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(54) A recessed cistern for a dual control flushing system

(57) A recessed cistern for a flushing system for sanitary use, including a cistern body or tank (2) for containing the water, a support frame (5) mounted in the upper part of the tank (2) and which supports a control device (1) for opening the water outlet valve; the control device (1) is, in turn, manually operated by an external actuator element, for example, a rocking switch connected to a rod (22) hinged to an angle lever (9) of the control device (1); according to the invention, depending on the installation requirements, the cistern has two

openings through which the aforesaid control device (1) passes, one horizontal and the other vertical, possibly closed by reduced portions, and the outlet valve can be operated through both of the said apertures, as the angle lever (2) includes two pairs (10) and (11) of substantially perpendicular arms in which the arms of each pair have hinge seats (24, 25) in which the rod (22) can be selectively engaged, depending on the type of operation of the cistern.

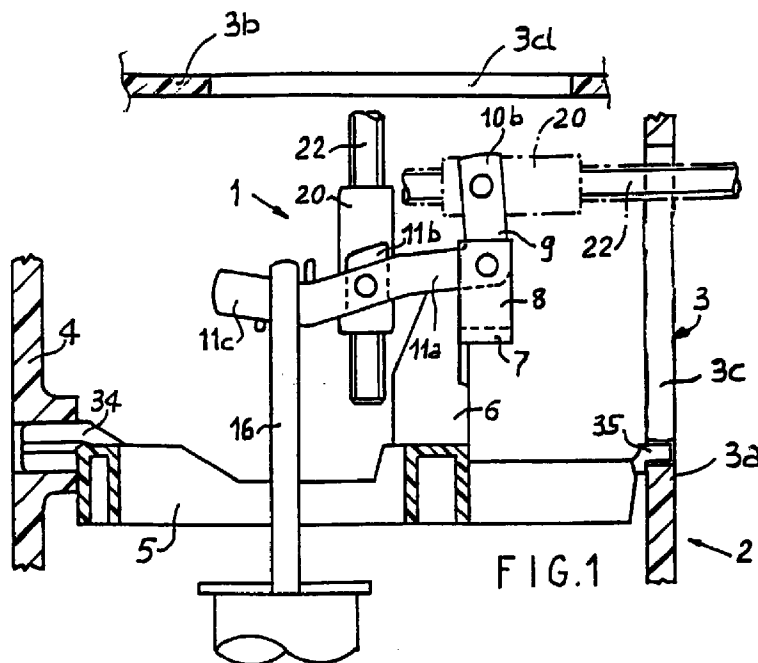


FIG. 1

EP 0 893 543 A1

Description

The present invention concerns a recessed cistern for a flushing system of the recessed kind, in which the water outlet valve is controlled by an actuator element, for example, a push-button operable manually from a control plate, located externally and parallel to a wall of the cistern.

A recessed cistern for a flushing system is known from European Patent No. 276 633 B2, comprising a water container and a support frame releasably fixed therein between the front and rear walls of the container; the frame supports an angle lever for controlling the outlet valve, pivoted on a column fixed firmly to the frame; the angle lever is manually operated from the outside by means of a push rod pivoted to an arm of the lever, which passes through an opening in the front wall of the cistern body and is operated by an actuator element constituted by a rocking switch mounted at the front on a protection plate covering the opening.

However, this cistern, including a single frontal actuator element, cannot be used in installations that require the outlet valve to be operated from the upper part of the cistern.

German Patent Application No. 35 05 188 describes a flushing cistern that can be mounted on a wall, in which the outlet valve control device is mounted at the top on a frame fixed to the cover that closes an opening in the top of the cistern; in this case, the cistern cannot be installed in a cavity recessed frontally in a wall, as it is not possible to control the outlet valve from the front of the cistern.

The object of the present invention is therefore to produce a recessed cistern for a flushing system, in which the outlet valve can be operated by an external actuator element, disposed either in front of a vertical front wall of the cistern, or in front of a horizontal top wall (defining the cover or top of the cistern), depending on the installation requirements of the cistern.

A further object of the invention is to produce a recessed cistern for a flushing system, in which the connection between several components of the control device for opening the outlet valve is easily modifiable in order to change the operation of the outlet valve from the front to the top, and vice versa.

The aforesaid objects are achieved by the invention, according to the present utility model, which concerns a recessed cistern for a flushing system, comprising a tank containing the water, a support releasably mounted within the upper part of the tank, which supports a control device operated by an actuator element, for operating the water outlet valve located outside the cistern, the control device comprising an angle lever rotatably pivoted on a column of the support frame and a push element rotatably connected to the angle lever and the external actuator element, characterised in that:

- the cistern has two openings through which the aforesaid control device passes, one horizontal and the other vertical, possibly closed by reduced portions of the cistern; and, in combination,
- the angle lever comprises double means for operating the outlet valve, selectively coupleable with the push element in order to operate the outlet valve from the front or, alternatively, from a position at the upper part of the cistern.

This and other characteristics of the invention will become clearer from the following description of a preferred embodiment, given by way of non-limitative example, with reference to the accompanying drawings, in which:

Figure 1 represents schematically a lateral view of the cistern and the associated device for controlling the outlet valve, according to the present utility model;

Figure 2 is a front view of the device of Figure 1;

Figure 3 is a plan view of the device of Figure 1; and Figure 4 is a detail of the angle lever forming part of the device of Figure 1.

With reference to Figures 1 to 3, the reference numeral 1 generally indicates a control device for an outlet valve, not shown, for a cistern 3 of a flushing system, defining a cistern body or tank 2 which contains a predetermined quantity of flushing water, of which an anterior, or front, wall 3a, vertical in use, an upper wall 3b (defining the top, or cover, of the system 2), horizontal in use, and a rear wall 4 are shown in partial section.

The device 1 is supported by a support frame 5, made from plastics material in the non-limitative example given by way of illustration, and is releasably mounted as a bridge between the two opposite walls, front 3 and rear 4, by means of pins 34 and tabs 35; the frame 5 is located in the upper part of the tank 2, in a substantially horizontal position; a column 6 provided with a U-shape support rod 7 is integrally formed on the frame 5; an angle lever 9 is rotatably pivoted on two lateral wings 8 of the rod 7, facing upwards in use, according to the invention.

According to the invention, the device 1 for controlling the outlet valve of the cistern can be selectively operated either by a frontal actuator element or, if preferred, and depending on the installation requirements, by an upper actuator element located above the upper wall 3b of the cistern 3.

For this purpose, both of the walls 3a and 3b of the cistern 3 have respective through-holes, for example, rectangular, indicated respectively 3c and 3d, at least one (or both) of which is possibly closed with a fluid-tight seal by a reduced portion (not illustrated for simplicity) of the same wall 3a, 3b, intended to be removed, for example cut, or closed directly by the producer of the cistern during the assembly thereof, or by the installer of

the sanitary equipment for which the cistern is intended.

In addition to the aforesaid characteristic, the angle lever 9 is constituted by a first pair 10 of parallel arms 10a and 10b, of equal length and fixed at one end to a transverse connection element 12 (Figures 2, 3) carrying two lateral pins 14 which engage corresponding holes in the wings 8; a second pair 11 of parallel arms, 11a and 11b, leaves the element 12 in a substantially perpendicular direction with respect to the arms 10a, 10b; the arms of the pair 10 can be the same length or a different length from the arms of the pair 11; the two pairs of arms 10a, 10b, 11a, 11b of the angle lever 9 therefore constitute, according to the invention, the double means of operating the cistern outlet valve; one of the two arms of the pair 11, for example, the arm 11a, extends the corresponding arm 11b with a tract 11c which terminates in a seat 15 capable of engaging in a slot in a lifting rod 16 connected to the cistern outlet valve.

The arms 10a, 10b and 11a, 11b are provided with hinge means 18 selectively engageable with the lateral pins 21, diametrically opposite a push element 20, constituted by a catch 20 having a threaded hole coupled with an end of a threaded rod 22; in turn, the other end of the threaded rod 22 is connected to an actuator element, not shown, of the outlet valve constituted, for example, by a rocking switch of known type, mounted externally on a plate, not shown, and located parallel to one of the walls of the tank 2.

The hinge means 18 are located at the free ends 26 (Figure 4) of the arms 10 and 11, and include a through-hole 23 located close to the end 26 of the arms 10 and 11, with its axis parallel to the axis of the pins 14 of the lever 9; each hole 23 is associated with a connection seat 24 which facilitates the engagement of the pins 21 of the catch 20 with the corresponding holes 23, as will be explained below; each connection seat 24 is constituted by a guide portion 25 having an inclined plane, located between the free end 26 of the arms 10 and 11 and each corresponding hole 23; the guide portions 25 are arranged in facing pairs within each pair of arms, in a specularly symmetrical arrangement.

The angle lever 9 is mounted on the frame 5, preferably before the frame 5 is mounted in the tank 2, with the arms 10 substantially vertical and the arms 11 horizontal; in order to facilitate the insertion of the catch 20 between the arms 10 or 11, the connection seats 24 are located with the line of maximum incline vertically orientated so that the catch can easily be inserted or removed from the seats 24, even when the frame 5, together with the control device 1, is mounted within a cistern.

The operation for adapting the control device 1 to a frontally controlled cistern, or an upwardly controlled cistern is advantageously effected before inserting the frame 5, together with the associated control device 1, in the tank 2.

For example, after having removed the reduced clo-

sure portion from the opening in question (3c or 3d), in order to arrange the device 1 for an upwardly-controlled cistern, it is necessary simply to push the catch 20 with slight force between the arms 11a and 11b, in order elastically to separate them, until the pins 21, once having passed the inclined portions 25, enter the holes 23.

On the other hand, in order to adapt the device 1 for a frontally-controlled cistern, it is necessary to insert the catch 20 between the arms 10 in an analogous way, as shown in Figure 1 in broken outline. In both cases, therefore, the prepared device 1 can be inserted in the cistern 3 through the opening 3c, 3d which is large enough to allow the device 1, already assembled, to be inserted in the cistern, or to assemble it directly and rapidly within the cistern.

The arrangement proposed by the present utility model enables a reduction in the production costs and the storage of the components of the control device 1 and the cistern 3, in that the same control device 1 can be used selectively both in a cistern controlled from the front, and in one controlled from the top.

The support frame 5 can also be provided with an element 27 for fixing supply tubing 28 (Figure 2); the fixing element 27 is constituted by an annular plastics body, open at the side to enable the elastic snap-introduction of the tubing 28, and has internal ribs 29 capable of axially securing and preventing the rotation of the tubing 28; the element 27 is further provided with resilient engagement elements 30 capable of being snap-inserted in through-holes 31 (Figure 3) formed in the frame 5 for the easy mounting and disassembly of the element 27 with respect to the frame 5.

Claims

1. A recessed cistern for a flushing system, including a cistern body or tank (2) for containing the water, a support (5) releasably mounted in the upper part of the tank (2) and which supports a control device (1) operated by an actuator element outside the cistern, for operating the water outlet valve, the control device (1) comprising an angle lever (9) rotatably pivoted on a column (6) of the support frame (5), and a push element (20) rotatably connected to the said angle lever (9) and the said external actuator element, characterised in that:
 - the cistern (3) has two openings (3c, 3d) through which the said control device (1) passes, one horizontal (3d) and one vertical (3c), possibly closed by reduced portions of the cistern (3); and, in combination,
 - the said angle lever (9) comprises double means (10a, 10b, 11a, 11b) for operating the said outlet valve, selectively coupleable with the said push element (20) in order to operate the said outlet valve from the front or, alternatively, from a position at the top of the said c-

tern.

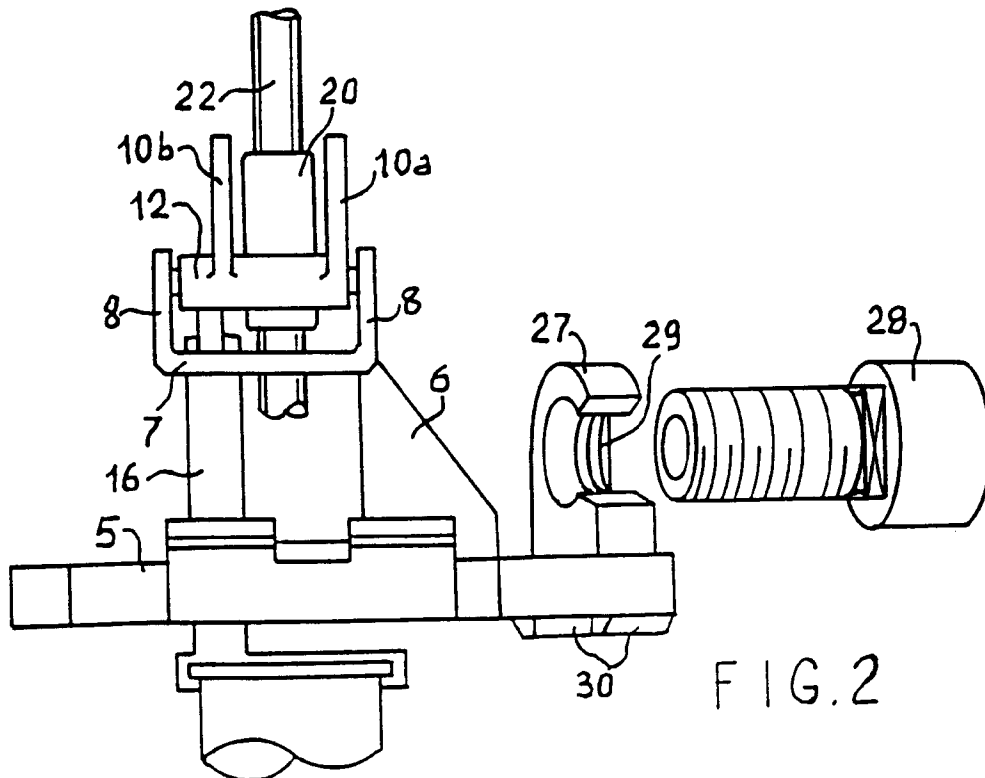
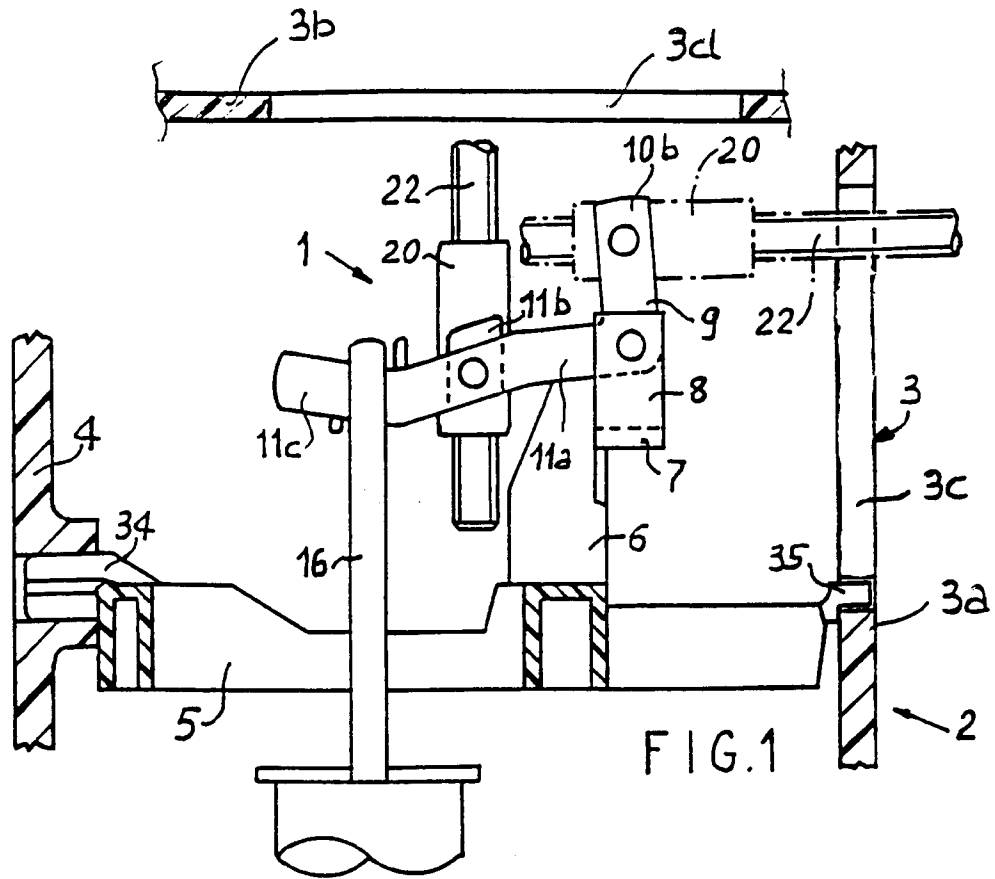
2. A cistern according to Claim 1, characterised in that the said double operation means (10a, 10b, 11a, 11b) of the said outlet valve are constituted by first (10) and second (11) pairs of arms (10a, 10b, 11a, 11b), each of the said pairs of arms being provided with hinge means (18) capable of selectively engaging the said push element (20). 5
3. A cistern according to Claim 2, characterised in that the said hinge means are constituted by a hole (23) close to an end of each of the said arms (10a, 10b, 11a, 11b), each hole (23) being associated with a connection seat (24) which facilitates the selective engagement of the said push element (20) with the said first (10) or the said second (11) pair of arms (10a, 10b, 11a, 11b). 10 15
4. A cistern according to Claim 3, characterised in that the said connection seats (24) are constituted by guide portions (25) having an inclined plane, located between a free end (26) of the said arms (10) and (11) and the said hole (23), the said guide portions (25) being in facing pairs inside each pair of arms (10, 11), the said inclined planes having a specularly symmetrical arrangement. 20 25
5. A cistern according to any of claims from 2 to 4, characterised in that the said angle lever (9) is mounted on the said support frame (5) on the part facing upwards in use, with the two first pairs of arms (10a, 10b) being orientated substantially vertically. 30 35

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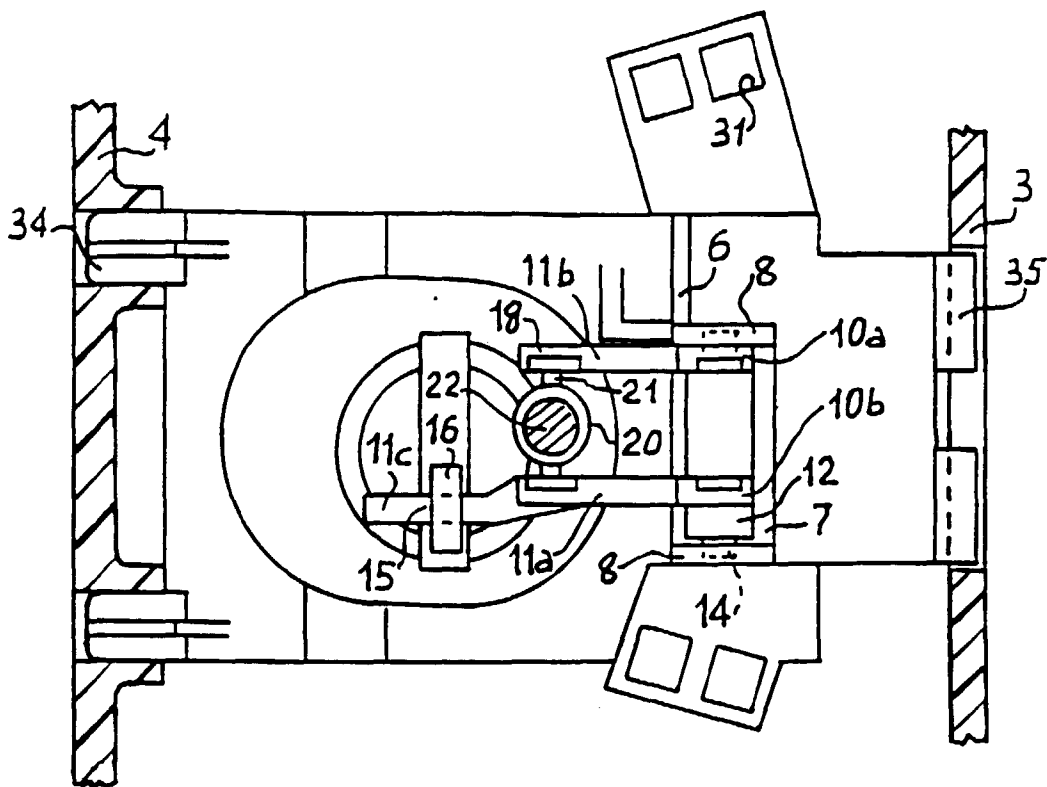


FIG. 3

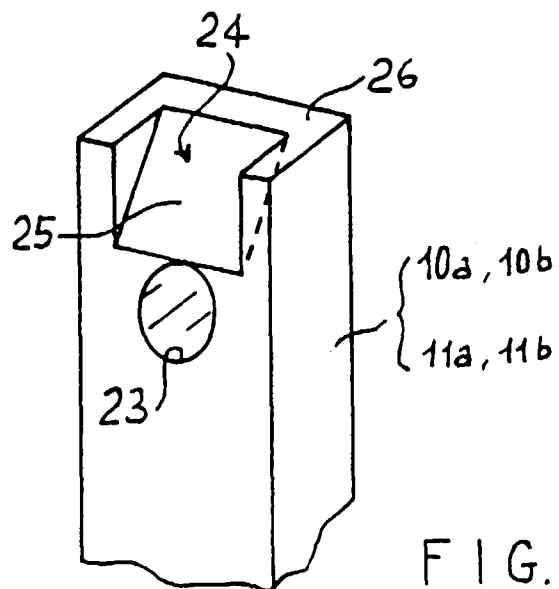


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 3805

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	FR 2 739 116 A (ALLIA) 28 March 1997 * page 2, line 15 - page 3, line 29; figures 1,2,4,5 *	1	E03D1/012 E03D5/092
Y,D	EP 0 276 633 A (GEBERIT) 3 August 1988 * the whole document *	1	
A	EP 0 754 808 A (CECCHI) 22 January 1997	2-5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E03D E03C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		26 November 1998	Hannaart, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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