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(54) Toilet-flushing cistern with double-chamber system

(57) The present invention relates to a water flush tank (1), said tank (1) being connected with a water inlet conduct (2) and with a water outlet or discharge conduct (3), and comprising water level control means (5, 6, 7, 8), said control means (5, 6, 7, 8) restoring a set water level (L) within said tank (1) after each flushing; said tank (1) being characterised in that it provides an inner partition (9), said partition (9) realising a first space and a second space (10, 11), said spaces (10, 11) being adjacent each other, and having each one a water exit opening (4', 4") connected with said water outlet or discharge conduct (3); a first and a second actuating device (12, 13), respectively provided within said first and second spaces (10, 11) and connected with said openings (4', 4"); and activation means (17, 18, 20, 21), connected with said first and second flushing actuating devices (12, 13), said activation means (17, 18, 20, 21) permitting independent actuation of said first and second flushing actuating devices (12, 13); activation of said first flushing actuation device (12) by said activation means (17, 20) conveying water contained within said tank (1) through said exit or discharge conduct (3), but the water contained within said second space (11), while activation of said second flushing actuation device (13) by said activation means (18, 21) conveying water contained within said tank (1) through said exit or discharge conduct-(2), but the water contained within said first space (10).

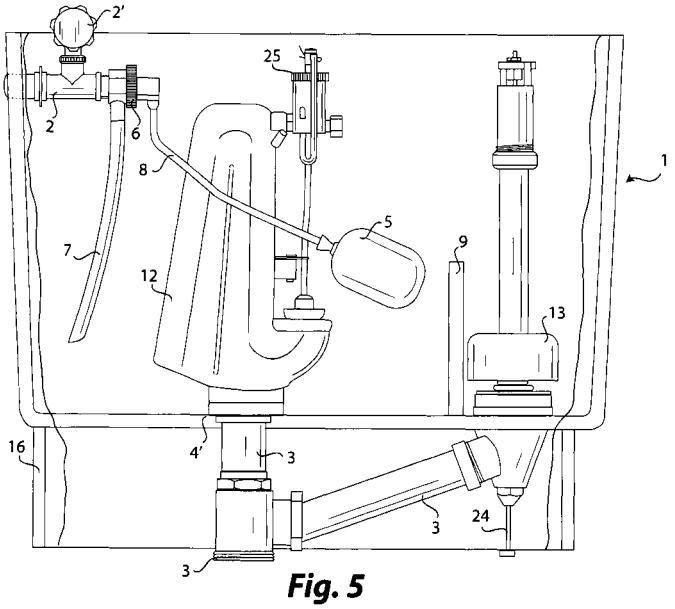

Fig. 5

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Description

[0001] The present invention relates to a water saving, outside wall flush tank for toilet.

[0002] More specifically, the invention relates to a water-closet flush tank permitting dosing water according to a differentiated mode, thus allowing rationalising water consumption. ,

[0003] As it is well known, at present various kind of water flush apparatuses are available on the market. Particularly, wall flush apparatuses are known since many years, permitting by a simple hydraulic system, flushing within water closet a set water amount.

[0004] Problems connected with the water lack are well known to everybody, these problems being more evident in summer, although in some parts where precipitation are scarce they are relevant all the year.

[0005] Notwithstanding the above, a rather imprudent use of the hydraulic resources is quite diffused. It is in fact known that a large waste is present mainly downward the distribution system, i.e. by the final users. This occurs notwithstanding a diffused awareness of the problem exists.

[0006] A not scrupulous use of the resources by the final users occurs each time one pushes the flush button, wastes drinkable water.

[0007] At present, water-delivering companies give suggestions about a proper use of the hydraulic resource. At the national or regional level, rules have been often suggested for a rational water delivery, just to prevent a wrong consumption. However, said measures are inefficient.

[0008] Various solutions are available on the market in order to reduce the water wasting for washing water closet, such as the use of built-in or "seat" flush tanks. Said tanks, besides being controlled by a single button, are comprised of a single reservoir. Mainly, they are installed with offices and hotels. However, said built-in tanks are scarcely used in the existing buildings and particularly in houses.

[0009] Usually, traditional wall tank is used in houses, having a single reservoir, or a closed circuit flush device actuated by a mechanic - pneumatic flush actuating device activating a siphon.

[0010] Replacement of said wall tanks by those of the built-it or "seat" type with a mechanic control, permitting a controlled and differentiated use of water according to the flush needing, is not usually made. This is due to various problems connected with replacement of these tanks, and particularly the unavoidable and expensive masonry and hydraulic work, as well as for the maintenance, repair and replacement costs of failed parts of the system.

[0011] In view of the above, it is an object of the present invention that of suggesting an outside wall water-closet flush tank, permitting rationalising the use of water and that at the same time permits their installation also on existing system at low costs.

[0012] It is therefore specific object of the present invention a water flush tank, said tank being connected with a water inlet conduct and with a water outlet or discharge conduct, and comprising water level control means, said control means restoring a set water level within said tank after each flushing; said tank being characterised in that it provides an inner partition, said partition realising a first space and a second space, said spaces being adjacent each other, and having each one a water exit opening connected with said water outlet or discharge conduct; a first and a second actuating device, respectively provided within said first and second spaces and connected with said openings; and activation means, connected with said first and second flushing actuating devices, said activation means permitting independent actuation of said first and second flushing actuating devices; activation of said first flushing actuation device by said activation means conveying water contained within said tank through said exit or discharge conduct, but the water contained within said second space, while activation of said second flushing actuation device by said activation means conveying water contained within said tank through said exit or discharge conduct, but the water contained within said first space.

[0013] Always according to the invention, said partition can have a height lower than the set water level.

[0014] Still according to the invention, said first space can have a volume bigger than said second space.

[0015] Furthermore, according to the invention, said first flushing actuating device can be of the mechanic - pneumatic type, said activation means comprising a button connected with said first flushing actuating device by an air conduct, said button preferably comprising a return spring and being fixed on the wall.

[0016] Still according to the invention, said first flushing actuating device can be of the mechanic type, said activation means comprising a substantially vertical button.

[0017] Always according to the invention, said second flushing actuating device can be of the mechanic - pneumatic type, said activation means comprising a button connected with said second flushing actuating device by an air conduct, said button preferably comprising a return spring and being fixed on the wall.

[0018] Advantageously, according to the invention, said second flushing actuating device can be of the mechanic type, said activation means comprising a substantially vertical button.

[0019] Still according to the invention, said tank can be fixed on the wall by fixing means, e.g. hooks.

[0020] Preferably, according to the invention, said tank can comprise a covering panel for said outlet or discharge conduct and connection tubes.

[0021] Always according to the invention, said tank can be porcelainized and/or vitrified and/or comprised of coloured resin.

[0022] The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the

figures of the enclosed drawings, wherein:

figure 1 shows a front section view of a water saving, outside wall flush tank for toilet according to the present invention;
, figure 2 shows a lateral section view of the tank according to figure 1;
figure 3 shows a front view of a pair of buttons for activation of flushing actuating devices of tank according to figure 1;
figure 4 is a top section view of the buttons according to figure 3; and
figure 5 shows a front section view of a second embodiment of a outside wall flush tank according to the present invention.

[0023] Making reference to figures 1 and 2, it is possible observing the flushing tank 1. said tank 1 is connected above with a water inlet conduct 2, permitting its filling. A regulation valve 2' is provided on said conduct 2.

[0024] Said tank 1 provides on its base two openings 4', 4", each one connected by two different conducts 3', 3" with a water discharge conduct 3.

[0025] A floating 5 is provided on the upper part of the tank 1, said floating being coupled by a rod 8 with a further valve 6 provided on said water inlet conduct 2. said valve 6 permits the passage of water from said water inlet conduct 2 to a tube 7 sending water at the base of said tank 1.

[0026] Water within the tank 1 is maintained at a set level L, thanks to said floating 5 closing said valve 6, once the level L has been reached.

[0027] Inside, said tank 1 provides a partition 9, realising two spaces 10, 11, separated and adjacent each other, and filled in with water. Said spaces 10, 11 communicate each other by said openings 4', 4".

[0028] A flushing actuating device 12, 13 is installed within each of said spaces 10, 11, in correspondence of said openings 4', 4".

[0029] When one of said flushing actuating devices 12, 13 is actuated, it makes water out flowing sending the same toward the corresponding opening 4', 4".

[0030] Tank 1 can be installed on a wall for example by one or more hooks 15. moreover, said tank 1 can be porcelainized and/or vitrified or comprised of coloured resin.

[0031] On the bottom, said tank 1 can comprise a covering panel 16 for covering conduct 3, 3', 3".

[0032] Flushing actuating devices 12 and 13 can be activated independently each other. Making reference to figures 3 and 4, it is possible noting said activation buttons 17 and 18, mounted on a base 19 placed on the wall 14.

[0033] Each actuation button 17 or 18 activates one of the flushing actuating devices 12 or 13 by air tubes 20 and 21, in case said flushing devices 12 or 13 are of the mechanic - pneumatic type. Finally, said actuation buttons 17 and 18 each one provides return springs 22 and 23.

[0034] Tank 1 can also have a different shape, such as the shape shown by the dotted line A in figure 1.

[0035] In case it is possible, in a double pneumatic - mechanic control system, in order to avoid the partial removal of the existing coating and permitting the connection of the further actuation button, it will be possible making the chase on the rear of the wall 14, making the air tube 20 or 21 entering back at the same height of the tank 1.

[0036] In case the tank 1 according to the invention is installed when realising the hydraulic system, it will be installed as described in the above,

[0037] Presence of a partition 9 permits flushing different water amounts. Particularly, three different volumes are individuated:

- V1, corresponding to space 10 volume;
- V2, corresponding to space 11 volume; and
- V3, corresponding to the volume between level L and partition 9 height.

[0038] Volume V3, communicating with spaces 10 and 11, can be adjusted on the basis of level L, that can be varied by floating 5. said partition 9 has a height under the minimum storage capacity.

[0039] Two spaces 10, 11 are different each other in the present embodiment, so that V1 is different (bigger) than V2.

[0040] Actuating flushing actuating device 12 by button 17, water contained within volume corresponding to V1 + V3 is flushed through opening 4' and exit conduct 3. After flushing, floating 5 fills back set water level L, opening valve 7.

[0041] Obviously, in an completely symmetrical way, actuating button 18, water contained within volume corresponding to V2 + V3 is flushed through opening 4" and exit conduct 3. in this case too, floating 5 fills back set water level L.

[0042] Position of partition 9 permits setting volumes V1 and V2, and thus water amount contained within them. In the present embodiment, water amount roughly contained within volumes V1 and V3 is that necessary for eliminating solid matter. Water contained within volumes V2 and V3 is sufficient for eliminating liquid matter, thus being lower than V1 + V3.

[0043] Theoretically, it is possible realising, even if not advantageous, an embodiment of the tank 1 with partition 9 with a height equal or higher than water level L. in this way, volume V3 is zero and two floatings 5 and valves 7, corresponding to two water inlet conducts 2 will be installed, each one for filling in spaces 10 and 11 delimited by said partition 9.

[0044] Considering that number of outlet for liquid matter is usually higher than the number for eliminating solid matter, by said tank 1, each flushing for eliminating liquid matter saves an amount of water corresponding to water contained in V1 + V2.

[0045] Figure 5 shows a second embodiment of the present invention. Particularly, it is possible observing

that flushing actuating device 12 is still of the mechanic - pneumatic type, while flushing actuating device 13 is of the mechanic type. As it can be noted, a vertical button 24 is placed under flushing actuating device 13 in order to priming inner siphon.

[0046] Theoretically, it is also possible realising an embodiment with two mechanic flushing actuating devices 12 and 13.

[0047] Always making reference to figure 5, it is possible observing in greater detail flushing actuating device 12 of the mechanic - pneumatic type according to the prior art. It comprises a plunger 25 for conveying water exiting, said plunger being actuated by air arriving from said air tubes 20 and 21.

[0048] It must be noted that both mechanic flushing actuating devices and pneumatic - mechanic flushing actuating devices leave a small amount of water at the basis of tank 1 that is not flushed.

[0049] Finally, in the embodiment of the invention according to figure 6 it can be noted the regulation valve 2' and valve 6 for filling in tank 1 are placed above, within the same tank 1. this technical solution permits, in case losses occur, avoiding that water drops on the toilet floor making it siphoning through the siphon gooseneck.

[0050] In order to evaluate importance of the solution according to the present invention, it must be taken into consideration that, only for cleaning services, per-person water average consumption is 48 l, while using the inventive solution, the amount can be reduced even at 20 l per-person. Therefore, valuating users that in Italy use services provided with a wall flush tank system are about 40,000,000, water amount that can be saved per-person is of 20 l per day, and days are 365, at the end of the year a lower consumption of about m^3 292,000,000 will be obtained.

[0051] Solution according to the present invention can be provided in new buildings, permitting also application in existing systems, and satisfies the needing of a lower water waste with advantages both for the user and the whole collectivity.

[0052] On the basis of the previous specification, it can be noted that the basic feature of the present invention is a separation of the amount of water contained, and, by a pair of independent flushing actuating devices, differentiated control of water contained within said tank.

[0053] Main advantage of the present invention is that replacement of existing tanks does not require expensive masonry work. It is in fact necessary only installation of a second flushing actuating device, and the relevant wall button, and realisation of a deviation on a discharge conduct.

[0054] A further advantage of the present invention is that of permitting installation limiting expenses for purchasing and mounting the inventive solution, that will be amortized also by saving costs for water consumption and depuration treatments.

[0055] The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

Claims

1. Water flush tank (1), said tank (1) being connected with a water inlet conduct (2) and with a water outlet or discharge conduct (3), and comprising water level control means (5, 6, 7, 8), said control means (5, 6, 7, 8) restoring a set water level (L) within said tank (1) after each flushing; said tank (1) being **characterised in that** it provides:

- an inner partition (9), said partition (9) realising a first space and a second space (10, 11), said spaces (10, 11) being adjacent each other, and having each one a water exit opening (4', 4") connected with said water outlet or discharge conduct (3);
- a first and a second actuating device (12, 13), respectively provided within said first and second spaces (10, 11) and connected with said openings (4', 4"); and
- activation means (17, 18, 20, 21), connected with said first and second flushing actuating devices (12, 13), said activation means (17, 18, 20, 21) permitting independent actuation of said first and second flushing actuating devices (12, 13);

activation of said first flushing actuation device (12) by said activation means (17, 20) conveying water contained within said tank (1) through said exit or discharge conduct (3), but the water contained within said second space (11), while activation of said second flushing actuation device (13) by said activation means (18, 21) conveying water contained within said tank (1) through said exit or discharge conduct (2), but the water contained within said first space (10).

2. Tank (1) according to claim 1, **characterised in that** said partition (9) has a height lower than the set water level (L).

3. Tank (1) according to one of the preceding claims, **characterised in that** said first space (10) has a volume bigger than said second space (11).

4. Tank (1) according to one of the preceding claims, **characterised in that** said first flushing actuating device (12) is of the mechanic - pneumatic type, said activation means comprising a button (17) connected with said first flushing actuating device (12) by an air conduct (20), said button (17) preferably compris-

ing a return spring (22) and being fixed on the wall (14).

5. Tank (1) according to one of the preceding claims 1 - 3, **characterised in that** said first flushing actuating device (12) are of the mechanic type, said activation means comprising a substantially vertical button (24).

6. Tank (1) according to one of the preceding claims, **characterised in that** said second flushing actuating device (13) is of the mechanic - pneumatic type, said activation means comprising a button (18) connected with said second flushing actuating device (13) by an air conduct (21), said button (18) preferably comprising a return spring (23) and being fixed on the wall (14).

7. Tank (1) according to one of the preceding claims 1 - 5, **characterised in that** said second flushing actuating device (13) is of the mechanic type, said activation means comprising a substantially vertical button (24).

8. Tank (1) according to one of the preceding claims, **characterised in that** said tank (1) is fixed on the wall (14) by fixing means (15).

9. Tank (1) according to claim 8, **characterised in that** said fixing means are comprised of hooks.

10. Tank (1) according to one of the preceding claims, **characterised in that** said tank (1) comprises a covering panel (16) for said outlet or discharge conduct (3) and connection tubes (3', 3").

11. Tank (1) according to one of the preceding claims, **characterised in that** said tank (1) is porcelainized and/or vitrified and/or comprised of coloured resin.

12. Tank (1) according to each one of the preceding claims, substantially as illustrated and described.

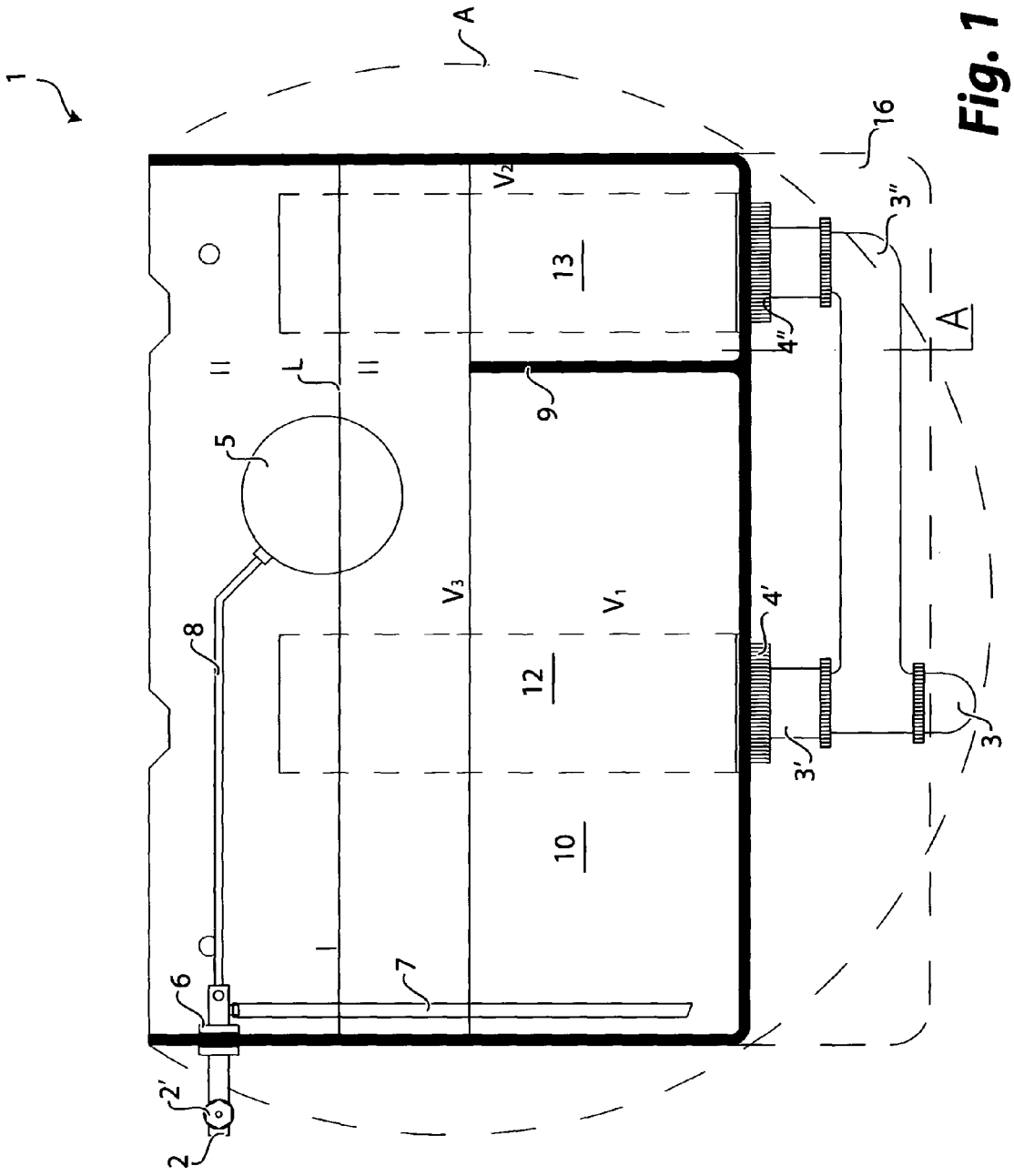

Fig. 1

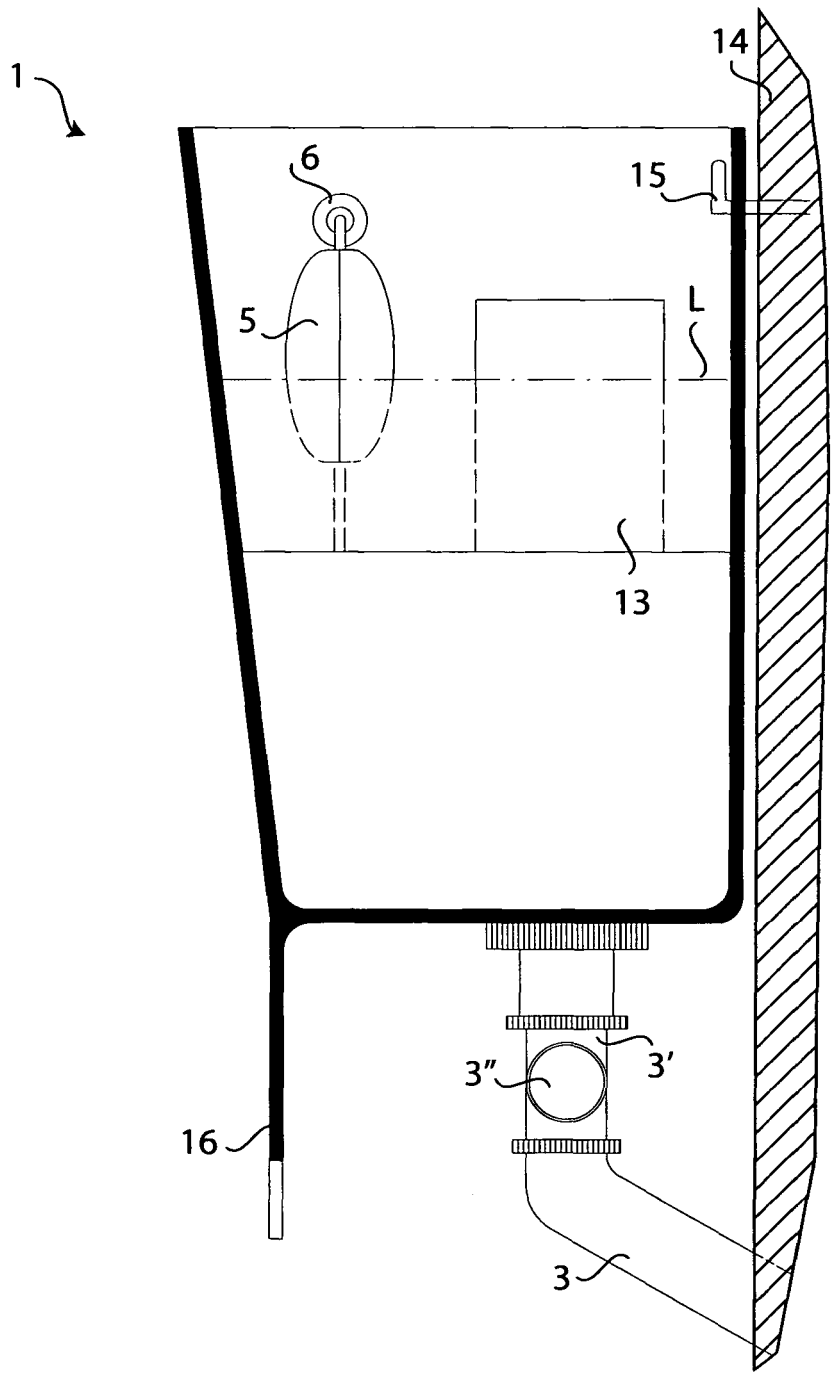

Fig. 2

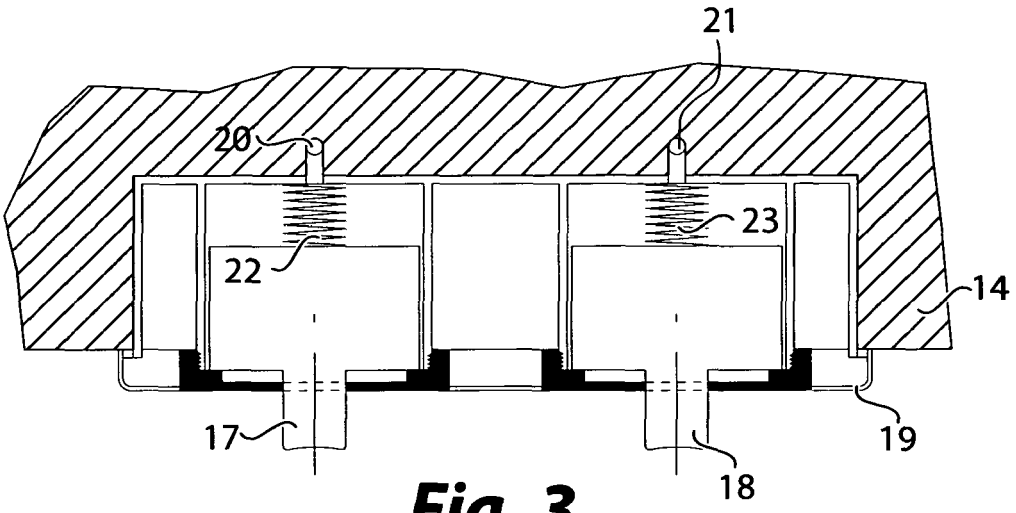

Fig. 3

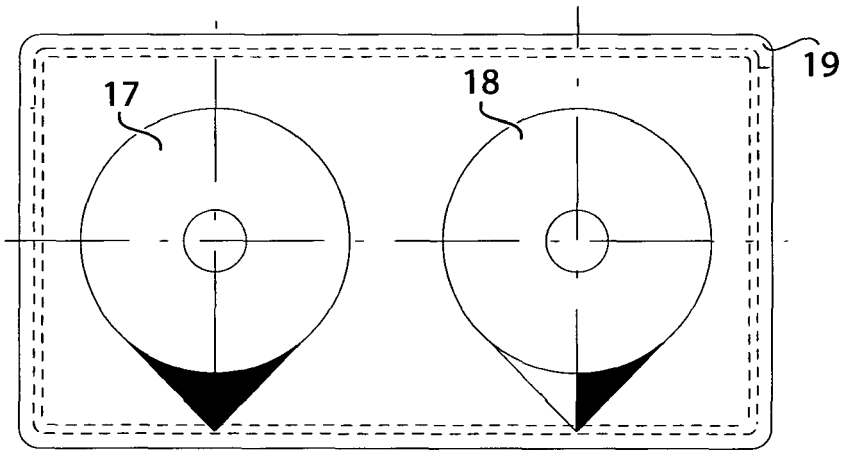

Fig. 4

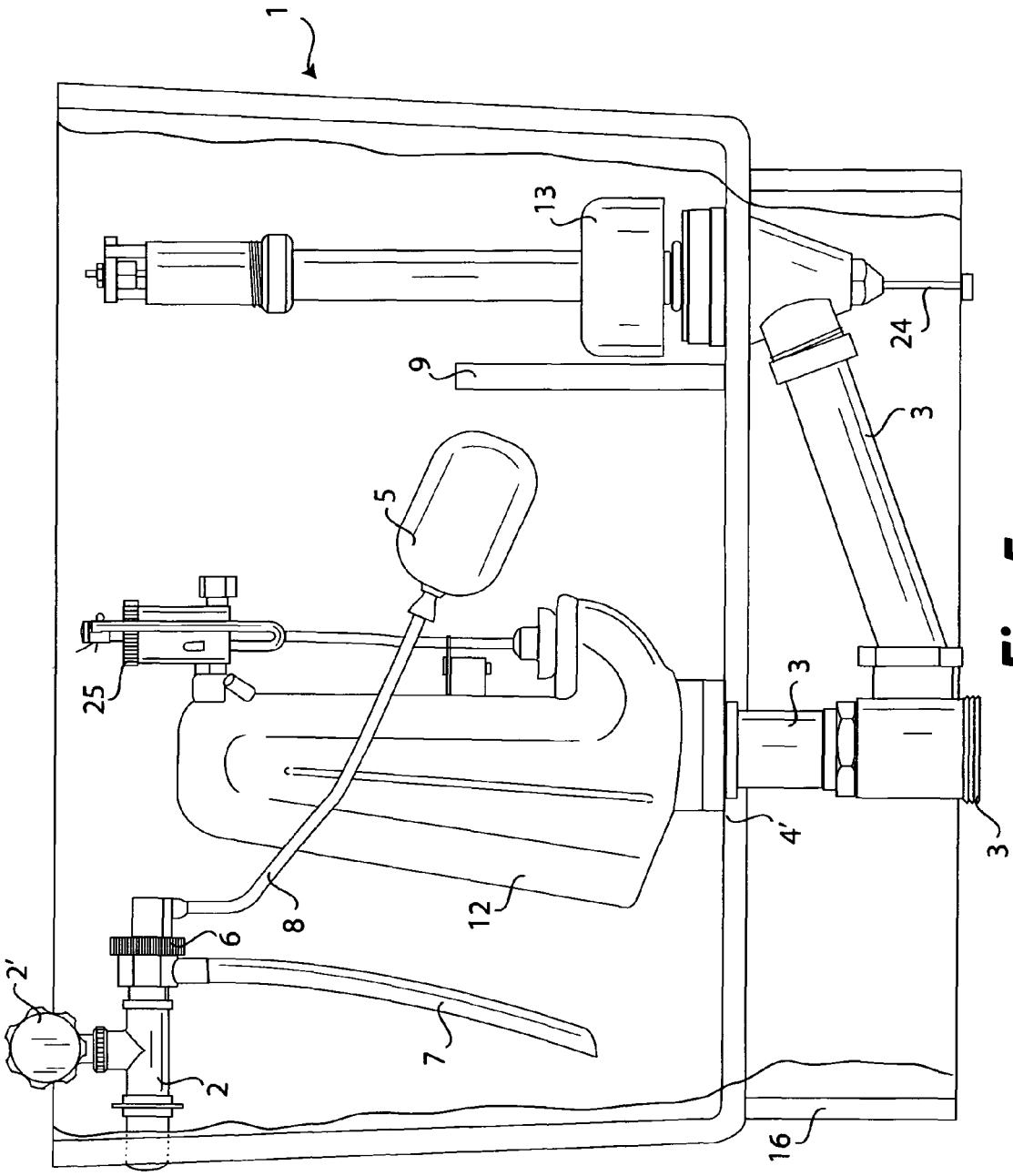

Fig. 5

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PARTIAL EUROPEAN SEARCH REPORT

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number EP 06 42 5169

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	FR 2 461 067 A (RAITEUX CHRISTIAN) 30 January 1981 (1981-01-30) * the whole document *	1-3,5, 7-9,11 4,6	INV. E03D1/14 E03D1/22
Y	DE 37 29 569 A1 (SCHWAB SANITAER-PLASTIC GMBH) 16 March 1989 (1989-03-16) * column 5, line 38 - line 40 *	4,6	
X	DE 34 16 727 A1 (PFANNER,HELMUT) 31 October 1985 (1985-10-31) * the whole document *	1,3,5, 7-10	

TECHNICAL FIELDS SEARCHED (IPC)

E03D

INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

Place of search	Date of completion of the search	Examiner
Munich	30 May 2006	Isailovski, M

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
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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INCOMPLETE SEARCH
SHEET C

Application Number
EP 06 42 5169

Claim(s) not searched:
12

Reason for the limitation of the search:

Claim 12 refers to description (Rule 29 (6) EPC)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 42 5169

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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30-05-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2461067 A	30-01-1981	NONE	
DE 3729569 A1	16-03-1989	NONE	
DE 3416727 A1	31-10-1985	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82