

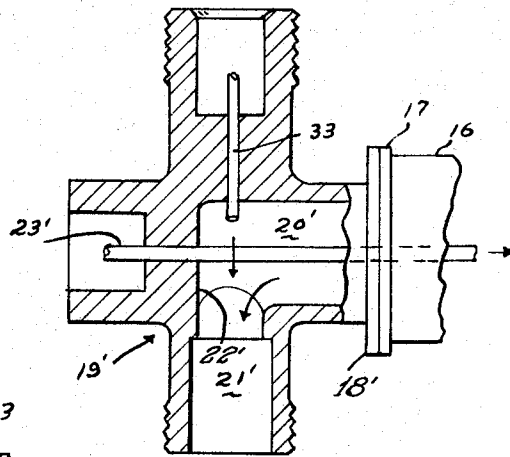
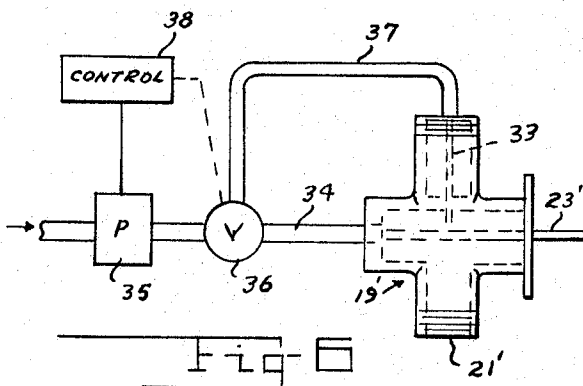
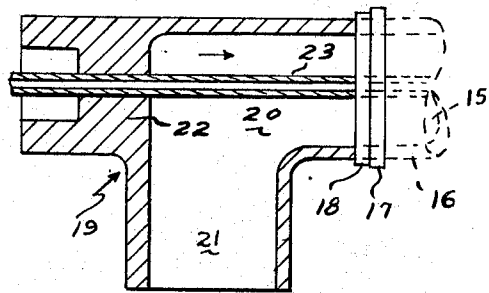
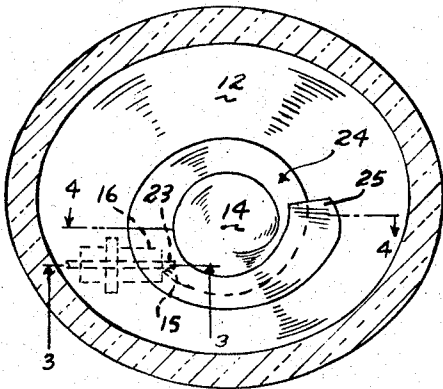
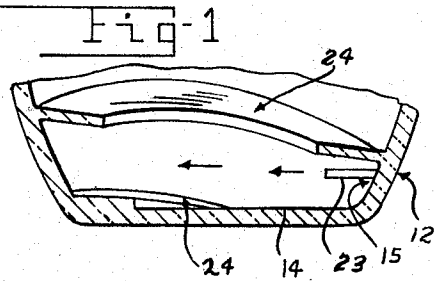
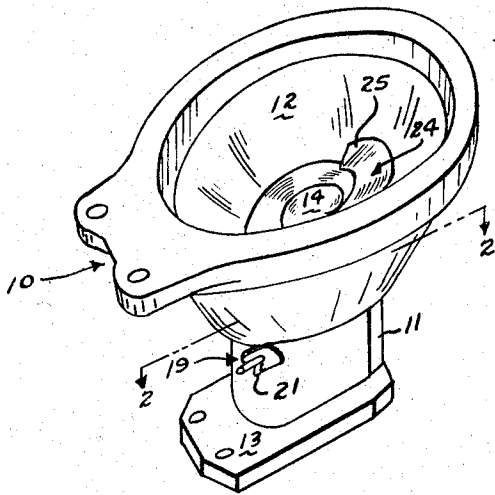
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3,334,358

JET OPERATED TOILET

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3,334,358

JET OPERATED TOILET

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This invention relates to a toilet installation facilitating the disintegration and dissipation of human waste. It is particularly advantageous for use where there is an absence of a conventional sewer line and will be so described. However, it will become obvious from the following that neither its form nor its application is so limited.

A primary object of the invention is to provide a toilet installation which is economical to fabricate, more efficient and satisfactory in use, adaptable to a wide variety of applications and unlikely to malfunction.

Another object of the invention is to provide an improved toilet facility for use where a conventional sewer connection cannot be had.

A further object of the invention is to provide a toilet installation having particular utility for marine use.

An additional object of the invention is to provide a novel toilet installation including a normally dry bowl having means in connection therewith enabling the timed injection of fluid to first liquefy solid waste before it leaves the bowl and then pump the liquefied waste from the bowl.

Another object of the invention is to provide an improved toilet installation including a dry bowl from which waste is positively displaced by means of a fluid jet.

A further object of the invention is to provide a toilet unit having an improved bowl structure and means in connection therewith to produce an internal whirlpool in a manner to fully liquefy contained waste prior to exit from the bowl.

Another object of the invention is to provide a toilet installation including a normally dry bowl having a gravity drain and incorporating jet means operable to liquefy waste within the bowl and during the liquefying process to inhibit a gravity drain.

An additional object of the invention is to provide toilet installations possessing the advantageous structural features, the inherent meritorious characteristics and the means and mode of operation herein described.

With the above and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

Referring to the accompanying drawing wherein is shown, in generally schematic form, some but obviously not necessarily the only forms of embodiment of the invention,

FIG. 1 is a perspective view of a toilet as provided by the present invention;

FIG. 2 is a sectional view taken on line 2-2 of FIG. 1;

FIG. 3 is a sectional view of jet apparatus employed in the device of FIG. 1;

FIG. 4 is a sectional view taken on line 4-4 of FIG. 2, the structure being shown in generally schematic form;

FIG. 5 is a fragmentary sectional view of a modified jet unit enabling another form of toilet unit; and

FIG. 6 is a schematic illustration of the controls utilized in conjunction with the device of FIG. 5.

Like parts are indicated by similar characters of reference through the several views.

Referring to the drawings, a toilet 10 is seen to com-

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prise a pedestal 11 and, formed integral therewith, at its top, a bowl 12. The pedestal has a plate-like base 13 including spaced apertures accommodating fastening elements by means of which the entire toilet unit may be secured to a floor structure.

The bowl 12 has a generally ovular configuration, its major axis orienting from front to rear. The bowl expands upwardly from its bottom surface 14, the latter of which slopes to a lateral opening providing the entrance to a drain channel 15 formed in the bowl wall. The channel 15 orients to one side and to the rear of the bowl, generally parallel to its major axis.

A tubular projection 16 provides an outward extension of the channel 15 at the base of the bowl 12. It projected extremity has an external flange 17 which is sealingly secured to a mating flange 18 on an adapter 19. The adapter 19 is a pipe type fitting including a cavity 20 forming an extension of the channel 15. An opening to the bottom of the cavity 20 is defined by a drain tube 21.

In formation of the cavity 20, the adapter 19 is provided with a wall section 22 which positions directly opposite and spaced from the discharge end of the projection 16. Extended through the wall section 22, the cavity 20 and the drain channel 15 to the interior of the bowl 12 is a small bore tube 23. The tube 23 orients adjacent and generally parallel to the major axis of the bowl.

Formed on the inner surface of the bowl per se is a peripheral spiral ramp 24 which commences at a point spaced beyond, directly below and in the general line of the discharge end of the tube 23. From this point the ramp moves upwardly of the bowl on a gradual incline. It forms a spiral loop the beginning and end portions of which overlap to a small extent so as to respectively position adjacent and on respectively opposite sides of a vertical plane including the major axis of the bowl. It is to be noted that the ramp is reversely inclined at its upper terminal portion 25.

In installing the toilet above described on a boat, for example, the unit is first secured to a floor structure by bolts applied through the apertures in the base 13. In completing the installation a discharge conduit is extended from the drain tube 21 to terminate exteriorly and below the water line of the boat. Also a further conduit incorporating a positive displacement pump is connected at its downstream end to tube 23 and so arranged to have its upstream end terminate exteriorly and below the water line of the boat. Suitable pump controls are conventionally positioned adjacent the bowl structure and so arranged, on operation thereof, to cause the pump to deliver water to flow through the tube 23 and produce thereby, for a predetermined interval of time, a high velocity jet discharge interiorly of the bowl.

The respective conduits and displacement pump, together with the pump controls, may be of conventional nature and suitably installed by any mechanic versed in the art. Since the details of this structure do not per se afford a significant aspect of the present invention, they are not described with any particularity.

In accordance with the invention, it is contemplated that the toilet unit be used with the bowl in a dry condition. When a flushing action is necessary, the controls for the aforementioned displacement pump may be operated, whereupon water will be pumped to and delivered through and from the tube 23 to discharge as a high velocity jet. Due to the orientation of the tube 23 the jet will initially impinge on the directly opposite portion of the bowl wall immediately above the entrance to the ramp 24. The water so discharged will inherently follow the ramp configuration, moving upwardly of the expanding bowl structure at a high velocity. In this manner, the

water is caused to swirl violently upward of the bowl proper and to thereby create a whirlpool. This whirlpool causes a lifting and whirling of the waste matter contained in the bowl. The force of this action is such that in a matter of seconds the waste is disintegrated and liquefied. While the jet continues to flow and produce this whirlpool it inhibits passage of the liquefied waste to the cavity 20 and the drain tube 21. Thus, as long as the jet is being delivered from the tube 23, the waste is effectively prevented from leaving the bowl proper.

Any suitable means may be used to control the interval of jet discharge. Being of a conventional nature, the details thereof are not pertinent to the present invention and are therefore not described.

Once the jet is interrupted by an automatic shutdown of the pump, the water in the bowl, including the liquefied waste, will drain by gravity, passing over the bottom surface 14 through the channel 15 to the cavity 20 and out the drain tube 21. It is noted that on termination of the jet discharge the whirlpool influence remains to an extent sufficient that it assists the gravity discharge and insures a cleansing of the bowl. The liquefaction procedure is such that on gravity discharge the bowl is flushed clean.

Accordingly, in this phase of the invention one starts with a dry bowl and requires as little as a single high velocity fluid jet to completely liquefy deposited waste and termination of the jet results in a cleansed bowl structure.

The economy and efficiency inherent in the fabrication and use of the above described structure is believed obvious.

The invention also contemplates its embodiment to provide a basement toilet which can be installed below a conventional gravity fed sewer line. In this instance, the bowl structure is the same as that previously described. However, an adapter 19', seen in FIG. 5 of the drawings, replaces the adapter 19.

The adapter 19' is also a pipe type fitting applied by means of an external flange 18', including a seal, to the flange 17 on the projection 16 of the bowl structure. The adapter 19' has a cavity 20' which opens to the drain channel 15. It also includes a wall section 22' directly opposite and spaced from the discharge end of the projection 16, which wall section accommodates the extension therethrough of a small bore tube 23' of a nature and positioned in a manner identical with that described in reference to the aforementioned tube 23. To one side of the cavity 20' the adapter has a discharge opening defined by a drain tube 21'. At an opposite side, the adapter wall structure includes a small bore opening which accommodates the projection therethrough of a small bore tube 33. Tube 33 is positioned coaxial with the drain tube 21'.

Noting FIG. 6 of the drawings, it is there shown, in schematic fashion, that in use of this last mentioned embodiment of the invention the tube 23' may be connected with a source of fluid through a line 34 which incorporates a pump 35 and a valve 36. The valve 36 is a two-way valve and arranged to be selectively directed to open to a line 37 in connection with the tube 33. In this last instance the flow to the tube 23' is cut off.

A suitable control unit 38 may be interconnected with the pump 35 and valve 36 whereby on energizing of the pump it will initially deliver water through the tube 23' and, after a suitable interval, at which point the valve 36 is automatically switched to open to line 37, it will selectively direct fluid to the tube 33 rather than the tube 23'. At the end of another interval, there is an automatic shutoff of the pump 35.

In use of this modification of the invention, after waste is deposited in the bowl 12, one actuates the control unit to energize pump 35. This causes a high velocity jet to issue from the tube 23' on the lower portion of the bowl wall immediately above the ramp 24 and be directed upwardly by the ramp to form a waste disintegrating whirlpool in the bowl. The whirlpool prevents drain of

the bowl as in the case first described. When the time control of the unit 38 switches valve 36 to direct the water to flow in a high velocity jet from the tube 33 the line to tube 23' is closed. As the jet from tube 23' terminates, and the liquefied waste moves downwardly to the cavity 20' to discharge through tube 21', its flow is enhanced by the high velocity jet from tube 33 which orients transverse to the discharge end of the channel 15. This jet not only exerts a suction influence to draw the bowl contents but also positively forces the contents through the discharge tube 21'. As a matter of fact the force of discharge is such that the liquefied waste may be directed upwardly through a pipe in connection with tube 21', which pipe may be connected at an upper level for gravity drain to a conventional sewer line.

The advantages of the invention in this form of embodiment are believed obvious. As mentioned previously, the controls may be of any conventional nature and the details thereof per se may be optional as long as incorporated as and for the purpose described.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. A toilet installation including a bowl which expands upwardly and has a laterally opening discharge passage to its bottom, means forming a gravity drain in connection with said passage, means providing for jet inflow to said bowl extending through said passage and over said drain, the jet being directed transversely of the bowl in overlying relation to its bottom in a manner to inhibit exit of bowl contents through said passage while said jet is operating, and a ramp formed to commerce generally opposite said jet inflow and upon which said jet inflow impinges, said ramp extending upwardly within said bowl, so arranged to create a rising waste disintegrating whirlpool in said bowl by controlling the path of said jet inflow.

2. A toilet installation as in claim 1 characterized in that said bowl is generally oval in horizontal section and said jet inflow originates at a point adjacent and discharges in a line generally parallel to its major axis.

3. A toilet installation as in claim 1 wherein means are connected to form an extension of said passage outwardly of said bowl, and means are provided for a jet to discharge through said extension means transverse to the lateral opening from said passage, said last mentioned jet being operative thereby to draw liquefied waste from said bowl and positively displace it through said extension means.

4. A toilet installation comprising a bowl having a dependent relatively reduced drain section and including a lateral drain opening adjacent the bottom of the bowl, means defining a ramp on the inner wall of said bowl originating opposite said lateral drain opening, an adapter connected to communicate with said drain section through said drain opening, said adapter providing a communicating cavity having a discharge opening, and means providing a small bore channel through said adapter extending into and through said lateral drain opening and directed transversely of the bowl to deliver an impinging

jet of fluid on the inner wall of said bowl adjacent the lower portion of said ramp, said ramp being so formed to create a rising whirlpool effect in said bowl by directing the jet upwardly in a swirling fashion in a manner to liquefy the bowl contents, said jet inflow inhibiting exit of bowl contents through said drain opening while the jet is operating.

5. A toilet installation as in claim 4 wherein said channel is provided by a small bore tube adapted for delivery of fluid therethrough at a high velocity.

6. A toilet installation as in claim 5 characterized by said adapter providing means in axial alignment with said cavity discharge opening for delivery across said lateral drain opening of a high velocity fluid jet operative to produce a suction to assist in drawing the liquefied contents of the bowl to and to push said contents from said adapter cavity.

7. A toilet installation as in claim 6 wherein means are provided in connection with both said tubes to deliver the jets therefrom in a predetermined sequence whereby to first fully liquefy waste within said bowl and then provide for its discharge therefrom.

8. A toilet installation including a normally dry bowl convergent to its bottom and having a lateral opening adjacent said bottom for drain and means for selectively injecting at least one jet of fluid through said opening at a velocity to swirl up and about the sides of said bowl and thereby create a waste disintegrating whirlpool within said bowl while at the same time inhibiting exit of bowl contents through said lateral drain opening while said jet is operating.

9. A toilet installation as in claim 8 and means so applied to form a drain in connection with said lateral opening and provide for discharge therethrough of the liquefied waste on termination of said jet, said last named means further providing jet delivery means in connection with said drain means operable to pressure flow the liquefied waste on discharge.

10. A toilet installation consisting of a bowl structure convergent to its bottom at which point it includes a lateral opening providing for gravity discharge at one side, a small bore tube projecting into said bowl through said lateral opening, offset from a center line of the bowl, and an angular formed ramp rising within said bowl structure, a lower end of said ramp being presented as an impact surface opposite the discharge end of said tube, said ramp being operative to produce a waste disintegrating whirlpool in said bowl on jet discharge from said tube, liquid under pressure being selectively supplied to said tube.

11. A toilet installation as in claim 10 characterized by a fitting in connection with said bowl structure providing a flow extension for said gravity discharge means and the jet delivered from said tube being operative to inhibit passage of the bowl contents to said flow extension.

12. A toilet installation as in claim 11 characterized

by further jet delivery means in connection with said flow extension operative on termination of the aforementioned jet to produce a pressured drive of the bowl contents through said flow extension.

13. A toilet installation including a bowl having a curving side wall and a closed bottom to which waste solids descend, a discharge outlet opening laterally through said bowl adjacent to the bottom thereof, and a water flow means arranged laterally of the bowl to direct water under pressure in a jet across the interior of the bowl in overlying adjacent relation to the bottom of the bowl, said jet disintegrating intermediately encountered solids in the bottom of said bowl against a portion of the bowl side wall opposite said water flow means on which portion said jet impinges, said jet creating a whirlpool in the bowl rising above the level of said discharge outlet, said whirlpool entraining solids and further disintegrating them against the side wall of the bowl, shutting off of flow through said water flow means allowing introduced water and fluidized solids to drain down the bowl side wall to the bottom and out said discharge outlet.

14. A toilet installation according to claim 13, characterized in that said water flow means has the form of a small bore tube entering the bowl through said discharge outlet, the flow therefrom inhibiting exit of bowl contents through said discharge outlet while said jet is operating.

15. A toilet installation according to claim 13, characterized by a fitting mounted to said bowl on the exterior thereof, said fitting having an inlet opening to align with and communicate with said discharge outlet and a drain opening, there being a chamber in said fitting intercommunicating said openings, said water flow means including a small bore tube installed in said fitting to project longitudinally through said inlet opening therein to and through said discharge outlet into said bowl, said tube aligning with said portion of the side wall forming an impingement area opposite said discharge outlet.

16. A toilet installation according to claim 15, characterized by another inlet opening in said fitting aligned with said drain opening, water under pressure being directed to and through said fitting by way of said other inlet opening concomitantly with the shutting off of flow through said water flow means to exert through said chamber a suction effect upon the contents of the bowl.

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