

WATER OUTLETS FOR AN ABLUTIONARY DEVICE OR APPLIANCE

This invention concerns water outlets such as shower heads and water spouts for ablutionary devices or 5 appliances.

It is known to adapt outlets to help water to drain from the outlets when a flow of water is no longer being supplied to the outlets to minimise the risk of the 10 outlets being damaged by frost, and it is commonplace for some water to drain out of outlets when the supply flow thereto ceases.

However conventional outlets usually remain 15 internally moist when not in use, and it is known for bacteria to multiply therein causing problems. For example, some such bacteria are pathogens, e.g. legionella, and others can form muscus-like films and multiply to an extent sufficient to block or restraint the 20 fine spray holes in outlets such as shower heads.

In order to reduce such problems, in accordance with the present invention there is provided an outlet of the aforementioned kind is characterised in that it is 25 provided with at least one vent to admit air into a body of the outlet and a member movable between an in-use position in which it at least partially closes the vent and a not in-use position in which the vent is open so that air can circulate within the body to remove moisture.

For those outlets which are in the form of shower heads having a perforate shower plate situated in a discharge opening in the body, the shower plate may be movable to serve as said member and the discharge opening
5 may serve as said vent, the shower plate being movable between the in-use position in which it occupies the discharge opening to close the vent (except for the perforations in the plate itself) and the out of use position in which it is clear of the discharge opening so
10 that air can flow freely into the body and around the plate. The plate is preferably accessible or exposed for disinfecting or cleaning on both sides in the not in-use position.

15 For these outlets which are in the form of spouts, e.g. on tap fittings for sinks, baths and bidets, the vent is preferably provided in the body remote from the water discharge opening and the member preferably moves so that in the not in-use position air can pass freely through the
20 body from the vent to the discharge opening or vice versa.

The vent preferably provides access into the outlet for injection of disinfectant or cleaning solutions.

25 The member is preferably movable by an actuator. The actuator is preferably responsive to water pressure to move the member from the not in-use position to the in-use position, and is also preferably biased to move the member

in the reverse direction. However, the actuator may be manually, electrically or thermally actuated.

The actuator or a further actuator preferably
5 controls a valve which controls a purging flow passage in the body. A drain conduit or duct may be attached to or disposed adjacent to the body to receive purging water from said flow passage.

10 The actuator or further actuator may incorporate means to provide hysteresis in moving the valve from a closed condition to allow a purging flow of water through the outlet and via the flow passage to drain conduit or duct. The actuator may incorporate means to provide
15 hysteresis also in moving the member from the not in-use to the in-use position, especially in shower head versions of the outlet, and means to inhibit discharge of water as a fine spray until the outlet has been purged.

20 The actuator may also move a valve to close a passage between an inlet to the body and the, or a, discharge opening when the outlet is moved to the not in-use condition.

25 The invention will be described further, by way of example with reference to the accompanying diagrammatic drawings, wherein:-

FIGURE 1 shows the schematic arrangement of an ablutionary appliance in the form of a shower with hot and cold water supply ductwork feeding an outlet in the form of a shower head of the invention via a manually settable supply valve;

FIGURES 2 and 3 are cross-sectional diagrams showing the shower head in "not in use" and "in use" conditions respectively;

FIGURE 4 is a more detailed cross-sectional diagram of a modified form of the shower head shown in FIGURE 2;

FIGURES 5 to 10 are simplified sectional diagrams showing six further embodiments of outlet of the invention.

In all embodiments the outlet 10 comprises a hollow body 11, a member 12 (various forms of which are referenced hereinafter by suffix letters A,B,C, et seq) which is movable by an actuator 13 to open and close a vent 14 for admitting air into the body.

In the first embodiment shown in FIGURES 1 to 3 the outlet 10 is in the form of a shower head 10A for use in a shower installation 15 which includes a usual tray 16, supply hot pipe 17, supply cold pipe 18, a thermostatic or manually settable supply valve 19, and optionally a drain duct 20 leading from the head 10A to a usual waste water drain pipe 21.

In the head 10A the member 12 is in the form of a

perforate shower plate 12A and the body has a discharge opening 26 which the plate 12A substantially closes (FIGURE 3) when the shower is in operation so that water only issues through the perforations as a spray 22.

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When the supply of water is turned off, the actuator 13, comprising a bias spring 24 which acts on a thrust rod 25, moves the plate 12A out of the opening to the not in-use position (FIGURE 2) so that air can flow easily 10 through the annular vent 14A between the periphery of the plate and the body 11 to dry out the back of the plate and the interior of the body.

The actuator 13 further includes a diaphragm 27 15 movable by water pressure against a bias provided by a spring 28 to raise the rod 25 against the spring 24 to ram the plate 12A back into the opening 26 to close the vent 14A.

20 In this embodiment the actuator also actuates a valve 29 carried by the rod 25 between a purging condition (FIGURE 2) in which water entering an inlet 30 to the body can exit via a passage 31 to the duct 20, and a showering condition in which the flow to the passage 31 is shut off 25 and a further passage 32 to the opening 26 is open. The period in which the purging condition exists can be adjusted by means of a throttle screw 33 to vary the flow rate of the water flowing to one side of the diaphragm 27

whereby to provide a delay or actuation hysteresis in the response of the actuator to the onset of water being supplied to the outlet.

5 The mechanism for providing hysteresis is more clearly shown in FIGURE 4, and comprises in detail a metering passage 34 variably restrictable by the screw 33, a larger bore 35 in parallel between the inlet 30 and the diaphragm pressure chamber 36, a bleed passage 37 running
10 from the chamber 36 to the passage 31, and a short piston 38 slidable in the bore 35 and movable by the diaphragm 27 which is partially supported by a cup assembly 39 on which the piston 38 is mounted and which is abutted by the spring 28. When water starts to flow into the body 11
15 some flows through the passage 34 into the chamber and a proportion will flow out through the bleed passage 37 so that there is an initial period in which the chamber 36 is being pressurised and the cup assembly 39 is being lifted relatively slowly. During the initial period there will
20 be a purging flow of water through the body to the duct 20. When the assembly 39 has risen far enough to lift the piston 38 from the bore 35, the bore will admit a sudden inrush of water into the chamber to slam the cup assembly upwards to strike a collar 40 on the rod 25 and to move
25 the rod, plate and valve 29 upwards suddenly to terminate the purging flow and initiate the spray discharge.

There are a multiplicity of other ways of opening

and closing the vent 14 some of which are schematically outlined in FIGURES 5 to 10.

In the embodiment shown in FIGURE 5 the shower plate 12B is mounted on a pivot rod 50 and the actuator 23B comprising a piston 52 in a chamber 54, and is directly connected to the rod 25 which is connected by a further pivot 51 (offset from the axis of the rod 50) on the plate 12B to swing the plate about said axis so as to open and close a pair of vents 14B. The piston 52 may also carry a valve member 55 (shown in broken lines) which closes off the inlet passage in the not in-use condition, and which when initially partially lifted by the initial supply of water, restricts the flow to the opening 26 so that it dribbles or flows non-forcibly through the vents and, as the plate rotates to close the vents, through the perforations in the plate so as not to produce fine droplets which can be inhaled. This non-spray producing initial flow can thus serve to purge the outlet, before spraying commences. A restrictive air flow passage 53 may lead to the chamber 54 to damp the motion of the piston 52.

In the embodiment shown in FIGURE 6, the operation of the actuator 23C is reversed so that the shower plate 12C is drawn into the body 11 instead of being extended from or rotated relative to the body 11.

Whilst it is convenient to use the shower plate as the member 12 it is not essential to do so, and other forms of member 12 may be used for shower heads, and should be used for other forms of outlet 10. For example, 5 the vents 14D may be provided in the body 11 separate from the discharge opening 26D shown in broken lines in FIGURE 7, and the member 12 and actuator 13 are combined to be in the form of a piston 70 having a skirt 71 with ports 72 therein which register with said vents 14D in the not in- 10 use condition. The speed with which the piston 70 is moved forwards (arrow A) against the bias of a spring 73 depends upon water pressure and the sizes of further ports 74 in the piston crown, and, optionally, the resistance provided by an adjustable pneumatic damper 75 indicated in 15 broken lines in FIGURE 7. In this embodiment, the outlet 10 instead of being occupied by a spray member 76 may be in the form of an opening 26D at the end of a spout or nozzle 77.

20 A trough 78 may be provided to collect purge water flowing whilst the piston is moving forwards to close the vents.

The embodiment shown in FIGURE 8 is closer to that 25 shown in FIGURE 1 than that shown in FIGURE 7, and primarily includes a piston form of the actuator 13 to move a shower plate and front body member 80 forwards to open an annular vent gap 14E between said member 80 and

the body part 11E when the supply of water ceases. The vent gap 14E may be disposed over the purge drain trough 78.

5 In the embodiment shown in FIGURE 9, the member 12 and actuator 13 are again combined in the form of a piston 90 which is movable by water pressure against the bias of a spring 91 to move to cover vents 14F provided in the body 11E.

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The body may have a spout 77 and outlet 26E (shown in broken lines in FIGURE 9) attached thereto instead of being provided with, or incorporating an integral, spray plate 76.

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The invention is not confined to details of the foregoing examples, and many variations are possible within the scope of the invention. For example the outlet of the invention may include any functional combination of 20 features from one embodiment with features taken from another embodiment or embodiments or features known from other outlets.

Although it is preferred to use the pressure or 25 absence of water under pressure to provide energy for operation of the outlet to and from its in-use condition from and to its vented not in-use condition, the outlet can be modified so that said energy can be provided

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manually via a manually movable lever, rod or cam; or electrically by means of a solenoid; or thermally via a thermally responsive, e.g. bimetallic, device which deflects when heated to move that member 12 which closes the vent 14. Such a thermally responsive actuator will also provide hysteresis to permit purging of the outlet as the actuator heats up.

The invention further includes and provides an outlet having any novel, or novel combination of, parts, functional features or arrangement of parts disclosed herein or in the accompanying drawings.

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CLAIMS

1. A water outlet (10) for an ablutionary device characterised in that the outlet (10) is provided with at least one vent (14A) to admit air into a body (11) of the outlet (10) and a member (12) movable between an in-use position in which it at least partially closes the vent (14A) and a not in-use position in which the vent (14A) is open so that air can circulate within the body (11) to remove moisture.
2. A water outlet (10) according to Claim 1 which is in the form of shower head (10A) having a perforate shower plate (12A) situated in a discharge opening (26) in the body (11), the shower plate (12A) being movable to serve as said member and the discharge opening (26) serving as said vent (14A); the shower plate (12A) being movable between the in-use position in which it occupies the discharge opening (26) to close the vent (except for the perforations in the plate itself) and the out of use position in which it is clear of the discharge opening (26) so that air can flow freely into the body and around the plate.
3. A water outlet (10) according to Claim 2 in which the plate (12A) is accessible or exposed for disinfecting or cleaning on both sides in the not in-use position.

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4. A water outlet (10) according to Claim 1 in which the outlet (26E) is in the form of a spout (77) in which the vent is provided in the body (11E) remote from the water discharge opening (26E) and the member (12) moves so
5 that in the not in-use position air can pass freely through the body (11E) from the vent (14F) to the discharge opening or vice versa.

5. A water outlet (10) according to a Claim 4 in which
10 the vent (14F) provides access into the outlet (10) for injection of disinfectant or cleaning solutions.

6. A water outlet (10) according to any preceding claim in which the member is movable by an actuator (13).

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7. A water outlet (10) according to claim 6 in which the actuator (13) is responsive to water pressure to move the member (12) from the not in-use position to the in-use position.

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8. A water outlet according to Claim 6 or Claim 7 in which the actuator (13) is biased to move the member (12) in the reverse direction.

25 9. A water outlet according to any of Claims 6 to 8 in which the or a further actuator (13) controls a valve (29) which controls a purging flow passage (31) in the body.

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10. A water outlet (10) according to Claim 9 in which a drain conduit or duct (20) is attached to or disposed adjacent to the body to receive purging water from said flow passage (31).

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11. A water outlet (10) according to Claim 9 in which the actuator (13) incorporates means to provide hysteresis in moving the valve (29) from a closed condition to allow a purging flow of water through the outlet (10) and via 10 the flow passage (31) to drain conduit or duct (20).

12. A water outlet (10) according to any preceding claim in which the actuator (13) incorporates means to provide hysteresis also in moving the member from the not in-use 15 to the in-use position and means to inhibit discharge of water as a fine spray until the outlet (10) has been purged.

13. A water outlet (10) according to any of Claims 6 to 20 12 in which the actuator (13) moves a valve (29) to close a passage between an inlet to the body and the, or a, discharge opening (26) when the outlet (19) is moved to the not in-use condition.

25 14. A water outlet substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.



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