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Dispenser And Method And Valve

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This invention relates to an apparatus for dispensing and a method for dispensing flowable materials particularly, but not exclusively, into sanitation systems in bathrooms, toilets and the like. The invention further relates to a valve mechanism for use in a flowable material dispensing apparatus.

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As water flows through a sanitation system, it is desirable to add to the water an amount of material, such as disinfectants, detergents, deodorants, cleaning agents or the like.

In the prior art, an amount of water from the sanitation system is diverted into a container which contains the sanitation material. The mater mixes with the sanitation material and a portion of the diluted sanitation material returns to the main sanitation system.

In other known apparatus, such as in International Application No. PCT/GB82/00341 (Lotti), a quantity of sanitation material is dispensed into the water. The water does not enter the reservoir of sanitation material. The problem with this earlier art is that the apparatus required to dispense the sanitation material into the water is complex in shape.

It is an object of the present invention to provide dispensing apparatus and a method of dispensing sanitation material which is cheaper and/or easier to construct than the known apparatus.

SUMMARY OF INVENTION

In accordance with a first aspect, the present invention provides a flowable material dispensing device for use with a sanitation system, said dispensing device comprising a container for holding the flowable material and having at least one restricted flow outlet opening, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downwardly direction when the flowable material at the or each said restricted flow outlet opening is not in communication with an air flow condition

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and/or liquid of said sanitation system and allowing flow of the flowable material downwardly through the or each said restricted flow outlet opening when the flowable material at the or each said restricted flow outlet opening is in communication with the air flow condition and/or liquid of said sanitation system. Conveniently, the device may include mounting means whereby said container can be mounted in said sanitation system with the or each said restricted flow outlet opening being directed in a downwardly direction in a position to receive the air flow condition and/or said liquid of the sanitation system upwardly against the or each said restricted flow outlet opening.

10 According to a further aspect, the present invention also provides a flowable material dispensing apparatus for dispensing flowable material into a liquid of a sanitation system, said apparatus comprising

a first container adapted to hold a quantity of liquid and having inlet means to receive a flow of said liquid to said first container and outlet means to permit flow of said liquid out of said first container, a second container located within said first container, said second container being adapted to hold a quantity of said flowable material and having at least one restricted flow outlet opening facing in a downward direction, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downward direction when the flowable material at the or each said restricted flow outlet opening is not in contact with the liquid and/or exposed to an air flow condition in said first container and allowing flow of the flowable material downwardly through the or each said restricted flow outlet opening when the flowable material at the or each said restricted flow opening is in communication with the liquid and/or exposed to the air flow condition in said first container.

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In accordance with a still further aspect, the present invention also provides a flowable material dispensing apparatus for dispensing material into a liquid of a sanitation system, said apparatus comprising a first container adapted to hold a quantity of liquid and having inlet means to receive a flow of said liquid to said first container and outlet means to permit flow of said liquid out of said first container, a second container located within said first container, said second container being adapted to hold a quantity of said flowable material and having at least one restricted flow outlet opening facing in a downward direction, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downward direction when the flowable material is in an equilibrium state, and air and/or liquid flow generation means to provide a flow condition at

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the or each said restricted flow outlet opening whereby a localised area of low pressure is formed to assist flow of the flowable material through the or each said restricted flow outlet opening.

5 According to another aspect, the present invention provides a method of dispensing a quantity of flowable material from a container into a sanitation system, said method comprising the steps of:

 placing flowable material in a container which is provided with at least one generally downwardly directed opening for said flowable material to exit from said container such that,
10 in an equilibrium state, said material in said container remains substantially within said container; and

 creating a current of air and/or liquid adjacent the or each said opening such that a quantity of the flowable material is extracted from said container through the or each said opening in response to said current, such that said quantity of material is able to be conveyed
15 by said liquid to said sanitation system.

 In a further aspect, the present invention provides a flowable material dispensing apparatus for dispensing flowable material into a sanitation system, said apparatus comprising:

 a first container having inlet means to receive a flow of air and/or liquid from the
20 sanitation system,

 outlet means to permit flow of the air and/or liquid out of the first container,

 a second container within the first container, the second container being adapted to hold a quantity of said flowable material and having at least one restricted flow outlet opening, wherein

25 the at least one restricted flow outlet opening permits flow of the flowable material in response to an air and/or liquid flow condition adjacent the at least one restricted flow outlet, and

 the at least one restricted flow outlet opening preventing flow of the flowable material in the absence of a flow condition adjacent the at least one restricted outlet opening.

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 Preferably, the air and/or liquid flow generation means includes a flow passage providing fluid communication between the sanitation system and the inlet means,

 at least one slideable element retained within the flow passage capable of substantially blocking fluid communication along the flow passage and capable of sliding

35 freely along the flow passage,



where in use, air and/or liquid from the sanitation system drives the slideable element along the flow passage such that a body of air and/or liquid is forced through the inlet means to create an air and/or liquid flow condition adjacent the at least one restricted flow outlet opening.

5 Conveniently, as the air and/or liquid drains back into the sanitation system, the at least one slideable element is drawn along the flow passage toward the sanitation system creating a low pressure region between the at least one slideable element and the outlet means to urge flowable material from the first container into the flow passage.

10 Preferably, the at least one slideable element is a plastic sphere.

A still further aspect of the present invention provides a valve adapted for use in a sanitation material dispensing apparatus which is connectable to a sanitation system, said valve being provided with an internal duct therethrough, a cross-section of said duct being
15 alterable by an aperture-varying mechanism, wherein adjustment of said mechanism controls the amount of liquid that enters said dispensing apparatus through said valve.

According to yet another aspect of the invention, there is provided a flowable material dispensing device for use with a sanitation system, said dispensing device
20 comprising

a container for holding the flowable material and having at least one restricted flow outlet opening, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downwardly direction when the flowable material at the or each said restricted flow outlet opening is not in communication with liquid of said sanitation
25 system and allowing flow of the flowable material downwardly through the or each said restricted flow outlet opening when the flowable material at the or each said restricted flow outlet opening is in communication with the liquid of said sanitation system.

The flowable material dispensing device may further include mounting means
30 whereby said container can be mounted in said sanitation system with the or each said restricted flow outlet opening being directed in a downwardly direction in a position to receive flow of said liquid of the sanitation system upwardly against the or each said restricted flow outlet opening.



According to yet another aspect of the invention, there is provided a flowable material dispensing apparatus for dispensing flowable material into a liquid of a sanitation system, said apparatus comprising

5 a first container adapted to hold a quantity of liquid and having inlet means to receive a flow of said liquid to said first container and outlet means to permit flow of said liquid out of said first container, a second container located within said first container, said second container being adapted to hold a quantity of said flowable material and having at least one restricted flow outlet opening facing in a downward direction, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downward
10 direction when the flowable material at the or each said restricted flow outlet opening is not in contact with the liquid in said first container and allowing flow of the flowable material downwardly through the or each said restricted flow outlet opening when the flowable material at the or each said restricted flow opening is in communication with the liquid in said first container.

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Further preferred features of the invention will be apparent from the claims annexed hereto and the subject matter of these claims are hereby imported into this specification.

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DRAWINGS

In order that the invention might be more fully understood, embodiments of the invention will be described, by way of example only, with reference to the accompanying drawings, in which:

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Figure 1 is a cross-sectional diagram of a sanitation liquid dispensing apparatus constructed according to an embodiment of the invention, shown with the apparatus positioned above the waterline A-A of a sanitation system;

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Figure 2 illustrates an embodiment of the invention positioned partially below the waterline A-A of the sanitation system;

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Figure 3 is a cross-sectional diagram of a sanitation liquid dispensing apparatus constructed according to another embodiment of the invention. (For the sake of clarity, the drawings of the containers shown in Figures 1, 3, 3A and 3B are similar and use the same

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reference number for similar features, however, this does not imply that the embodiments are identical);

Figures 3A and 3B illustrate another embodiment of the invention. Figure 3A shows the apparatus configuration as air and/or liquid is diverted in from the sanitation system, and Figure 3B shows the configuration as the air and/or liquid drains away from the apparatus.

Figure 4 is a schematic diagram which shows various components of the sanitation liquid dispensing apparatus of Figure 3;

Figure 5 illustrates an example of a sanitation system to which embodiments of the invention such as the apparatus of Figure 3, may be attachable; and

Figure 6 illustrates a yet further embodiment used in sanitation systems that include a reservoir or holding tank.

EMBODIMENTS

Referring to the drawings, Figure 1 illustrates a dispensing device for use with a sanitation system, the device comprising a container 5. The lower portion of the drawing shows a partial cross-sectional view.

The container 5 is used in a sanitation system which, in the present preferred embodiment, is a toilet flushing system. In the present embodiment, the container is placed in direct fluid communication with the main duct from the cistern to the toilet. The container 5 may be filled with a flowable material which may be disinfectant, detergent, deodorant or other materials used for sanitation systems. The flowable material within the container 5 would usually be a liquid, but other flowable materials such as gels may also be used. When the sanitation system is in use, the water within the cistern flushes to a toilet. A portion of the water is diverted to the opening of the container where it is believed to break the film of surface tension covering the opening. A small amount of sanitising material then discharges into the diverted water because of the hydrostatic pressure of the flowable material within the container. Turbulence and diffusion assist in mixing the sanitising material with the diverted water which then drains back into the main duct from the cistern and into the toilet where it



acts to clean, disinfect and/or deodorise, depending on the characteristics of the flowable material.

5 Once the diverted water and sanitising material have drained away from the opening, the surface tension film soon reforms to substantially prevent any further discharge of sanitising material until next the sanitation system is in use.

10 The container 5 has preferably been provided with a downwardly directed opening 510 preferably located at its lowest point as this is the point of greatest hydrostatic pressure within the container 5. Therefore, the discharge of flowable material will be greatest at this point. During installation of the container 5, there is an initial flow of liquid through the opening 510. Some air may also remain in the container 5. After a short period of time, an equilibrium state is reached where the flow of liquid ceases. This cessation of flow is a result of surface tension across the opening 510.

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Breaking the surface tension may be effected by bringing a fluid into contact with the opening 510. The fluid may be a stationary liquid, or air and/or liquid in steady state or turbulent flow.

20 With regard to the preferred embodiment shown in Figure 2, the container 5 is placed within a cistern (not shown) such that the opening 510 is below the surface of the water A-A of the cistern. The contact of the water with the opening 510 breaks the film of surface tension and sanitising material flows into the cistern because of the hydrostatic pressure at the opening 510. Flow of material from the container reduces the pressure within the
25 container until the pressure at the opening 510 of the container 5 equalises with the pressure that the water in the cistern exerts on the opening 510. At this stage, the flow of material from the container ceases except for negligible quantities that escape by diffusion.

30 When the sanitation system is next used, the water in the cistern, which has now mixed with a small quantity of the sanitising material, flushes into the toilet to clean, disinfect and/or deodorise. Meanwhile, the opening 510 of the container 5 has become exposed and a small quantity of air is drawn into the container 5 to bring the pressure in the air at the top of the container to atmospheric pressure. A film of surface tension then forms across the opening to prevent further drainage of sanitising material from the container 5
35 until the cistern re-fills and water again contacts the opening 510. At this point another

quantity of material is dispensed into the cistern until the pressure reduction in the container 5 again stems the flow. The process then repeats with each subsequent use of the sanitation system.

5 The quantity of sanitation material dispensed by the apparatus may be determined by the physical dimensions of the opening 510, for example, the length of the outlet passage 520,530 and/or cross-sectional area of the opening 510. Thus, the amount dispensed from the container may be controlled or altered with the use of different outlet openings.

10 Alternatively, the dispenser may be provided with means for altering the physical dimensions of the opening 510. In the present embodiment, this alteration means may be in the form of an opening 510 formed as a passage 520,530 within a cap 51. The cap 51 includes two nested cap portions 52, 53. The cap portions 52, 53 may be used singly or in combination, such that the length of the passage may be adjusted. In other embodiments, cap
15 portions may be provided with different diameters (not shown), so that the desired diameter may be obtained by selecting the appropriate cap portion. The length and diameter of the opening 510 of the container 5 will influence the flow rate of the liquid or material through the opening. Therefore, the dimensions of the opening may be altered to control the amount of sanitation material that exits the container. The means for altering said physical
20 dimensions of the opening 510 is not limited to the above examples. Any number of embodiments may be proposed to achieve the function of altering the dimensions and constricting the opening of the opening. For example, in a different embodiment, an opening in the form of a hole (not shown) may be provided, the diameter of which may be enlarged by forcing an awl through the hole.

25 More than one opening may be used, provided that the combined effect of the plurality of openings still ensures that the sanitation material remains substantially in the container once an equilibrium state is reached when the sanitation system is not in use. The provision of a plurality of openings is to allow a greater throughput of sanitation material
30 from the container.

 An advantage of the present embodiment is that a simple dispensing container may be placed in a sanitation system. Quantities of sanitation material may be dispensed simply through contact with the liquid that flows through the sanitation system. Conceivably, such



an apparatus may conveniently be positioned in a range of points in the sanitation system where contact with liquid is possible.

Another preferred embodiment of the invention is illustrated in Figures 3 and 4. In the description of this further embodiment, the drawings of the containers in Figures 1 and 3 are similar and use the same reference numbers for similar features for the sake of clarity. This does not imply that the two embodiments are identical.

Referring to Figure 3, a container 5 is housed in a cabinet 40,41. The container 5 is used to contain flowable sanitation material. The container 5 is also provided with a downwardly directed opening 510. The same principle of extracting sanitation material from the container using a pressure differential effect, described in the above embodiments of Figures 1 and 2, is also used in this further embodiment of Figure 3.

In the preferred embodiment of Figure 3, fluid from the sanitation system is diverted through the flow passage B to flow immediately adjacent the opening 510 of the container 5. The flow passage of the embodiment is described as follows : fluid enters the cabinet 40,41 through a pipe 2. The pipe 2 is connected to the cabinet 40,41 by an adjustable control valve 3 in the form of an angled screw valve. Fluid from the pipe 2 enters the cabinet in a space 500 which is adjacent the opening 510. The angled screw valve 3 is fitted through a hole 400 in the base of the cabinet 40, and is fastened by a hexagonal nut 42. Although the pipe 2 is connected to the cabinet 40,41 adjacent the opening 520, it is not a requirement of the invention that the fluid enter the cabinet directly under the opening 510. It is sufficient if the fluid contacts the opening 510. However, the fluid should not generally flow into the container 5 directly, since this would lead to a progressive dilution of the sanitation material in the container 5.

It is believed that when the sanitation system is in use, fluid is diverted through the pipe 2 into the space 500 and breaks the film of surface tension across the opening 510 to initiate the flow of sanitising material from the container 5. Fluid and dispensed sanitising material mix and collect in the base of the cabinet 40,41. Once the inflow of fluid from the sanitation system has ceased, the mixture of fluid and sanitising material drain from the cabinet 40,41 to the toilet. This leaves the opening 510 again exposed to air such that the film of surface tension may re-form to stop the flow of sanitary material from the container 5 until the sanitation system is next used.

The fluid from the sanitation system is generally a turbulent mix of air and/or liquid. If the main pipe 610 pressure is high, the diverted fluid may enter the cabinet 40,41 with such force that liquid spills from the dispenser. This may be prevented with the adjustable control valve 3 whereby the flow passage is constricted to further stem the flow into the cabinet 40,41. However, this may also unduly constrict the flow of the sanitising material from the cabinet. In light of this the embodiment shown in Figures 3A and 3B has positioned one or more slideable elements such as a plastic sphere 501, in the flow passage B. The sphere 501 fits within the passage B such that the passage is substantially blocked while enough clearance is left to allow the sphere 501 to slide freely.

When the sanitation system is flushed, diverted fluid from the main pipe 610 flows rapidly along passage B pushing the sphere 501 before it. This in turn creates a piston of air which is forced along passage B and up into the cabinet 40,41. This creates a flow condition at the opening 510 of the container 5 which serves to break the surface tension film and initiate the flow of sanitary material. The flow condition may be solely air, or air and a small amount of liquid, as most, if not all of the liquid from the sanitation system is prevented from flowing to the cabinet 40,41 when the sphere lodges at the end of passage B as shown in Figure 3A. Consequently, spillage of liquid from the cabinet 40,41 is avoided.

Furthermore, as the fluid drains back into the sanitary system, the sphere 501 will tend to be drawn along with it as shown in Figure 3B. This creates a region of low pressure between the sphere 501 and the cabinet 40,41 which assists the discharge of the sanitary material through the adjustable control valve 3 into the passage B where it mixes with the liquid as it drains into the sanitary system.

Figure 5 illustrates an example of a sanitation system, in the form of a urinal 600, to which embodiments of the present invention may be connected. Water from the mains pipe 610 flows into the urinal during a flushing process. A portion of the water from the mains pipe is diverted along pipe 2 in the direction B. The flow of water in direction B is illustrated in Figure 3 to show the interrelationship of the components. The urinal in Figure 5 has been provided as an illustration only. It is clear that embodiments of the invention may also be connectable to other types of sanitation systems such as wash basins, toilet bowls and the like.

In another illustration of this further embodiment, Figure 4 is a perspective exposed diagram which illustrates the various components shown in Figure 3. As best seen in Figure 4, the container 5 is housed inside a two piece cabinet 40,41 comprising a base 40 and a slideable cover 41. The container 5 is removably positioned within base 40, and cover 41 slides onto the base 40 to enclose the container therein. The rear backing plate of the base 40 is provided with holes 45 to allow the cabinet to be mounted, for example, on a wall. In this embodiment, there is no airtight seal, and the interior of the cabinet 40,41 may be open to atmospheric air pressure.

Since the interior of the cabinet 40,41 is provided with vents in the form of ventilation holes 45 and is open to the atmosphere, the scent of the sanitation material within the cabinet is able to diffuse into the atmosphere to provide a pleasant air freshening effect.

The final proportion of sanitation material in the water that eventually leaves the dispensing apparatus to flush the sanitation system is believed to depend on two factors, namely, the amount of water or fluid entering the dispensing apparatus through the pipe 2 and on the quantity of sanitation material that is dispensed into this amount of water.

In the present embodiment, the amount of water or fluid entering the dispensing apparatus is preferably controlled by the valve 3 which has an aperture varying mechanism. The valve 3 consists of an internal duct through which water may flow. Water enters the pipe 2 and flows through the valve duct into the base of the cabinet 40. The internal duct of the valve 3 is internally screw threaded with a female thread. A hollow sleeve 31 is provided with a complementary male screw thread. The position of the sleeve 31 within the internal duct is adjustable by rotating the sleeve 31. The bottom 32 of the sleeve 31 may be raised or lowered to increase or decrease a cross-sectional area of an aperture 35 through which the water must flow. Effectively, the cross-section of the duct is alterable by the variable placement of the sleeve 31 within the duct. Construction of the valve 3 occurs by using the sleeve to close off, to varying degrees, a branch portion of the duct. In this embodiment, the branch portion is formed as a perpendicular junction within the valve 3, although the non-linear portion may also be curved.

The upper rim of the hollow sleeve is provided with an indentation or slot which enables the sleeve to be rotated by a screw driver. The size of the aperture 35 is varied by

altering the position of the bottom 310 of the sleeve 31. The size of the aperture 35 is selected to enable an appropriate amount of liquid to enter the base of the cabinet 40.

The screw-valve 3 is particularly advantageous when used in sanitation systems that have a definite flushing time. The screw valve would not be advantageous for systems where water is running continuously since the screw valve cannot cut the water flow at a predetermined amount. It relies, instead, on the premise that the flow of water is for a finite time, so that varying the aperture affects the amount of water that passes through the valve in the finite flushing period. As an example, the urinal of Figure 5 would have a flushing time of a few seconds. during this flushing period, a portion of water is diverted along the pipe 2 through the angled screw valve 3. Therefore, adjustment of the hollow sleeve 31 to vary the size of the aperture determines the amount of water that may enter the cabinet during the finite flushing time. The amount of water entering the cabinet determines the degree of dilution of the sanitation material that returns to the urinal.

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Experimentation may be required to achieve the right balance of variables, so as to produce the desired dilution of sanitation material in the water in the sanitation system. Some of these variables include: the amount of water entering the cabinet, the amount of sanitation material that is dispensed into the water, the physical dimensions of the opening 510 of the container 5, the viscosity of the sanitation material. Furthermore, the pressure differential at the opening of the container 5 that extracts the sanitation material may also be influenced by the amount of water that is allowed to enter the base 40 by the aperture varying mechanism.

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The aperture varying mechanism may use other mechanisms, other than screw threads, to vary the aperture 35. For example, an inner sleeve may be slideably positioned within the internal duct with a friction or press fit. Alternatively, the aperture varying mechanism may use an iris mechanism, similar to that found in apertures of photographic lenses. Hence, a number of alternative embodiments may be proposed to achieve the function of varying the aperture of the valve 3. Specifically, the aperture varying mechanism need not consist of a screw valve, but may include a number of alternative mechanisms that are able to vary the size of the aperture.

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It should be noted that embodiments of the valve having an aperture varying mechanism of the present invention may be used in other types of sanitation material

dispensing apparatus. For example, embodiments of the valve having an aperture varying mechanism may be used in the apparatus of International Application No. PCT/GB82/00341 (Lotti). (The content of this prior art document is not incorporated into the present specification.) The disadvantage of the float valve found in the Lotti patent application is that there is no unrestricted flow path for water to enter the chamber. The float valve acts as an obstacle to the flow path of the water, and turbulence in the chamber is thereby minimised. In the present embodiment, there is a clear flow channel for water to enter through the pipe 2 and through the valve 3. The clear flow channel increases the likelihood of turbulence in the cabinet. An amount of turbulence may assist in creating currents of fluid past the opening of the container 5 such that the extraction of the sanitary material is enhanced by the Venturi effect which acts to lower the static pressure of the moving fluid immediately outside the opening. Turbulence may also assist in mixing the sanitation material in the water. Furthermore, a float valve used in the prior art is only capable of allowing a predetermined amount of water to enter the chamber, whereas an aperture varying mechanism allows the amount of water entering the cabinet to be altered. It may be desirable to change the amount of water, depending perhaps on the concentration or type of the sanitation material in the container. More concentrated substances may require a greater amount of water to enter the cabinet to provide a greater degree of dilution.

A further embodiment of a dispensing apparatus is illustrated in Figure 6, which is similar to the embodiment of Figure 3. However, instead of the apparatus 4 being connected to a sanitation system at the mains pipe or other liquid flow channel, the present embodiment is adapted to be used in sanitation systems that include a reservoir or holding tank. The reservoir holds a quantity of liquid that is dispensed with each flush, and the liquid level of this reservoir is illustrated in Figure 6 as water level A-A.

The apparatus 4 is provided with a depending tube 2A. The tube 2A is able to dip into the liquid in the reservoir A-A. As the liquid level in the cistern or reservoir rises and falls with each flush and refill cycle, the liquid level in tube 2A rises in tandem. Since the liquid level in tube 2A can only rise as high as the liquid level in the cistern, the liquid level in the tube 2A never reaches as high as the valve 3. However, the rise and fall of liquid in tube 2A creates an air flow condition in valve 3. As the liquid level in the tube 2A falls during flushing of the reservoir, air from the cabinet 40,41 flows past the opening 510 of the container, and into the valve 3 and tube 2A to fill the void created by the receding liquid in

the tube. This air flow condition is sufficient to draw a small quantity of sanitising material from the container 5 in the manner described above.

5 In a further embodiment, it may be desired to provide an area of localised low pressure within the cabinet 40,41 adjacent the opening 510. This might be achieved by providing a current of liquid in this vicinity to achieve a Venturi type effect.

10 In the above embodiments, the components of the cabinet 40,41, the container 5 and the cap 51 may be made of plastics material, and the cap portion 52,53 are preferably made of resilient plastics material. The angled screw valve 3 may be made of injection moulded plastics material, and the hollow sleeve 31 may be made of metal. Importantly, the components of the present invention may be made of any material which serves to fulfil the function of each component.

15 The liquid that flows through the sanitation system is usually water, but the invention may be useable in sanitation systems that use other types of liquids. The invention in its broadest aspect is not limited to a particular type of liquid.

20 The embodiments have been advanced by way of example only, and modifications are possible within the spirit and scope of the appended claims.

CLAIMS :

1. A flowable material dispensing device for use with a sanitation system, said dispensing device comprising
 - 5 a container for holding the flowable material and having at least one restricted flow outlet opening, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downwardly direction when the flowable material at the or each said restricted flow outlet opening is not in communication with an air flow condition and/or liquid of said sanitation system and allowing flow of the flowable material
 - 10 downwardly through the or each said restricted flow outlet opening when the flowable material at the or each said restricted flow outlet opening is in communication with the air flow condition and/or liquid of said sanitation system.
2. A flowable material dispensing device according to claim 1, further including
 - 15 mounting means whereby said container can be mounted in said sanitation system with the or each said restricted flow outlet opening being directed in a downwardly direction in a position to receive said air flow condition and/or liquid of the sanitation system upwardly against the or each said restricted flow outlet opening.
- 20 3. A flowable material dispensing apparatus for dispensing flowable material into a liquid of a sanitation system, said apparatus comprising
 - a first container adapted to hold a quantity of liquid and having inlet means to receive a flow of said liquid to said first container and outlet means to permit flow of said liquid out of said first container, a second container located within said first container, said second
 - 25 container being adapted to hold a quantity of said flowable material and having at least one restricted flow outlet opening facing in a downward direction, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downward direction when the flowable material at the or each said restricted flow outlet opening is not in contact with the liquid and/or exposed to an air flow condition in said first container and allowing flow of the flowable material downwardly through the or each said restricted flow
 - 30 outlet opening when the flowable material at the or each said restricted flow opening is in communication with the liquid and/or exposed to the air flow condition in said first container.

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4. A flowable material dispensing apparatus for dispensing material into a liquid of a sanitation system, said apparatus comprising a first container adapted to hold a quantity of liquid and having inlet means to receive a flow of said liquid to said first container and outlet means to permit flow of said liquid out of said first container, a second container located
5 within said first container, said second container being adapted to hold a quantity of said flowable material and having at least one restricted flow outlet opening facing in a downward direction, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downward direction when the flowable material is in an equilibrium state, and air and/or liquid flow generation means to provide a flow condition at
10 the or each said restricted flow outlet opening whereby a localised area of low pressure is formed to assist flow of the flowable material through the or each said restricted flow outlet opening.

5. A flowable material dispensing apparatus according to claim 3 or claim 4, wherein
15 the first container is formed by a liquid holding receptacle of a sanitation flushing system and said liquid received into said liquid holding receptacle is used as flushing liquid.

6. A flowable material dispensing apparatus according to claim 3 or claim 4, wherein the first container and said second container form a sub assembly and said inlet means to said
20 first container is adapted for connection to a liquid flow path in a sanitation flushing system whereby liquid in said flow path can flow into said first container.

7. A flowable material dispensing apparatus according to any one of claims 3 to 6, wherein said inlet means is separate to said outlet means.
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8. A flowable material dispensing apparatus according to any one of claims 3 to 6, wherein said inlet means and said outlet means are formed by a common flow passage.

9. A flowable material dispensing apparatus according to claim 3, wherein air and/or
30 liquid current generation means is provided for creating an air and/or liquid current into said first container, said current generation means being formed by a flow passage to allow said air and/or liquid to flow immediately adjacent the or each said restricted flow opening.

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10. A flowable material dispensing apparatus according to claim 9, wherein the quantity of said flowable material extractable by said liquid current is determined in part by physical dimensions at the or each said restricted flow opening.
- 5 11. A flowable material dispensing apparatus according to claim 10, wherein said apparatus is provided with means for altering said physical dimensions of the or each said restricted flow opening.
12. A flowable material dispensing apparatus according to claim 3, wherein a localised
10 area low pressure is formed adjacent an external face of the or each said restricted flow opening whereby flow of said flowable material toward said localised low pressure area is assisted.
13. A flowable material dispensing apparatus according to claim 12, wherein said area of
15 localised low pressure is formed by a Venturi effect from flow of said air and/or liquid in said first container.
14. A flowable material dispensing apparatus according to any one of claims 3 to 13,
20 wherein the dispensing apparatus includes a valve controlling the amount of said air and/or liquid flowing into said first container.
15. A flowable material dispensing apparatus according to claim 14, wherein said valve
is provided with an internal duct therethrough, a cross-section of said internal duct being alterable by an aperture varying mechanism.
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16. A flowable material dispensing apparatus according to claim 15, wherein said duct comprises a first portion and a second portion angularly connected to the first portion and in fluid communication therewith, said aperture varying mechanism comprising a hollow sleeve within said first portion, said sleeve being selectively moveable such that fluid
30 communication between the first and second portions is varied.
17. A method of dispensing a quantity of flowable material from a container into a sanitation system, said method comprising the steps of :
placing flowable material in a container which is provided with at least one generally
35 downwardly directed opening for said flowable material to exit from said container such that,

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in an equilibrium state, said material in said container remains substantially within said container; and

creating a current of air and/or liquid adjacent the or each said opening such that a quantity of the flowable material is extracted from said container through the or each said opening in response to said current, such that said quantity of material is able to be conveyed by said liquid to said sanitation system.

18. A method according to claim 17, wherein said current creates an area of localised low pressure adjacent the or each said opening to assist flow of the flowable material therethrough.

19. A method according to claim 18, wherein said area of localised low pressure is formed by a Venturi effect.

20. A method according to any one of claims 17 to 19, wherein a flow passage is provided to create a current of said air and/or liquid to a position immediately adjacent the or each said opening.

21. A flowable material dispensing apparatus for dispensing flowable material into a sanitation system, said apparatus comprising :

a first container having inlet means to receive a flow of air and/or liquid from the sanitation system,

outlet means to permit flow of the air and/or liquid out of the first container,

a second container within the first container, the second container being adapted to hold a quantity of said flowable material and having at least one restricted flow outlet opening, wherein

the at least one restricted flow outlet opening permits flow of the flowable material in response to an air and/or liquid flow condition adjacent the at least one restricted flow outlet, and

the at least one restricted flow outlet opening preventing flow of the flowable material in the absence of a flow condition adjacent the at least one restricted outlet opening.

22. A flowable material dispensing apparatus according to Claim 21, wherein, the air and/or liquid flow generation means includes a flow passage providing fluid communication between the sanitation system and the inlet means,

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at least one slideable element retained within the flow passage capable of substantially blocking fluid communication along the flow passage and capable of sliding freely along the flow passage,

- 5 where in use, air and/or liquid from the sanitation system drives the slideable element along the flow passage such that a body of air and/or liquid is forced through the inlet means to create an air and/or liquid flow condition adjacent the at least one restricted flow outlet opening.

23. A flowable material dispensing apparatus according to claim 22, wherein, as the air
10 and/or liquid drains back into the sanitation system, the at least one slideable element is drawn along the flow passage toward the sanitation system creating a low pressure region between the at least one slideable element and the outlet means to urge flowable material from the first container into the flow passage.

- 15 24. A flowable material dispensing apparatus according to any one of claims 22 to 23, wherein the at least one slideable element is a plastic sphere.

25. A valve adapted for use in a sanitation material dispensing apparatus which is connectable to a sanitation system, said valve being provided with an internal duct
20 therethrough, a cross-section of said duct being alterable by an aperture-varying mechanism, wherein adjustment of said mechanism controls the amount of liquid that enters said dispensing apparatus through said valve.

26. A valve according to claim 25, wherein said aperture-varying mechanism comprises
25 a hollow sleeve insertable within said duct, said sleeve being variably adjustable with respect to a non-linear portion of said duct such that a flow area of said duct is varied by said sleeve.

27. A valve according to claim 26, wherein said sleeve is adjustably mountable within
said duct by a screw threaded arrangement.

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28. A flowable material dispensing device for use with a sanitation system, said dispensing device comprising

- a container for holding the flowable material and having at least one restricted flow outlet opening, the or each said restricted flow outlet opening being configured to prevent
35 flow of the flowable material in a downwardly direction when the flowable material at the or

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each said restricted flow outlet opening is not in communication with liquid of said sanitation system and allowing flow of the flowable material downwardly through the or each said restricted flow outlet opening when the flowable material at the or each said restricted flow outlet opening is in communication with the liquid of said sanitation system.

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29. A flowable material dispensing device according to claim 28, further including mounting means whereby said container can be mounted in said sanitation system with the or each said restricted flow outlet opening being directed in a downwardly direction in a position to receive flow of said liquid of the sanitation system upwardly against the or each said restricted flow outlet opening.

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30. A flowable material dispensing apparatus for dispensing flowable material into a liquid of a sanitation system, said apparatus comprising

a first container adapted to hold a quantity of liquid and having inlet means to receive a flow of said liquid to said first container and outlet means to permit flow of said liquid out of said first container, a second container located within said first container, said second container being adapted to hold a quantity of said flowable material and having at least one restricted flow outlet opening facing in a downward direction, the or each said restricted flow outlet opening being configured to prevent flow of the flowable material in a downward direction when the flowable material at the or each said restricted flow outlet opening is not in contact with the liquid in said first container and allowing flow of the flowable material downwardly through the or each said restricted flow outlet opening when the flowable material at the or each said restricted flow opening is in communication with the liquid in said first container.

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31. A flowable material dispensing apparatus according to claim 30, wherein liquid current generation means is provided for creating a liquid current into said first container, said current generation means being formed by a flow passage to allow said liquid to flow immediately adjacent the or each said restricted flow opening.

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