July 4, 1939. W. C. GROENIGER 2,164,320

COMBINATION SEAT AND FLUSH RIM

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Fig. 1.

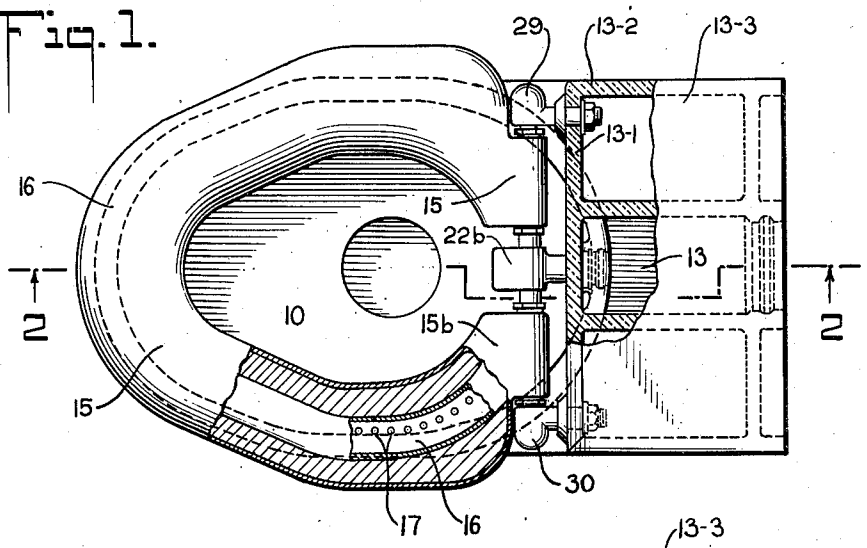


Fig. 2.

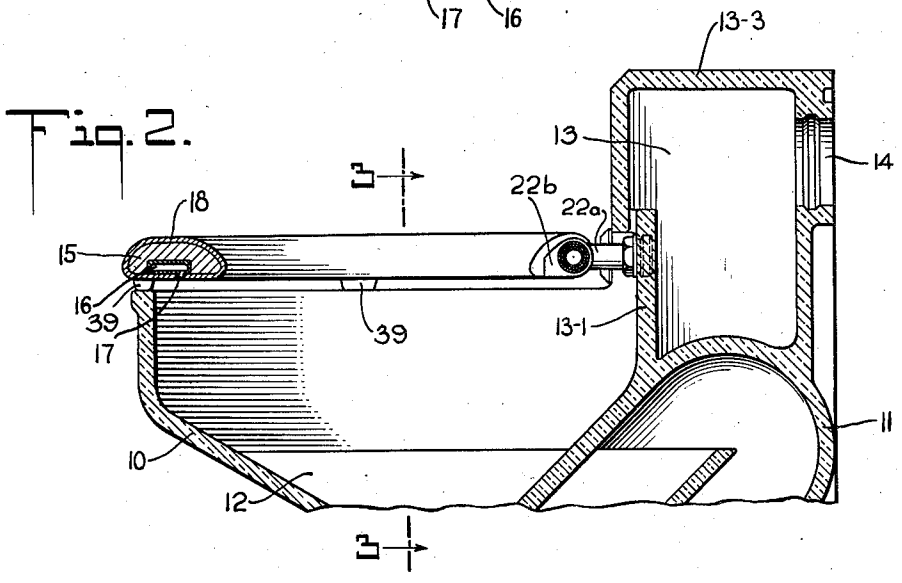
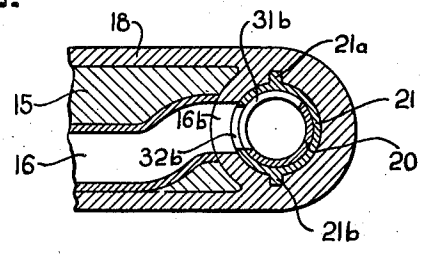


Fig. 8.



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Fig. 3.

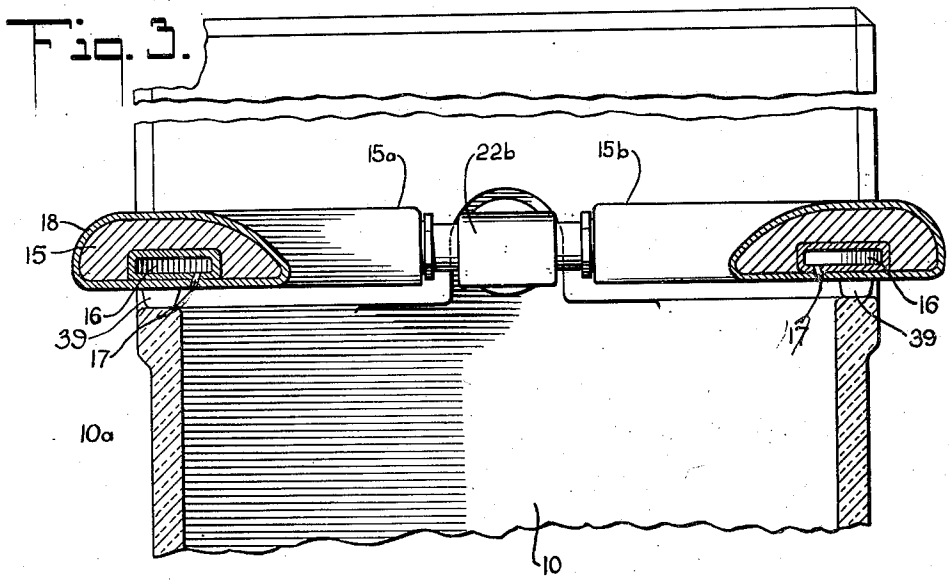


Fig. 4.

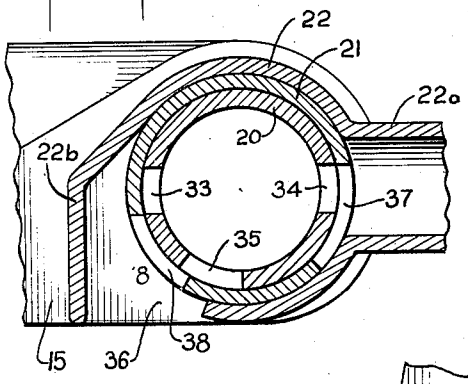


Fig. 5.

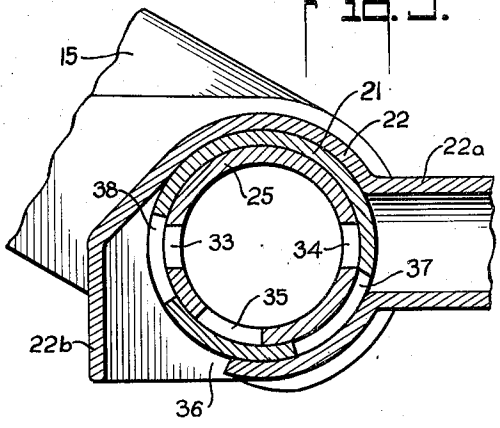
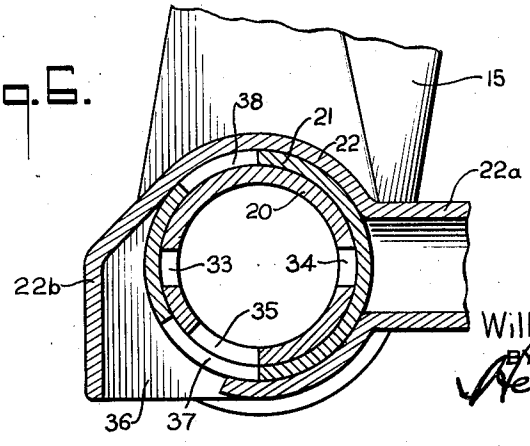


Fig. 6.



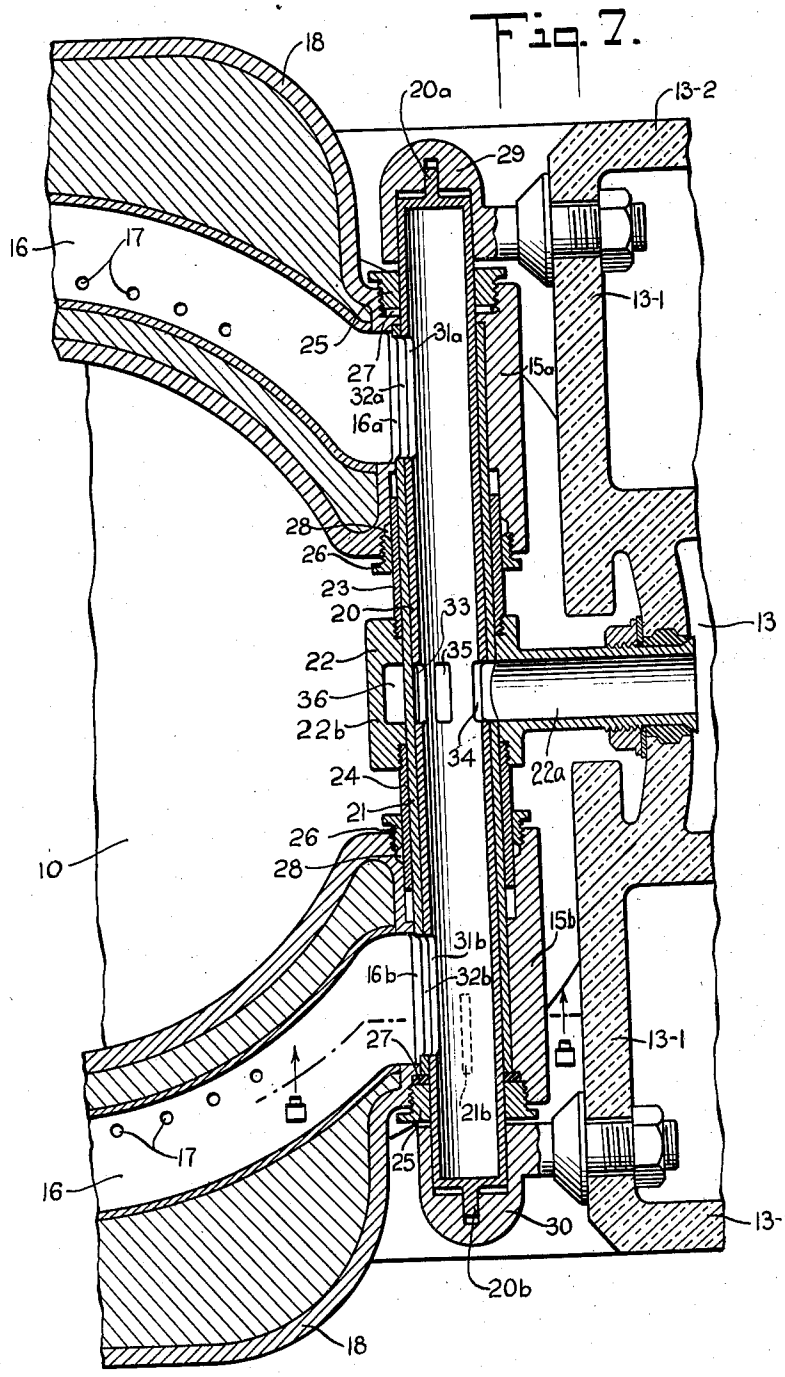
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Fig. 7.



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COMBINATION SEAT AND FLUSH RIM

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Application April 8, 1938, Serial No. 200,829

8 Claims. (Cl. 4—70)

This invention relates to waste disposal apparatus, and more particularly to waste disposal apparatus having a bowl for the reception and discharge of waste materials, and having, further, an independent flow channel providing structure associated with the bowl and connected to a source of supply of flushing liquid.

The invention is concerned primarily with such waste disposal apparatus in combination with a novel valve mechanism, the latter serving as a hinge support for the flow channel providing structure as well as a regulator of the supply of flushing liquid thereto.

The invention is advantageously embodied in a defecator construction wherein a water closet bowl serves to receive and to discharge waste material and wherein the seat thereof includes a flow channel hingedly connected through the flow regulating valve mechanism to a source of supply of flushing liquid.

The novel valve mechanism provides a most convenient and compact means for regulating flow of flushing liquid into the flow channel of the defecator seat, such valve mechanism being open to allow flow of liquid when the seat is in lowered position, i. e,, superimposed on the rim of the bowl, and closing to prevent liquid flow as the seat is raised.

A feature of the novel valve mechanism resides in the provision of a discharge port opening into the bowl, and being at all times in communication with the flow channel of the flow channel providing structure. Accordingly, after the main flushing operation, the flow channel may drain directly into the bowl throughout the entire range of hinge movement of the flow channel providing structure.

From the above it is apparent that an important object of the invention is to provide, in waste disposal apparatus, a flow channel providing structure operative, in the stage of flushing, to conduct flushing liquid from a source of supply to a waste receiving and discharging bowl, the flow channel providing structure being compactly hinged to the source of supply of flushing liquid, in functional relation with the bowl, by valve mechanism operative to control the supply of flushing liquid according to the position of the flow channel providing structure within its range of hinge movement.

Another object is to provide, in waste disposal apparatus having flow channel providing structure mounted for hinge movement in flushing relation with a waste-receiving and waste disposing bowl, means for drainage the flow channel into the bowl at any position within the range of hinge movement of the flow channel providing structure.

Further features and objects of the invention will be apparent from the following detailed description and the accompanying drawings.

In the drawings:

Fig. 1 represents a top plan view of waste disposal apparatus in the form of a defecator embodying a preferred form of the present invention.

Fig. 2 represents a vertical section taken on the line 2—2, Fig. 1, unimportant bottom portions being broken away for convenience of illustration.

Fig. 3 presents a vertical section taken on the line 3—3, Fig. 2.

Fig. 4 represents an enlarged fragmentary detail view in vertical section of the valve mechanism of the defecator of prior figures, the defecator seat being in lowered position. The section is taken transversely of the length of the valve mechanism at its midpoint.

Fig. 5 represents a view corresponding to Fig. 4, but illustrating the defecator seat raised through an arc of approximately 22.5°.

Fig. 6 represents a view corresponding to Figs. 4 and 5, but illustrating the seat raised through an arc of approximately 101°.

Fig. 7 represents an enlarged fragmentary horizontal section taken on the line 7—7 of Fig. 2.

Fig. 8 represents a fragmentary detail view in vertical section taken on the line 8—8, Fig. 7.

Referring to the drawings: As illustrated, the invention is embodied in a defecator construction, a water closet bowl 10 serving for the reception of waste matter, and an evacuator 11, which is conveniently integral with the bowl 10, serving to discharge the received waste matter through suitable piping (not shown) into a sewerage system.

A liquid seal 12, maintained in the well of the bowl, serves as a vehicle for receiving and discharging waste matter as well as to seal the trapway of the evacuator 11.

Flushing liquid may be supplied from a distributing chamber 13, formed integral with the bowl and the evacuator, and receiving its liquid supply by suitable connection, above the overflow spill channel of the bowl as at 14, with a water supply system (not shown).

The front wall, 13—1, of the distributing chamber advantageously extends laterally substantially coextensive with the width of the bowl, thus affording supporting structure to which the

defecator seat may be hinged, and merges into side and top walls 13—2 and 13—3, respectively, provided for the sake of symmetry of design. While the illustrated distributing chamber construction forms a convenient means for the supply of flushing liquid, other means, such as the usual flush tank for the storage of flushing liquid, may be employed.

The water closet bowl may be of any desired flushing type, the illustrated bowl 10 being of the ordinary syphon type without momentum jets.

Flushing liquid is supplied to the bowl through a flow channel incorporated in structure which is independent of the bowl but associated therewith adjacent its rim, such flow channel providing structure being hingedly connected to the source of supply of flushing liquid by valve mechanism adapted to regulate supply of flushing liquid according to the movement of the flow channel providing structure about its hinge mounting.

In the instance of defecators, as here particularly considered, the flow channel is advantageously incorporated in the defector seat, the flow-channel providing for flushing of the bowl directly from the seat. As illustrated, the defecator seat 15 has embedded therein a flow channel 16, the same being so disposed in the seat that a portion of its periphery overhangs the top opening of the bowl 10. At spaced locations along the length of that portion of the flow channel which overhangs the top opening of the bowl are jet openings 17, desirably directed at an angle toward the interior walls of the bowl.

The defecator seat 15 is hinged for controlled communication with the source of supply of flushing liquid, i. e., with distributing chamber 13. For this purpose the periphery of the seat proper may be interrupted at its back portion, providing, between terminal ends 15*a* and 15*b*, a space for the reception of valve mechanism.

In the present instance, defecator seat 15 is sheathed with rigid material 18 which extends at the terminal ends 15*a* and 15*b* in formation adapted to receive and journal valve mechanism. Flow channel 16 opens into the receiving passages of terminal ends 15*a* and 15*b* through ports 16*a* and 16*b*, respectively.

The valve mechanism is adapted to function as a hinge on which the seat turns in its up and down movement as well as a regulator for supplying and controlling flow of flushing liquid to the flow passage 16 of the seat.

The valve mechanism preferably comprises a tubular inner valve element 20 having a hollow interior which forms an axial core. The ends of valve element 20 are closed and key formations 20*a* and 20*b* extend therefrom for a purpose hereinafter made clear. A cooperating valve element is provided by a hollow tubular sleeve 21 which is concentrically mounted in quill fashion on the element 20, intermediate the ends thereof, for rotation relative thereto. Freely and substantially concentrically mounted on the valve element 21, intermediate the ends thereof and in the space between terminal ends 15*a* and 15*b* of the seat, is a hollow and generally tubular outside, or spout-providing, valve element 22, the mounting of the latter being completed by hollow tubular sleeves 23 and 24 which are secured to the respective ends thereof and extend into journal relationship with terminal ends 15*a* and 15*b*, respectively, of the defecator seat.

The valve mechanism as an entirety is secured in liquid-seal relationship to the defecator seat. Such securement may be accomplished in various ways. As illustrated, open ends of the receiving passages of terminal ends 15*a* and 15*b* of the seat are threaded for the reception of the packing sleeve-nuts 25 and 26. The sleeve-nuts 25 are threaded into outside ends of the stated passages and are adapted to receive and journal the respective end portions of valve element 20. The sleeve-nuts 26 are threaded into the inside ends of the stated passages and are adapted to receive and journal the intermediate portion of the valve mechanism, i. e., that portion adjacent the free ends of the tubular sleeves 23 and 24.

Valve element 21 extends at its ends almost completely through the receiving passages of terminal ends 15*a* and 15*b* of the seat, but stops short of the threaded outside ends thereof to permit the positioning of packing gaskets 27 of any suitable waterproof material, such as rubber, under the sealing pressure of the packing sleeve-nuts 25.

A packing gland 28 is associated in pressure relationship with each packing sleeve-nut 26 for sealing the inside ends of the receiving passages of terminal ends 15*a* and 15*b*.

Mechanical attachment of defector seat 15 to the defector structure proper is preferably accomplished by securing seat posts, as at 29 and 30, to the front wall 13—1 of distributing chamber 13, such seat posts being recessed to receive and journal respective closed ends of valve element 20. The seat posts are further recessed to receive key formations 20*a* and 20*b* for preventing rotation of valve element 20.

The outside or spout-providing valve element 22 is formed with a nipple 22*a* which extends back into flow receiving communication with distributing chamber 13 through an appropriately provided aperture in front wall 13—1 thereof, the joint being suitably packed to prevent leakage.

For regulating the flow of flushing liquid from distributing chamber 13 into flow channel 16 of the seat and directly into the bowl 10 through spout-providing element 22, the component valve elements are provided with ports which cooperate according to the placement of seat 15 relative to the bowl 10.

Ports 31*a*, 32*a* and 31*b*, 32*b* are provided adjacent the opposite ends of valve elements 20 and 21, respectively, for registering cooperation one with the other, and with the ports 16*a* and 16*b*, respectively, of flow channel 16, in permitting flow of liquid from the hollow interior of valve element 20 into the flow channel 16 when the defecator seat is in lowered position, see Fig. 7.

The ports 31*a* and 31*b* are extended circumferentially around inner valve element 20, see Fig. 8, to such an extent as to provide communication of its hollow interior with flow-passage 16 throughout the entire range of seat movement, thus affording back-drainage from flow-passage 16 into the valve mechanism at all times.

Control of flow of flushing liquid from the distributing chamber 13 through nipple 22*a* into the hollow interior of valve element 20 is accomplished by a series of cooperating ports provided in the concentrically disposed component valve elements 20, 21 and 22, the ports being aligned circumferentially of the stated valve elements for registry according to the movement of intermediate valve member 21 relative to the stationary inner valve element or pintle 20 and the stationary outer or spout-providing valve element

22. Coincidentally with such control of inflow of the flushing liquid to the valve mechanism from distributing chamber 13, control of discharge of flushing liquid directly into the bowl 10 through the spout of outer or spout-provided valve element 22, and provision for drainage directly into the bowl therethrough at all times, is attained by the same series of ports.

In the preferred embodiment illustrated, valve element 20 remains stationary at all times, and is provided with two substantially diametrically opposed ports, 33 and 34, respectively, which lie in substantially a horizontal plane in flow alignment with the flow passage through nipple 22a when the seat is in lowered position, i. e., resting on top of the rim of the closet bowl, see Fig. 4. A third port 35 is disposed in the lower portion of the valve element 20 intermediate ports 33 and 34. As illustrated, port 35 is offset toward port 33 from a location coincident with that diameter of valve element 20 which is at right angles to the diameter which passes horizontally through the middle of ports 33 and 34.

Ports 33, 34 and 35 remain in fixed position relative to outer valve element 22 and to the bowl 10 at all times during the raising and lowering movement of defecator seat 15. Port 34 functions as an intake port registering with the flow passage through nipple 22a; port 33 functions as an outlet port; and port 35 functions as a drainage port; the latter two ports register with the spout (hereinafter described) of outer valve element 22.

Outer or spout-providing valve element 22 remains stationary at all times, by reason of the rigid connection of its nipple 22a with the front wall of distributing chamber 13. It, in effect, provides a housing for the ported intermediate portion of the valve mechanism, and is disposed in the space between terminal ends 15a and 15b of the defecator seat, with its spout formation 22b located directly over the top opening of the bowl 10 at the rear thereof. The spout opening 36 of spout formation 22b thus opens, and is adapted to discharge directly into the bowl 10.

The defecator seat 15 is secured rigidly to valve element 21, as by means of the tongues 21a and 21b fitting into coordinating recesses in the material of seat terminal end 15b. Thus, intermediate valve element 21 rotates about inner valve element 20 and within outer or spout-providing valve element 22, as well as within the tubular sleeve elements 23 and 24, as defecator seat 15 is raised and lowered.

Valve element 21 is ported for cooperation with the ports of valve element 20 and spout-providing valve element 22, in controlling inflow of flushing liquid directly into the bowl through spout opening 36, and drainage of flushing liquid from the flow channel 16, all in accordance with the variant positions of defecator seat 15 in its range of movement. For this purpose, valve element 21 is provided with two mutually opposed ports 37 and 38, the port 37 permitting inflow of flushing liquid from nipple 22a when the seat is in lowered position and permitting drainage through spout 22b while the seat is in its raised position, and port 38 permitting drainage through spout 22b while the seat is in its lowered position and throughout the greater portion of its upstroke.

The preferred positioning of ports 37 and 38 relative to each other and to the other ports of the series at the various positions assumed by defecator seat 15 in its range of movement may be best understood by reference to Figs. 4, 5 and 6, wherein the valve mechanism is illustrated as it appears when the seat is in its completely lowered, i. e., horizontal position, in an intermediate position, i. e., having traveled through an arc of approximately 22°, and in its completely raised or rest position, i. e., having traveled through an arc of approximately 101°, respectively.

In Fig. 4, defecator seat 15 is supported directly on the rim 10a of bowl 10, as by means of bumper elements 39, see Fig. 3. In this position, the defecator seat is available for use, and for flushing action, the latter being accomplished preferably by the manual manipulation of a conventional flush valve (not shown) provided for regulating flow of flushing liquid into distributing chamber 13. Port 37 is in registry with the flow passage through nipple 22a and with inflow port 34, thus permitting flushing liquid to flow into the hollow core of valve element 20 and therefrom, through the registering ports 31a, 32a, 16a and 31b, 32b, 16b, into and around flow-channel 16. Port 38 is circumferentially so disposed with respect to port 37 that, at this position of the defecator seat, it falls short of registry with passage 33 of valve element 20, but extends into partial registry with drainage port 35 thereof. Upon actuation of the aforestated flush valve, flushing liquid flows through nipple 22a and through the registered ports 37 and 34 into the hollow core of inner valve element 20. Thereupon, the major portion of the flow passes through registered ports 31a, 32a, 16a and 31b, 32b, 16b into flow channel 16, see Fig. 8, and thence into bowl 10 through rim jet openings 17. A minor portion of the flow discharges directly into the bowl from spout opening 36 by way of partially registered ports 35 and 38.

In Fig. 5, defecator seat 15 has been raised through an arc of approximately 22°. Rotation of intermediate valve element 21 closes inflow port 34 and drainage port 35, but brings port 38 into registry with outflow port 33, thus providing an outlet, by way of spout 22b, for back flow from flow channel 16 directly into the bowl.

In Fig. 6, defecator seat 15 has been raised through an arc of approximately 101° bringing it into a completely raised and rest position. Rotation of intermediate valve element 21 closes outflow port 33, without thereby opening inflow port 34, and brings port 37 into complete registry with drainage port 35. Full back-flow from flow channel 16 drains through spout 22b directly into the bowl.

It is to be noted that, throughout the entire range of up and down movement of defecator seat 15, provision is made for drainage from flow channel 16 directly into the bowl.

Whereas this invention has been illustrated and described with respect to only one embodiment thereof, it should be clearly understood that many changes may be made without departing from the generic scope of the invention as set forth herein and in the claims that follow.

I claim:

1. In waste disposal apparatus provided with a bowl for receiving and discharging waste matter and with means for the supply of flushing liquid to the bowl, flow channel providing means structurally independent of the bowl but associated therewith for effecting flushing thereof, and valve mechanism forming a hinge mounting for said flow channel providing means while establishing controllable flow communication between

said means for the supply of flushing liquid and said flow channel providing means, said valve mechanism comprising concentric valve elements having a hollow axial core which forms a flow passage, ports in said valve mechanism registering with the flow channel of said flow channel providing structure and establishing flow communication between said axial core and said flow channel throughout the full range of movement of the latter, flow passage means connecting the valve mechanism with said liquid supply means, and a plurality of cooperating ports in the component valve elements adapted to regulate flow of flushing liquid from said flow passage means into said axial core and from said axial core directly into said bowl.

2. Apparatus as recited in claim 1 wherein the outer of the stated component valve elements is provided with spout means which discharges into the bowl, the plurality of cooperating ports being so arranged that there is at all times flow communication between the hollow core and said spout means.

3. Apparatus as recited in claim 1 wherein the stated concentric valve elements comprise an inner valve element, an intermediate valve element, and an outer valve element, the said inner and outer valve elements being fixed relative to each other and to said intermediate valve element, and said intermediate valve element being fixed relative to the flow channel providing structure for rotative movement around said inner valve element and within said outer valve element.

4. In waste disposal apparatus provided with a bowl for receiving and discharging waste matter and with means for the supply of flushing liquid to the bowl, flow channel providing means structurally independent of the bowl but associated therewith for effecting flushing thereof, and valve mechanism forming a hinge mounting for said flow channel providing means while establishing controllable flow communication between said means for the supply of flushing liquid and said flow channel providing means, said valve mechanism comprising a hollow tubular inner valve element providing an enclosed core passage for liquid flow, an intermediate sleeve element concentrically and rotatably mounted on said inner valve element, and an outer valve element concentrically mounted on said intermediate valve element, said inner and said outer valve elements being mounted in fixed relation to each other and to said intermediate valve element, and said intermediate valve element being rigidly secured to said flow channel providing means for rotative movement therewith around said inner valve element as an axis, passage means connecting said outer valve element in flow communication with said liquid supply means, spout means from said outer valve element directing discharge into said bowl, ports in said intermediate valve element opening into the flow channel of said flow channel providing structure, and ports in said inner valve element registering with said ports in the intermediate valve element over the entire range of movement of said intermediate valve element relative to said inner valve element; a series of ports circumferentially aligned in said inner, said intermediate and said outer valve elements, ports of said series being disposed relative to one another, to the passage means leading from said liquid supply means into said outer valve element, and to the spout means of said outer valve element such that they control flow of flushing liquid into said core passage of the inner valve element and into said spout means according to the position of said flow channel providing structure relative to said bowl.

5. In a defecator provided with a water-closet bowl, means for the suuply of flushing liquid, and a defecator seat adapted to rest at the rim of the bowl; a flow channel associated with the said seat adjacent the rim of the bowl and having jet openings directed for discharge within the top opening of the bowl, and valve mechanism forming a hinge mounting for said flow channel in association with the hinge mounting for said seat, said valve mechanism comprising a hollow tubular inner valve element providing an enclosed core passage for liquid flow, an intermediate sleeve valve element concentrically and rotatably mounted on said inner valve element, said inner and said outer valve element being mounted in fixed relation to each other and to said intermediate valve element, and said intermediate valve element being rigidly secured to said flow channel providing means for rotative movement therewith around said inner valve element as an axis, passage means connecting said outer valve element in flow communication with said liquid supply means, spout means from said outer valve element directing discharge into said bowl, ports in said intermediate valve element opening into the flow channel providing structure, and ports in said inner valve element registering with said ports in the intermediate valve element over the entire range of movement of said intermediate valve member relative to said inner valve member; a series of ports circumferentially aligned in said inner, said intermediate, and said outer valve elements, ports of said series being disposed relative to one another, to the passage means leading from said liquid supply means into said outer valve element, and to the spout means of said outer valve element such that they control flow of flushing liquid into said core passage of the inner valve element and into said spout means according to the position of said flow channel providing structure relative to said bowl.

6. Structure as recited in claim 5 wherein the full periphery of the seat is broken to provide spaced terminal ends; wherein the flow channel is embedded within the seat and has its ends opening into the said terminal ends of the seat; and wherein the opposite end portions of the valve mechanism are secured to said terminal ends of the seat with the respective end openings of said flow channel in registry with the stated ports in said intermediate and said inner valve elements, and with the spout means of the outer valve element positioned between the said terminal ends of the seat.

7. In a defecator provided with a water closet bowl and with a chamber for the supply of flushing liquid to the bowl, a defecator seat adapted to rest on the rim of the bowl; a flow channel associated with said seat, said flow channel having a plurality of jet outlets disposed in such manner as to be positioned above the overflow spill level of the bowl when the said seat is resting on the rim of the bowl; valve means providing a hinge mounting for said seat; said valve means communicating adjacent each of its ends with said flow channel; conduit means joining said valve means, adjacent its mid-portion, with said chamber for the supply of flushing liquid; ports in said valve means regulating flow of flushing liquid from said chamber into said flow channel; and

ports disposed adjacent the mid-portion of said valve means for regulating flow of flushing liquid from said chamber directly into said water closet bowl and providing passage for drainage from said flow channel when said seat is in its raised position.

8. In a defecator providing with a water closet bowl and with a chamber for the supply of flushing liquid to the bowl, a defecator seat adapted to rest on the rim of the bowl; a flow channel associated with said seat, said flow channel having a plurality of jet outlets disposed in such manner as to be positioned above the overflow spill level of the bowl when the said seat is resting on the rim of the bowl; valve mechanism providing a hinge mounting for said seat, said valve mechanism comprising concentric tubular valve elements having a hollow axial core which forms a flow passage, ports in said valve mechanism registering with the said flow channel of the seat and establishing flow communication between said axial core and said flow channel throughout the full range of movement of the latter; conduit means joining said valve means, adjacent its mid-portion, with said chamber for the supply of flushing liquid; and a plurality of cooperating ports in the component valve elements adjacent said conduit means for regulating flow of flushing liquid from said conduit into said axial core and from said axial core directly into said water closet bowl and providing passage for drainage from said flow channel when said seat is in its raised position.

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