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(54) **SHOWER WATER USAGE INDICATOR APPARATUS**

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(57) **ABSTRACT**

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Shower water usage indicator apparatus comprises a shower head, a shower base for receiving shower water discharged from the shower head, a waste shower water outlet element for receiving runoff waste shower water from the shower base and for discharging to a drain, a controller for controlling water flow to the shower head and/or water flow from the waste shower water outlet element, a water flow rate detector for outputting a flow rate signal to the controller based on a detected water flow rate, and a water usage display element which is spaced from the water flow rate detector. A water usage indication is displayable on the water usage display element based on an output of the water flow rate detector. A data storage element stores usage data when showering, a representation of usage history based on the stored usage data being displayable on the water usage display element.

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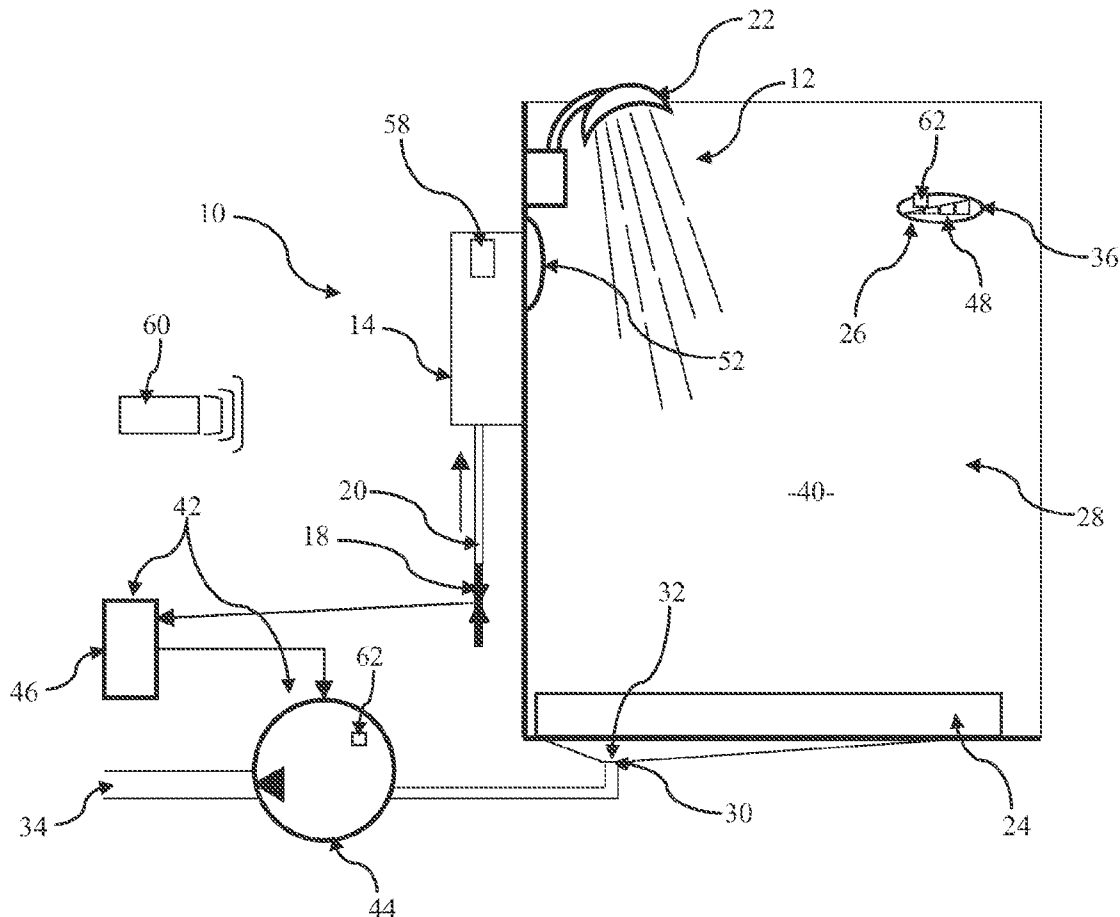
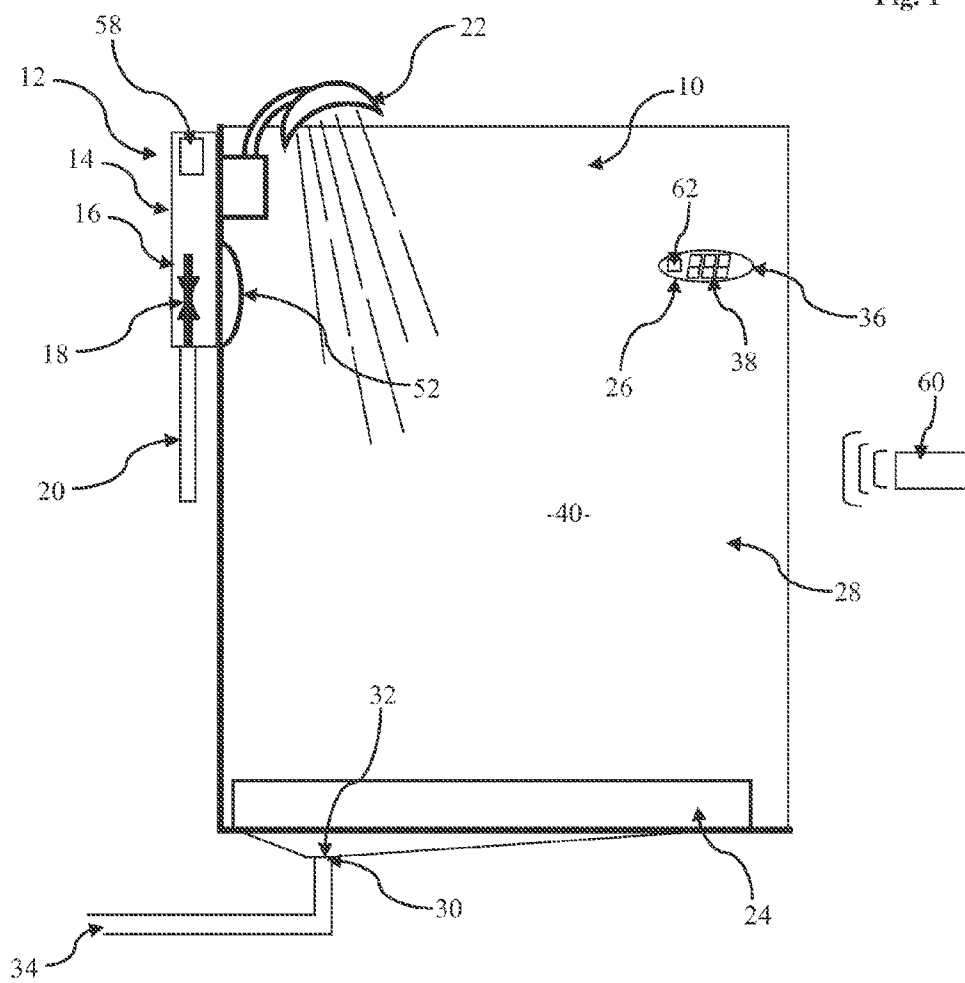
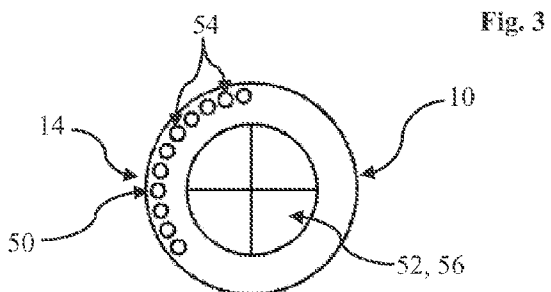
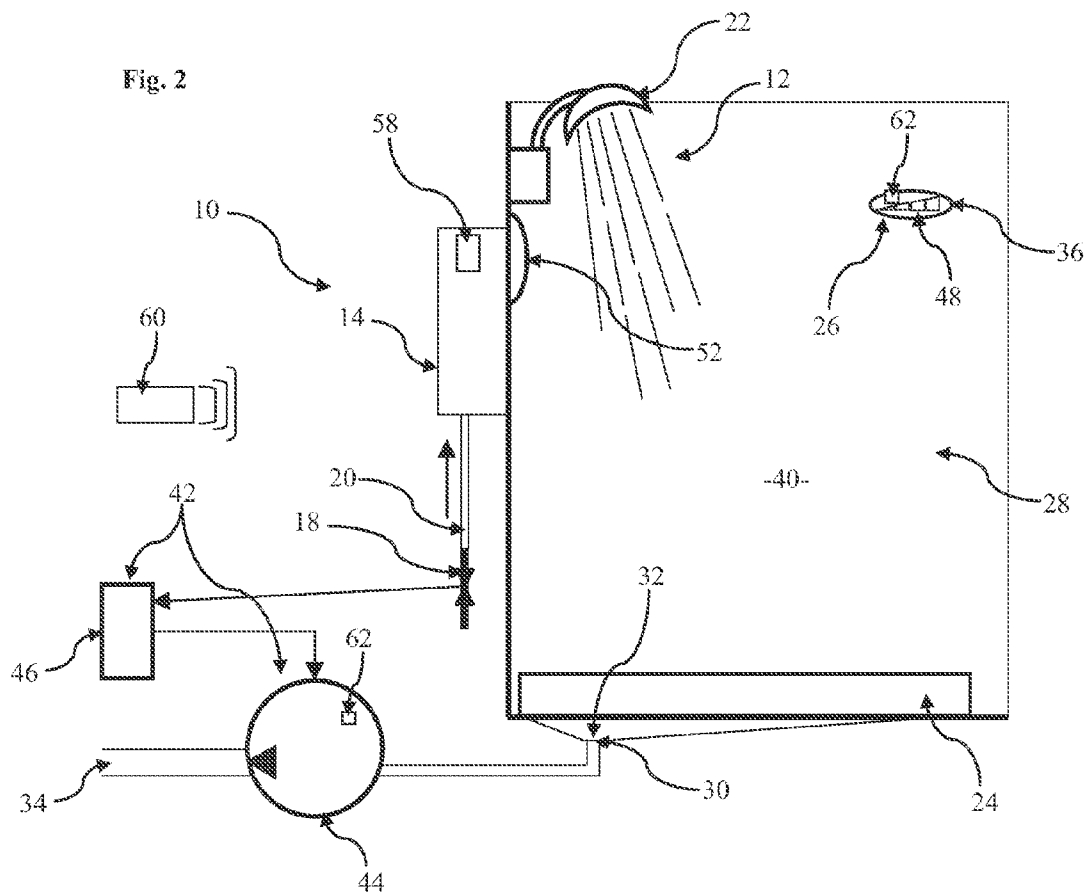


Fig. 1





SHOWER WATER USAGE INDICATOR APPARATUS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of International Application No. PCT/GB2009/051564 filed on 18 Nov. 2009, the entire contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to indicator apparatus which is specifically adapted for use with a shower to indicate water usage, and to a method of monitoring such shower water usage.

BACKGROUND OF THE INVENTION

[0003] A shower with an integrated water flow meter, typically on a flow path of a water supply downstream of the shower controller, for monitoring a flow rate of water to or through the shower is known. The water flow meter is used to assist in optimising the heating of the water by a heater of the shower. Additionally or alternatively, the integrated water flow meter can assist in optimising the pumping rate of a waste shower water pump device of the shower. The use of such an integrated water flow meter has to date therefore been focused solely on optimising the operation of electrical parts of the shower, such as heaters and pump motors.

[0004] It is becoming increasingly important to conserve water, thus reducing costs and energy consumption.

[0005] Current state of the art provides a calibrating container and a shower use timer, such as the Efergy® Shower Timer by Efergy of Wetherby, Yorkshire and the Shower-drop® Timer by Product Creations Limited of West Sussex. Both of these devices require the user to time the shower head filling a container with water in order to calibrate the timer device. This is a flawed method of operation and assumes that the shower water supply is constant. This is not the case, as even seasonal supply water temperatures may affect shower supply flow rates substantially, resulting in under reporting of water consumption by 50 to 100% or possibly more.

SUMMARY OF THE INVENTION

[0006] The present invention seeks to provide a solution which makes use of a known integrated water flow meter whilst indicating and/or controlling an amount of water used during showering.

[0007] According to a first aspect of the present invention, there is provided shower water usage indicator apparatus comprising a shower head, a shower base for receiving shower water discharged from the shower head, a waste shower water outlet element for receiving runoff waste shower water from the shower base and for discharging to a drain, a controller for controlling water flow to the shower head and/or water flow from the waste shower water outlet element, a water flow rate detector for outputting a flow rate signal to the controller based on a detected water flow rate, and a water usage display element which is spaced from the water flow rate detector, a water usage indication being displayable on the water usage display element based on an output of the water flow rate detector.

[0008] Preferable and/or optional features of the present invention are also set forth herein.

[0009] According to a second aspect of the invention, there is provided a method of conserving water during showering, the method comprising the step of providing a shower installation having an integrated water flow rate detector for outputting a flow rate signal to a controller which controls water flow to a shower head and/or water flow from a waste shower water outlet element on a shower base with a water usage display element which is spaced from the water flow rate detector, a water usage indication being displayable on the water usage display element based on an output of the water flow rate detector, so that a user can monitor their water usage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The invention will now be more particularly described, by way of example only, with reference to the accompanying drawings, in which:

[0011] FIG. 1 shows a diagrammatic side view of a shower installation which comprises a first embodiment of shower water usage indicator apparatus, in accordance with the present invention;

[0012] FIG. 2 shows a diagrammatic side view of a shower installation which comprises a second embodiment of shower water usage indicator apparatus, in accordance with the present invention; and

[0013] FIG. 3 shows a front view of a user interface of a controller of a third embodiment of shower water usage indicator apparatus, in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0014] Referring firstly to FIG. 1 of the drawings, there is shown a first embodiment of shower water usage indicator apparatus **10** which comprises a shower installation **12** including a shower controller **14** having an integrated electric shower water heater **16**, an integrated water flow rate detector **18** internally within the controller **14** and in this case at an outlet of a water supply pipe **20**, a shower head **22** in liquid communication with a shower water outlet of the controller **14**, a shower base **24** below the shower head **22** to receive shower water discharged from the shower head **22**, and a water usage display element **26**.

[0015] The shower controller **14** may not necessarily include the heater **16**, and may simply be a mixer and/or control the flow rate of shower water being discharged from the shower head **22**. The controller **14** may be electronic and/or mechanical and, for example, may be thermostatic.

[0016] The shower head **22** may be connected to an output of the controller **14** via an elongate flexible hose, or it may be unmountably attached to a wall surface of the shower area **28**, as in the present case.

[0017] The water flow rate detector **18** may be electronic and/or mechanical, but preferably outputs an electronic water flow rate signal.

[0018] The shower base **24** may be a shower tray, for example, a level-entry shower tray for wheel-chair access or a step-in shower tray, or a former with a preformed fall with or for supporting a wet-floor waterproof flexible plastics covering thereon. A waste shower water outlet element **30** is provided at a drain opening **32** of the shower base **24** and is in liquid communication with a drain **34**. The outlet element **30** receives runoff waste shower water from the shower base **24** and enables flow to the drain **34**.

[0019] In this embodiment, the water usage display element **26** comprises a display housing **36** which is mountable

independently of and spaced from the controller 14, and a display screen 38, in this case being a number-displaying LCD. A wireless receiver is provided in the display housing 36, for example mounted on a PCB. Control circuitry also on the PCB interfaces between the receiver and the display screen 38.

[0020] Although wireless, the water usage display element 26 may be additionally or alternatively hard wired.

[0021] The water usage display element 26 may include a user interface on the display housing 36 and/or a user interface may be provided on the controller 14.

[0022] The water usage display element 26 is preferably removably mountable on a wall 40 of the shower area 28, at a remote location which is convenient for a user to view. However, the water usage display element 26 may be permanently affixed to the wall 40.

[0023] Energisation of the water usage display element 26 is preferably by, for example rechargeable, battery, but a mains power supply can additionally or alternatively be utilised.

[0024] In use, the integrated water flow rate detector 18 outputs a continuous real-time flow rate signal to the shower controller 14. This allows the controller 14 to optimise the heating of the water by the electric heater 16. A control circuit in the controller 14 additionally converts the real-time flow rate signal to a volume signal which is outputted, via in this case a wireless transmitter, to the water usage display element 26. The received volume signal is then displayed in real-time on the display screen 38 of the water usage display element 26 as a numerical value in litres, so that a user can see how much water the current showering process is using. The user can thus moderate or modify their showering habit to optimise or minimise water consumption.

[0025] If the water usage display element 26 is hard wired to the controller 14, then the transmitter associated with the controller 14 may not necessarily be wireless.

[0026] Referring to FIG. 2, there is shown a second embodiment of shower water usage indicator apparatus 10. Like references refer to parts which are the same as or similar to those of the first embodiment, and thus further detailed description is omitted.

[0027] In this embodiment, the integrated water flow rate detector 18 is provided upstream of the shower controller 14 and towards a water supply, for example from a tank, boiler or mains. A waste shower water pump device 42 is also provided downstream of the drain opening 32 in the shower base 24. The pump device 42 may be spaced downstream of the outlet element 30, as shown in FIG. 2, or provided in the outlet element 30. The pump device 42 typically includes an electric motor 44 and a pump controller 46. The pump controller 46 controls a pump of the pump device 42 based on the water flow signal outputtable by the water flow rate detector 18. In this case, the water flow rate detector 18 may only output the water flow signal to the pump device 42, but the signal may also be outputted to the controller 14, as or similar to that described in the first embodiment.

[0028] In use, a pump of the pump device 42 is controlled based on the water flow signal received from the water flow rate detector 18, so as to typically optimise a pumped flow rate of waste shower water being drawn through the drain opening 32 and from the outlet element 30 and discharged to the drain 34.

[0029] During use, and as in the first embodiment, a control circuit in the pump device 42 converts the real-time flow rate

signal of the water flow rate detector 18 also to a volume signal which is outputted, via in this case a, preferably wireless, transmitter in the pump device 42, to the water usage display element 26. The received volume signal is then displayed in real-time on the display screen 38 of the water usage display element 26, so that a user can see how much water the current showering process is using. The user can thus again moderate or modify their showering habit to optimise or minimise water consumption.

[0030] In this embodiment, the display screen 48 of the remote water usage display element 26 utilises a graduated LCD display, preferably including different colours to indicate and differentiate between levels of water usage.

[0031] The numerical LCD display of the first embodiment can of course be utilised instead of the graduated display, or the graduated display of the second embodiment can be used in place of the numerical display of the first embodiment.

[0032] Referring to FIG. 3, part of a third embodiment of shower water usage indicator apparatus 10 is shown. Like references again refer to parts which are the same as or similar to those of the first and second embodiments, and thus further detailed description is omitted.

[0033] The shower controller 14 of the first and second embodiments may include a local water usage display element 50 mounted thereon, additionally or alternatively to the described remote water usage display element 26. In this case, it may be convenient to provide the display of the water usage display element 50 on a user interface 52 of the controller 14, as shown in FIG. 3. This may take the form of a plurality of LEDs 54, which may be graduated in terms of colour, similarly to the display 48 of the second embodiment, to provide a visual indication of total water volume consumed during a specific showering process.

[0034] In this embodiment, the display is provided so as to extend partway around the user controls 56 on the user interface 52 of the controller 14. However, other arrangements can be considered.

[0035] As an alternative, it is possible to have the display screen 38, 48 of one of the remote water usage display elements 26, 50 described in the first and second embodiments locally provided on the controller 14.

[0036] Although the water usage indications displayable by the local and remote water usage display elements 26, 50 are visual, they may additionally or alternatively be audible.

[0037] The water usage indication preferably relates to a real-time volume of water used during the showering process. However, the water usage display element may only provide a water usage indication once the showering process is finished, or periodically throughout the showering process.

[0038] Following completion of the showering process, the water usage display element 26, 50 is deenergised and the respective control circuit is preferably reset. However, the water usage may be stored, for example, on a data storage device 58 in the controller 14, pump device 42 and/or water usage display element 26, 50, for a predetermined or user determined period to allow analysing, optimisation of usage and to identify usage trends, for example, via computer interrogation 60.

[0039] To enable more direct control of the actual volume of shower water used during a showering process, the controller 14, pump device 42 and/or water usage display element 26, 50 preferably include a data storage element 62, such as non-volatile electronic memory. The data storage element 62 is accessible, for example, by an installer during the setup of

the heater 16 and/or pump device 42 by using, for example, the user interface 52 of the controller 14, to input a recommended water usage value and/or a maximum water usage value. The recommended water usage value may be based on national and/or local authority recommendations or guidelines, for example, 35 litres per showering process.

[0040] In use, the water usage indication displayed by the water usage display element 26, 50 can be based on the recommended water usage value. For example, if a graduated display is utilised, then the graduations may change colour as the recommended water usage value is approached. Alternatively, if a numerical display is utilised, a running tally of saved water volume could also be displayed based on the recommended water usage value, thereby encouraging a user to continue their water conserving habits.

[0041] If the maximum water usage value were utilised, then the shower controller 14 may be programmed to halt or reduce the flow of water to the shower head 22 once the maximum water usage value was reached. This may be beneficial in recreational areas, gyms, schools and other public and/or private locations with showering facilities. This would also be of benefit in a care environment where an invalid, infirm or elderly person may need longer to shower but may accidentally leave a shower running and/or may still want to feel that they too are able to conserve water.

[0042] If a pump device 42 is provided, then the local water usage display element 50 may be provided on a visible part of the pump device 42, such as part of a pump housing which may project from or be mounted on, for example, a wall of the shower area 28 or be provided in the drain opening 32 of the shower base 24.

[0043] Although the water flow rate detector 18 is provided upstream of the shower controller 14 or as part of the shower controller 14, it may be provided downstream of the shower controller 14 but prior to the shower head 22. Furthermore, the water flow rate detector 18 may be provided in the waste shower water outlet element 30 or downstream thereof.

[0044] The water usage display element 26, 50 provides an indication of the volume of water used during a showering process. However, it may also display the energy consumption, for example, if a heater 16 is utilised. The energy consumption may be compared to a base level amount and/or a previous usage amount so that a user can compare their current usage with the aim of achieving savings.

[0045] It is thus possible to provide shower water usage apparatus which makes use of an existing water flow rate detector which is provided as part of the shower installation for a different purpose, such as optimising a heater and/or a pump device. By modifying the control circuitry of the existing shower installation and providing a water usage display element locally and/or remotely, a water usage indication, typically being a real-time volume of water used during the showering process, can be displayed. It is thus also possible for a user to monitor their current water consumption in real-time during a showering process, thereby encouraging the user to economise. It is also possible for a user to monitor their water consumption during a showering process based on recommended and/or maximum usage volumes, and the shower can be automatically controlled accordingly.

[0046] The embodiments described above are provided by way of examples only, and various other modifications will be apparent to persons skilled in the art without departing from the scope of the invention as defined by the appended claims.

1. Shower water usage indicator apparatus comprising a shower head, a shower base which receives shower water discharged from the shower head, a waste shower water outlet element which receives runoff waste shower water from the shower base and which discharges to a drain, a controller which controls water flow to the shower head and/or water flow from the waste shower water outlet element, a water flow rate detector which outputs a flow rate signal to the controller based on a detected water flow rate, and a water usage display element which is spaced from the water flow rate detector, a water usage indication being displayable on the water usage display element based on an output of the water flow rate detector and a data storage element which stores usage data when showering, a representation of usage history based on the stored usage data being displayable on the water usage display element.

2. Shower water usage indicator apparatus as claimed in claim 1, further comprising an interrogation device by which the data storage element is interrogatable.

3. Shower water usage indicator apparatus as claimed in claim 1, wherein the water usage display element is part of the interrogation device.

4. Shower water usage indicator apparatus as claimed in claim 1, wherein the data storage element is part of at least one of the controller and the water usage display element.

5. Shower water usage indicator apparatus as claimed in claim 1, wherein the controller includes a shower water heater which is controllable based at least in part on the flow rate signal outputted by the water flow rate detector.

6. Shower water usage indicator apparatus as claimed in claim 5, wherein the shower water heater is connectable to the or a further data storage element which stores energy consumption data when showering, a representation of usage history based on the stored energy consumption data being displayable on the water usage display element.

7. Shower water usage indicator apparatus as claimed in claim 1, further comprising a waste shower water pump device which moves waste shower water from the waste shower water outlet element to a drain, the pump device being controllable by the or a controller based at least in part on the flow rate signal from the water flow rate detector.

8. Shower water usage indicator apparatus as claimed in claim 7, wherein the pump device includes the or a yet further data storage element which stores usage data when showering, a representation of usage history based on the stored usage data being displayable on the water usage display element.

9. Shower water usage indicator apparatus as claimed in claim 1, wherein the water usage display element includes a wireless receiver which wirelessly receives a water usage signal based on the output of the water flow rate detector.

10. Shower water usage indicator apparatus as claimed in claim 1, wherein the data storage element stores recommended water usage data.

11. Shower water usage indicator apparatus as claimed in claim 10, wherein the water usage indication displayable by the water usage display element includes the recommended water usage data.

12. Shower water usage indicator apparatus as claimed in claim 10, wherein water flow to the shower head is controllable by the controller, and the controller can halt and/or limit water flow to the shower head based on the flow rate signal from the water flow rate detector and the recommended water usage data.

13. A method of conserving water during showering, the method comprising the steps of: a) providing a shower installation having an integrated water flow rate detector which outputs a flow rate signal to a controller which controls water flow to a shower head and/or water flow from a waste shower water outlet element on a shower base with a water usage display element which is spaced from the water flow rate detector, and a data storage element; b) storing in the data storage element an amount of water consumed when the shower is used and displayed on the water usage display element; and c) displaying on the water usage display element the said amount of water consumed in comparison with historical usage each time the shower is used.

14. A method as claimed in claim **13**, further comprising a step d), subsequent to step b), of interrogating the data storage element to retrieve usage data.

15. A method as claimed in claim **14**, further comprising a step e) of automatically controlling the water flow to the shower head (**22**) based on the usage data.

16. A method as claimed in claim **13**, wherein, in step b), an amount of energy consumed by a water heater of the shower installation when the shower is used is stored by the or a further data storage element.

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