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(54) **A WC SUITE**

(57) A WC suite is provided. The WC suite comprises a water cistern (20), a WC bowl (40), and a flow path (14) extending between an outlet (12) of the water cistern (20) and an inlet (48) of the WC bowl (40) for guiding flushing water during a flush, said WC suite further comprising a flush box (50) arranged in fluid communication with said

flow path (14) such that flushing water bouncing at the inlet (48) of the WC bowl (40) will accumulate therein. The WC suit is characterized in that the flush box (50) is in fluid communication with a sewer pipe (46) connected to an outlet (12) of the WC bowl (40), wherein said flush box (50) is provided with a water trap (56).

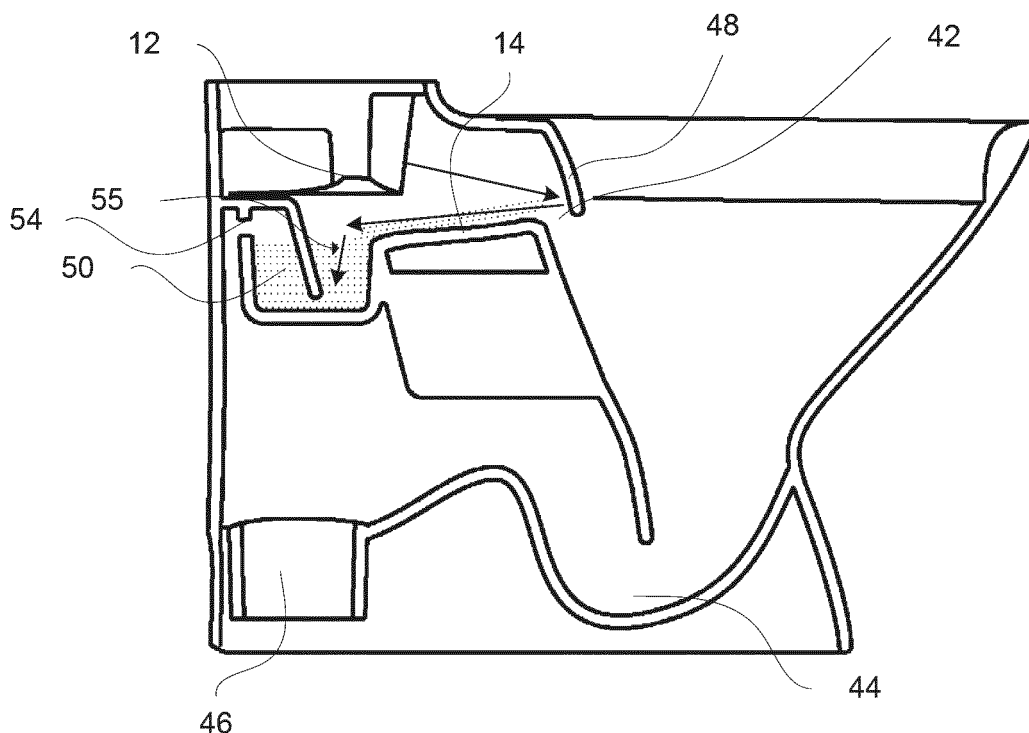


Fig. 3a

Description

Technical Field

[0001] The present invention relates to a WC suite. More particularly, the present invention relates to an improved WC suite which reduces trickles after a flush.

Background

[0002] Many different types of WC suites are available on the market. The flushing system of such WC suites may e.g. be designed to allow flushing water to enter the bowl by gravity by arranging a flushing cistern at a level vertically above a water outlet connected to the WC bowl. In such a system, the flushing cistern contains a certain volume of flushing water, which is at least partially emptied when a user initiates a flush.

[0003] The flushing water flows from the cistern out through an outlet valve, and into the WC bowl via a flow path inside the WC suite. Especially for ceramic WC suites the interior areas may be constructed in very specific manner due to the complex manufacturing techniques used. In particular, in today's WC suites the flow path extending from the outlet valve of the water cistern to the inlet of the WC bowl is tilted downwards. When water flows during a flush the majority of the water will enter the WC bowl via a rim or other flow distributor provided for forcing the flushing water to flow along the entire inner surface of the WC bowl. A small amount of water will however hit the rim (or other flow distributor device), and bounce backwards. The backflow of water will consequently follow the flow path between the inlet of the WC bowl and the outlet of the cistern.

[0004] The backflow of water will not flow all the way back to the cistern, but it will instead accumulate in a small compartment arranged inside the WC suite behind the cistern outlet, being in fluid communication only with the flow path extending from the cistern outlet and the inlet of the WC bowl. This small compartment is commonly denoted as the flush box.

[0005] As water accumulates in the flush box, it will eventually start to flow back into the WC bowl due to the tilted flow path from the flush box to the inlet of the WC bowl. This kind of return flow normally begins when the flush is completed, and the flow rate is usually very low. Hence, many WC suites will suffer from slow water trickles after a completed flush. This water dripping could last from several seconds up to several minutes. The water trickles are particular problematic in areas with calcareous water since the water drops of calcareous water create lime deposits in the back part of the toilet bowl, which are very difficult to remove.

[0006] The problem of dripping water may be at least partly reduced in prior art system by using a water distributor arranged under the rim of the WC suit. However, in some situations such water distributors are not desirable due to for example the design of the toilet or due to

cleaning and hygiene aspects.

[0007] There is thus a need for a WC suite that eliminates the problems of water trickles after a flush in an improved manner.

Summary

[0008] Accordingly, the present invention preferably seeks to mitigate or eliminate one or more of the above-identified deficiencies in the art singly or in any combination and solves at least the above mentioned problems by providing an improved WC suite.

[0009] According to a first aspect, a WC suit is provided. The WC suit comprises a water cistern, a WC bowl, and a flow path extending between an outlet of the water cistern and an inlet of the WC bowl for guiding flushing water during a flush, said WC suite further comprising a flush box arranged in fluid communication with said flow path such that flushing water bouncing at the inlet of the WC bowl will accumulate therein. The WC suite is characterized in that the flush box is in fluid communication with a sewer pipe connected to an outlet of the WC bowl, wherein said flush box is provided with a water trap.

[0010] The flush box may be aligned with the sewer pipe along a vertical line. The flush box may be in fluid communication with the sewer pipe by means of an orifice provided in a wall of said flush box. This allows the bouncing water to travel directly down the sewer pipe instead of dripping back into the WC bowl where it creates stains.

[0011] The flush box may comprise a dividing wall extending downwards into said flush box, said dividing wall forming part of said water trap. The water trap eliminates or at least reduces odour gases to escape from the WC suit.

[0012] The flow path may be extending between the flush box and the inlet of the WC bowl may be tilted upwards. The accumulated water in the flush box will thus be guided to flow towards the water trap instead of flowing back towards the WC bowl.

Brief Description of the Drawings

[0013] Further objects, features and advantages will appear from the following detailed description, with reference being made to the accompanying drawings, in which:

Fig. 1 is a cross-sectional view of a WC suite according to an embodiment;

Fig. 2 is a cross-sectional view of a WC suite according to an embodiment; and

Figs. 3a-b each shows a cross-sectional view of parts of a WC suite according to an embodiment directly after a flush has been initiated.

Detailed Description

[0014] The following description focuses on embodi-

ments of the present invention applicable to a WC suit.

[0015] In an embodiment according to Fig. 1, a flushing system 10 for flushing water into a WC bowl 40 of a WC suit 100 is shown. The flushing system 10 is constructed to allow a user of an associated WC suit 100 to flush the toilet after use, and for this purpose the flushing system 10, and hence the WC suite 100, includes a water cistern 20 and a flushing mechanism 30. The water cistern 20 is in fluid communication with the WC bowl 40 by means of an outlet 12 being controlled to open by means of the flushing mechanism 30.

[0016] The water cistern 20 is capable of storing water between flushes and is in fluid communication with the WC bowl 40 by means of the outlet 12 being controlled to open by means of the flushing mechanism 30.

[0017] The flushing mechanism 30 is constructed to open and close the outlet 12 when the user operates a flush initiation means, such as a push button 32 arranged at the upper end of the water cistern 20. When pressing the flush button 32, the outlet 12 will open, i.e. it will be in fluid communication with the water cistern 20, to allow the water enclosed within the water cistern 20 to drain out from the outlet 12 and into the WC bowl 40. After passing the outlet 12, the water will pass through a flow path 14 which guides the flushing water through an opening 42 leading into the WC bowl 40. The flow path 14 extends between the outlet 12 of the water cistern 20 and an inlet 48 of the WC bowl 40.

[0018] The WC bowl 40 is constructed with a bend 44 creating an integrated water trap in order to eliminate or at least reduce odours gases that are allowed to flow from a sewer pipe 46, into the WC bowl 40 and further into the surrounding bathroom. After the flushing water has passed the bend 44, the water is led out from the WC bowl 40 into the sewer pipe 46.

[0019] During a flush, most of the water released from the cistern 20 will flow from the outlet 12 through the bend 44 of the WC bowl 40 into the sewer pipe 46. However, some of the water will, when it passes the flow path 14, hit the inlet 48 (such as a rim or a flow distributor device) of the WC bowl 40 which will cause a change in the water flow. The water will flow back, since it bounces at the inlet 48, into a flush box 50 arranged in fluid communication with the flow path 14. The flush box 50 is an enclosure, or compartment, where water will accumulate during flushes. In prior art system, once the flush box 50 is filled with water, the water will eventually start to flow back into the WC bowl 40 due to the tilted flow path 14 from the flush box 50 to the inlet 48 of the WC bowl 40. Hence, many WC suites 100 will suffer from slow water trickles after a completed flush due to the arrangement of the flush box 50. This is a rather unpleasant feature since the water droplets create stains and lime deposits on the back of the WC bowl 40.

[0020] The inventors of the present invention have realized, after inventive and insightful reasoning that by arranging a water trap 56 in the flush box 50 and arranging the flush box 50 to be in fluid communication with the

sewer pipe 46 the above mentioned problems will be greatly reduced. Instead of having water trickling for several minutes, the water dropping has now been reduced to merely a few seconds. The reduction of the amount of water trickling thus greatly reduces the risks of stains in the toilet bowl 40.

[0021] As seen in Fig. 2, the flush box 50 comprises two opposite side walls 58, 59 and one bottom surface 57 forming an enclosure. It should be realized that additional side walls are also provided, however they are not shown. The flush box 50 further comprises a dividing wall 52 which extends downwards into the flush box 50, but not entirely to the bottom of the flush box 50. The dividing wall 52 forms part of the water trap 56. The water trap 56 may thus be in the form of a U-bend or N-shaped structure, formed by the side walls 58, 59, the bottom surface 57 as well as the dividing wall 52.

[0022] The height of the water enclosed in the water trap 56 may be between 30 and 70 mm, and more preferably around 50 mm. The height of the enclosed water is determined by the height of the two side walls 58, 59 and should be chosen to cope with standardised regulations.

[0023] In the back wall 58 of the flush box an orifice 54 is arranged in order to connect the flush box 40 to the sewer pipe 46. The flush box 50 is thus in direct fluid communication with the sewer pipe 46 by means of the orifice 54. The flush box 50 is aligned with the sewer pipe 46 along a vertical line, so that when the flush box 50 fills up during a flush, the water will flow through the orifice 54 vertically down towards the sewer pipe 46.

[0024] The flush box 50 and its water trap 56 are preferably constructed by ceramic or other durable materials. In one embodiment the flush box 50 and the WC bowl 40 are constructed by the same material. The flush box 50 and its water trap 56 may be an integrated structure with the rest of the WC bowl 40. The water trap 56 is thus formed simultaneously with the rest of the WC bowl 40 which greatly reduces manufacturing costs.

[0025] Fig. 3a shows an exemplified situation where the water trap 56 of the flush box 50 starts to fill up with water just after a flush has occurred. The water which bounces at the inlet 48 of the WC bowl 40 will be lead into the flow path 14 leading to the flush box 50 and the water trap 56.

[0026] In order to further reduce the water trickle the flow path 14 is tilted so as to guide the water towards the water trap 56. This restricts the direction of the water flow after a flush. The inlet 48 of the WC bowl 40 is arranged at a higher level compared to the flush box 50, which creates a tilted flow path 14. The flow path 14 is tilted so that the highest point is arranged near the inlet 48 of the WC bowl 40 and the lowest point is arranged near the water trap 56 of the flush box 50. The flow path 14 is thus tilted upwards. The flushing water will flow in a direction downwards, while bouncing back from the inlet 48 towards the flush box 50.

[0027] Fig. 3b shows the situation where the flush box

50 is fully filled with water. The remaining water in the flush box 50 will flow out through the orifice 54 down towards the sewer pipe 46. The water will thus not be dripping on the toilet bowl, but will instead be lead through the water trap 56 into the sewer pipe 46.

[0028] The WC suits 100 shown in Fig. 1-3 are of a rimless design i.e. the inlet 48 of the WC bowl 40 is not a rim. In a rimless WC suit the inlet 48, or flow distributor device, may be a single lip. The lip is arranged at the back of the upper part of the toilet bowl 40 and releases the flushing water from the cistern 20 into the WC bowl 40. However it should be noted that the following description also is applicable for a WC suite having a flow distributor device such as a rim.

[0029] In one embodiment the WC suit 100 is of a rimless design. Having a rimless design eliminates the possibility to arrange a water distributor in the WC suite 100 (since it normally is arranged under the rim of the WC suit 100) in order to reduce the problems of water trickles. The present invention is thus particularly useful for toilets being of a rimless design.

[0030] Although the present invention has been described above with reference to specific embodiments, it is not intended to be limited to the specific form set forth herein. Rather, the invention is limited only by the accompanying claims and, other embodiments than the specific above are equally possible within the scope of these appended claims.

Claims

1. A WC suite, comprising a water cistern (20), a WC bowl (40), and a flow path (14) extending between an outlet (12) of the water cistern (20) and an inlet (48) of the WC bowl (40) for guiding flushing water during a flush, said WC suite further comprising a flush box (50) arranged in fluid communication with said flow path (14) such that flushing water bouncing at the inlet (48) of the WC bowl (40) will accumulate therein,
characterized in that the flush box (50) is in fluid communication with a sewer pipe (46) connected to an outlet (12) of the WC bowl (40), wherein said flush box (50) is provided with a water trap (56).
2. The WC suite according to claim 1, wherein the flush box (50) is aligned with the sewer pipe (46) along a vertical line.
3. The WC suite according to claim 1 or 2, wherein the flush box (50) is in fluid communication with the sewer pipe (46) by means of an orifice (54) provided in a wall (58) of said flush box (50).
4. The WC suite according to any one of the preceding claims, wherein said flush box (50) comprises a dividing wall (52) extending downwards into said flush

box (50), said dividing wall (52) forming part of said water trap (56),

5. The WC suite according to any one of the preceding claims, wherein said flow path (14) extending between the flush box (50) and the inlet (12) of the WC bowl (40) is tilted upwards.
6. The WC suite according to any of the preceding claims, wherein said flush box (50) comprises ceramic.
7. The WC suite according to any of the preceding claims, wherein said flush box (50) is integrated with the WC bowl (40).
8. The WC suite according to any of the preceding claims, wherein said flush box (50) and said WC bowl (40) comprises the same material.

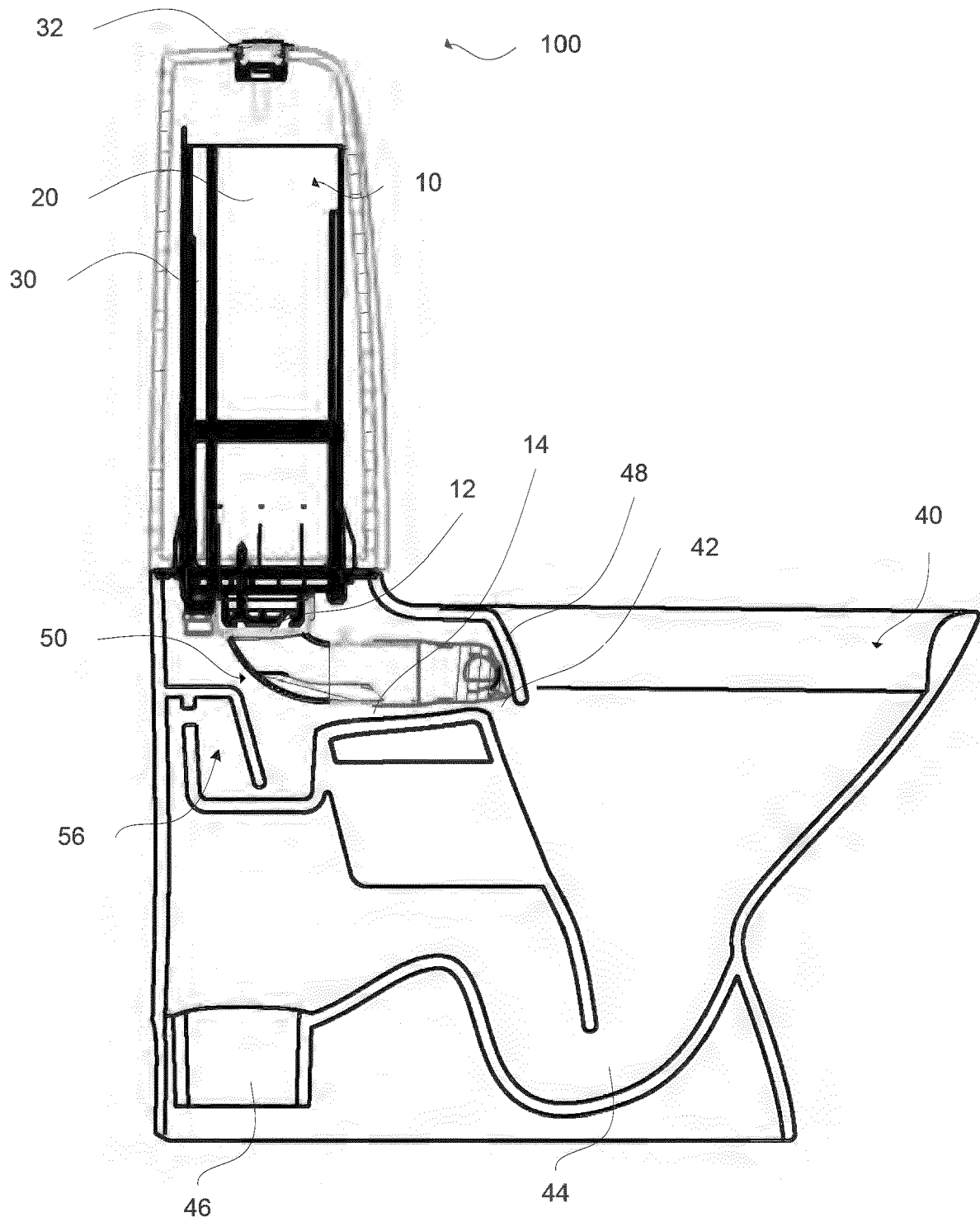


Fig. 1

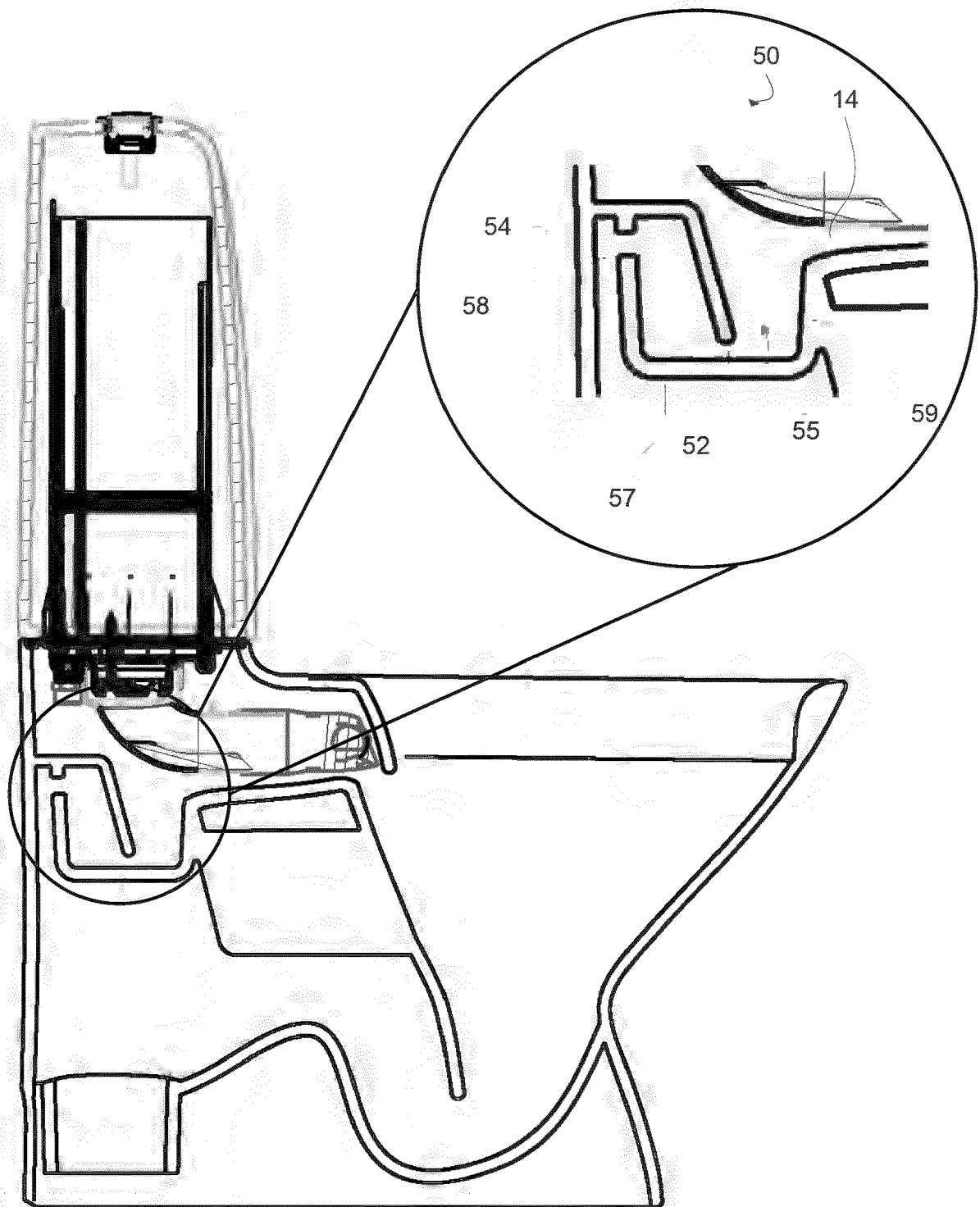


Fig. 2

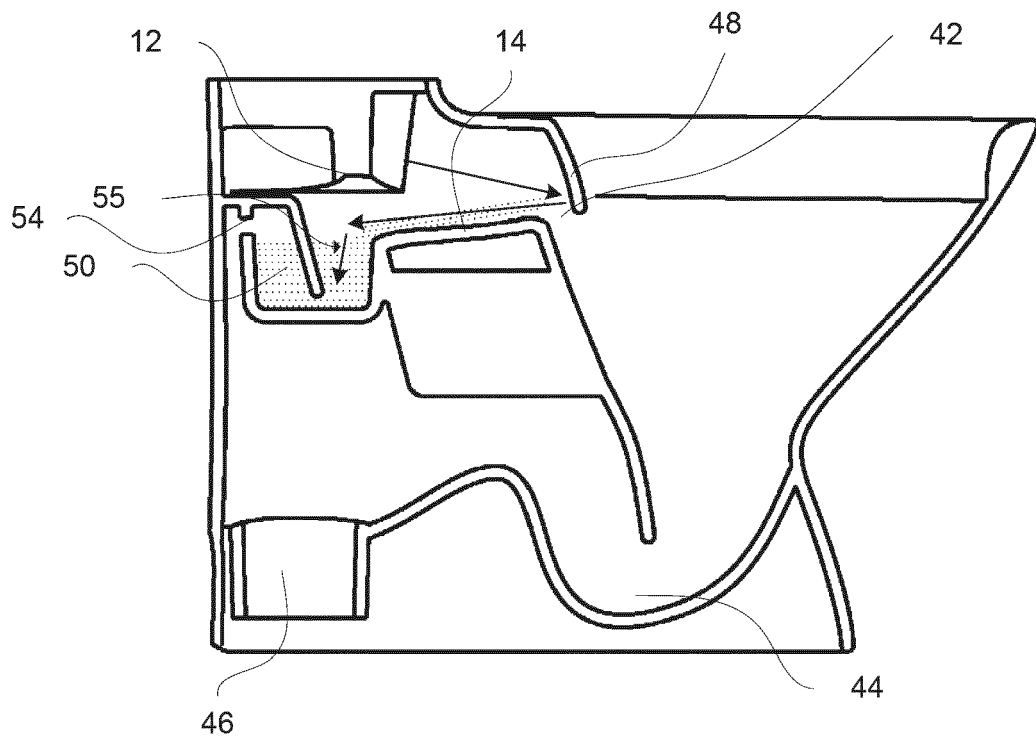


Fig. 3a

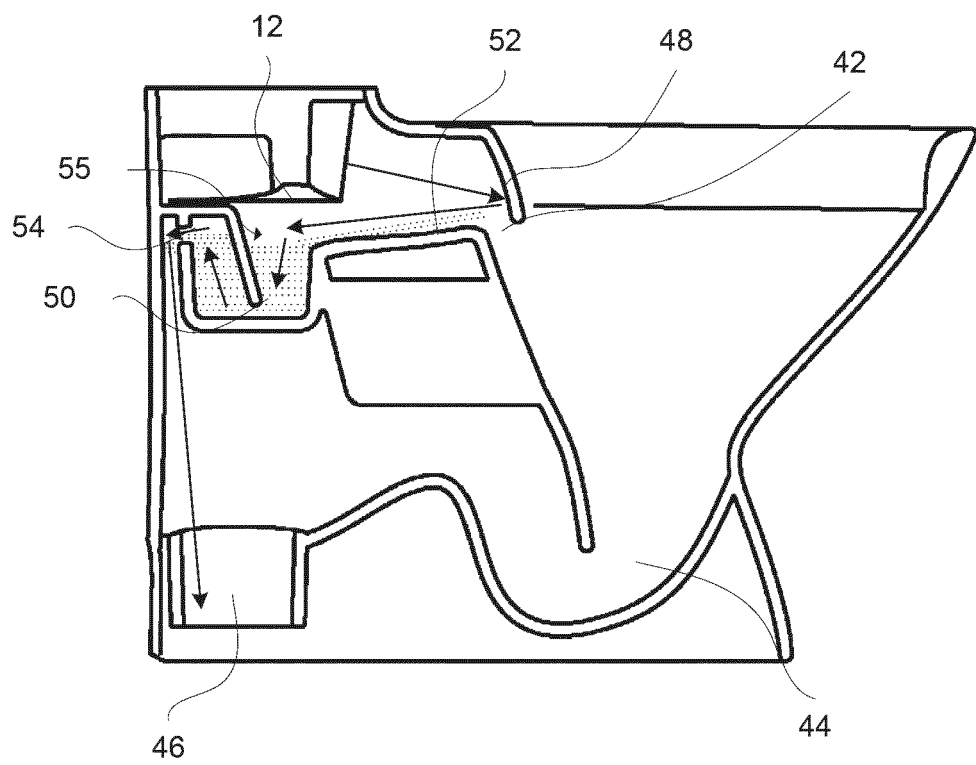


Fig. 3b



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