United States Patent

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[54] **WATER CLOSET**
4 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **4/77**, 4/111
[51] **Int. Cl.** **E03d 5/016**
[50] **Field of Search** 4/76, 116, 77, 111, 114, 115, 209, 213

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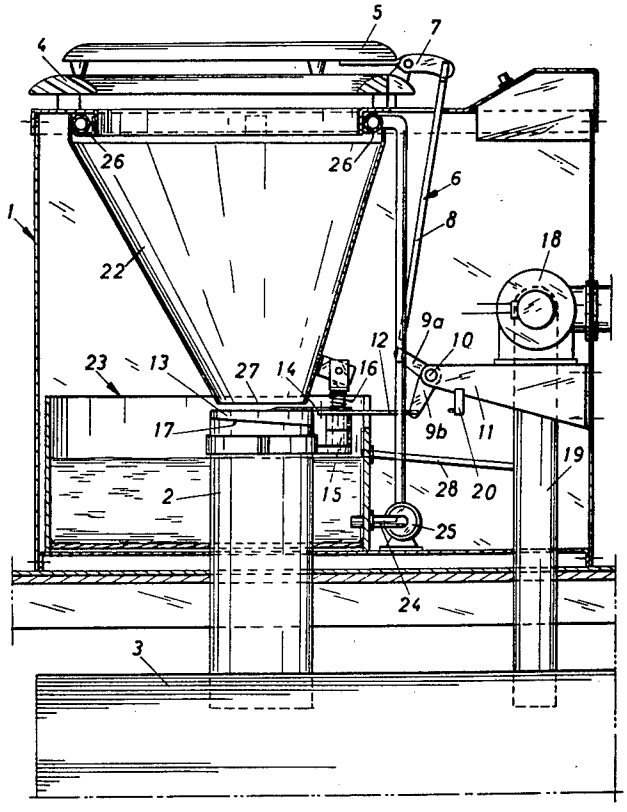
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ABSTRACT: A water closet using a very limited amount of flushing water owing to recirculation of the same by means of a pump system. The flushing liquid receptacle is positioned beneath the closet bowl and through said receptacle extends in the vertical direction a discharge pipe which at its lower end opens into a sludge tank and which has its upper end positioned vertically below the lower opening of the closet bowl. A disclike valve is adapted to provide preferably airtight sealing of the upper end of the discharge pipe.

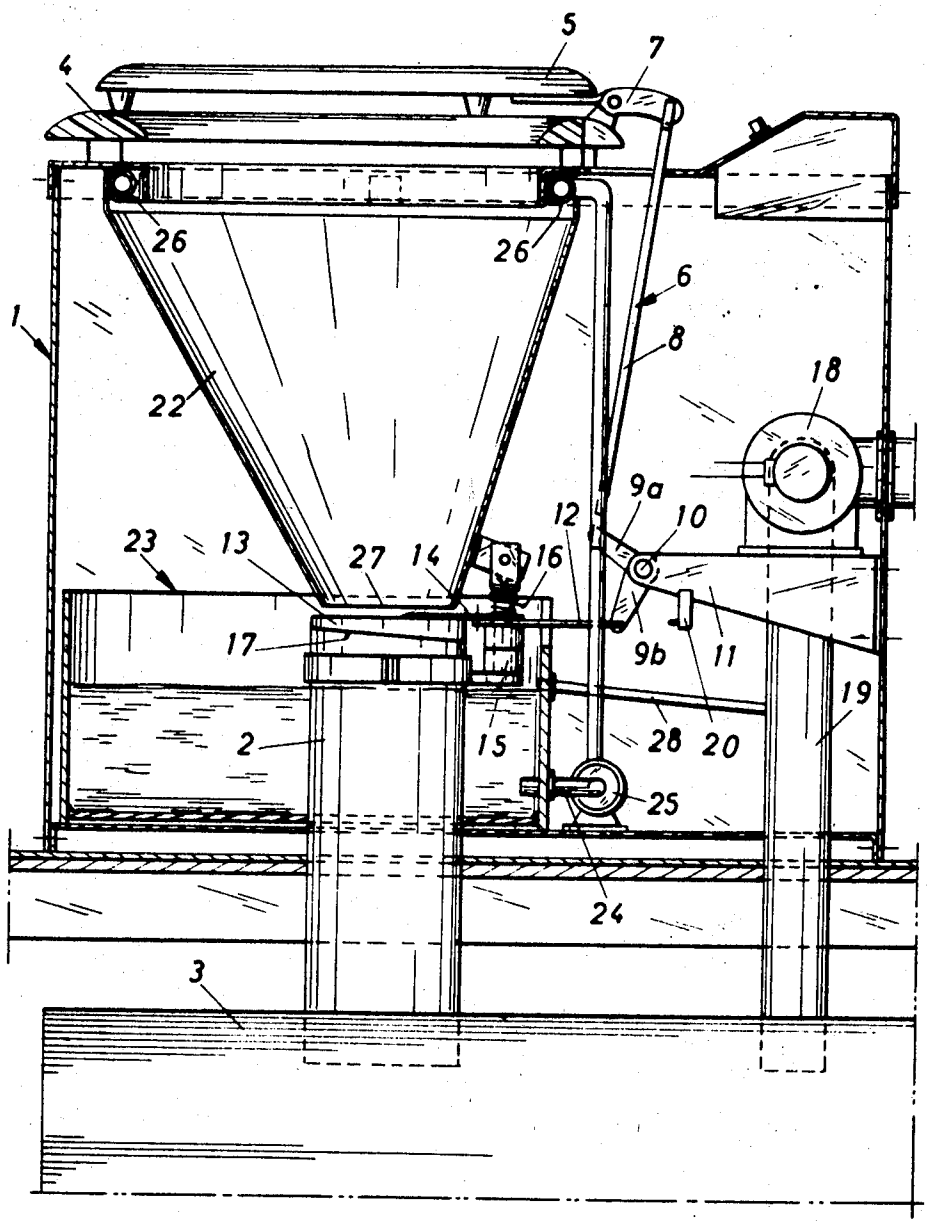


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SHEET 1 OF 2

Fig.1



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Fig.2

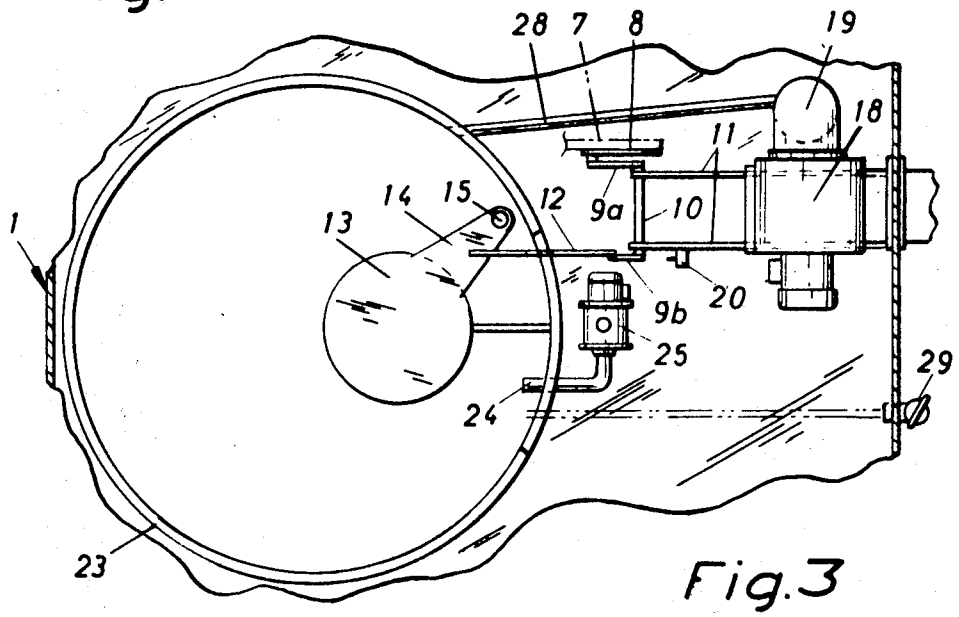
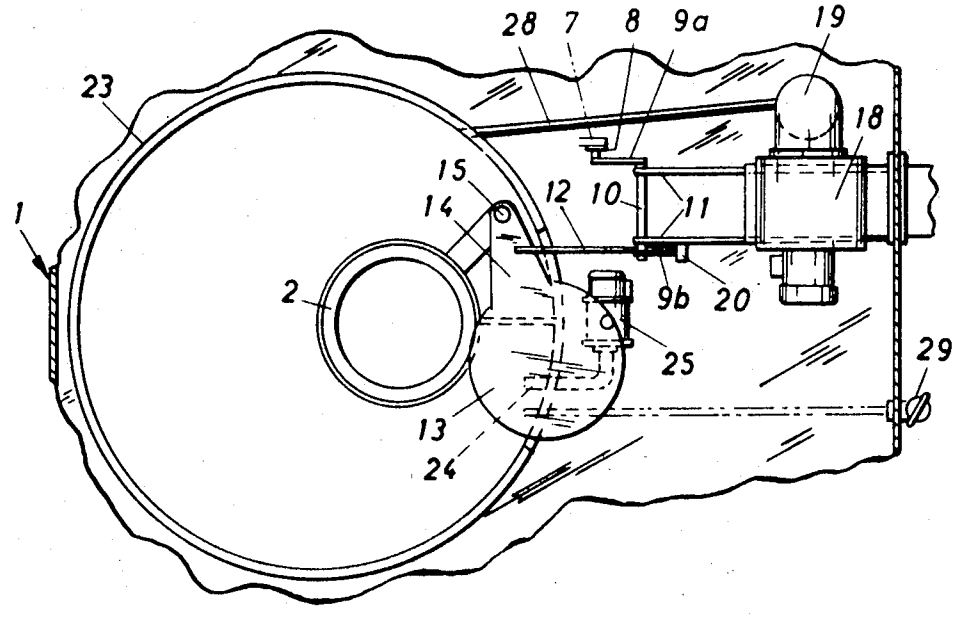


Fig.3



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WATER CLOSET

BACKGROUND OF THE INVENTION

The present invention relates to an improved water closet comprising a container for flushing liquid, a pump for pumping the flushing liquid up to a ramp or row of flushing nozzles in the closet bowl, and a sludge tank.

Various types of closets have already been constructed which are intended to be used in areas where there are no pressure mains or only a limited supply of water, such as in holiday areas or houses supplied from wells. The disadvantages connected therewith are that urine and faeces are collected in a receptacle positioned in the closet tank, it being therefore impossible, despite chemical or similar decomposition, to avoid foul smells. These containers have a very reduced volume and consequently have to be emptied of the faeces or decomposition products at relatively frequent intervals.

The above disadvantages are not present in a conventional water closet which, however, contrary to the present invention, requires a considerable amount of water, appr. 10 litres at each use. An ordinary well does not, particularly not in summer, have a capacity to deal with such a high water consumption. In addition, it might be difficult to dispose of this relatively large amount of waste water.

Also in houses where considerable difficulties and costs are involved to install a waste water main for instance on account of the foundation conditions, such as surface rock, the closet in accordance with the present invention presents considerable advantages, as it makes possible to install a sludge tank for instance in the basement of the house.

SUMMARY OF THE INVENTION

The characterizing feature of the present invention is that the flushing liquid container is positioned beneath the closet bowl and that through said flushing liquid container extends vertically a discharge pipe which at its lower end opens into the sludge tank while the upper end thereof is positioned vertically below the lower opening of the closet bowl and preferably adapted to be sealed airtight by means of a valve.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be described more in detail in the following, reference being made to the accompanying drawing. In the drawing:

FIG. 1 shows diagrammatically a longitudinal section through the improved closet in accordance with the invention;

FIG. 2 is a view from above of particularly the flushing system, the valve being in its closed position, and

FIG. 3 is a similar view but in the open position of the valve.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

As shown in FIGS. 1, 2 and 3, the flushing toilet consists essentially of a closet trunk 1, a flushing system comprising a level mechanism 6, a discharge pipe 2, a sludge or sewage tank 3 and an evacuation system. At the upper part of the closet trunk 1 there are arranged in the usual manner a seat ring 4 and a closet lid 5. At the rear edge of the lid 5 is arranged a level mechanism 6 comprising a level 7 which is rigidly connected to the closet lid but journaled to a rod 8 which in turn is journaled to the upper limb 9*a* of an angle bar 9. The latter is pivotally mounted by means of its rotational shaft 10 to a bracket 11. At the other limb 9*b* of the angle bar 9 is pivotally mounted one end of a horizontal link 12, the opposite end of which is also pivotally mounted to valve 13. The latter is a disc valve which, as shown in FIGS. 2 and 3, can be brought to cover the drainpipe 2 by means of its circular main portion and is provided with a prolongation 14 supporting at its free end the valve 13 in such a way that said valve can be swung in a horizontal plane. In this pivot point 15, the valve is provided with a spring 16 opposing the opening movement of the valve

13. The said details making up the lever mechanism 6 cooperate in the following manner. Upper raising of the closet lid 5, the valve 13 is swung in the lateral direction to its open position (FIG. 3) and upon closing the lid, the valve is swung back to its original position (FIG. 2), i.e. the one in which it covers the upper end of the discharge pipe. Owing to the fact that the surface of the valve 13 which makes contact with the discharge pipe 2 forms an acute angle with the horizontal plane and that said surface is covered with a sealing material the engagement with the upper end 17 of the discharge pipe 2 will be practically completely airtight. The risk of foul gases seeping through in the closed position of the valve 13 is thereby completely eliminated.

To prevent smells from entering into the toilet trunk when the closet lid 5, and consequently the valve 13, is being opened, the evacuation system which consists of a fan 18 and a ventilation duct 19 is started in that the lower limb 9*b* of the angle bar operates an electrical microswitch 20 starting the fan 18. When the closet lid 5 is lowered and the valve 13 again closes the upper end 17 of the discharge pipe 2, the current feeding the fan 18 is broken by the change of position of the angle bar 9.

The flushing system consists of a flushing liquid container 23 positioned beneath the closet bowl 22—the latter preferably being made from enameled sheet metal—and having a discharge or outlet pipe 24 in its sidewall. A pump 25 is arranged in the discharge pipe to pump the flushing liquid contained in the flushing liquid container 23 up to a flushing platform 26 at the upper edge of the closet bowl 22. The pump 25 is started upon lowering of the closet lid 5 in that the above-mentioned microswitch 20 for the fan 18, which microswitch is operated by the angle bar 9, also operates a timing relay which during a predetermined period closes the circuit to the pump 25. The walls of the closet bowl 22 are thereby heavily sprayed from flushing nozzles with the flushing liquid consisting of water to which sanitary cleansing fluid has been added, urine deposits and faeces remains, if any, being thereby flushed down through the lower opening 27 of the closet bowl 22 which is spaced above valve 13 to form an annular opening through which flushing liquid may flow back to flushing liquid container 23. During the flushing, the closet lid 5 thus is closed which prevents splashing and the like, and consequently the valve 13, under the influence of the lever mechanism 6, is in closed position. The flushing liquid is thereby flushed back in the open-top flushing liquid container 23, the outlet pipe 24 is preferably situated at a level somewhat above the bottom of the flushing liquid container 23 so that the solid particles assembling at its bottom are not sucked into the outlet pipe 24. An overflow pipe 28 is mounted between the flushing liquid container 22 and the ventilation duct 19 to carry any surplus of flushing liquid down into the sludge tank 3 via the ventilation duct 19.

Replacement of flushing liquid is effected after one month's normal family use. The closet lid 5 is thereby kept raised, i.e. the valve 13 is open such that flushing liquid is discharged through the discharge pipe 2 down into the sludge tank 3. When the flushing liquid container 23 has been emptied, it is filled with clean water and, in case water from pressure mains is available, water can be supplied therefrom via a water pipe valve 29 to the flushing liquid container 23. Otherwise clean water is supplied from through the closet bowl 22. To enable filling in this way, the joint between the lever 7 and the rod 8 is made easily detachable such that, while the closet lid 5 is kept raised for filling purposes. It is possible to hold the valve 13 in closed position (although the lid is thus in open position). The container 23 is thereby flushed clean. The valve 13 is thereafter opened and the pump 25 started by closing the lid 5, whereupon water will be forced out via the flushing nozzles 25 through the closet bowl 22 and the discharge pipe 2, which is thus also cleaned, and down into the sludge tank 3. The valve 13 is then closed, the flushing liquid container 23 filled to the desired level, sanitary cleansing liquid added, the joint between the lever 7 and the pushing rod 8 connected together and the flushing toilet is again ready for use.

The flushing toilet thus functions in the following manner:

The closet lid is raised 5 swinging the valve 13 by means of level mechanism 6 to the open position. Urine, faeces and the like can then fall almost freely into the sludge tank 3. When the closet lid 5 is raised, the fan 18 is started in the way described above for evacuation of foul gases. Upon subsequent closing of the closet lid 5, the valve 13 is closed by means of the lever mechanism 6 at the same time as the fan 18 is also stopped. At the same moment, the pump 25 starts in the manner described above, flushing liquid being thereby pumped up to the flushing nozzles 26 and the closet bowl 22 flushed clean of particles, the pumping being maintained sufficiently long to circulate the total volume of the flushing liquid once.

A soil-pipe (not shown) extends from the sludge tank 3 to the exterior, for instance outside the house body, the outer end of the soil-pipe being adapted for being sealed airtight as indicated above. Sludge removal can be obtained at low costs in most places, since such removable is carried out while using the same equipment as when emptying ordinary septic tanks.

The invention is not limited to the embodiment as shown and described above but various modifications are possible within the scope of the appended claims. It is for instance possible to start the pump manually before flushing by pressing a pushbutton switch positioned on the closet trunk 1.

We claim:

1. An improved water closet comprising a closet bowl having a lower opening, a seat ring, and a closet bowl lid, flushing nozzles positioned at the top of said closet bowl, a pump for pumping liquid up to said flushing nozzles and a sludge tank, wherein the improvement comprises a container for flushing liquid positioned beneath the closet bowl and a discharge pipe arranged such that it extends vertically through said flushing liquid receptacle, the said discharge pipe opening at its lower end into the sludge tank and having its upper end positioned vertically below said lower opening of the closet bowl, the upper end preferably being sealed airtight by means of a valve which is spaced below said lower opening of the closet bowl forming an annular opening through which said flushing liquid may flow back into said container and a lever mechanism connected with the closet lid for pushing said valve in the lateral direction to open the upper end of the discharge pipe through raising of the closet lid.

2. An improved water closet in accordance with claim 1, wherein the improvement comprises a valve in the shape of a plate covering the upper end of the discharge pipe.

3. An improved water closet in accordance with claim 1, wherein the improvement comprises a fan, which is connected to a ventilation duct extending from the sludge tank, said fan functioning upon raising of the closet lid to evacuate foul gases from the sludge tank.

4. An improved water closet in accordance with claim 1, wherein the improvement comprises a pump which is started by closing of the closet lid to circulate the flushing liquid for a certain, predetermined period, a microswitch being arranged, when influenced by said lever mechanism, to switch on a timing relay to close the circuit to said pump.