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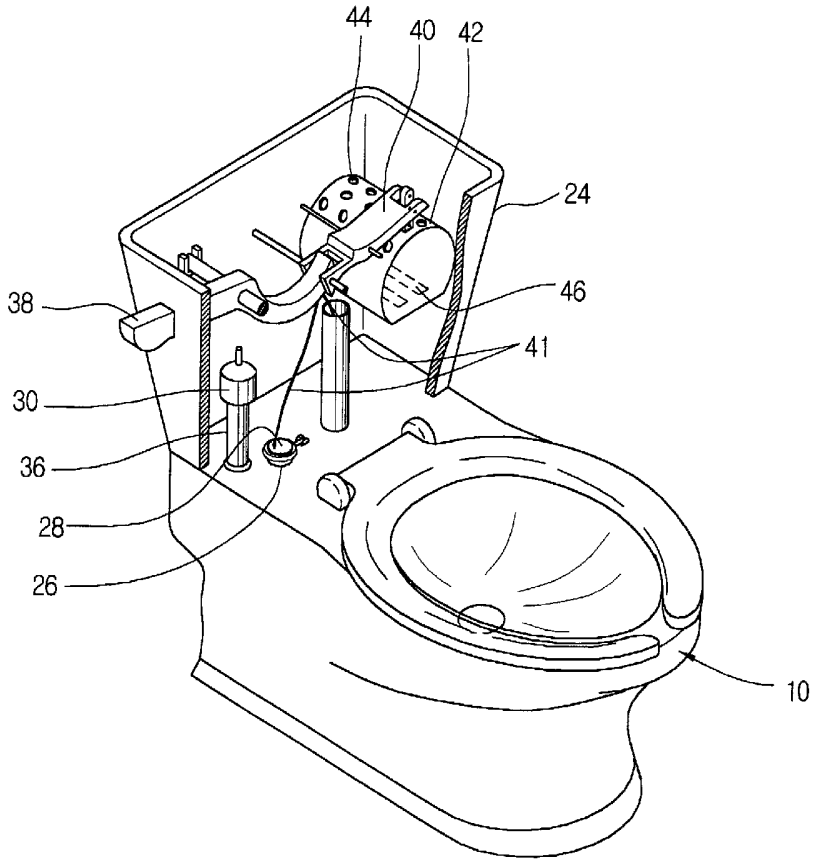
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(54) **Title:** NATURAL DISCHARGE TYPE WATER CLOSET



(57) **Abstract:** Disclosed is a natural discharge type water closet, in which flushing water with waste is discharged in a natural manner, so as to reduce the consumption of the flushing water and the noise during the discharge of the flushing water with waste. Also in the water closet, a modified bowl can be easily manufactured by selecting a proper position of a waste discharge pipe.

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NATURAL DISCHARGE TYPE WATER CLOSET

Technical Field

The present invention relates to a natural discharge type water closet.

Background Art

In a siphon-type water closet being in common use, as shown in Fig. 1, a bowl 1 is formed at its upper end with a water supply channel 3 through which flushing water is supplied into the bowl 1, and a discharge channel 5 curved in an inverted U-shape is provided at a rear portion of the bowl 1. In this case, an inner end and an outer end of the discharge channel 5 are respectively defined as an inlet 5a and an outlet 5b.

With such a construction of the siphon-type water closet, when the flushing water is supplied through the water supply channel 3 into the bowl 1, a water level of the flushing water is increased from a position of a remaining water surface S to a position of an elevated surface T, and simultaneously the flushing water begins to flow within the discharge channel 5. In this case, since the outlet 5b is lower than the inlet 5a in the discharge channel 5, when the flushing water reaches a state of a full water level within the discharge channel 5, a siphon action occurs due to the difference of water levels, so that the flushing water along with waste, such as excretion or shit (hereinafter referred to as waste), is discharged through the discharge channel 5 to the exterior of the water closet by a strong exhausting force. Thereafter, when the water level within the bowl 1 becomes lower than a position of an intake surface 7 on the inlet side, air is fed into the discharge channel 5 while the siphon action disappears, and the flow of the flushing water within the discharge channel 5 is ended. Also, after the water is supply up to the level of the remaining water surface S, the water supply is stopped and the water level is restored to the initial state.

In the conventional siphon-type water closet, however, in order to obtain the strong exhausting force by the siphon action, the water must be supplied up to the position of the full water level T, which results in large flushing water consumption. Besides, the conventional water closet has another problem of large water-discharging noise generated due to action of the strong exhausting force.

Disclosure of Invention

Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and an object of the present invention is to provide a natural discharge type water closet, in which flushing water with waste is discharged in a natural manner, so as to reduce the consumption of the flushing water and the noise during the discharge of the flushing water with waste.

Another object of the present invention is to provide a natural discharge type water closet, in which a modified bowl can be easily manufactured by selecting a proper position of a waste discharge pipe.

To accomplish theses objects, there is provided a water closet in accordance with the present invention, the water closet comprising: a bowl having a water supply channel and a discharge channel, the discharge channel being declivous in a backward direction of the bowl, so that waste and flushing water can be discharged in a natural manner; a waste discharge pipe interconnecting the discharge channel and a waste box; a waste discharge pipe plug installed in the waste discharge pipe in such a manner that the waste discharge pipe plug can move up and down in the waste discharge pipe; a water tank having a water discharge port in communication with the water supply channel of the bowl, a water supply port connected to a water pipe, a water discharge port-opening/closing plug for selectively opening and closing the water discharge port, and water supply port-opening/closing means for blocking the water supply port at a full water level and opening the water supply port prior to the full water level by a float rising and falling pursuant to a water level; a water tank-opening/closing lever pivotally disposed within the water tank, exposed at its outer end to the exterior of the water tank, and connected at its inner end to the water discharge port-opening/closing plug; an auxiliary lever having a first end hingedly connected to an inner end of the water tank-opening/closing lever, the first end of the auxiliary lever being connected to the waste discharge pipe plug, the auxiliary lever being pivotally disposed within the water tank; and an auxiliary water pail hingedly connected to a second end of the auxiliary lever, the auxiliary water pail having upper and lower holes respectively formed at upper and lower portion of the auxiliary water pail.

Preferably, the waste discharge pipe may be located at a center portion of a width of the bowl.

Also, it is preferred that the waste discharge pipe plug comprises a plug body; a rubber packing screwed to a lower portion of the plug body with a certain gap from the lower portion; and a downwardly open casing which covers the plug body together with at least the gap.

The plug body and the rubber packing preferably have a through hole penetrated in a longitudinal direction, respectively and an auxiliary pipe having a hook-shaped flow channel is mounted to an upper end of the through hole of the plug body.

Accordingly, the water closet in accordance with the present invention can not only obtain effects of water saving and noise reduction by discharging the flushing water including the waste in a natural manner not a forced manner, but also can make it easy to modify a shape of the closet by improving a position of the waste discharge pipe.

Brief Description of Drawings

The above and other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a sectional view of a conventional siphon-type water closet for showing the construction thereof;

Fig. 2 is a perspective view of a natural discharge type water closet in accordance with the present invention;

Figs. 3a and 3b are longitudinal and transverse sections of a natural discharge type water closet in accordance with the present invention, when the water closet is in a pre-operative state;

Figs. 4a and 4b are longitudinal and transverse sections of a natural discharge type water closet in accordance with the present invention, when the water closet is in an operated state; and

Fig. 5 is a constructional view of a waste discharge pipe plug in accordance with the present invention.

Best Mode for Carrying Out the Invention

Hereinafter, a preferred embodiment of the present invention will be described with reference to the accompanying drawings. In the following description and drawings, the same reference numerals are used to designate the same or similar components, and so repetition of the description on the same or similar components will be omitted.

Figs. 2 to 4b are perspective and sectional views showing constructions and operative states of a natural discharge type water closet in accordance with the present invention.

In the water closet of the present invention, a water supply channel 12 is formed along an upper end of a bowl 10, and a discharge channel 14 is formed at a lower portion of the bowl 10 in such a manner that the discharge channel 12 is declivous in a backward direction of the bowl 10, so that waste and flushing water can be discharged in a natural manner. A waste box 16 embedded in the underground is located under the bowl 10, and the waste box 16 is connected to the discharge channel 14 of the bowl 10 through a waste discharge pipe 18. This waste discharge pipe 18 is located at a center of the width b of the bowl 10 as stated below, which reduces restrictions in a modification of left and right side shapes of the bowl 10. That is, if the waste discharge pipe 18 is located leaning to one side of the bowl 10 as is in the existing water closet, it is impossible to modify the left and right side shapes of the bowl because the waste discharge pipe can be exposed to the exterior of the bowl 10 so that the beauty of the closet is spoiled in a front view of the bowl 10. On the contrary, if the waste discharge pipe 18 is located at the center of the width b of the bowl 10, it goes without saying that the both sides of the bowl 10 can be slimmer in so far as the waste discharge pipe is not exposed.

Also, provided is a waste discharge pipe plug 20 capable of moving up and down within the waste discharge pipe 18 and having dimensions occupying nearly an entire inner volume of the waste discharge pipe 18.

As shown in Figs. 3a and 4a, this waste discharge pipe plug 20 comprises a downwardly open casing 21, a plug body 22 fitted into the casing 21, and a rubber packing 23 screwed to a lower portion of the plug body 22. In this case, the rubber packing 23 is

screwed to the lower portion of the plug body 22 while leaving a certain gap from the plug body 22, and such a gap portion d is maintained in a covered state with the casing 21 so as to prevent the waste discharged out of the bowl 10 from coming into the gap portion d.

A water tank 24 is generally located at a rear portion of the bowl 10 and has in its lower portion a water discharge port 25 communicating with the water supply channel 12. A water discharge port-opening/closing plug is securely seated onto the water discharge port 26 to selectively open and close the water discharge port 26. In addition, a float 30 rising and falling pursuant to a water level and water supply port-opening/closing means connected to the float 30 are so installed within the water tank 24 as to shut off the water supply into the water tank 24 at a full water level by blocking the water supply port 34 connected to the water pipe with the rise of the float 30 and to enable the water supply into the water tank 24 prior to the full water level by keeping the water supply port 34 in an open state.

A water tank-opening/closing lever 38 of a seesaw type is pivotally supported within the water tank 24, a part of the water tank-opening/closing lever 38 is penetrated through one side of the water tank 24 and exposed to the exterior so as to enable its manipulation outside the water tank 24, and an inner end of the water tank-opening/closing lever 38 is connected to the water discharge port-opening/closing plug 28. Thus, an inner end of the water discharge port-opening/closing lever 28 can be lifted by an artificial manipulation (that is, an action of pushing the exposed part of the water tank-opening/closing lever 38). Also, an auxiliary lever 40 of a seesaw type is hinged and connected at its inner end to the inner end of the water tank-opening/closing lever 38, and the waste discharge pipe plug 20 is connected to the inner end of the auxiliary lever 40. At this time, the auxiliary lever 40 is pivotally disposed within the water tank 24.

An auxiliary water pail 42 is hinged and connected to the other end of the auxiliary lever 40 to assist the seesaw action of the auxiliary lever 40 by inflow or outflow of the fluxing water into or from the auxiliary water pail in accordance with the water level within the water tank 24 (hereto, a description will be followed in detail).

Now, a detailed description will be given for the operation of the water closet as constructed above.

Figs. 3a and 3b shows a pre-operative state of the water closet of the present invention. In a state that the flushing water is fully contained within the water tank 24 (a state of being full of water), the float 30 is positioned on the full water level by buoyancy of the fleshing water and the auxiliary water pail 40 is also positioned nearly at this water level. If the float 30 rises to the full water level, the water supply port 34 is closed to shut off the water supply into the water tank 24, and the auxiliary water pail 42 comes to have a lighter weight than that of the waste discharge pipe plug 20 because it is not completely filled with the flushing water. Consequently, the waste discharge pipe plug 20 is in a state of blocking the outlet side 19 of the waste discharge pipe 18 while maintaining its lowered state.

If the exposed part of the water tank-opening/closing lever 38 is forcedly pushed down from such a state, the inner end of the water tank-opening/closing lever 38 and the inner end of the auxiliary lever 40 connected thereto rise together by the pushing force to lift the water discharge port-opening/closing plug 28 and the waste discharge pipe plug 20 connected to the respective inner ends and thus to open the water discharge port 26 and the discharge channel 14 simultaneously. Besides, if the auxiliary water pail 42 is compulsorily lowered by the seesaw action of the auxiliary lever 40 and simultaneously the flushing water within the water tank 24 flows into and fills the auxiliary water pail 42 through upper and lower holes formed in upper and lower portions of the auxiliary water pail 42, the auxiliary water pail 42 gets heavier and is naturally lowered to keep the connecting portion between the water tank-opening/closing lever 38 and the auxiliary lever 40 in a lifted state. Therefore, the waste discharge pipe plug 20 and the water discharge port-opening/closing plug 28 connected to the connecting portion between the water tank-opening/closing lever 38 and the auxiliary lever 40 maintain their open states.

From this state, as the water level within the water tank 24 gets lower and the flushing water contained within auxiliary water pail 42 is flowed out through the lower hole 46 of the auxiliary water pail 42 as shown in Figs. 4a and 4b, the weight of the auxiliary water pail 42 is reduced. Thus, when nearly all of the flushing water has been discharged out of the auxiliary water pail 42, the waste discharge pipe plug 20 relatively heavier than the auxiliary water pail 42 is lowered to block the outlet 19 of the waste

discharge pipe 18 and simultaneously pull down the connecting portion between the water tank-opening/closing lever 38 and the auxiliary lever 40, which causes the auxiliary water pail 42 to rise again.

On the other hand, the flushing water effluent from the water tank 24 is discharged through the water supply channel 12 and the open discharge channel 14 of the bowl 10 together with the waste. In this case, the flushing water with the waste can be discharged in a natural manner, not in a forced manner, because the waste discharge channel 14 is declivous toward the waste discharge pipe 18. It is also noted that, since the discharge channel 14 has a slight inclination, the flushing water can be prevented from splashing when the waste comes into the water. It is believed that this is because the dropping impact is absorbed due to the shape of the discharge channel 14 when the waste is dropped.

In addition, since the waste discharge pipe 18 is located at the center of the width b of the bowl 10, it is possible to slim the shape of the bowl 10 by narrowing the both sides of the bowl 10 (indicated by chain lines "A" in Fig. 3b) in so far as the waste discharge pipe 18 is not exposed in a front view of the bowl 10. This results in an effect of minimizing volume of the bowl 10.

As shown in Fig. 5, the gap portion d between the plug body 22 and the rubber packing 23 of the waste discharge pipe plug 20 serves as a spare space, which enables the rubber packing 23 to seal the outlet 19 of the waste discharge pipe 18 even when the rubber packing 23 does not exactly coincide with the outlet 19. In this case, considering the fact that the waste discharged through the discharge channel 14 may flow into the gap portion d to weaken an air-tightening force between the rubber packing 23 and the outlet 19, the casing covering the gap portion 21 is a useful component for interrupting the waste in advance.

Moreover, referring to Fig. 5, the plug body 22 and the rubber packing 23 respectively have a through hole 22a, 23a extending in longitudinal directions thereof, and an auxiliary pipe 25 having a hook-shaped flow channel 25a is mounted to an upper end of the through hole 22a of the plug body 22. Accordingly, when the water level of the flushing water within the waste discharge pipe 18 is higher than the top of the waste discharge pipe plug 20, the excessive flushing water is discharged into the waste box 16

through the flow channel 25a of the auxiliary pipe 25 and the through holes 22a, 23a. On the other hand, an emission of stink generated from the waste box can be minimized, since a lower end of the auxiliary pipe 25 is curved upwardly.

Industrial Applicability

As stated above, in the water closet of the present invention, since the flushing water with the waste is discharged in a natural manner, water can be saved and noise can be reduced. In addition, since the water discharge port-opening/closing plug and the waste discharge pipe plug are compulsorily operated by means of the respective levers, an opening time of each plug can be exactly regulated, thereby improving the reliability of water closet products. It is also possible to modify a shape of the bowl, and in particular, to reduce a width between both sides of the bowl, by selecting a position of the waste discharge pipe.

Although a preferred embodiment of the present invention has been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A natural discharge type water closet comprising:

a bowl having a water supply channel and a discharge channel, the discharge channel being declivous in a backward direction of the bowl, so that waste and flushing water can be discharged in a natural manner;

a waste discharge pipe interconnecting the discharge channel and a waste box;

a waste discharge pipe plug installed in the waste discharge pipe in such a manner that the waste discharge pipe plug can move up and down in the waste discharge pipe;

a water tank having a water discharge port in communication with the water supply channel of the bowl, a water supply port connected to a water pipe, a water discharge port-opening/closing plug for selectively opening and closing the water discharge port, and water supply port-opening/closing means for blocking the water supply port at a full water level and opening the water supply port prior to the full water level by a float rising and falling pursuant to a water level;

a water tank-opening/closing lever pivotally disposed within the water tank, exposed at its outer end to the exterior of the water tank, and connected at its inner end to the water discharge port-opening/closing plug;

an auxiliary lever having a first end hingedly connected to an inner end of the water tank-opening/closing lever, the first end of the auxiliary lever being connected to the waste discharge pipe plug, the auxiliary lever being pivotally disposed within the water tank; and

an auxiliary water pail hingedly connected to a second end of the auxiliary lever, the auxiliary water pail having upper and lower holes respectively formed at upper and lower portion of the auxiliary water pail.

2. A natural discharge type water closet according to claim 1, wherein the waste discharge pipe is located at a center portion of a width of the bowl.

3. A natural discharge type water closet according to claim 1, wherein the waste discharge pipe plug comprises a plug body; a rubber packing screwed to a lower portion of

the plug body with a predetermined gap from the lower portion; and a downwardly open casing which covers the plug body together with at least the gap.

4. A natural discharging type-water closet according to claim 1 or 2, wherein the plug body and the rubber packing respectively have a through hole extending through the plug body and the rubber packing in their longitudinal directions, and an auxiliary pipe having a hook-shaped flow channel is mounted to an upper end of the through hole of the plug body.

Fig. 1

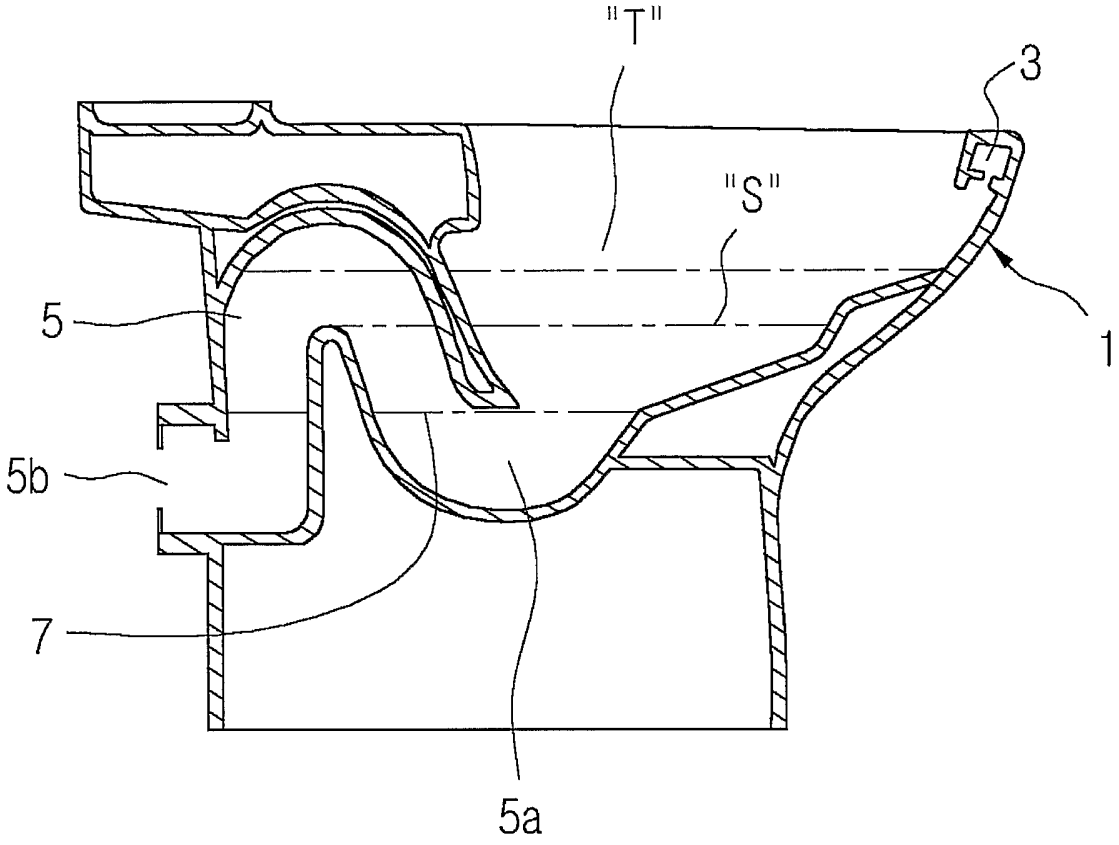


Fig. 2

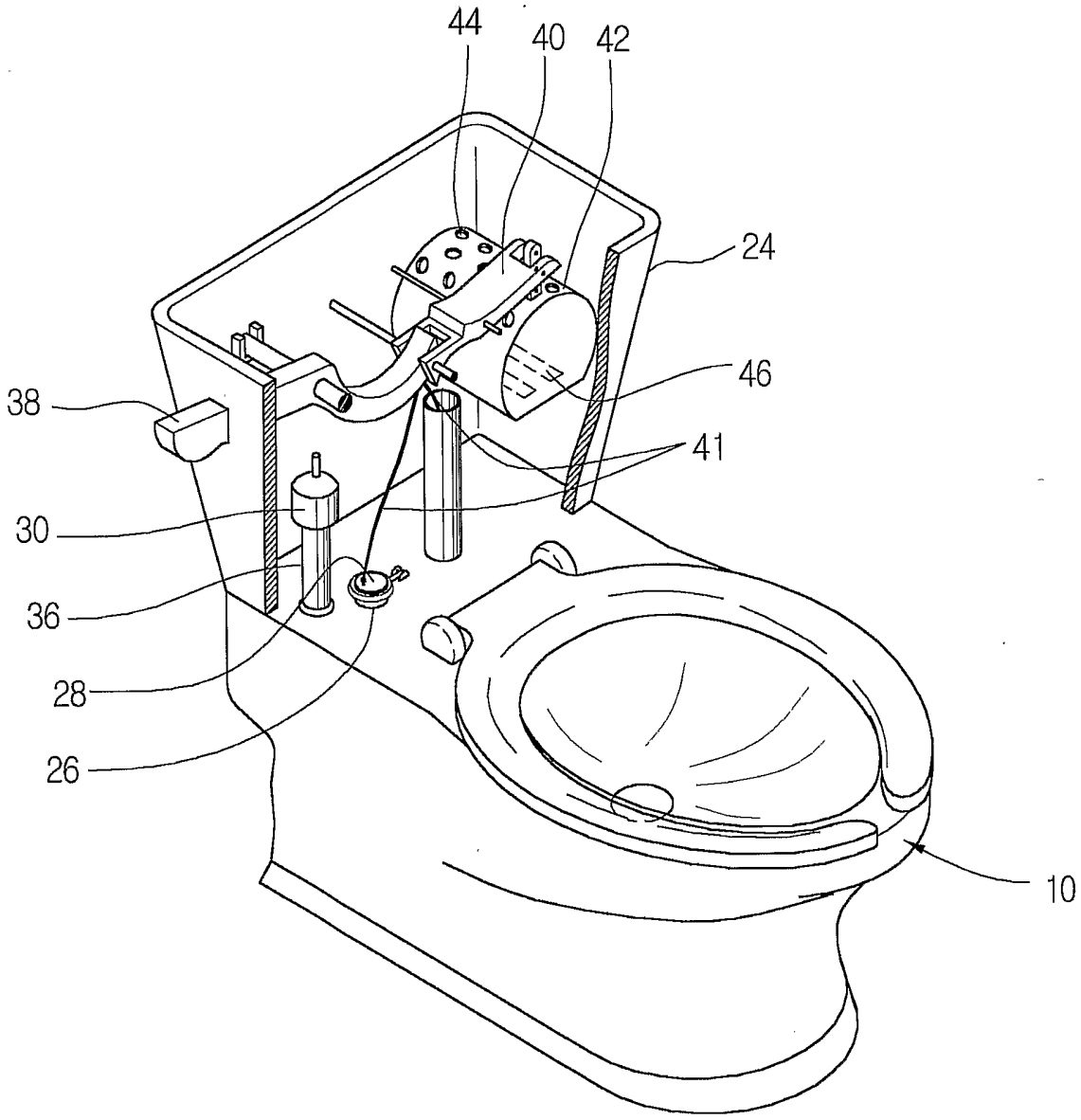


Fig. 3a

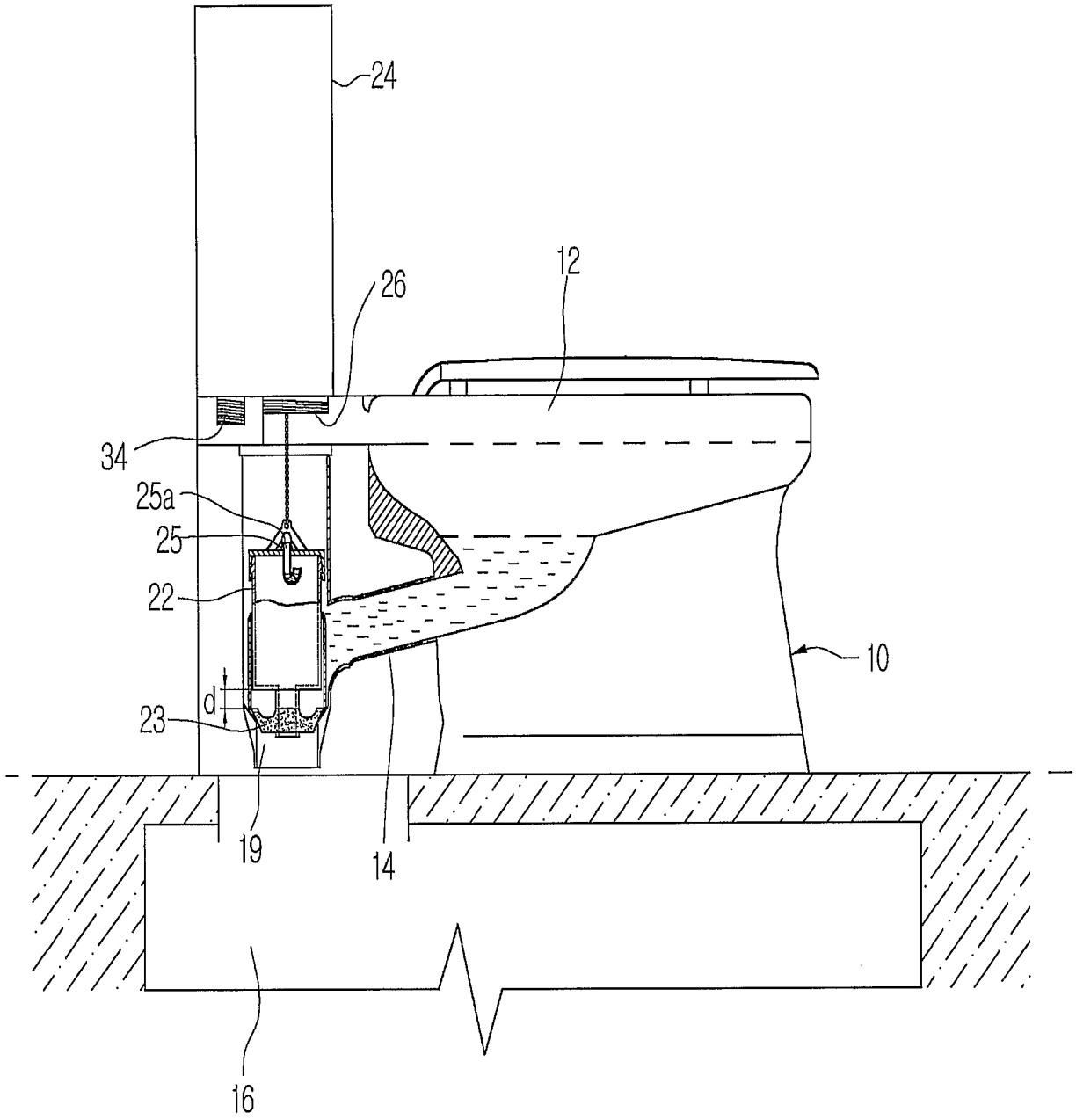


Fig. 3b

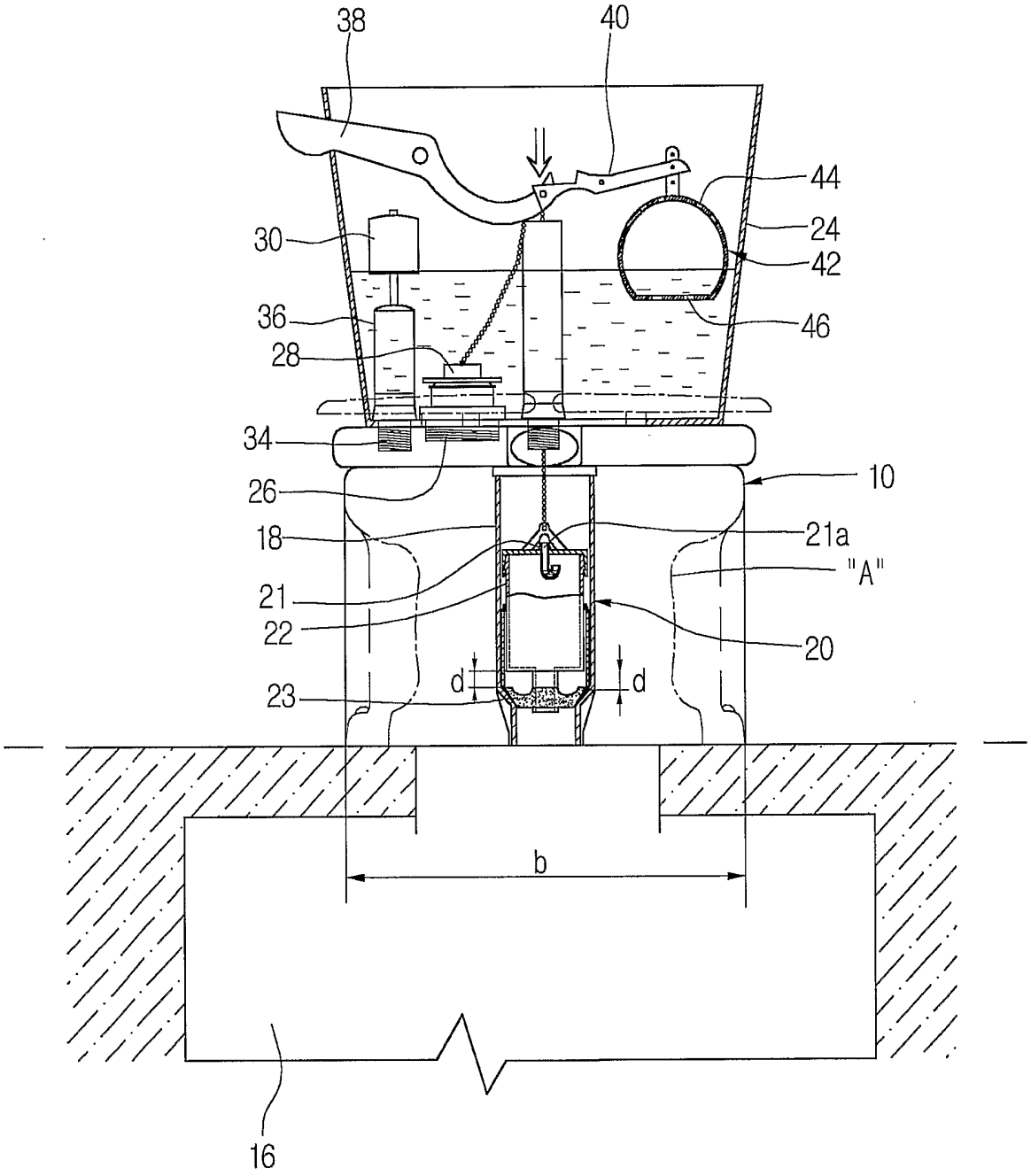


Fig. 4a

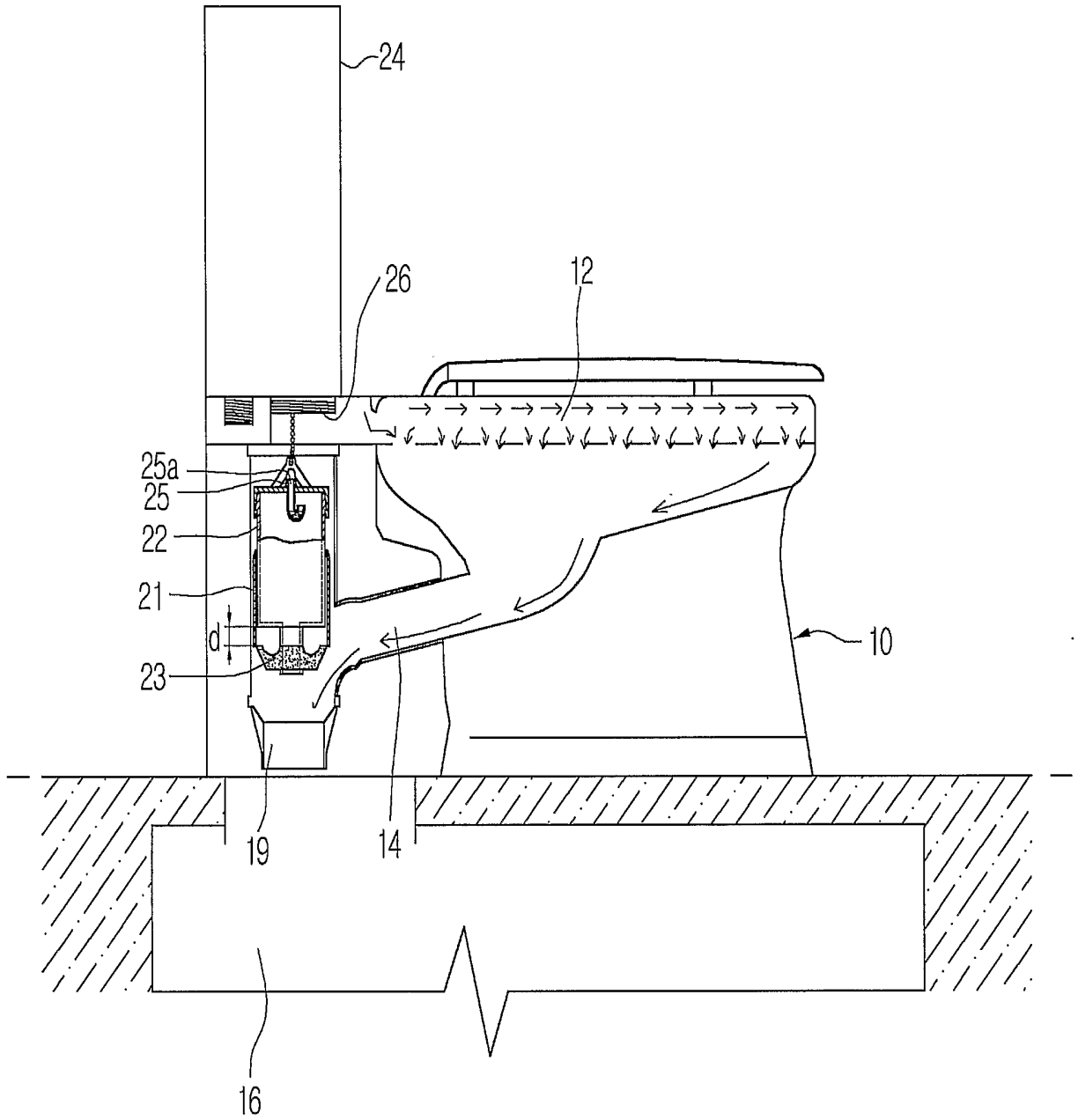


Fig. 4b

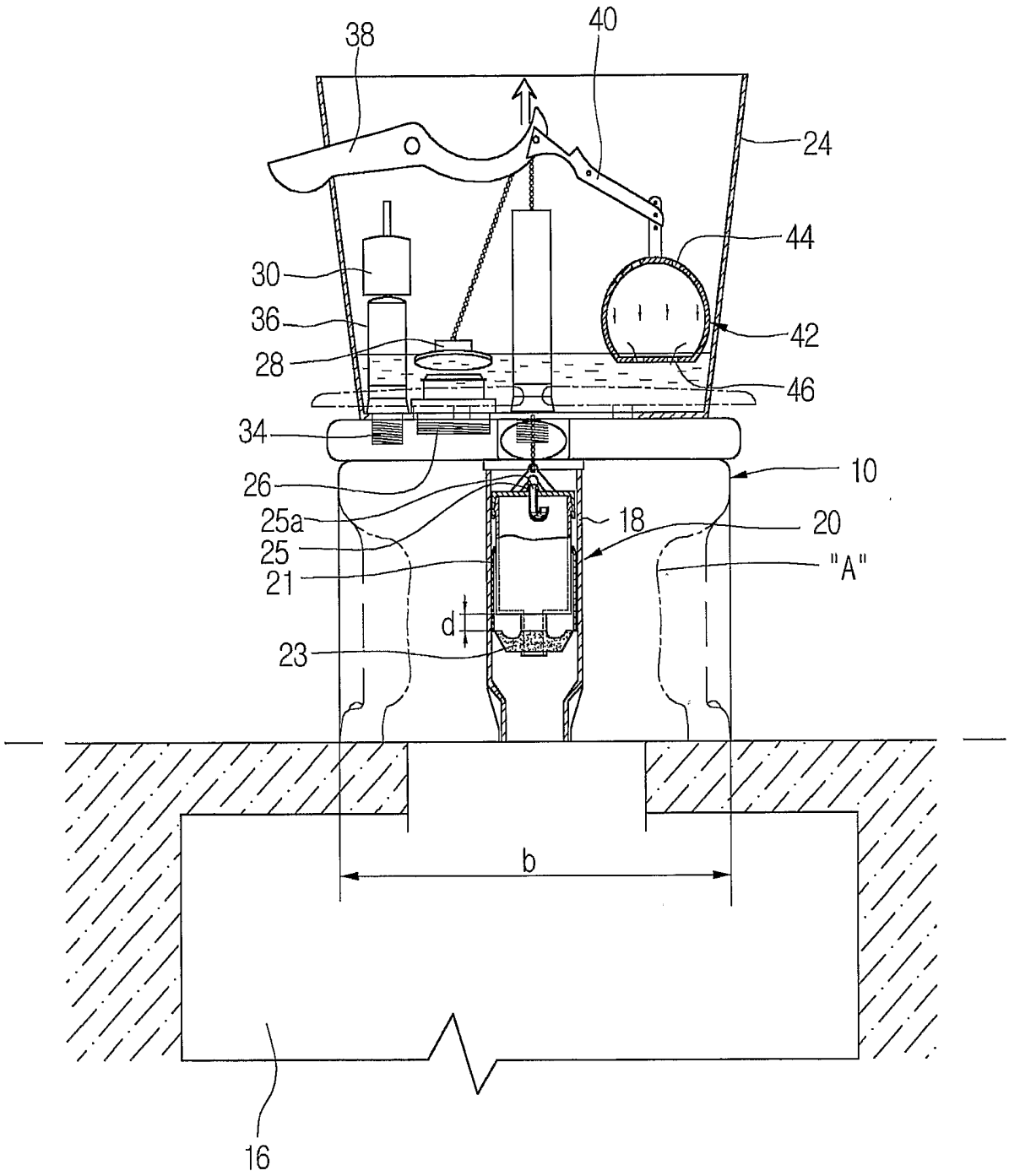
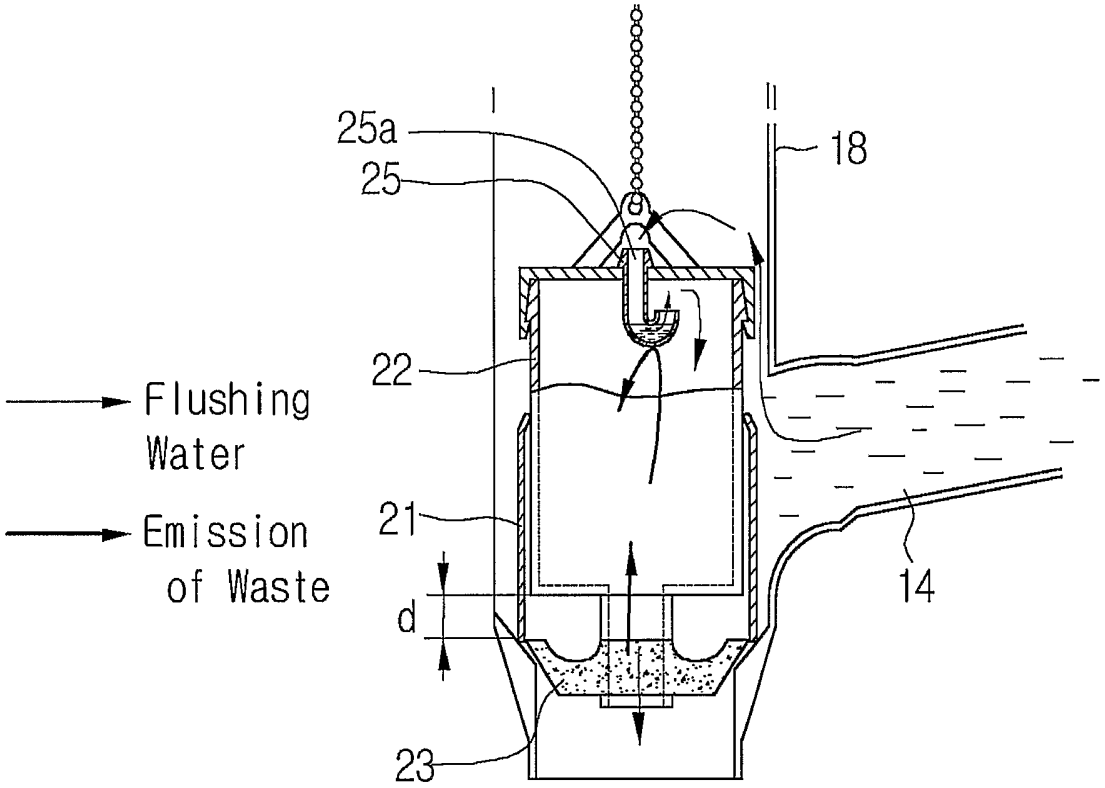


Fig. 5



INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

IPC7 E03D 5/012

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)

IPC 7 E03D 5/012

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

KR,JP : IPC as above

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 2001-0007700 U (LIM,OKHWA) 26 JUNE 2001 See the whole document	1-4
A	KR 2001-0012470 U (LIM,OKHWA) 7 AUGUST 2001 See the whole document	1-4
A	JP H2-101866 U (DAIWA CO.) 14 AUGUST 1990 See the whole document	1
A	JP S60-85367 U (MATZSITA CO.) 12 JUNE 1985	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
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