

Discharge valve for a flushing cistern

5 The invention relates to a discharge valve for a flushing
cistern, having a valve housing which has an outlet
opening with a valve seat, having a closure body which
interacts with the valve seat at a bottom end, having a
two-quantity actuator which has a connecting rod which is
10 connected to the closure body and by means of which the
closure body can optionally be raised by different
displacement distances, having a top activatable partial-
quantity float for partial flushing, and having a bottom,
full-quantity float which is mounted in a pivotable
15 manner on the valve housing and is intended for full
flushing.

A discharge valve of this type has been disclosed in the
prior art in the applicant's EP-A-1 672 130. In this
20 document, the full-quantity float is mounted such that it
can be pivoted about a stationary axial element, and it
fixes the closure body counter to gravitational force
once this closure body has been raised by a long
triggering displacement distance. The full-quantity float
25 releases the closure body only after essentially all the
flushing water has been discharged. In the case of a
shorter triggering displacement distance for triggering
partial-quantity flushing, the full-quantity float uses
an integrally formed nose to prevent the closure body
30 from being raised beyond this displacement distance. Once
the envisaged partial quantity has been discharged, then
the partial-quantity float subjects the closure body to
loading and the closure body thus drops onto the valve
seat and interrupts flushing.

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It has been found that it is sometimes the case in
practise, despite the abovementioned nose on the full-
quantity float, that, once partial-quantity flushing has

been triggered, the closure body is raised yet further by the water buoyancy and is finally fixed to the full-quantity float. Instead of partial-quantity flushing, full-quantity flushing thus takes place here, which means
5 that an unnecessary amount of water is consumed.

The object of the invention is to provide a discharge valve of the abovementioned type by means of which partial-quantity flushing can be carried out more
10 reliably and unnecessary water consumption can thus be avoided. The abovementioned malfunctioning should thus be reliably avoided.

The object is achieved in the case of a discharge valve
15 of the generic type according to Claim 1. In the case of the discharge valve according to the invention, the connecting rod blocks the full-quantity float once partial-quantity flushing has been triggered. It not only prevents premature closure of the valve once full-
20 quantity flushing has been triggered but also, by the blocking action of the connecting rod, prevents, in a yet more reliable manner than has been the case up until now, the situation where the closure body is raised further, and undesired full-quantity flushing thus takes place,
25 once partial-quantity flushing has been triggered. The functional reliability in the case of partial-quantity flushing can thus be significantly increased by way of cost-effective development of comparatively straightforward design. The operations of triggering
30 partial flushing and full flushing can be carried out as they have been previously. It is thus possible to use a previously known two-quantity actuator for example according to the abovementioned EP-A-1 672 130. It is likewise also possible to set the partial-flushing
35 quantity by adjusting the partial-quantity float.

According to a development of the invention, it is provided that the closure body has a guide means with which the full-quantity float interacts in order to block

further displacement. Such a suitable guide means can be realized without any further outlay. A particularly reliable design solution to the abovementioned object can be realized when, according to a development, the
5 blocking element is a protruberance which is arranged on the full-quantity float. In particular this protruberance is integrally formed on the full-quantity float. This can be realized without any significant further outlay. According to a development of the invention, the guide
10 means has a horizontally extending shoulder against which the blocking element butts, and thus blocks further displacement, once partial flushing has been triggered.

According to a development of the invention, it is
15 provided that the connecting rod blocks the full-quantity float in a predetermined pivoting position once partial-quantity flushing has been triggered. The abovementioned blocking means can thus be designed in a particularly reliable manner. The full-quantity float even provides
20 reliable blocking when, as has been the case up until now, it is produced with a comparatively low level of buoyancy. There is thus no need for the full-quantity float to be larger than has been the case up until now.

25 According to a development of the invention, it is provided that a retaining protruberance is arranged on the connecting rod, this retaining protruberance acting on the full-quantity float once partial-quantity flushing has been triggered. This allows straightforward and
30 nevertheless automatic and reliable fixing of the closure body once partial-quantity flushing has been triggered. This can be achieved particularly straightforwardly, and nevertheless reliably, in design terms by the retaining protruberance, according to a development of the
35 invention, engaging behind part of the full-quantity float.

Further advantageous features can be gathered from the dependent patent claims, from the following description and from the drawing.

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An exemplary embodiment of the invention will be explained in more detail hereinbelow with reference to the drawing, in which:

- 10 Figure 1 shows a partially sectional view of a discharge valve according to the invention,
Figure 2a shows a partially sectional view of part of the discharge valve according to the invention in its rest position according to Figure 1,
15 parts of the full-quantity float having been eliminated for illustrative reasons,
Figure 2b shows an illustration according to Figure 2a, but with the closure body raised partially following triggering of partial-quantity
20 flushing,
Figure 2c shows an illustration according to Figure 2a, but with the closure body raised fully following triggering of partial-quantity flushing, and
25 Figure 2d shows an illustration according to Figure 2a, but with the closure body raised fully following triggering of full-quantity flushing.
- 30 Figure 1 shows the discharge valve 1 according to the invention in a flushing cistern 2 for a WC. The flushing cistern 2 has, as usual, an opening 17 into which a connector 18 of a valve housing 14 has been inserted. On the underside of the flushing cistern 2, the connector 18
35 has been fixed by a nut 19.

The valve housing 14 forms, as usual, a valve seat 16 with which a closure body 12 interacts, this closure body having an elastomeric valve disc 15 at a bottom end 27.

The valve housing 14 has, as usual, windows (not presented any more specifically here) through which, when the valve is open, flushing water (not shown here) can flow through the connector 18 into the connected WC (not shown here).

The flushing cistern 2 has a removable cover 3 in which is mounted an actuator 4 which has a button 5 for triggering full-quantity flushing and a further button 6 for triggering partial-quantity flushing. The actuator 4 can thus optionally be used to trigger partial flushing or full flushing. Full flushing uses, for example, 6 litres and partial flushing uses 3 litres. However, other flushing quantities, of course, are also possible. Instead of the buttons 5 and 6, it is also possible to use other triggering elements. For example contactless actuation would also be conceivable in principle.

The actuator 4 is connected to a yoke 11 and has a push rod 7 by means of which a two-armed lever 8 can be pivoted about a pin 9. The pivoting movement of the lever 8 is transmitted to a connecting rod 10 which is connected to the closure body 12. If the button 6 is pushed, then the closure body 12 is raised by a short displacement distance. When the button 5 is pushed, the closure body 12 is raised by a greater displacement distance. Figure 2b shows the displacement following triggering of partial-quantity flushing and Figure 2d shows the displacement following triggering of full-quantity flushing.

Once partial-quantity flushing has been triggered, a partial-quantity float 13 is coupled to the closure body 12 in a manner which is known per se. This float keeps the closure body 12 in the position which is shown in Figure 2b until the level of the flushing water in the flushing cistern 2 has reached a predetermined partial-quantity water line. Once the water level drops below this water line, the partial-quantity float 13 subjects

the closure body 12 to loading and the closure body then drops immediately into the closing position, which is shown in Figure 2a. A comparatively large quantity of the flushing water then still remains in the flushing cistern
5 2.

In order for it not to be possible for the closure body 12 to move further upwards in the case of partial-quantity flushing, the guide means 23 which is shown in
10 Figures 1 and 2a-2d is integrally formed at the bottom end 27 of the closure body 12. This guide means has a shoulder 24 which extends, as can be seen, horizontally. The guide means 23 runs essentially vertically above this shoulder 24. A blocking element 22 in the form of a
15 protruberance or nose is arranged on the full-quantity float 20, at a distance above the pivot pin 21. If the closure body 12 is raised into the position which is shown in Figure 2b, then this blocking element 22 is located directly above this shoulder 24. If the closure
20 body 12 is raised yet further, this is prevented by the blocking element 22 striking against the shoulder 24. The blocking element 22 is pressed onto the guide means 23 by the buoyancy of the full-quantity float 20. In order for the closure body 12 to be raised further beyond the
25 position which is shown in Figure 2c, the full-quantity float 20 would thus have to be pivoted in the clockwise direction counter to its buoyancy force. In order for such a pivoting movement to be reliably prevented, the buoyancy of the full-quantity float 20 could be increased
30 by the float being correspondingly enlarged. As an alternative, according to the embodiment shown, a retaining protruberance 25 may be integrally formed at the bottom end of the connecting rod 10, this retaining protruberance engaging behind part 26 of the full-
35 quantity float 20 according to Figure 2b. The retaining protruberance 25, in the position which is shown in Figure 2b, thus prevents the full-quantity float from being able to be pivoted in the clockwise direction out of the blocking position shown. It is thus the case that

the blocking action of the full-quantity float 20 cannot be eliminated even by the closure body 12 being subjected to a pronounced force in the upward direction. The closure body 12 thus inevitably remains in the position
5 which is shown in Figure 2b.

In the case of a long displacement distance for full-quantity flushing, the closure body 12 is raised by the connecting rod 10 into the position which is shown in
10 Figure 2d. The blocking element 22 slides downwards along the guide means 23 as far as the shoulder 24, as Figure 2c shows. The protruberance 25 is then located above the part 26 and thus no longer performs any blocking action. It is thus possible, as the closure body 12 is raised
15 further, for the blocking element 22 to run round the shoulder 24 as a result of a corresponding pivoting movement in the clockwise direction, and it finally passes into the position which is shown in Figure 2d. In this position, the blocking element 22 engages beneath
20 the shoulder 24. This position is maintained by the buoyancy of the full-quantity float 20. If the level of the flushing water drops to the full-quantity water line, which is located beneath the full-quantity float 20, then the buoyancy of the full-quantity float 20 dissipates and
25 this float, as a result of its own weight, pivots in the clockwise direction into the position which is shown in Figure 2a. The closure body 12 is thus no longer supported by the full-quantity float 20, and it drops downwards onto the valve seat 16. The flushing cistern 2
30 is then filled with flushing water again through an inlet valve (not shown here). The flushing cistern is thus ready, once again, for further flushing.

List of designations

	1	Discharge valve
	2	Flushing cistern
5	3	Flushing-cistern cover
	4	Actuator
	5	Button (full-quantity flushing)
	6	Button (partial-quantity flushing)
	7	Push rod
10	8	Lever
	9	Pivot pin
	10	Connecting rod
	11	Yoke
	12	Closure body
15	13	Partial-quantity float
	14	Valve housing
	15	Valve disc
	16	Valve seat
	17	Opening
20	18	Connector
	19	Nut
	20	Full-quantity float
	21	Pivot pin
	22	Blocking element
25	23	Guide means
	24	Shoulder
	25	Retaining protruberance
	26	Part
	27	Bottom end (closure body)
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Patent Claims

1. Discharge valve for a flushing cistern (2), having a valve housing (14) which has an outlet opening with a valve seat (16), having a closure body (12) which interacts with the valve seat (16) at a bottom end (27), having a two-quantity actuator (4) which has a connecting rod (10) which is connected to the closure body (12) and by means of which the closure body (12) can optionally be raised by different displacement distances, having a top activatable partial-quantity float (13) for partial flushing, and having a bottom, full-quantity float (20) which is mounted in a pivotable manner on the valve housing (14) and is intended for full flushing, which full-quantity float (20) has a blocking element (22) which, once partial flushing has been triggered, engages with the closure body (12) and blocks the latter against further displacement, characterized in that the connecting rod (10) blocks the full-quantity float (20) in a predetermined pivoting position once partial-quantity flushing has been triggered.
2. Discharge valve according to Claim 1, characterized in that the closure body (12) has a guide means (23) with which the full-quantity float (20) interacts in order to block further displacement of the closure body (12).
3. Discharge valve according to Claim 1 or 2, characterized in that the blocking element (22) is a protruberance or nose which is arranged, and in particular integrally formed, on the full-quantity float (20).
4. Discharge valve according to Claim 2 or 3, characterized in that the guide means (23) has an approximately horizontally extending shoulder (24)

against which the blocking element (22) butts, and thus blocks further displacement, once partial flushing has been triggered.

- 5 5. Discharge valve according to one of Claims 1 to 4,
characterized in that a retaining protruberance (25)
is arranged on the connecting rod (10), this
retaining protruberance acting on the full-quantity
float (20) once partial-quantity flushing has been
10 triggered.
6. Discharge valve according to Claim 5, characterized
in that the retaining protruberance (25) of the
connecting rod (10) engages behind part (26) of the
15 full-quantity float (20) and thus fixes the full-
quantity float (20) in its blocking position.
7. Discharge valve according to Claim 6, characterized
in that the retaining protruberance (25) can be
20 moved upwards out of the abovementioned blocking
position, and this unblocks the full-quantity float
(20).
8. Discharge valve according to one of Claims 1 to 7,
25 characterized in that, once full-quantity flushing
has been triggered, the blocking element (22), which
is arranged on the full-quantity float (20), couples
the full-quantity float (20) to the closure body
(12) and keeps the same in the raised position
30 during full-quantity flushing.
9. Discharge valve according to one of Claims 1 to 8,
characterized in that the two-quantity actuator (4)
has a push rod (7) by means of which the closure
35 body (12) can optionally be made to execute a short
displacement or a long displacement.