(54) Title: IMPROVEMENTS IN AND RELATING TO FLUSHING CISTERNs

(57) Abstract: A siphon device for flushing a toilet cisterns is provided. The siphon device includes a siphon tube and means for initiating a flushing by inducing siphon action in said siphon tube. Further means are provided for selectively venting the siphon action at a user selected arbitrary point in the flush, thereby terminating the flush.
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
Improvements in and Relating to Flushing Cisterns

A siphon device for flushing cisterns.

The present invention relates to a siphon device for flushing cisterns, particularly to a siphon device for flushing toilet cisterns.

Siphon devices for flushing toilet cisterns are known and can be single flush, whereby the siphoning action is vented when the cistern is emptied of water, or dual flush whereby an added feature built into the device can vent the siphoning action to arrest it at a pre-determined point before the cistern is emptied of water.

A disadvantage of single flush devices is the fixed volume of water in the flush, using a larger volume of water than may be required. Dual flush devices can deliver a smaller, but fixed volume of water or can empty the cistern like a single flush device. The smaller volume of water delivered by a dual flush device when not used to empty the cistern may still be more than is required, so again water is wasted.

A simple flap valve on the cistern outflow has been proposed to allow a user to vary the volume of water delivered. This type of device, as it is gravity fed and is always in contact with water of the cistern can leak if inadequately maintained. Such leaks are contrary to the purpose of the valve, which is to stop water from being wasted.

It is desirable to achieve the variable flush of the valve arrangement in combination with the leak resistance of siphon devices to give minimum water wastage.
It is an aim of preferred embodiments of the present invention to provide a siphon device that is capable of performing variable flush operation.

In accordance with a first aspect of the invention there is provide a siphon device for flushing a cistern including a siphon tube and means for initiating a flush by inducing siphon action in said tube, and wherein means are provided for selectively venting the siphon action at a user selected arbitrary point in the flush, thereby terminating the flush.

Preferably the flush is terminated rapidly after venting the siphon action.

Preferably, the cisterns are toilet cisterns.

The user selected arbitrary point is any point or stage in the flush determined by the user at which they wish to terminate the flush. This is in contrast to the prior art where the user is required to select one or more pre-determined points at which the flush can terminate and the user has no ability to terminate the flush between these pre-determined points.

There may be a pre-determined point before which the user is unable to terminate the flush, such as for example, if there is a requirement in a particular country that a minimum volume of water should be used to flush the toilet. In addition, there is typically a pre-determined maximum threshold limit at which the flush terminates, irrespective of whether the user has selected to terminate the flush, such as for example, if there is a maximum volume of water that can be used to flush the toilet.
The point at which the user selects to terminate the flush is typically dependent on the clearance of the contents of the toilet pan.

Preferably, the siphon tube comprises a U or V shaped tube, arranged in an inverted configuration so as to provide the possibility of siphoning action, the first leg of the inverted U or V shaped tube is adapted to form an outlet from the cistern, the second leg of the tube adapted to form an inlet enabling water within the cistern to fill the tube and form a free surface at the same level as the surface of the water in the body of the cistern.

Preferably, the means for initiating flushing comprises a chamber adapted to connect to the inlet leg, a piston movably mounted in said chamber, user operable means for moving said piston within said chamber so as to sweep water from said chamber up said inlet leg and into said outlet leg as a means for creating the siphoning action, and biasing apparatus to return said piston to a rest position after release of said user operable means, the piston being arranged so as to permit the passage of water from the cistern up said inlet leg during flushing of the cistern.

Preferably, the means for selectively venting the siphon action comprises a venting aperture on any part of the siphon tube, preferably on either the inlet or outlet leg to vent the siphon and rapidly terminate the flush, and means for uncovering said venting aperture after a user selected volume of flushing water has been delivered.

Preferably, a sealing element and means for movably mounting the sealing element are provided, the sealing element being movable between a first configuration in which the venting
aperture is covered and a second configuration in which the venting aperture is uncovered.

Preferably said means for movably mounting the sealing element is actuated by the means for initiating the flush and, more preferably, by any point on the apparatus used to move said piston.

Preferably, release of the means for initiating the flush whilst the flush is still taking place is arranged to cause movement between the first and second configuration to rapidly terminate the flush.

Preferably, release of the user operable means causes movement of the sealing element between the first and second configuration.

Preferably, the means for movably mounting the sealing element is attached to the siphon tube.

Preferably, the means for movably mounting the sealing element is attached to the inlet leg.

Preferably, said means for movably mounting the sealing element comprises: a lever to which the sealing element is connected and said lever being actuated by the user operable means.

Said lever may be pivotally mounted to the siphon tube.

Said lever may be pivotally mounted to the inlet leg.

Said lever may be directly or indirectly connected to a rod of said piston.
Preferably, said lever is connected to the rod via a tension element.

Said piston rod may be connected to a flushing handle via link means.

Preferably, the axis of rotation of the lever is substantially in the horizontal plane.

Preferably, rotation of the lever is actuated by tension in the tension element, force being generated by the relative separation of the free end of the lever to which the tension element is attached at one end and a fixture of the piston rod, to which the other end of the tension element is attached.

In a first alternative embodiment, the lever, rather than being connected directly or indirectly to a piston rod may be connected to a flushing handle.

Such a connection may be via resilient biasing means, using the handle (which forms part of the user operable means) preferably causes the sealing element to enter the first configuration and release of the handle causes the sealing element to move to the second configuration.

In a further alternative embodiment, the means for movably mounting the sealing element may comprise a resilient and elastically deformable element to which the sealing element is directly attached.

Preferably, the resilient, elastically deformable, element is biased such that in a rest position the sealing element is in the second configuration.
Preferably, initiation of a flush operation causes the resilient, elastically deformable, element to deform and cause the sealing element to enter the first configuration.

Preferably, release for the means for initiating the flush during a flush operation allows the resilient and elastically deformable element to un-deform so as to move the sealing element into the second configuration.

The resilient, elastically deformable, element may be mounted to the inlet leg.

The resilient, elastically deformable, element may be deformed by raising the piston rod and un-deformed by lowering of the piston rod.

In yet further embodiments, the sealing element may be mounted to an actuating lever, rotational movement of the actuating lever causing movement between the first and second configuration.

The actuating lever may be directly or indirectly connected to a flushing handle to cause said movement. Preferably, the actuating lever is attached to the flushing handle by means of a tension element (such as a spring).

It will further be appreciated that in certain embodiments, movement from the first to second configurations may be independent of the means for initiating the flush. Such an independent mechanism may comprise a user operable mechanism (such as a button or similar) which may be directly operated by the user to uncover the venting aperture once a desired amount of water has been flushed. The mechanism
preferably forms the means for movably mounting the sealing element.

Preferably, the venting aperture is substantially at or above a normal operating water level of the cistern.

According to a further aspect of the present invention there is provided a siphon device for flushing a cistern including a siphon tube having an inlet leg and an outlet leg and means for initiating a flush by inducing siphon action in said siphon tube on actuation by a user of user operable means, and wherein a venting aperture is provided on said inlet leg and/or said outlet leg and closure means are provided which are movable relative to said venting aperture between a first open configuration, wherein the closure means is spaced apart from said venting aperture and said venting aperture is open, and a second closed configuration, wherein the closure means is positioned over the venting aperture to close the venting aperture, said siphon device being provided with further means to move said closure means from said second closed configuration to said first open configuration at a user selected arbitrary stage in the flush, thereby terminating the flush.

According to a yet further aspect of the present invention there is provided a toilet cistern incorporating a siphon device for flushing a toilet, said siphon device including a siphon tube and means for initiating a flush by inducing siphon action in said tube and wherein means are provided for selectively venting the siphon action at a user selected arbitrary point in the flush, thereby termination the flush.

The advantage of the present invention is that the user can select to terminate the flush at a point when they consider the toilet pan contents to have been cleared, without requiring the
flush to continue to its pre-determined end point, thereby allowing the saving of water. In addition, the user is able to break the flushing cycle at a user selected point or during any point of the flush.

The closure means and other elements of the present invention are simple and inexpensive to provide and can be more easily serviced compared to conventional air valves sometimes employed on dual flush cisterns.

The above features of the invention, in a particularly favoured embodiment, will be described with reference to the accompanying diagrammatic drawings, wherein:-

Figures 1-3B show a front perspective view of a siphon device for flushing cisterns, according to an embodiment of the present invention.

Figure 4 shows an exploded perspective view of the siphon venting mechanism as in the embodiment of Figures 1-3, detailing the components of said mechanism;

Figures 5 and 7-9 show side views of a siphon device for flushing cisterns according to alternative embodiments of the present invention.

Figure 6 shows a plan view of a siphon device for flushing cisterns according to an alternative embodiment of the present invention.

Figure 10 shows a normal installation of the embodiment of the invention shown in Figures 1-4;
Figure 11 shows a sectional view of the embodiment of the invention shown in Figures 1-4; and

Figure 12a shows a perspective view of flexible members and piston arrangement and Figure 12b shows a detailed view of the attachment of the flexible member to the support.

Referring to Figures 1-4 and Figure 11 there is shown, a siphon device, comprising a siphon tube in the form of an inverted U, the siphon tube made up of outlet leg 100 and inlet leg 102. A venting aperture 104 is provided on inlet leg 102. An external screw thread 106 on the end of outlet leg 100 in co-operation with a washer 108 and nut 110 provides means for forming a demountable sealed joint with the bottom of a cistern.

The siphon device comprises a chamber 112 that forms a passageway by which water can enter inlet leg 102.

The siphon device comprises apparatus for initiating a flush. The apparatus for initiating a flush comprises a piston 114 movably mounted in chamber 112 and user operable means which, in this case comprise a link 116 which is connected directly or indirectly to a flushing handle (not shown). The piston 114 is made up of a piston rod 118, a flexible membrane 120 and a support 122 for said membrane. A passageway 424 near the free end of piston rod 118 forms in combination with link 116 means to connect the siphon device to external actuation. An aperture 124 in the chamber 112 is adapted to allow the passage of piston rod 118.

Means for selectively uncovering venting aperture 104 comprises a sealing element 408 mounted on a cross-member 412 of bifurcated lever 406, anchor points 411 for bifurcated lever 406 and means for connecting bifurcated lever 406 to a point on the
apparatus used to initiate flushing. The means for connecting bifurcated lever 406 to a point on the apparatus used to initiate flushing comprises a piston rod cap 403, cotter pin 410, tension element 404, cotter pin 409 and quick release split pin 405. The cotter pin 410, tension element 404, cotter pin 409 and quick release split pin 405 in combination form the tension train.

Aperture 124 in chamber 112 is adapted to allow the passage of piston rod 118, which, in operation slides through said aperture. The flexible membrane of the piston rests on the support 122 and has planar dimensions equal to those of the cross section of chamber 112, whereas the support is smaller in extent than the cross section of chamber 112 and has only intermittently spaced support members. A cylindrical coil spring 126 is dispose around piston rod 118 and between the upper side of the support 122 and an abutment around the aperture 124, biasing the piston 114 to return to its rest position as shown in Figure 1.

A first end 422 of bifurcated lever 406 locates onto anchor points 411 and can pivot on these fixings about an axis defined by the longitudinal aspect of the fixed mounting bar 407. The sealing element 408 is mounted on the cross-member 412, and may be an elastomeric material, such as butyl rubber and may быть mountable onto the cross-member 412 by means of a rectangular lug 413. This enables simple press fitting of the sealing element 408 into a slot 128 on cross-member 412.

Piston rod cap 403 is a hollow cylindrical section, closed at one end and adapted to fit over the top of piston rod 401. A pair of diametrically opposed apertures are formed in the curved surface of piston rod cap 403 and are adapted to allow curved end 420 of link 116 to pass through the piston rod cap 403 and
the passageway 424 in piston rod 116 when the piston rod cap 403 is fitted over the top of the piston rod 116. The piston rod cap 403 is thus fixed in place by the curved end 420 of link 116 as shown in Figures 2 and 3. In the embodiment shown in Figures 1 to 4, the piston rod cap 403 is also adapted to provide a fixing for a cotter pin 410. Alternatively, the tension element 404 can be attached via a link to piston 118, as shown in figure 3B.

Piston rod cap 403 has a slot 425 formed in it, and an aperture 426 in the curved surface disposed substantially at right angles to the line of centres of the apertures 423 (not really shown). The slot 425 and aperture 426 connect with one another and are adapted to accommodate cotter pin 410. Before assembly the legs 427 of cotter pin 410 run straight and parallel to one another. The legs 427 are inserted into aperture 426 and bent away from one another substantially at right angles to their initial positions so that they assume the shape shown in Figure 4. The bending is performed by means operating inside slot 425. The legs 427 abut the inner end face of slot 425, both the legs 427 and the eye 428 of cotter pin 410 being too large to fit through aperture 426. The cotter pin 410 is thus fixedly attached to piston rod cap 403.

A first looped end 429 of tension element 404 passes through the eye 428 of cotter pin 410. In the embodiment shown in figures 1 to 4, the tension element is a coil spring, and may be manufactured from stainless steel. Alternatively, some other resilient, elastic element could be used.

A second looped end 430 of tension element 404 passes through the eye 431 of cotter pin 409. Before assembly the legs 432 of cotter pin 409 run straight and parallel to one another. The legs are inserted into an aperture 433 in quick release split pin
405 and bent away from one another substantially at right angles to their initial positions so that they assume the shape shown in Figure 4. The bending is performed by means operating between the legs 434 of quick release split pin 405. Both the legs 432 and the eye 431 of cotter pin 409 are too large to fit through aperture 433, and thus the cotter pin 409 is fixedly attached to the quick release split pin 405.

The second end 415 of bifurcated lever 406 comprises an aperture 414 adapted to accept the legs 434 of quick release split pin 405. The cotter pins 409 and 410, and the quick release split pin 405 provide means for the tension element to piston rod cap 403 and the second end of the bifurcated lever 415 in the particular embodiment shown in Figures 1 to 4, and could be replaced by alternative methods of fixation.

The device shown in Figures 1 to 4 operates as follows.

In a normal installation of this embodiment of the invention as shown in Figure 10, the washer 108 forms a seal against the bottom of a cistern, the level of the bottom of chamber 112 being set a distance above the inner surface of the cistern so as to allow ingress of water. In the initial configuration, water fills the cistern to level A, the piston 114 is in its normal rest position (Figure 11) and the sealing means are held down by the tension train 404 so that the aperture 104 is uncovered. A user actuates the apparatus used to initiate flushing, typically by turning a handle or other external means (not shown) which pulls link 116 and thereby raises the piston 114. The effect of raising the piston is threefold. Firstly, water is raised from chamber 112 up the inlet leg of the siphon and over the top of the inverted U shaped tube to initiate the siphoning action. Secondly, tension in tension train raises the second end 415 of the bifurcated lever 406 forcing the sealing element 408 over the
aperture 104 in the inlet leg 102 of the siphon, as shown in figure 3. Thirdly, as the piston is raised the coil spring 126 is compressed. Once the siphoning action has commenced, the pressure in the inlet leg falls below atmospheric, so the sealing element 408 is drawn into contact with the exterior surfaces of the inlet leg around the aperture 104, however, to prevent the seal from being broken and the consequent venting of the system requires the user to hold the piston 114 in its raised position. The flush continues until the piston 114 is allowed to fall by the user releasing the apparatus used to initiate flushing, whereupon the second end 415 of the bifurcated lever 406 lowers under the influence of gravity and the tension train 404. The tension train 404 is itself lowered under the influence of coil spring 126. The lowering of the second end 415 of the bifurcated lever 406 pulls the sealing element 408 away from the aperture 104 allowing air to enter the U shaped siphon tube and thereby rapidly terminate the flush. Because aperture 104 is at the same level as the normal water level, shown as line A in Figure 10 and venting of the system by entry of air through aperture 104 can take place whenever the water level in the cistern is below this level, the amount of water delivered by the flush can vary between the volume of water contained in the cistern and almost nothing.

Once the flush has been terminated, the water level in the cistern returns to level A as shown in Figure 10 under the control of means, typically a ballcock, and the cistern is ready to be flushed again.

Other embodiments of the invention relate to alternative means for selectively venting the siphoning action.

In a second embodiment of the invention, as shown in Figure 5, the means for forcing sealing element 501 against aperture 502
are actuated by the raising of piston rod 503. The sealing element is mounted on a resilient, elastically deformable, element 504. The resilient element 504 is movably mounted on the inlet leg of the siphon device and is biased such that in a rest position in which the sealing element 501 does not cover aperture 502. When a user actuates the mechanism used to initiate a flush, piston rod 503 is raised and comes into contact with the resilient element 504, urging it toward the inlet leg of the siphon device so that the sealing element 501 covers aperture 502. When the piston rod is released (by user release of user operable means such as a flushing handle for instance) it returns to its rest position, and as it drops the resilient element 504 is then free to return to its undeformed rest position in which the sealing element 502 uncovers aperture 502 to arrest the flush.

In a typical installation of the invention in flushing toilet cisterns, a user actuates the apparatus used to initiate flushing by turning a handle. The handle is typically mounted on the exterior of the cistern and rotates about an axis in a substantially horizontal plane.

In third, fourth, fifth and sixth embodiments of the invention as shown in Figures 6 to 9 respectively, the means for selectively venting the siphon action are actuated by the rotation of apparatus fixedly attached to user operable means in the form of handle.

Figure 6 shows a plan view of the rest position of a third embodiment of the invention, with a handle 600, spindle 602, lever 604, tension element 606, aperture 608, pivoting elbow 610 and sealing element 612. Spindle 602 is fixedly attached to handle 600, and lever 604 is fixedly attached to spindle 602. Tension element 606 joins lever 604 to a first end or pivoting
elbow 610. Sealing element 612 is attached to a second end of pivoting elbow 610 and arranged to cover or uncover apertures 608 dependent on the attitude of pivoting elbow 610. Aperture 608 may be situated on either the inlet leg or the outlet leg or the top of a siphon device as shown. When a user actuates handle 600, spindle 602 rotates as does lever 604. This increases the relative separation between the ends of tension element 606 and thereby rotates pivoting elbow 610 to force sealing element 612 over aperture 608. In this embodiment of the invention tension element 606 must be capable of supporting some compressive load. Returning the handle 600 to its rest position pushes tension element 606 which in turn rotates pivoting elbow 610 so as to move sealing element 612 away from aperture 608 and vent the system.

Figure 7 shows a side view of the rest position of a fourth embodiment of the invention. This embodiment is similar to the third embodiment of the invention as shown in Figure 6, except that the pivoting elbow 710 rotates in a substantially horizontal plane to cause a sealing element 712 to cover an aperture 708 in the top of a siphon tube.

Figure 8 shows a side view of a fifth embodiment of the present invention, comprising a spindle 802, a lever 804, a tension element 806, an aperture 808, a pivoting elbow 810 and a sealing element 812. Lever 804 is fixedly attached to spindle 802, said spindle being caused to rotate in the direction of arrow B by the user actuating apparatus used to initiate a flush. Tension element 806 connects a first end 805 of lever 804 to a first end of pivoting elbow 810. Sealing element 812 is attached to a second end of pivoting elbow 810 and arranged to cover or uncover aperture 808 dependent on the altitude of pivoting elbow 810. In typical installations of single or dual flush siphon devices for flushing cisterns, lever 802 is used to actuate
a piston 814 to initiate a flush and thus would already be in place within a cistern. When a user actuates the apparatus used to initiate a flush, spindle 802 rotates in the direction of arrow B and a first end 805 of lever 820 rises and this increases the relative separation between the ends of tension element 806, thereby rotating pivoting elbow 810 to force sealing element 812 over aperture 808. In this embodiment of the invention, tension element 806 must be capable of supporting some compressive load. Lowering the first end 805 of lever 804 pushes tension element 806 which in turn rotates pivoting elbow 810 so as to move sealing element 812 away from aperture 808 and vent the system.

Figure 9 shows a side view of the rest position of a sixth embodiment of the invention. This embodiment is similar to the fifth embodiment of the invention shown in figure 8, except that the pivoting elbow 810 has been replaced with the bifurcated lever of the first embodiment and the tension element 906 joins the second end 915 of bifurcated lever 900 to a fixture on spindle 902.

In further embodiments of the invention, the means for selectively uncovering a venting aperture may be actuated selectively by a user actuating apparatus expressly for this purpose and not connected to the apparatus used to initiate flushing. For instance, a sealing element may be provided which is normally biased (e.g. spring biased) so as to cover a venting aperture and a user operable means (such as a depressible button) may be used to overcome such bias to move the sealing element away from the venting aperture to uncover it. Suitable linking mechanisms between the user operable means and the sealing element may be devised by those skilled in the art without the need for further inventive action.
Such independent mechanisms would allow the invention to be applied to siphon devices which are not flushed in accordance with the mechanisms described in this document.

Features such as anchor points 411 could be manufactured as an integral part of the siphon device, but this does not preclude the possibility of producing kits of parts to fit to standard siphon devices to allow them, after modification, to operate as variable flush devices.

Referring to figures 12a and 12b, there is illustrated an example of the arrangement of flexible members in the form of flaps 120' which are connected to support 122'. The support 122' can be integrally formed with piston 118 or connected thereto.

As the piston is raised during actuation of the user operable means, the flaps 120' are forced against the frame of support 122' and any water above the flaps 120' is forced through the chamber and/or siphon tube. As the piston is lowered and/or as the cistern fills with water, the force of the water below the flaps causes the flaps to rise and the water to flow into the chamber and/or siphon tube in preparation for the next flush.

The flaps are typically made from EPDM or polythene and are of sufficient thickness to prevent damage when water is flowing against them and to prevent the same from folding over during use. Any number of flaps can be provided as is required. The flaps are typically attached to the frame of the support by locking bars 121 having a plurality of feet 123 which are located in corresponding apertures 125 on the flaps and support. Alternatively a plurality of screws or other conventional fastening devices can be used to attached the flaps to the support.
Another feature of the embodiments of the invention is the inclusion of an appropriately sized grommet attached to any convenient part of the mechanism to seal the aperture 10 should the sealing means cease to operate correctly. The various components can, of course, be of any suitable colour.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination of the steps or any method or process so disclosed.
Claims:

1. A siphon device for flushing a cistern including a siphon tube and means for initiating a flush by inducing siphon action in said tube, and wherein means are provided for selectively venting the siphon action at a user selected arbitrary point in the flush, thereby terminating the flush.

2. A siphon device according to claim 1 wherein at least one venting aperture is provided on the siphon tube for venting the siphon action.

3. A siphon device according to claim 2 wherein the siphon tube has an inlet leg and an outlet leg and the venting aperture is provided at a location on the inlet leg.

4. A siphon device according to claim 2 wherein closure means are provided for said venting aperture and said closure means are movable relative to said venting aperture between a first open configuration, wherein the closure means is spaced apart from said venting aperture, the venting aperture is open and flushing is terminated, and a second closed configuration, wherein the closure means is positioned over the venting aperture to close the venting aperture and the cistern is being flushed.

5. A siphon device according to claim 4 wherein the closure means is a sealing member which substantially seals said venting aperture in said second closed configuration.

6. A siphon device according to claim 5 wherein the sealing member is formed from elastomeric material.
7. A siphon device according to claim 4 wherein the closure means is moved between said first and second configurations on initiation of flushing by a user using user operable means.

8. A siphon device according to claim 7 wherein the user operable means is a handle or button.

9. A siphon device according to claim 7 wherein actuation of the user operable means actuates a piston, which induces siphon action in said siphon tube.

10. A siphon device according to claim 9 wherein the piston is movably mounted in a chamber connected to or integrally formed with the inlet leg of the siphon tube, said piston being arranged such that movement of said piston in said chamber causes liquid to flow from the cistern and through the siphon tube during flushing, while the venting aperture is closed.

11. A siphon device according to claim 10 wherein one or more flexible members are connected to a part of said piston to cause the flow of liquid from the cistern through the siphon tube.

12. A siphon device according to claim 11 where the piston and said flexible member(s) is/are movable within said chamber.

13. A siphon device according to claim 12 wherein the piston and flexible member(s) are movable between a lowered resting position, corresponding to the closure means being in a first open position, and a raised position,
corresponding to the closure means being in a second closed position.

14. A siphon device according to claim 13 wherein the piston and flexible member are resiliently biased towards said lowered resting position, such that termination of actuation of said user operable means causes said piston and flexible member to be lowered to said lowered resting position.

15. A siphon device according to claim 14 wherein one or more coiled springs are provided to resiliently bias said piston and flexible member.

16. A siphon device according to claim 9 wherein said closure means is connected to a lever and said lever communicates with the piston, such that movement of said piston results in movement of the closure means, via said lever, between said first and second configurations.

17. A siphon device according to claim 16 wherein the lever is pivotally mounted on said siphon tube and/or said chamber.

18. A siphon device according to claim 16 wherein the lever communicates with the piston via a tension element.

19. A siphon device according to claim 18 wherein the tension element is a coiled spring.

20. A siphon device according to claim 13 wherein said closure means is connected to a resilient, elastically deformable element and movement of said piston between said lowered and raised positions moves said deformable
element and thus the closure means between said first open and second closed configurations respectively.

21. A siphon device according to claim 7 wherein said closure means are connected to a pivoting elbow and said pivoting elbow is attached to said user operable means, directly or indirectly, via a tension element.

22. A siphon device according to claim 21 wherein actuation of said user operable means results in movement of said pivoting elbow and thus the closure means, via said tension element, between said first open configuration and second closed configuration.

23. A siphon device according to claim 21 wherein said pivoting elbow is pivotally mounted on said siphon tube.

24. A siphon device according to claim 22 wherein actuation of the user operable means increases the relative separation between the ends of the tension element, thereby resulting in rotation of pivoting elbow and thus the closure means relative to the venting aperture.

25. A siphon device according to claim 21 wherein the tension element is a coiled spring.

26. A siphon device according to claim 2 wherein the venting aperture is actuated separately to the means for initiating flushing.

27. A siphon device according to claim 1 wherein the cistern is a toilet cistern.
28. A siphon device according to claim 2 wherein the venting aperture is provided substantially at or above the normal level of the water in the cistern.

29. A siphon device for flushing a cistern including a siphon tube having an inlet leg and an outlet leg and means for initiating a flush by inducing siphon action in said siphon tube on actuation by a user of user operable means, and wherein a venting aperture is provided on said inlet leg and/or said outlet leg and closure means are provided which are movable relative to said venting aperture between a first open configuration, wherein the closure means is spaced apart from said venting aperture and said venting aperture is open, and a second closed configuration, wherein the closure means is positioned over the venting aperture to close the venting aperture, said siphon device being provided with further means to move said closure means from said second closed configuration to said first open configuration at a user selected arbitrary stage in the flush, thereby terminating the flush.

30. A toilet cistern incorporating a siphon device for flushing a toilet, said siphon device including a siphon tube and means for initiating a flush by inducing siphon action in said tube and wherein means are provided for selectively venting the siphon action at a user selected arbitrary point in the flush, thereby termination the flush.
**INTERNATIONAL SEARCH REPORT**

A. **CLASSIFICATION OF SUBJECT MATTER**

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According to International Patent Classification (IPC) or to both national classification and IPC

B. **FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of data base and, where practical, search terms used)

**EPO-Internal**

C. **DOCUMENTS CONSIDERED TO BE RELEVANT**

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<tr>
<th>Category</th>
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X Further documents are listed in the continuation of box C. X Patent family members are listed in annex.

**Date of the actual completion of the international search**

23 January 2002

**Date of mailing of the international search report**

30/01/2002

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