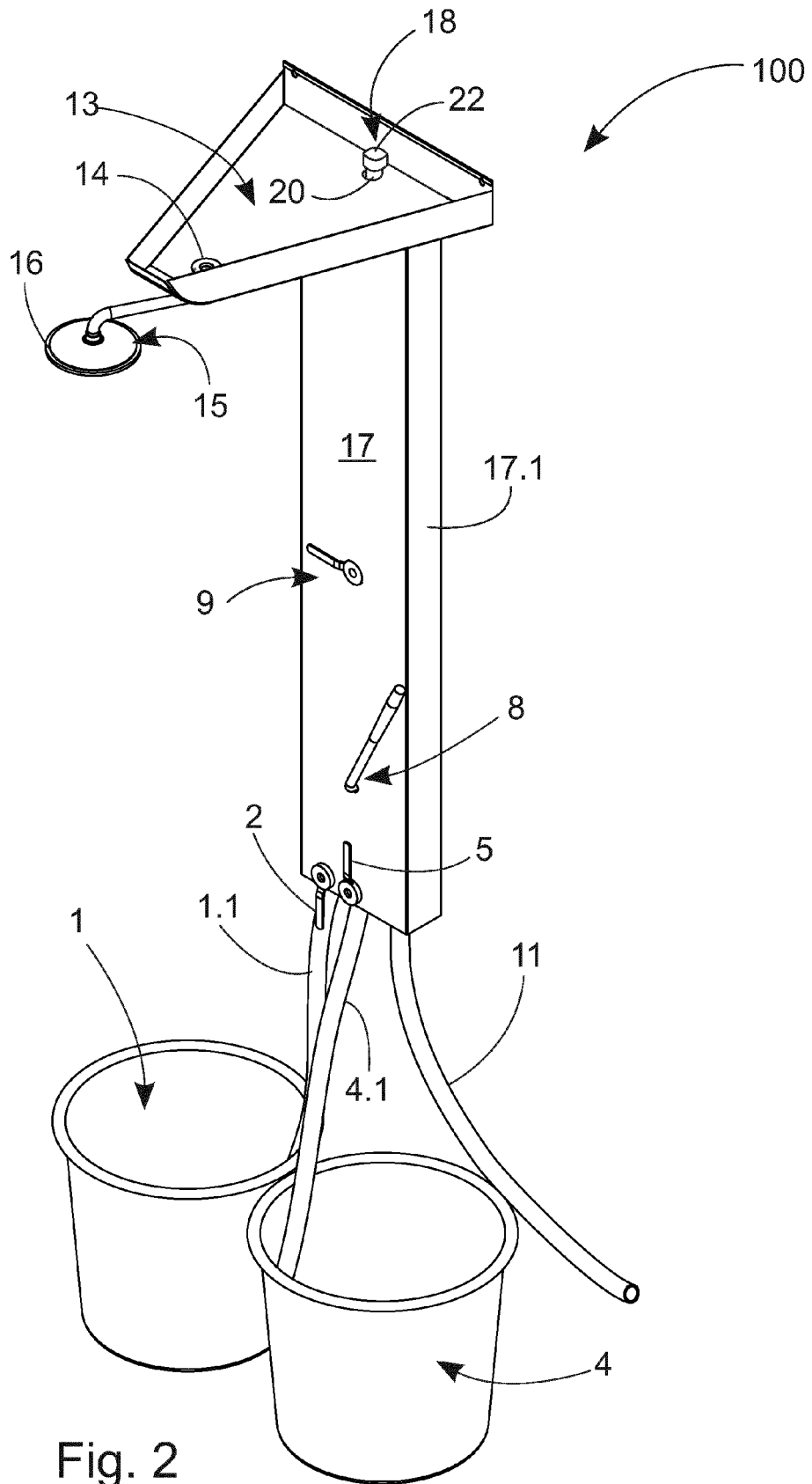


Fig. 1



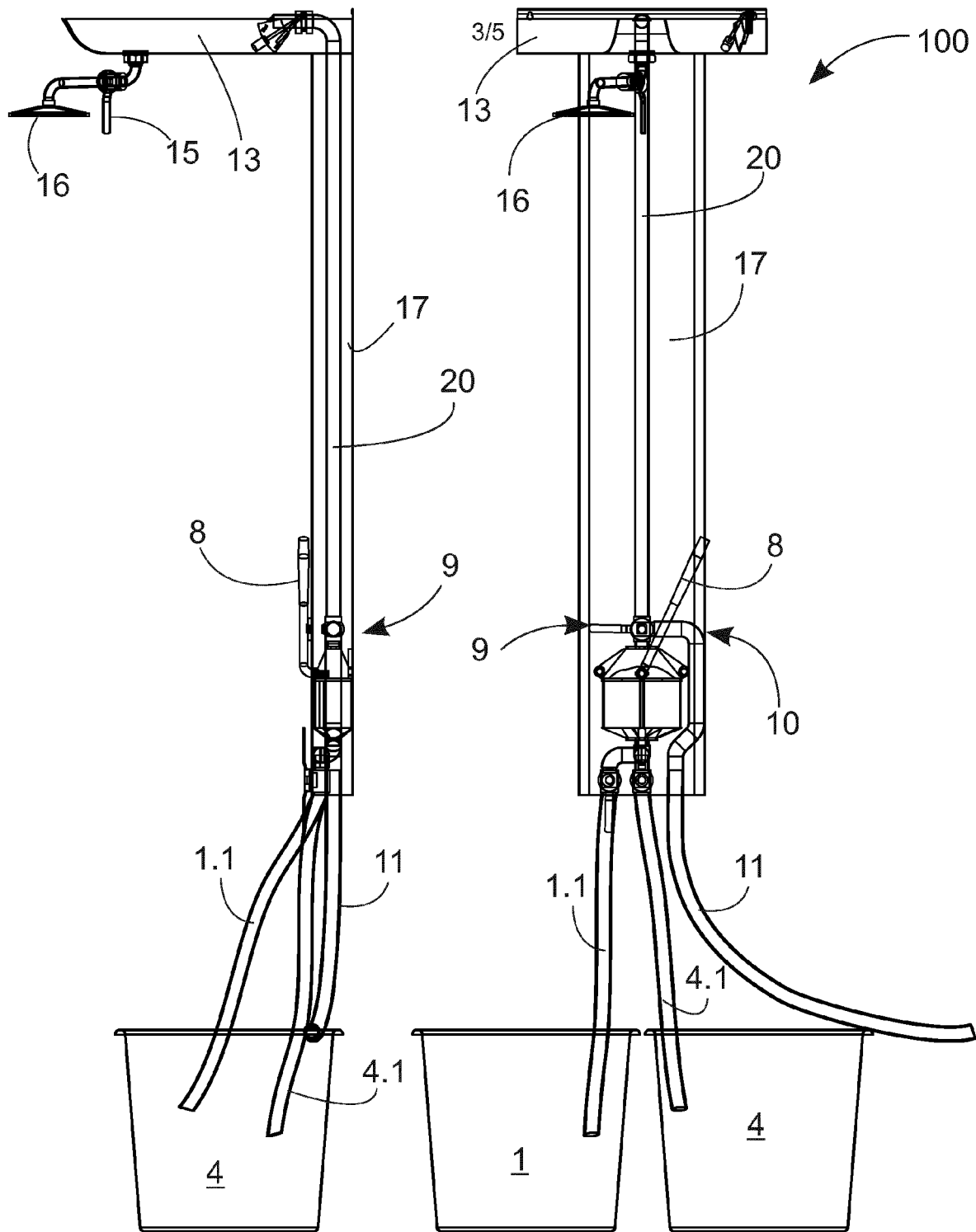


Fig. 3a

Fig. 3b

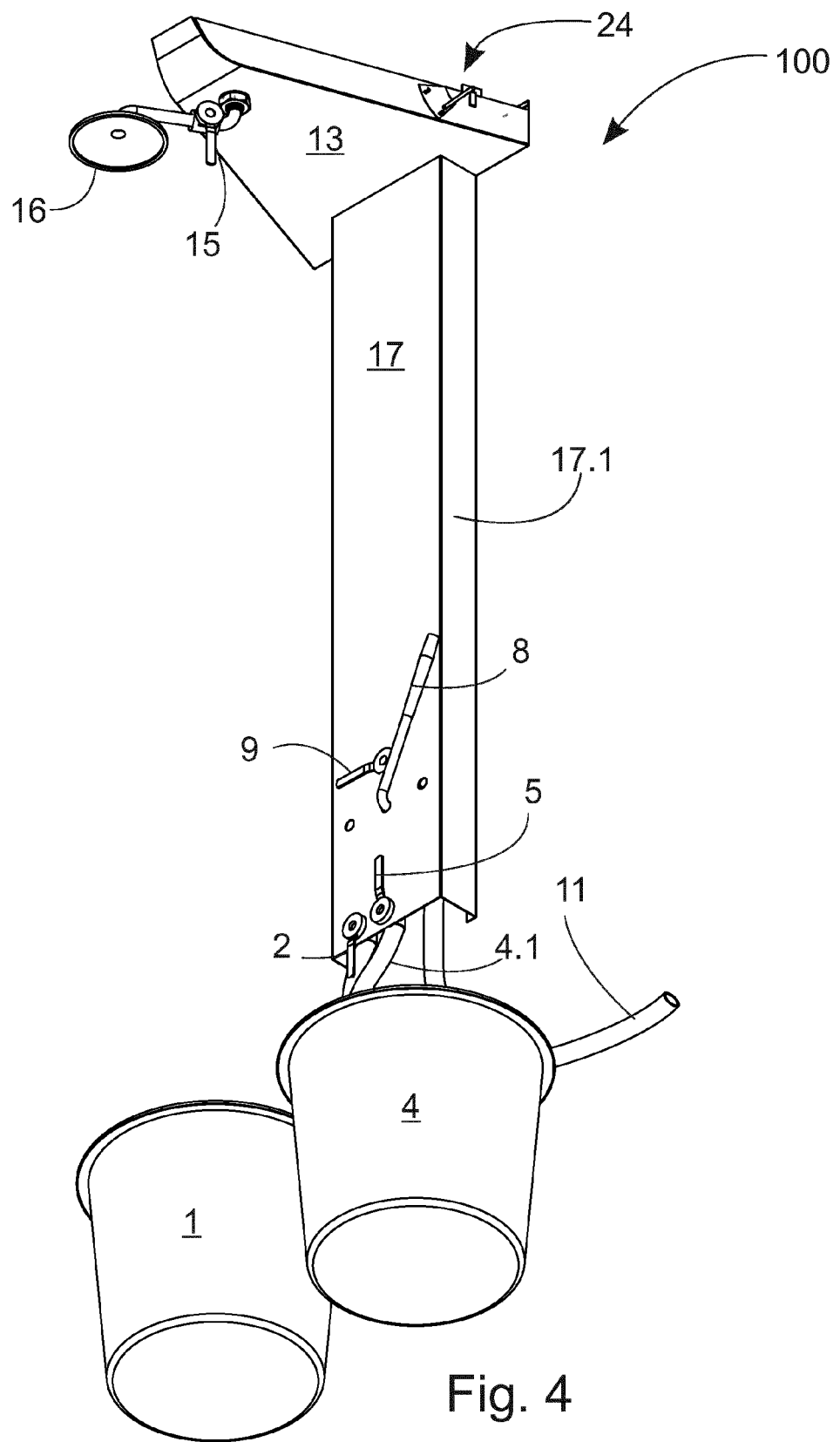


Fig. 4

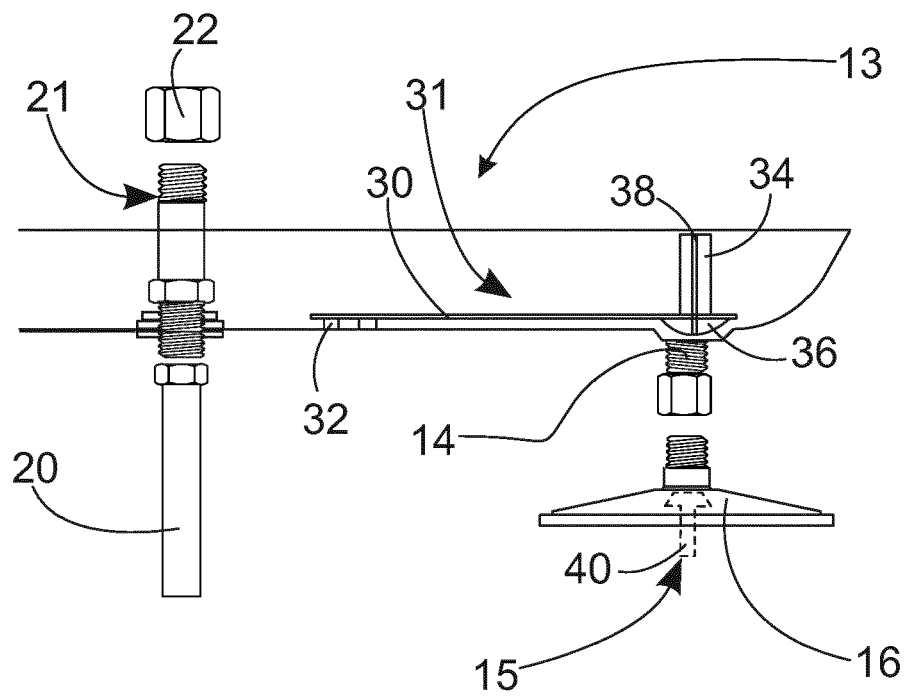


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 14 19 6743

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Place of search The Hague		Date of completion of the search 23 April 2015	Examiner Fordham, Alan
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 19 6743

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The members are as contained in the European Patent Office EDP file on
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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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