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(54) FLUSH-ADJUSTMENT DEVICE FOR TOILET TANK FLUSH SYSTEMS

(57) The invention relates to a flush-adjustment device for toilet tank flush systems. Flush systems essentially comprise a structure defined by a bell that is coupled to a water outlet mouth of the tank and an overflow comprising a rubber seal, whereby the overflow is guided through the tubular neck of the bell. Said systems also comprise at least one float element and a small independent open-topped container (1) which is disposed axially with the overflow (2) on top of the bell (6). The aforementioned container (1) houses at least one float element (12), which is associated with the overflow (2). The invention is **characterised in that** the container (1) is equipped with means for gradually adjusting the water outlet thereof when the flush system is activated, such that the volume of flushed water can be varied depending on the rate of flow of water from the container during flushing.

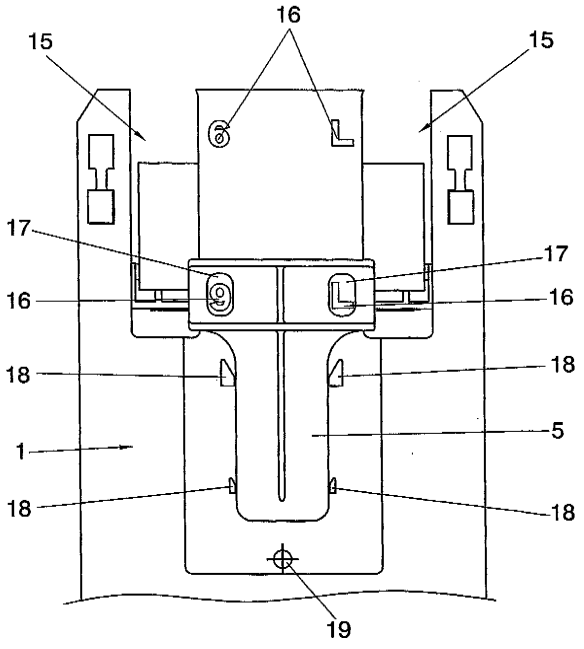

FIG. 4

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Description

OBJECT OF THE INVENTION

[0001] As stated in the title of this descriptive specification, the present invention relates to a flush-adjustment device for toilet tank flush systems intended to be able to select the volume of water to be flushed from the tank, in such a way that it is possible to vary said volume flushed through the outlet mouth of the tank when we operate the flush.

[0002] This is achieved in a simple manner by means of controlling the outlet of water from a small container associated with the flush, inside which container is a float associated with the overflow.

[0003] It is applicable both to double flush mechanisms and to complete flush mechanisms, the latter type being the system that benefits most from the device.

PRIOR ART OF THE INVENTION

[0004] There currently exist tank flushes which incorporate a float housed inside the bell coupled to the mouth of the tank, said float being attached to the overflow so that, when the flush is operated, the tank is completely emptied, which wastes a considerable amount of water since very often a smaller volume of water only is needed.

[0005] In other cases, there exist flush mechanisms with a partial flush and a total flush, so that one or the other option is chosen by pressing one of the two push-buttons included in the flush.

[0006] In this case, the mechanisms of the flushes display a certain complexity, which can make the final product more expensive.

[0007] The solution described in the previous paragraph incorporates, for example, invention patent No. 200300300, where the flush includes a lower float element which acts during total flushing and at least one upper float element which acts during partial flushing.

[0008] This solution is also included in utility model 9701307 as well as in European patent E-96200356.

[0009] In these flush mechanisms with partial and total flushing, two float elements are necessarily required to be arranged at different heights, and two operations are also required on the different buttons and therefore two different displacement mechanisms for the overflow which is positioned at two different heights, depending on the selection of partial or total flushing.

DESCRIPTION OF THE INVENTION

[0010] The flush-adjustment device for tank flushes is defined starting from a bell that is coupled to the mouth of a tank, the lip of which faces a rubber seal fixed to an overflow in turn guided through a tubular neck forming part of the bell, which at the same time projects above the base of that bell.

[0011] Arranged above the base of the bell is a small coaxial open-topped container limited by a wall forming the extension of the side wall of the bell, inside which container is at least one float associated with the overflow. Evidently, said container will fill up with water each time the tank as a whole fills up.

[0012] The main characteristic of the invention consists of certain means for adjusting the emptying of this small container during the flushing of the tank, in such a way that, depending on the speed of emptying of that container during flushing of the tank, more or less volume of water will be emptied from the tank by advancing or retarding the descent of the overflow and therefore the closure or end of that flushing.

[0013] To achieve this, in the coaxial wall demarcating the container, a window has been provided where a moving element is coupled having the possibility of closing that window to a greater or lesser degree with the aim of accelerating or slowing down the emptying of the container and therefore be able to obtain any volume of total flushing water by varying the amount of residual water remaining in the tank, this latter possibility being the one in which the window will be closed practically in its entirety. In this case, the complete emptying of the container will be effected by a hole of a width that is duly calculated and which is normal in this type of flush.

[0014] So, once the flush mechanism has been acted upon, the overflow rises up together with the rubber seal, releasing the mouth of the tank, in such a way that the float will maintain the elevated position of the overflow during the time needed for emptying the coaxial container, rather than for the time needed for the emptying (total or partial) of the tank.

[0015] During this emptying time, it is the buoyant float which keeps the overflow elevated along with the rubber seal, in such a way that the descent of the overflow towards the lower closing position will accompany the descent of the level of water inside the container, with closure of the mouth being achieved when the float loses its buoyancy.

[0016] Moreover, the moving element in charge of controlling the outlet flow from the tank incorporates some passing holes which face some signalling elements located externally on the side wall of the said container, these elements indicating to us the volume of flushing water in the tank, and which are also in directions parallel to the displacement of the moving element.

[0017] The displacement of the moving element is normally in the vertical direction, though said displacement could be horizontal or in any other direction and therefore in the direction of the window as well.

[0018] Below, in order to facilitate a better understanding of this descriptive specification and forming an integral part thereof, some figures are attached in which, on an illustrative rather than limiting basis, the object of the invention has been represented.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Figure 1.- Shows a perspective view of a tank flush system incorporating the flush-adjustment device of the invention.

Figure 2.- Shows another perspective view of the adjustment device.

Figure 3.- Shows a diagrammatic view of the adjustment device.

Figure 4.- Shows a front view of the device.

DESCRIPTION OF THE PREFERRED FORM OF EMBODIMENT

[0020] Considering the numbering adopted in the figures, the adjustment device consists of a small container 1 coaxial with the overflow 2 of a tank flush 3, the side wall of said container 1 including a centred window 4 where a moving element 5 is coupled for being able to adjust the outlet throat for water from that container 1 during its emptying, with that central window 4 even being able to be closed.

[0021] Depending on the position of the moving element 5, that central window 4 will close to a greater or lesser degree, thus varying the outlet throat.

[0022] The container 1 comprises a wall which rises up and is the extension of the side wall of the lower bell 6 which is coupled to the mouth 7 of the tank.

[0023] The base of that bell 6, constituting the bottom of the container 1, includes a tubular neck 8 which rises up and within it is guided the overflow 2, fixed to the lower end of which is a rubber seal 9, facing the mouth 7 in order to permit the exit or not of water from the tank.

[0024] Moreover, projecting from that neck 8 are two diametrically opposed extensions 10 which include some short shafts 11 to which are coupled two float elements 12 in an articulated manner located inside the inner space of the open-topped container 1.

[0025] The float elements 12 include some radial lugs 13 facing the overflow 2, in such a way that when the flush 3 is operated, the overflow 2 displaces upwards until the radial lugs 13 fit into an annular slot 14 of that overflow 2, with which the retention thereof in an elevated position is assured, with the water exiting via the mouth 7 of the tank until the container 1 is empty, or the water from the container ceases to produce any thrust on the float elements 12, at which moment the float elements 12 swivel outwards and downwards and the lugs 13 become decoupled from the annular slot 14 of the overflow 2.

[0026] At this moment, the overflow 2 will be displaced downwards until the rubber seal 9 sits on the mouth 7 of the tank, independently of the residual quantity or volume of water left in the tank, since said displacement depends only on the loss of buoyancy of the floats.

[0027] In any case, the volume of water displaced from the tank will be adjusted with the moving element 5 more or less closing off the throat for the water from the central window 4 of the container 1. Evidently, the emptying of the container 1 takes place during the flushing of the tank.

[0028] So, the larger the throat for the central window 4, the less the volume of water that will be displaced from the tank, while the smaller the throat the greater will be the volume of water displaced from that tank, since in this case the float elements 12 will be floating for a greater length of time and so the overflow 2 will be retained in a raised position.

[0029] The side wall of the container 1 includes two side windows 15 above the central window 4, thereby defining certain portions with a vertical edge for coupling and guiding the moving element 5 which presents the general shape of a "T" where the vertical arm is responsible for closing the throat for the water to a greater or lesser degree, while the cross-piece includes two end folds for coupling in the edge portions of the two side windows 15. The edges of the letter demarcate the displacement limit of the moving element 5.

[0030] The part of the wall of the container 1 demarcated between the two side windows 15 incorporates some projecting elements for signalling 16 arranged in correspondence with some viewfinders 17 made in the moving element 5, in such a way that when that moving element 5 is displaced vertically, the signalling elements 6 indicating the flushing volume of the tank will be able to be seen through the viewfinders, this volume evidently depending on the throat for the central window 4.

[0031] So, the viewfinders inform us of the flushing volume depending on their relative position with respect to the body of the container 1.

[0032] Obviously, the gradual positioning of the moving element 5 will permit intermediate flushing volumes.

[0033] In particular, provision has been made for signalling of maximum flush (9 litres) and another for minimum flush (6 litres) for a standard tank.

[0034] Although the float elements are arranged as in the case of invention patent No. 200300300, they could also be arranged in any other manner, such as for example by making them integral with the overflow.

[0035] The body of the container 1 incorporates some guide stops 18 for optimum sliding and positioning of the T-shaped moving element 5, especially its vertical arm.

[0036] Moreover, the body of the container 1 incorporates a hole 19 which corresponds to the throat or exit of water, habitual in this type of flush, and which will previously have been rated for emptying the container 1 in the maximum length of time that ensures complete flushing. It collaborates with the device forming the object of the invention to the point that, without it, we would not be sure of emptying the container 1, though in one possible embodiment provision is made so that the moving element 5 in its maximum lowest position does not completely cover the window 4, which performs the same function as said passage throat 19.

Claims

1. **FLUSH-ADJUSTMENT DEVICE FOR TOILET TANK FLUSH SYSTEMS**, in which the flush systems comprise a bell coupled to a water outlet mouth of the tank along with an overflow with a rubber seal, the overflow being guided in a tubular neck of the bell, furthermore comprising at least one float element; and including a small independent open-topped container (1) which is arranged axially with the overflow (2) on top of the bell (6), with at least one float element (12) associated with the overflow (2) being housed in the container (1); **characterised in that** the container (1) is equipped with means for gradually adjusting the water outlet thereof when the flush system is operated; all this in order to be able to vary the volume of flushed water depending on the rate of flow of water from the container during that flushing.

2. - FLUSH-ADJUSTMENT DEVICE FOR TOILET TANK FLUSH **SYSTEMS,** according to claim 1, **characterised in that** the means for gradually adjusting the outlet of fluid from the container (1) comprises a window (4), whose outlet cross-section is demarcated by a mobile element (5), the position of which will cause the flushing to be faster or slower, with said window (4) being able to be closed completely.

3. - **FLUSH-ADJUSTMENT DEVICE FOR TOILET TANK FLUSH SYSTEMS**, according to claim 2, **characterised in that** the container (1) and the moving element (5) include complementary means for signalling indicating to us the volume of water to be flushed via the mouth of the tank, said volume depending on the outlet cross-section of the container.

4. - **FLUSH-ADJUSTMENT DEVICE FOR TOILET TANK FLUSH SYSTEMS**, according to claims 2 and 3, **characterised in that** the window (4) for emptying the container (1) is arranged in the side wall of said container (1) in a vertical direction, with the mobile element (5) being coupled in correspondence with that window (4) and which will be displaced vertically in order to vary the outlet passage throat of the container, said mobile element (5) having some upper folds which grasp some portions of the edge of some upper windows (15) of the container (1) in order to guide the moving element (5); the container furthermore including other guide stops (15) of a lower part of said mobile element (5).

5. - **FLUSH-ADJUSTMENT DEVICE FOR TOILET TANK FLUSH SYSTEMS**, according to claims 3 and 4, **characterised in that** the signalling elements consist of some viewfinders (17) which include the moving element (5) and some projections or depressions (16) located in the side wall of the container (1); all this so that when the moving element is located in a vertical position the projections or depressions (16) may be seen through the viewfinder (17).

6. - **FLUSH-ADJUSTMENT DEVICE FOR TOILET TANK FLUSH SYSTEMS,** according to claim 1, **characterised in that** the container (1) is limited by a wall which is the extension of the side wall of the lower bell (6) with the bottom of the container (1) coinciding with the base of said bell (6).

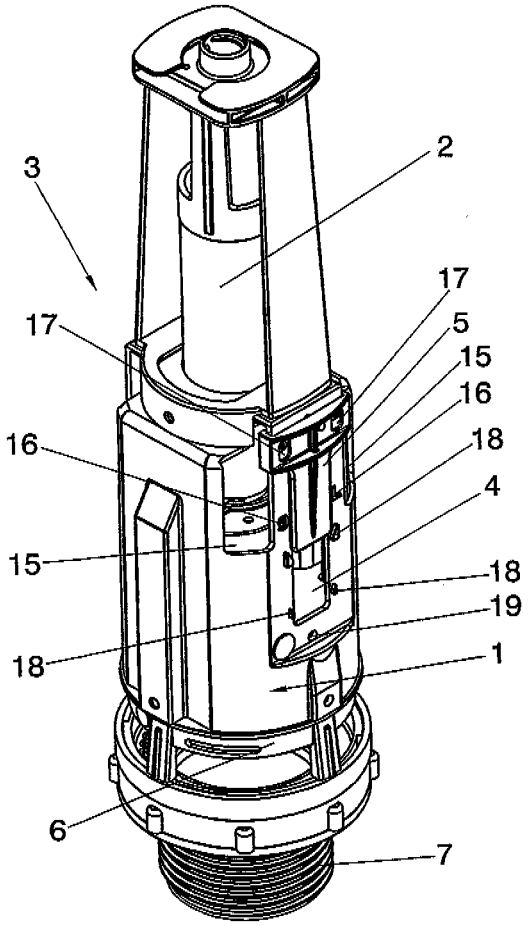

FIG. 1

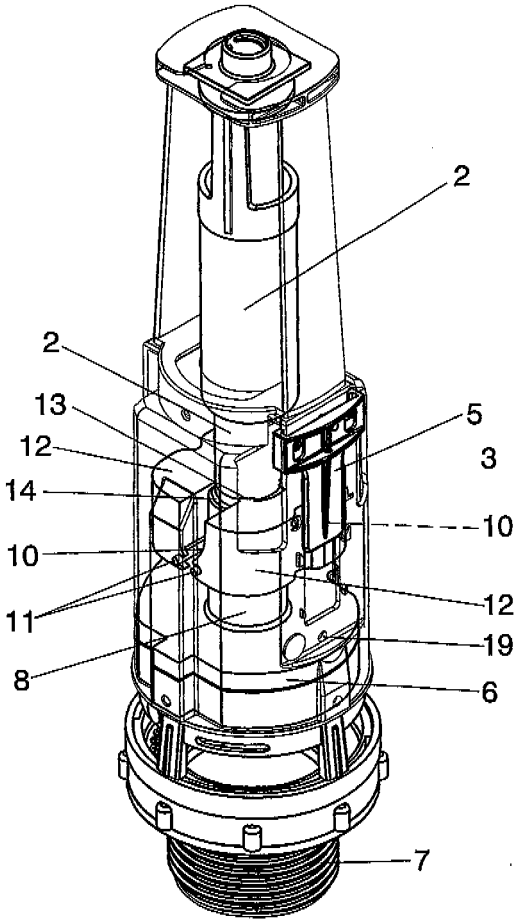

FIG. 2

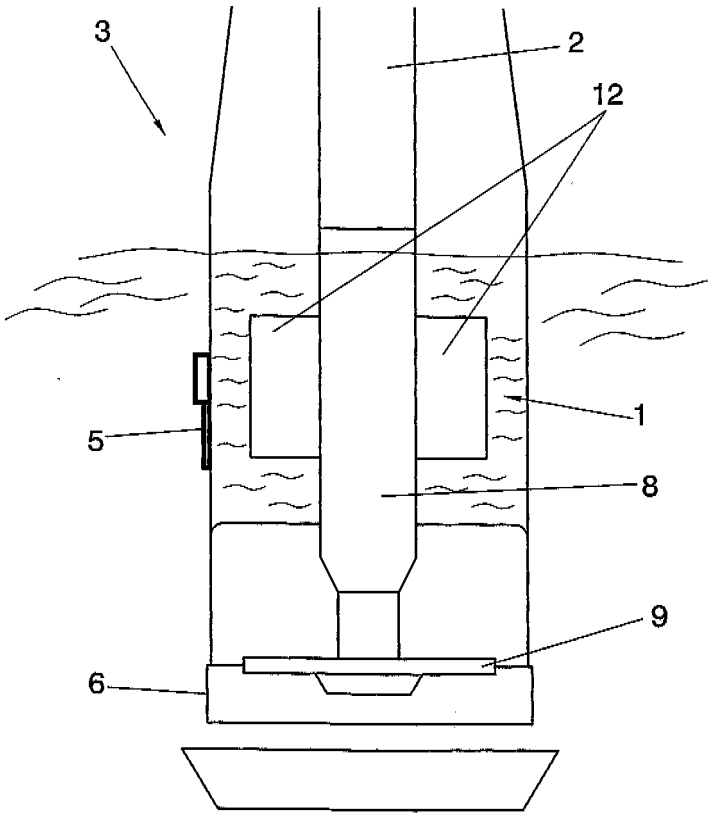

FIG. 3

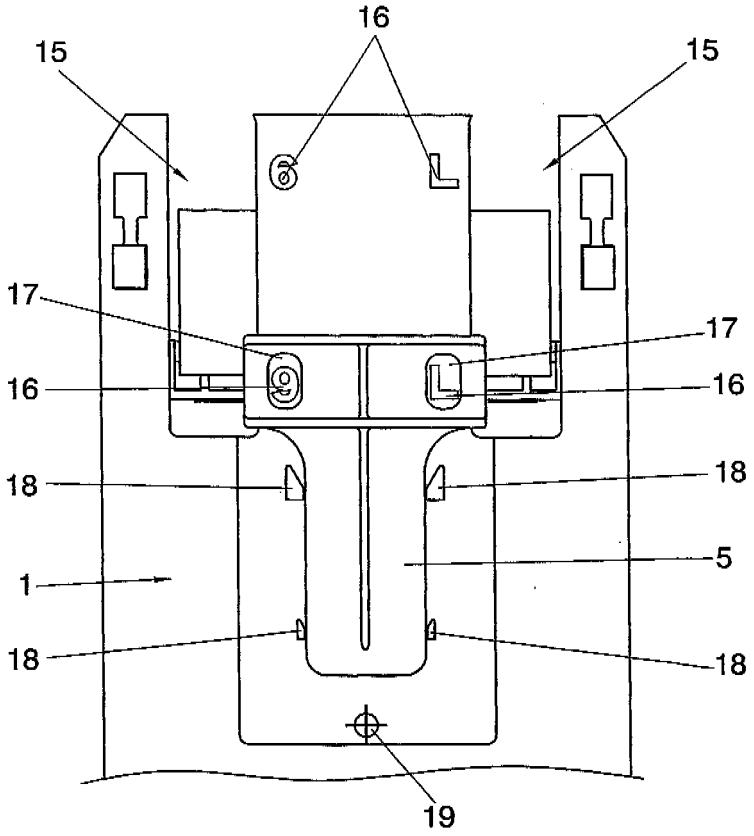

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2005/000633

A. CLASSIFICATION OF SUBJECT MATTER

E03D 1/14 (2006.01)

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)

E03D1/, E03D3/00, E03D3/12

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

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

CIBEPAT,EPODOC, PAJ, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US6112763 A (MURIEL ANN ORBELL), 05.09.2000. **the whole document**	1

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
14.03.2005	17-03-2006
Name and mailing address of the ISA/	Authorized officer
Facsimile No.	Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
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