United States Patent [19]

Johansen

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[54] **DEVICE IN WATER CLOSETS**

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[52] **U.S. Cl.** **4/85,** 4/84

[51] **Int. Cl.** **E03d 11/10**

[58] **Field of Search** 4/85, 76, 77, 78, 79, 80, 4/84, 89, 90, 92, 93, 15, 18

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[57] **ABSTRACT**

A water closet comprising a closet bowl having a drain mouth at its lower end which mouth may be closed by a valve disc operatively connected to the flushing mechanism of the toilet such that the disc uncovers the mouth during flushing, and a supply line feeding flushing liquid to a spray nozzle disposed internally of said closet bowl. Said nozzle is provided with two sets of sprinkling systems, one for directing water jets against the centre of the uncovered drain mouth, and another one for directing liquid jets in a helical path along the internal surface of the closet bowl.

2 Claims, 5 Drawing Figures

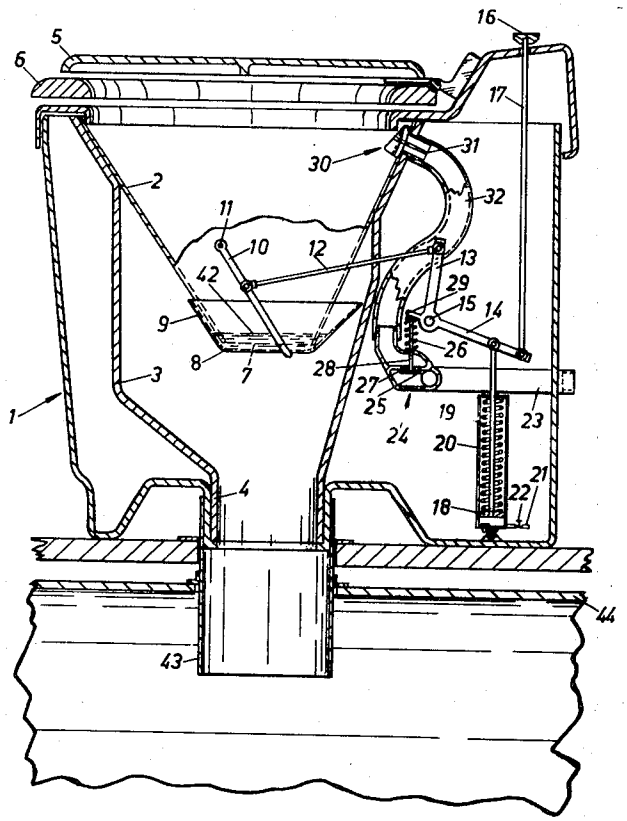


Fig.1

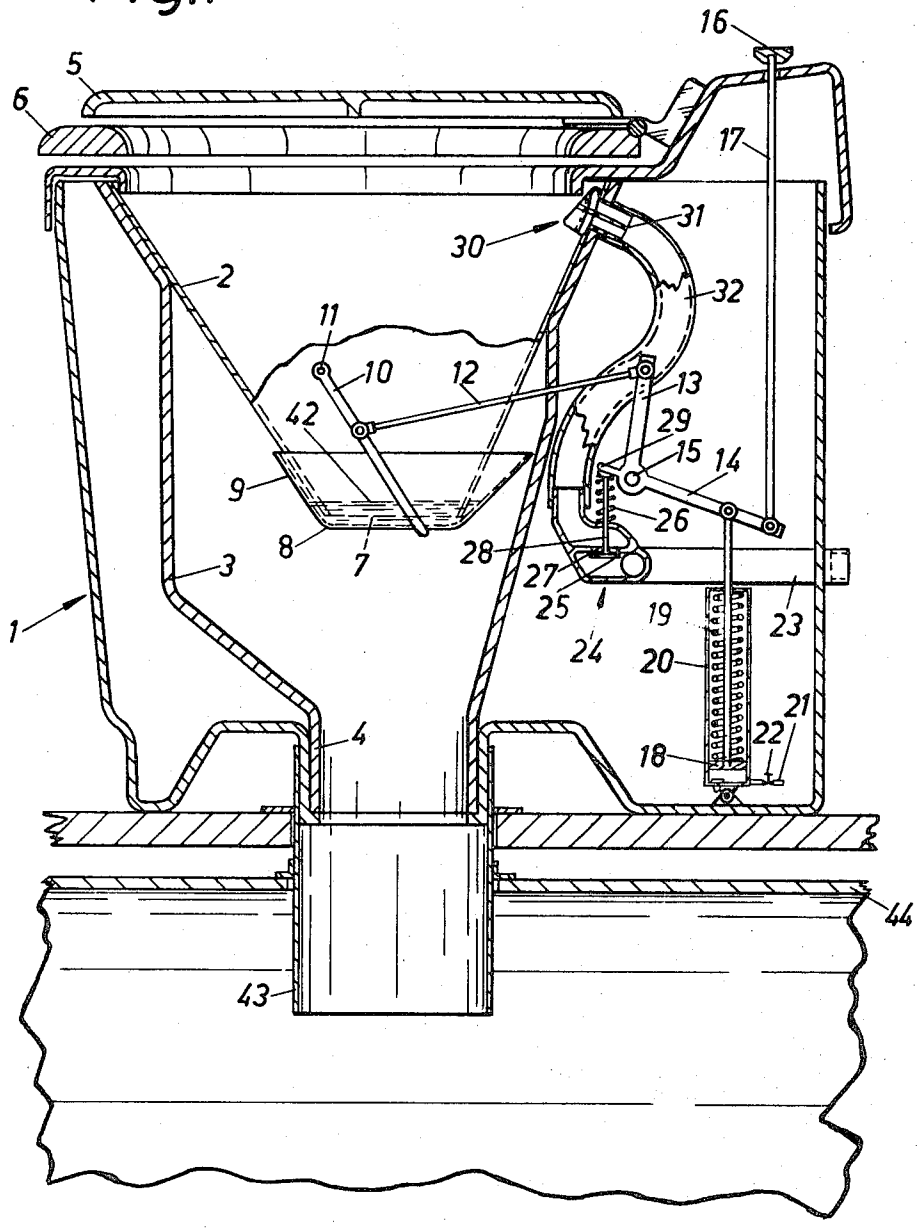

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Fig. 2

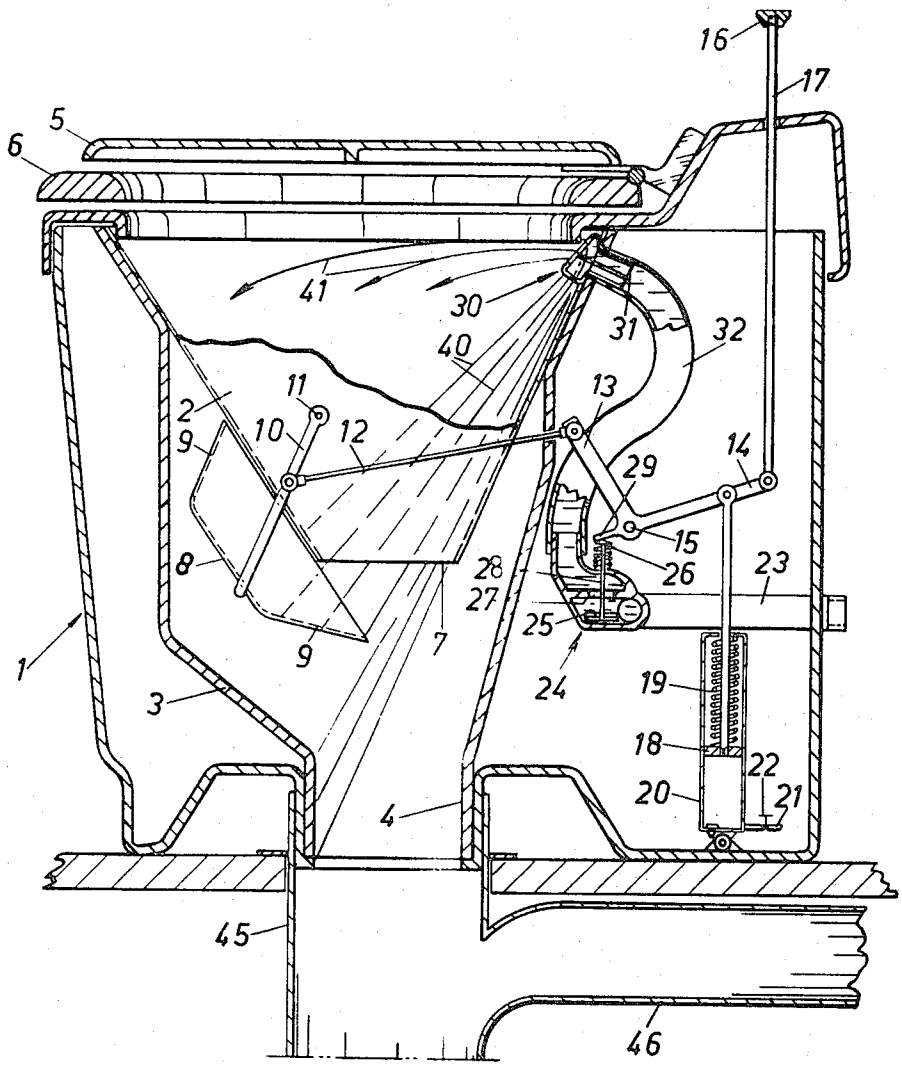

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Fig. 3

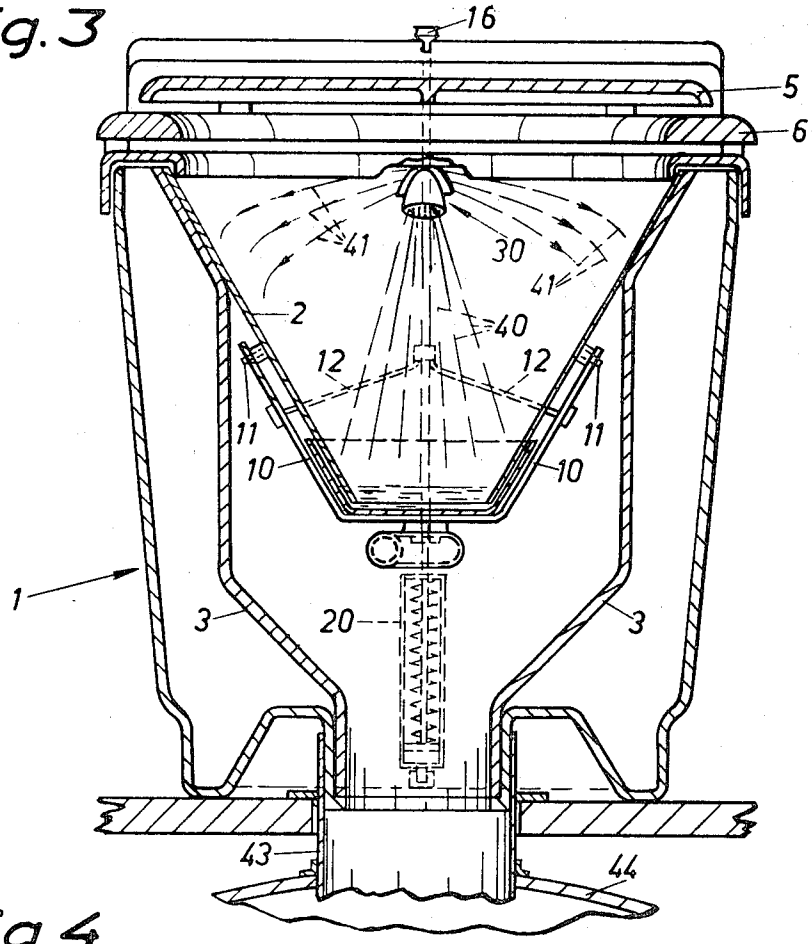


Fig. 4

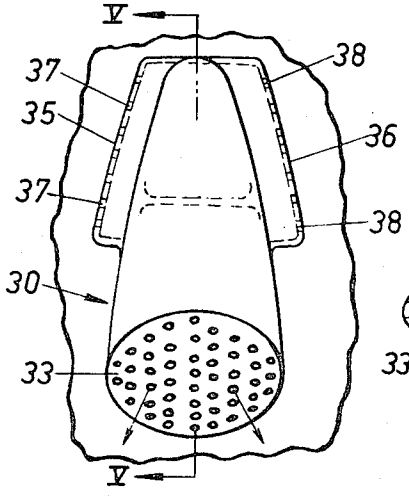
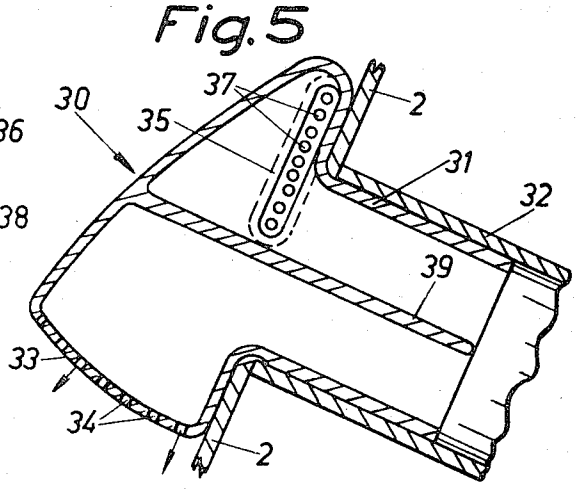


Fig. 5



DEVICE IN WATER CLOSETS

BACKGROUND OF THE INVENTION

The present invention relates to water closets of the kind which are provided with a closet bowl tapering in a downwards direction, a valve disc closing the bowl drain mouth, said disc being provided with an upstanding rim surrounding the drain mouth about the external face thereof and a supply line carrying flushing liquid to the inside face of the closet bowl when the drain mouth is uncovered. The purpose of the invention is to diminish to a minimum the amount of liquid required for the flushing and at the same time to prevent unpleasant odours from rising from the closet bowl mouth.

SUMMARY OF THE INVENTION

The characterising features of the invention are that the supply line feeding flushing liquid to the closet bowl debouches in a spray nozzle disposed at the inside face of the closet bowl, said nozzle being adapted to direct a spray-like bundle of water jets against the centre of the bowl drain mouth when the latter is uncovered as a result of displacement of the valve disc away from the mouth. Because this bundle of water jets "covers" the bowl mouth like a shower, foul gases are prevented from penetrating into the closet bowl. In addition, toilet paper is efficiently carried along down through the bowl drain by the water jets. Preferably, the nozzle is provided with laterally pointing openings directing liquid jets tangentially against the closet bowl inside surfaces. These tangential water jets carry along with them any toilet paper that might adhere to the closet bowl. Each flushing does not require more than about 0.4 liters of flushing liquid. When the valve disc has moved back to the position wherein it closes the bowl mouth, the disc fills with flushing liquid streaming downwards along the inside surfaces of the closet bowl, whereby the liquid on the disc rises upwards above the level of the bowl mouth. This creates an efficient liquid seal preventing unpleasant smells from penetrating from the collection receptacle or the sewage to which the closet is connected, also when the closet is not being used.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics of the invention will become apparent from the following description with reference to the accompanying drawings, wherein

FIG. 1 is a vertical longitudinal section through a closet having a flushing device in accordance with the invention and being connected to a sludge tank, the closet valve disc being in its closed position,

FIG. 2 is a similar longitudinal section through the same closet but the latter being connected to a sewage disposal pipe and the valve disc being in its non-closing position during flushing,

FIG. 3 is a vertical transverse section through the closet in accordance with FIG. 1 after the valve disc has returned to its closed position but immediately before finished flushing.

FIG. 4 illustrates on an enlarged scale a front view of the flushing spray nozzle in accordance with FIG. 3, and

FIG. 5 illustrates a vertical section through the nozzle along line V—V of FIG. 4.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

The toilet seat 1 illustrated on the drawings comprises a closet bowl 2 tapering conically downwards and supported by a support stand 3 forming a jacket around the bowl and having an outlet opening 4 at its bottom. The closet seat 1 is provided at its top with a lid 5 covering a hingedly mounted seat ring 6. The drain mouth 7 of the closet seat is arranged to be closed by means of a valve disc 8 the upstanding rim 9 of which, in the closed position of the valve body, extends upwards around the closet bowl wall surrounding the mouth 7. The valve disc 8 is attached to the lower ends of two parallel levers 10 (or a yoke), said levers being pivotally mounted about horizontal pivot pins 11 disposed at the upper ends of said levers. A rod 12 connects the levers 10 pivotally to a bell crank 13,14 which is journalled about a horizontal shaft 15 and operable by means of a handle 16 or the like attached to a pull rod 17. The bell crank 13,14 is attached to a piston 18 adapted for axial displacement against the action of a spring 19 by means of an air cylinder 20 having an outlet line 21 the cross sectional area of which may be controlled and adjusted through a throttle valve 22.

A valve 24 is inserted in a line 23 connected to a source of water under pressure (not illustrated), the valve body 25 of said valve 24 being normally held in closed position wherein it is pressed against a seat 27. The spindle 28 of the valve body abuts by means of its outer end against a follower arm 29 arranged on the bell crank 13,14. Close to the upper edge of the closet bowl 2 there is arranged internally a flushing spray nozzle 30 which by means of a pipe end 31 passes through the closet bowl wall and by means of a flexible tube 32 is connected to the line 23.

As most clearly illustrated in FIGS. 4 and 5 the nozzle 30 is provided with a spray section 33 having through-passage holes or perforations 34 which are directed downwards towards the drain mouth 7 of the bowl 2. The nozzle is also provided at its top with spray sections 35 and 36 at either side, having through-passage holes or perforations 37 and 38, respectively, which are directed tangentially towards the inside face of the bowl 2. Between on the one hand the spray section 33 and on the other the spray sections 35 and 36 a partition wall 39 is arranged, dividing inside the nozzle 30 the flow of water streaming thereinto out of the tube 32.

When, after use of the toilet, flushing is desired, rod 17 is pulled upwards by operating handle 16 against the action of spring 19 to the position illustrated in FIG. 2. When the bell crank 13,14 is thereby being swung in the clock-wise direction, the valve disc 8 is being swung away from the mouth 7 whereby the contents on disc 8 are emptied through the outlet 4. At the same time the follower arm 29 urges the valve body 25, against the action of spring 26, into opening position and pressurized water flows to the nozzle 30. Water jets 40 are sprayed in a bunch downwards towards the drain mouth 7 carrying along with them the toilet paper out through the mouth 7 while forming an odour block, and at the same time water jets 41 are being forced laterally out through the nozzle, describing a spiral-shaped or helical path along the inner surface of the bowl 2 down towards the mouth 7, whereby the closet bowl is rinsed clean. Piston 18 is being urged by the spring 19 against

the lower end of the cylinder **20** as air is being forced out through line **21.** The degree of retardation of this movement may be regulated through the throttle valve **22.** Simultaneously, or immediately after movement of the valve disc **8** through bell crank **13,14** and rod **12** to position of closure, the valve body **25** is moved back to closing position and the flushing thus made to cease. The last amount of the flushing liquid is collected on the valve disc **8** such that the level of the liquid **42** will be above the mouth **7,** thus forming an efficient liquid seal.

In accordance with FIG. **1** the outlet pipe stub **4** is connected to an inlet pipe stub **43** in a sludge tank **44** which must be emptied at regular intervals.

In accordance with FIG. **2** the outlet **4** is connected to an ordinary sewage line **45,** for instance in a private house or an apartment building.

The embodiment as described and illustrated is to be regarded as an example only and the various details of the closet seat may be constructively altered in various ways without departing from the scope of the invention. Line **23** may, for instance, be connected to a water tank via a pump for supplying flushing liquid under pressure to the nozzle **30.** The valve disc **8** may be movable to and from the closing position through other means than those illustrated in the drawings. The same is true of the means for retarding the operating movements of the valve disc **8** and the valve body **25.**

What I claim is:

1. A device in a water closet trapless comprising a trapless closet bowl tapering in a downwards direction, a drain mouth at the bottom of said closet bowl for discharging wastes directly from the trapless bowl, a valve disc closing said drain mouth of said bowl, an upstanding rim on said disc surrounding said drain mouth about the external face thereof, and a supply line carrying flushing liquid to the inside face of said closet bowl when the drain mouth in uncovered, characterised by a spray nozzle disposed at the inside surface of said closet bowl, said spray nozzle having a discharge portion directed directly at said drain mouth, said supply line feeding flushing liquid to said closet bowl debouching in said spray nozzle, said nozzle being adapted, upon displacement of said valve disc away from said drain mouth, to direct a shower-like bunch of water jets from said discharge portion directly against the center of said uncovered drain mouth for preventing the escape of objectionable odors from below said drain mouth through said drain mouth.

2. The device in accordance with claim **1,** wherein laterally pointing outlet holes are provided in said spray nozzle, said holes directing liquid jets tangentially against the inside surface of said closet bowl.

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