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Flinner et al.

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[45] **Dec. 3, 1974**

[54] **PORTABLE, SELF-CONTAINED TOILET**

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[52] **U.S. Cl.** **4/115**, 4/10, 4/76

[51] **Int. Cl.**... **A47k 11/02**, E03d 5/016, A61l 11/00

[58] **Field of Search** 4/10, 115, 116, 111, 114, 4/128, 95, 81, 89, 110, 79, 76, 90, 249

[56] **References Cited**

UNITED STATES PATENTS

3,418,664	12/1968	Carmichael et al.	4/115
3,570,018	3/1971	Sargent et al.	4/115
3,577,569	5/1971	Sargent et al.	4/79
3,609,772	10/1971	Howard	4/115
3,611,446	10/1971	Howard	4/115
3,713,177	1/1973	Tufts et al.	4/115 X
3,747,130	7/1973	Sargent et al.	4/10

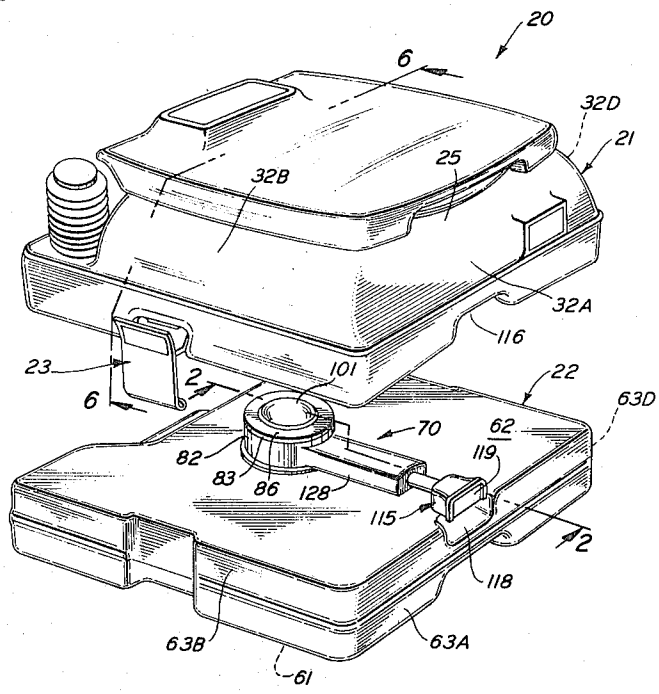
Primary Examiner—Henry K. Artis

Attorney, Agent, or Firm—Hamilton, Renner & Kenner

[57] **ABSTRACT**

A self-contained, portable toilet that has a seat section and a holding tank section. The seat section includes an upper rim, a lower base wall and a bowl portion extending downwardly of the rim to a drain through the base wall. At the point where the drain penetrates the base wall a socket is recessed upwardly into the base wall. A flush valve assembly is demountably secured to the holding tank section, and a thimble on the valve assembly is insertably receivable within the socket. A valve element in the form of a partial sphere is mounted in the valve assembly to control communication between the bowl portion and the interior of the holding tank section. The valve element is selectively opened and closed by rotation of a handle which is fittedly received within a recess in the toilet when the valve is closed and which requires translation outwardly of the recess before it can be rotated in order to preclude inadvertent opening of the valve. A horizontally spiraled distribution ledge circumscribes the bowl portion and receives a distributing tube having a plurality of circumferentially spaced discharged orifices for emitting flush fluid in directions and at locations most propitiously to clean the bowl.

13 Claims, 8 Drawing Figures



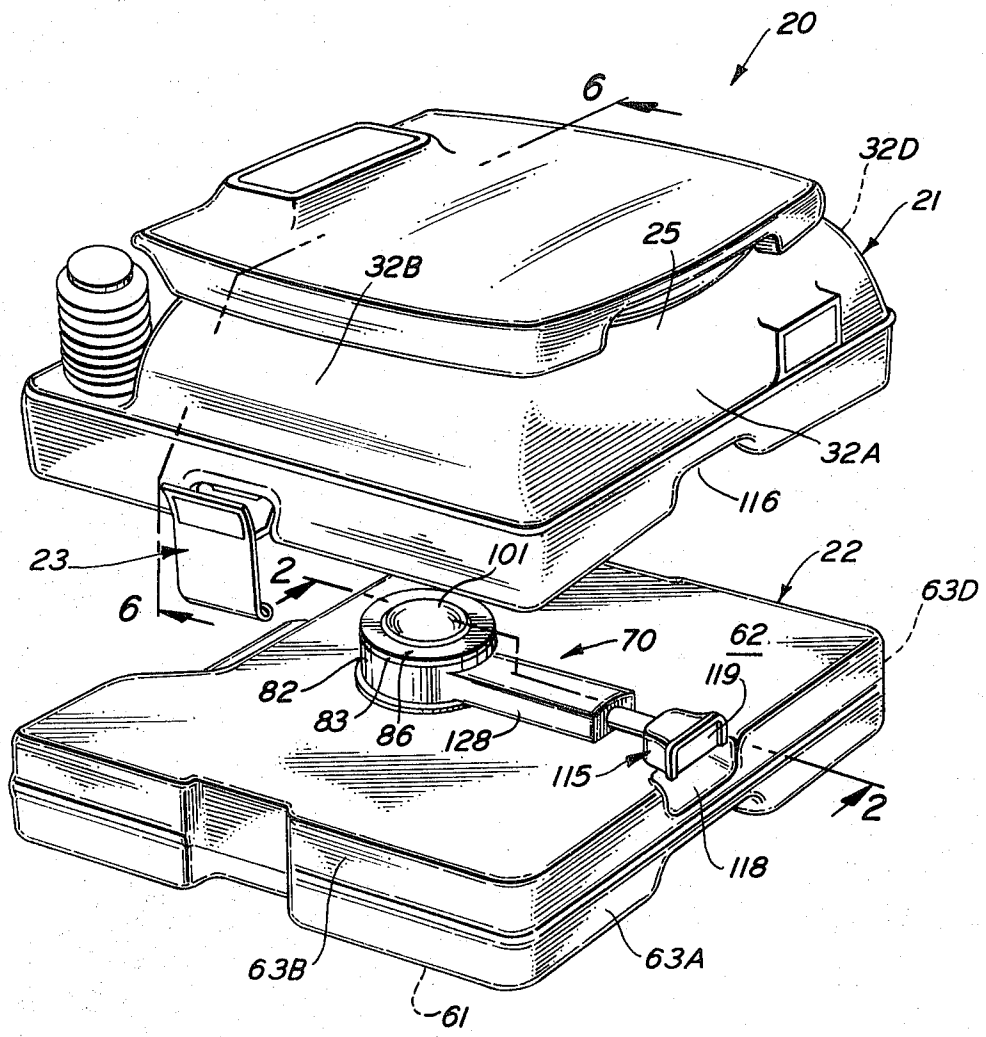

20
6
32D
21
25
32B
32A
116
23
2
101
22
63D
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70
62
119
82
83
86
128
115
2
118
63B
63A
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FIG. 1

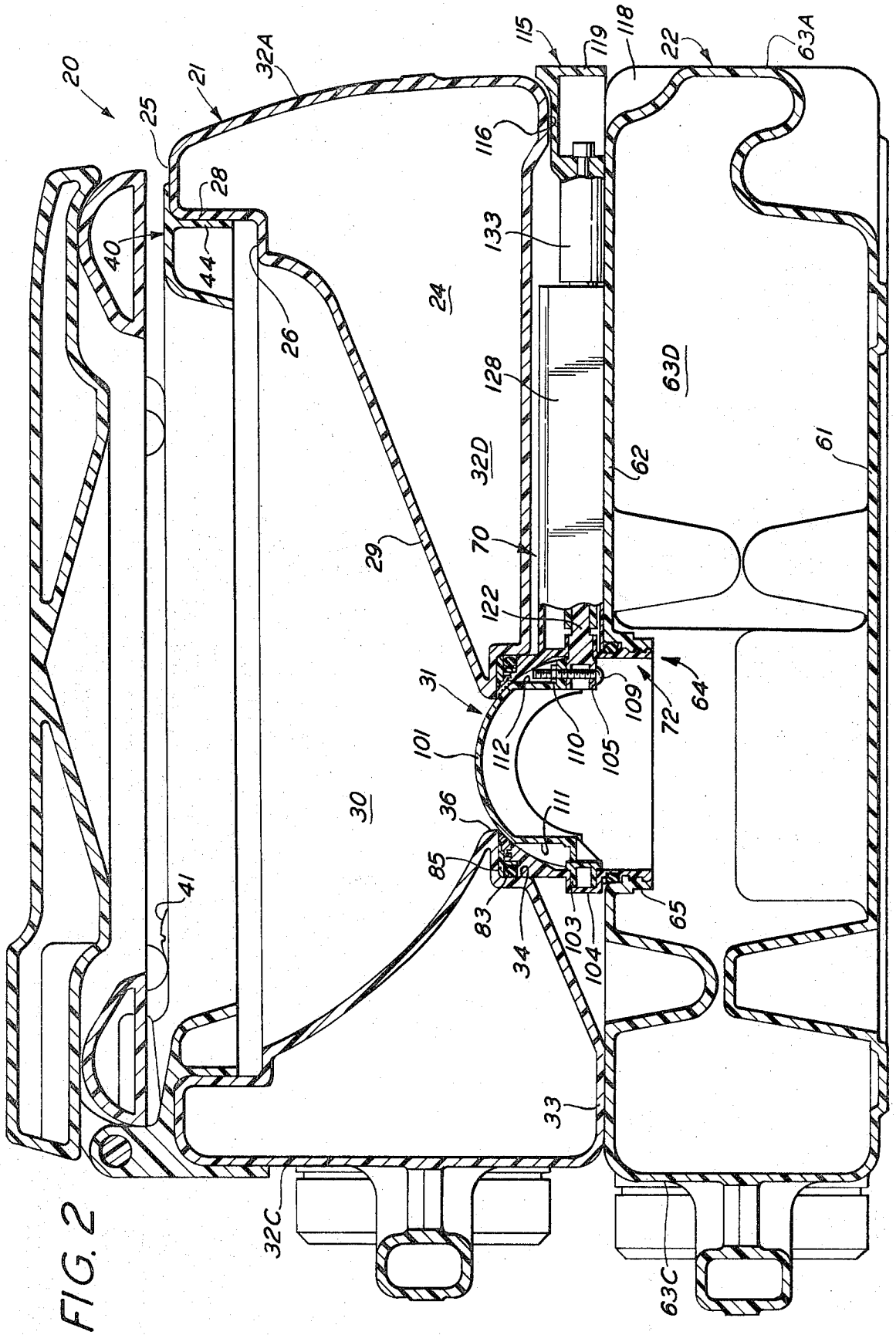

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32A
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63A
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63D
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61
29
70
122
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104
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32C
63C

FIG. 2

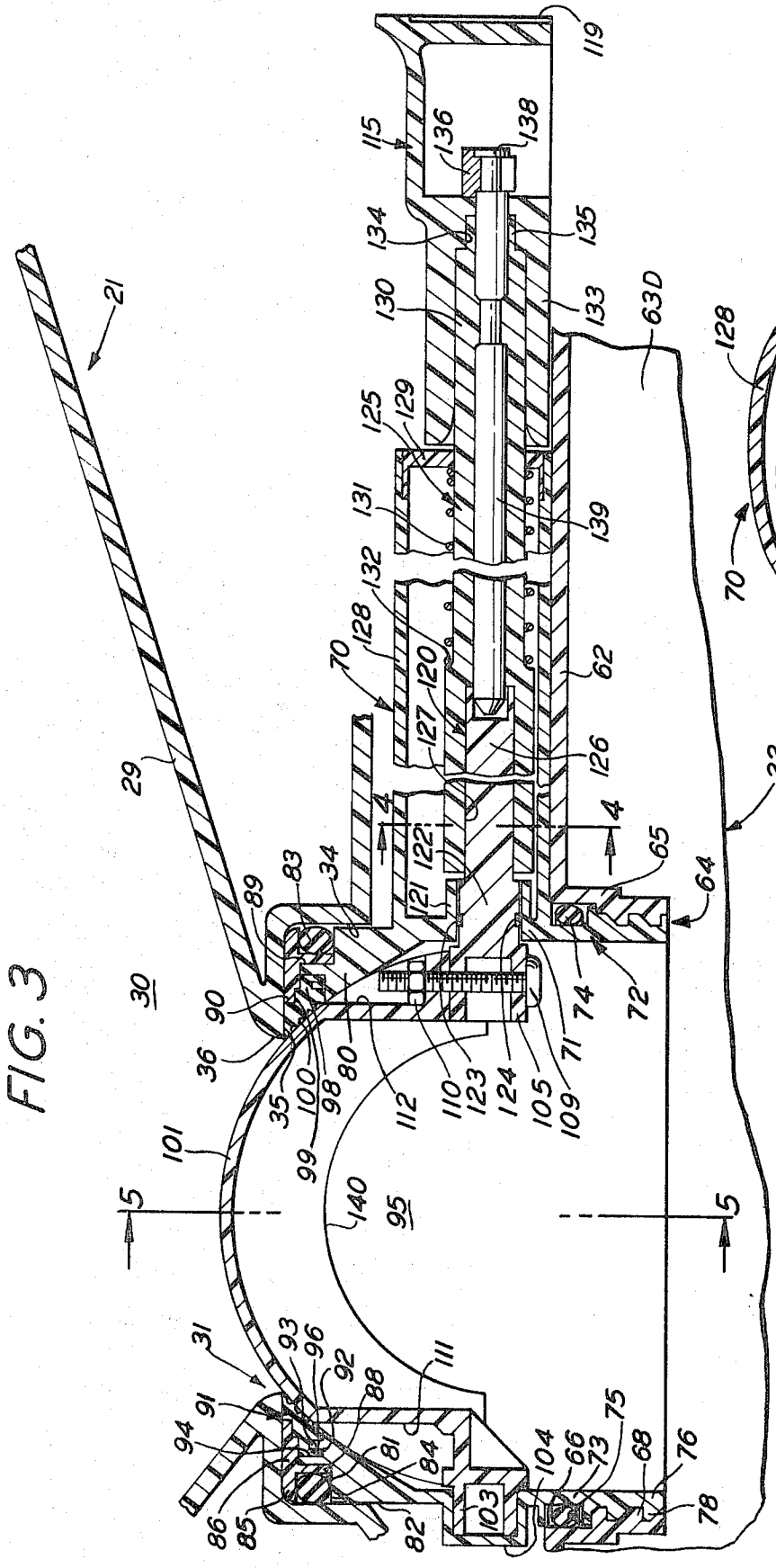


FIG. 3

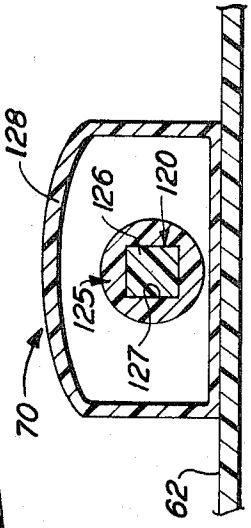


FIG. 4

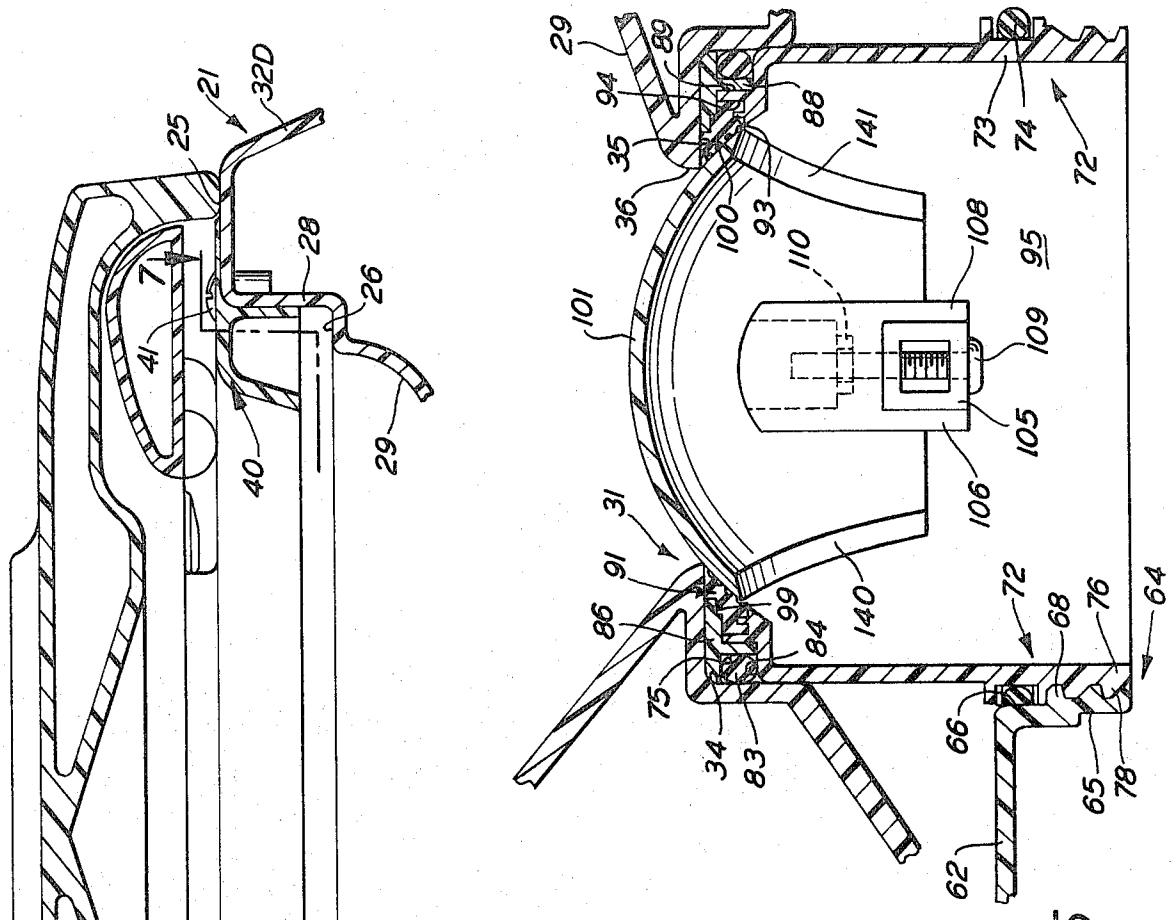

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106
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76
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86
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66
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FIG. 5

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33
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FIG. 6

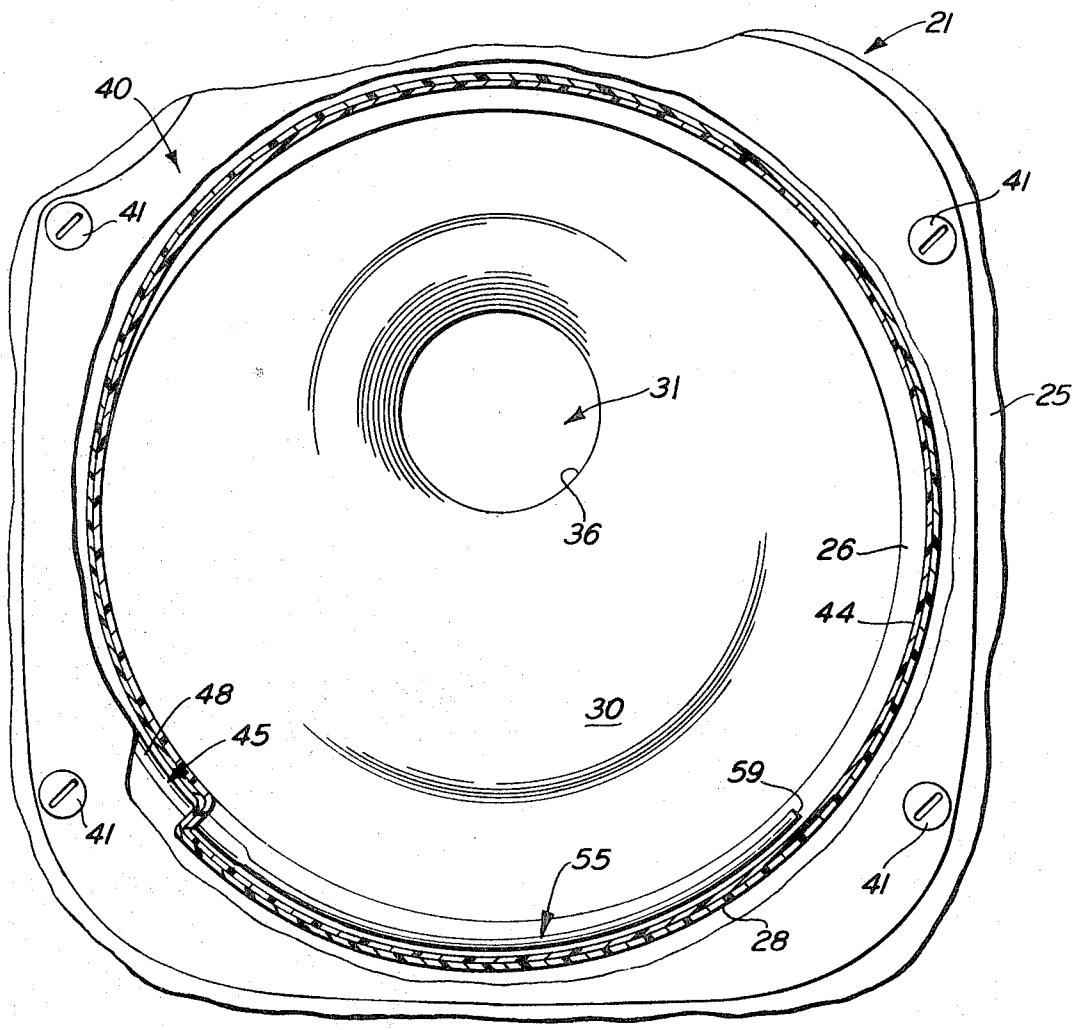

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FIG. 7

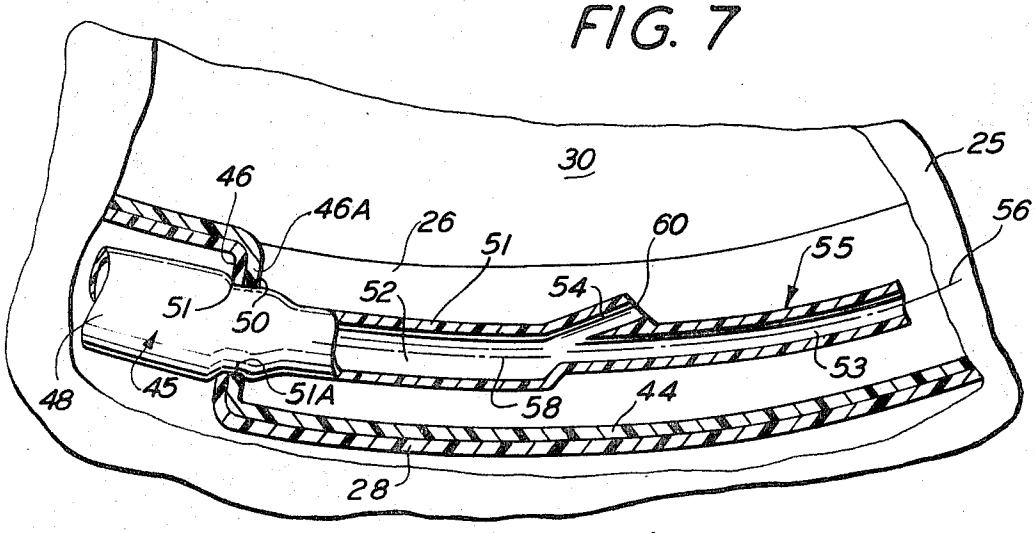

30
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46
46A
26
51
60
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48
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51A
58
44
28

FIG. 8

PORTABLE, SELF-CONTAINED TOILET

BACKGROUND OF THE INVENTION

The present invention relates to portable toilets, and particularly to portable toilets that incorporate a self-contained flush fluid reservoir and a detachable holding tank section that is constructed to permit convenient transportation and evacuation.

We believe that one of the best prior known arrangements is that disclosed in our copending U.S. patent application Ser. No. 310,557, filed on Nov. 29, 1972 and now U.S. Pat. No. 3,801,991. The aforesaid copending application discloses the use of a slide valve selectively to open and close the passageway between the bowl and the interior of the holding tank section. While a slide valve is wholly operative for use with a portable toilet, it has been found that a modified valve and thimble arrangement offers even greater advantages.

In order to effect a vortical flow to the flush fluid entering the bowl of a portable toilet a host of complicated physical arrangements have heretofore been employed. It has also been found that a modified flush fluid feed arrangement can effect the vortical flow desired and also more evenly distribute the introduction of the flush fluid around the periphery of the bowl.

SUMMARY OF THE INVENTION

Accordingly, it is the primary object of the present invention to provide a portable toilet construction which eliminates the recessed guides required by a slide valve, and within which contaminants can accumulate, and which employs a valve means that can be maintained more readily sanitary.

It is another object of the present invention to provide a portable toilet construction, as above, in which the seal of the valve means itself as well as the seal and the connection between the seat section, the valve assembly and the holding tank section is more efficiently achieved.

It is still another object of the present invention to provide a portable toilet construction, as above, in which the valve means closing the passage between the bowl and the interior of the holding tank section is restrained against inadvertently opening both when the seat and holding tank sections are conjoined or separated.

It is a further object of the present invention to provide a portable toilet construction, as above, in which the valve means can be readily replaced in the field.

It is an even further object of the present invention to provide a portable toilet construction, as above, in which the introduction of the flush fluid can be effected in such a way as to introduce the flush fluid more uniformly around the periphery of the bowl and at the same time provide the desired vertical flow down and around the bowl.

It is a still further object of the present invention to provide a portable toilet construction, as above, that is even less expensive to manufacture and maintain than prior known constructions.

These and other objects, together with the advantages thereof over existing and prior art forms which will become apparent from the following specification, are accomplished by means hereinafter described and claimed.

In general, a portable toilet embodying the concept of the present invention has a seat section and a holding tank section with a valve assembly secured therebetween. The valve assembly is demountably secured to an inlet port in the holding tank section and presents a thimble which extends outwardly and upwardly away from the holding tank section.

The seat section has a bowl that converges downwardly to a drain, and the drain incorporates a socket into which the thimble on the flush valve assembly is insertably received. Clamp means are employed to secure the seat and holding tank sections together with the aforesaid thimble and socket interfitted. A such, a passageway through the thimble and housing of the flush valve assembly provides direct communication between the drain in the bowl portion of the seat section and the interior of the holding tank section.

A valve element selectively opens and closes the passageway, and the improved valve element comprises a portion of a sphere that is rotatably mounted within the valve housing. A handle is operatively connected to the spherical valve element so that rotation of the handle rotates the valve element to open and close the passageway. The handle is received within a recess in at least one of the toilet sections when the valve is closed, and the recess so embraces the handle that it cannot be rotated until it is first translated out of the confines of the recess — thereby obviating inadvertent opening of the valve element. If the holding tank section presents the recess, or a portion thereof, into which the handle may be so confined, the valve cannot be inadvertently opened even when the holding tank section is being transported independently of the seat section.

The seat section has a horizontally spiraled distribution ledge that circumscribes the bowl portion thereof, and a distribution tube directs flush fluid onto the distribution ledge by at least two discharge orifices disposed in circumferentially spaced relation with respect to the bowl, the discharge orifices being particularly oriented to effect a relatively uniform distribution to the entry of the flush fluid into the bowl portion.

One preferred embodiment of a portable toilet embodying the concept of the present invention is shown by way of example in the accompanying drawings and described in detail without attempting to show all of the various forms and modifications in which the invention might be embodied; the invention being measured by the appended claims and not by the details of the specification.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a frontal-side perspective of a portable toilet embodying the concept of the present invention, said view being exploded to show the seat section vertically separated from the holding tank section;

FIG. 2 is an enlarged, vertical section taken substantially along line 2—2 of FIG. 1 and depicting the interrelationship of the flush valve assembly with both the seat and holding tank sections when those sections are conjoined and not vertically exploded as in FIG. 1;

FIG. 3 is a further enlarged area of FIG. 2 depicting the interconnection between the flush valve assembly, the seat section and holding tank section as well as the internal mechanism of the flush valve assembly, all in vertical cross section;

FIG. 4 is a transverse section taken substantially along line 4—4 of FIG. 3 to depict the relationship of the spindle on the valve element with the extension shaft within the valve assembly guide;

FIG. 5 is a transverse section through the valve element taken substantially along line 5—5 of FIG. 3;

FIG. 6 is an enlarged, vertical cross section through a portion of the seat section and taken substantially along line 6—6 of FIG. 1;

FIG. 7 is a reduced view taken substantially along line 7—7 of FIG. 6 to depict the cover ring, flush distribution ledge and a portion of the flush feed tube in top plan but broken away to depict the drop wall of the seat section and the juxtaposed locating flange of the cover ring in horizontal section; and,

FIG. 8 is an enlarged area of FIG. 7 with a portion of the flush feed tube represented in horizontal section.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring more particularly to the drawings, a portable toilet embodying the concept of the present invention is designated generally by the numeral **20** and comprises an upper, or seat, section **21** releasably securable to one or more lower, or holding tank, sections **22** by a pair of clamp assemblies **23**, the clamp assemblies being conveniently constructed according to the concept disclosed in the aforesaid copending application, Ser. No. 310,557 now U.S. Pat. No. 3,801,991.

Both sections may be conveniently blow molded from a durable plastic material such as high density polyethylene to provide a hollow construction. As such, the interior of the seat section **21** defines a cavity **24** (FIG. **2**) that serves as a reservoir for the flush fluid. The uppermost wall of the seat section **21** constitutes a peripheral rim **25** the inner edge of which is joined to a horizontal flush fluid distribution ledge **26** (FIGS. **2, 6, 7** and **8**) spaced uniformly below the rim **25** and joined thereto by a generally vertical drop wall **28.** From the radially inner edge of the distribution ledge **26** a wall **29** converges downwardly in the general configuration of a bowl **30** and terminates at a drain **31.**

From the outermost edge of the rim **25** the four exterior walls — front wall **32A**, side wall **32B**, rear wall **32C** and side wall **32D** — slope downwardly, and, in part, moderately outwardly, in an aesthetically pleasing configuration to join the horizontal base wall **33** which extends radially inwardly and then generally upwardly from all four side walls to converge at the drain **31.** In conjunction with, and concentrically of, the drain **31** an annular recess in the form of a socket **34** is directed upwardly from the base wall **33** and terminates in a horizontal ledge **35** the radially inner edge **36** of which delineates the circumference of the drain **31** and the upwardly directed surface of which constitutes that portion of the wall **29** which circumscribes the drain **31** at the lower terminus of the bowl **30.** The recess **34** serves a purpose more fully hereinafter explained.

A cover ring **40** may be demountably secured to the seat section **21** by a plurality of screws **41** that engage a corresponding number of T-nuts embedded within the peripheral rim **25.** The configuration of the cover ring itself as well as the configuration of the seat, lid and other components supported therefrom may conform to those disclosed in our aforesaid application Ser. No. 310,557 now U.S. Pat. No. 3,801,991.

The distribution ledge **26** is at its widest where the flexible flush fluid feed tube **45** passes through the offset wall **46** (FIGS. **7** and **8**) which accommodates the radial discontinuity effected by the spiral configuration of the drop wall **28.** As is also shown in FIGS. **7** and **8,** the cover ring **40** presents a vertically oriented, substantially spiral locating flange **44** that is frictionally received against the corresponding configuration of the drop wall **28** to position and stabilize the cover ring **40.** Flange **44** similarly presents an offset wall **46A** that is juxtaposed to offset wall **46** in drop wall **28.** The progressive narrowing of the distribution ledge **26** resulting from the aforesaid spiral configuration of the drop wall **28** and locating flange **44** in combination with the bifurcated discharge of an improved feed tube **45** effects a more uniform cleansing of the bowl **30** with the minimum volume of flush fluid.

Specifically, the feed tube **45** comprises a conduit portion **48** leading from the flush pump **49** (schematically depicted in FIG. **6** although a preferred embodiment of which is disclosed in our aforesaid copending application, Ser. No. 310,557 now U.S. Pat. No. 3,801,99), across the reservoir cavity **24** and through the offset walls **46** and **46A.** A modest annular indentation **50** in the outer surface of the feed tube **45,** and at the end of the conduit portion **48** most remote from the pump **49,** is engaged by the circular edges **51** and **51A** of the passageway through the offset walls **46** and **46A,** respectively, to maintain the feed tube **45** positioned with respect thereto.

An orienting portion **51B** of the feed tube **45** extends for several inches beyond the indentation **50** (at preferably somewhat reduced diameter) to assure the desired disposition of the discharge. That is, the orienting portion **51B** allows for a smooth transition between the inclined disposition of the conduit portion **48** of feed tube **45** as it passes through the reservoir cavity **24** and the preferably horizontal disposition desired for the discharge portion of the feed tube **45** as it lies along the distribution ledge **26.**

As shown in FIG. **8,** at the outer extremity of the orienting portion **51B** the single passageway **52** therein (which constitutes a continuation of the same passageway within the conduit portion **48**) divides into two passageways **53** and **54.** Passageway **53** is contained within a tubular portion **55** and is of approximately one-half the diameter of, and extends forwardly from, passageway **52** along an axis **56** generally parallel and offset with respect to the axis **58** of passageway **52.** The tubular portion **55** extends approximately one-quarter of the way around ledge **26** and terminates in a discharge orifice **59.**

Passageway **54** diverges from passageway **52** at an angle of approximately ten degrees inwardly with respect to a tangent to axis **58** which lies along the distribution ledge **26,** and opens in relatively close proximity to the end of the orienting portion **51B.** The passageway **54** is also approximately one-half the diameter of passageway **52** and terminates in a discharge orifice **60.**

With the foregoing configuration the flush fluid eminating from discharge orifice **60** may be directed radially inwardly along the ledge **26** at an oblique angle, and the flush fluid eminating from orifice **59** may be directed circumferentially along the ledge **26.** The horizontal disposition of the distribution ledge **26** allows the circumferential component of the discharge to impart a circumferentially oriented flow vector to the flush fluid. At the same time, the progressively diminishing radial dimension of the ledge **26** in combination with the radial component of the discharge from orifice **59** combines to distribute the spill over of flush fluid

from ledge 26 rather uniformly around the periphery of the bowl 30. As the flush fluid spills over the ledge 26 gravity imparts a vertical flow vector which combines with the circumferential flow vector to impart a vortical flow pattern to the flush fluid as it courses progressively downwardly and around bowl 30 to the drain 31, thereby most effectively cleaning the bowl.

Turning now to a brief consideration of the holding tank section 22, it is also a hollow construction bounded by a base wall 61, an upper wall 62 in vertically spaced, parallel relation to the base wall 61 and four exterior walls — front wall 63A, side wall 63B, rear wall 63C and side wall 63D. An inlet port 64 is provided in the upper wall 62 of the tank section 22. A collar 65 circumscribes that inlet port 64 and extends inwardly from the upper wall 62. The radially innermost surface of the collar 65 presents a cylindrical sealing wall 66 at the uppermost extent thereof. At the lowermost extremity of the sealing wall 66 a section of reduced internal diameter presents thread means 68 that extend radially inwardly with respect to the cylindrical sealing wall 66. In general, the details of the holding tank section 22 may satisfactorily incorporate those of the holding tank section disclosed in our copending U.S. application Ser. No. 310,557 now U.S. Pat. No. 3,801,991.

A unique valve assembly 70 is provided to open and close the inlet port 64 in the upper wall 62 of the seat section, and the housing 71 of the valve assembly 70 cooperatively interacts with the collar 65 to permit facile mounting and demounting of the valve assembly 70. Specifically, an annular neck 72 extends downwardly from the housing 71 and is removably received within the collar 65.

The upper portion 73 of the neck 72 has an outer diameter that approximates the inner diameter of the sealing wall 66 so that engagement of the wall 66 by an O-ring 74 received within an annular groove 75 in the upper portion 73 of the neck 72 effects a gas and liquid tight seal therebetween.

The lower portion 76 of the neck 72 is of lesser diameter than the upper portion 73 and presents thread means 78 that extend radially outwardly thereof to engage the thread means 68 on collar 65. The thread means 68 and 78 are designed to effect a mounting and demounting of the valve assembly 70 in preferably less than one revolution and at the same time interact to effect a tightly wedged seal between the neck 72 and collar 65. The details of the thread construction by which this result is obtained are also disclosed in our copending application, Ser. No. 310,557 now U.S. Pat. No. 3,801,991.

The thimble portion 80 of the housing 71 extends upwardly and is removably receivable within the annularly recessed socket 34 provided in the base wall 33 of the seat section 21. In fact, the outer diameter of the thimble 80 is preferably of such dimension that it closely approximates the inner diameter of the annular recess 34. Near the upper extent of the thimble 80 an annular groove 81 is provided on the radially outer wall 82 to receive an O-ring 83 for effecting a gas and liquid seal between the thimble portion 80 and the recess 34 in the seat section 21 when the seat and holding tank sections 21 and 22, respectively, are conjoined as assembly 20.

As best seen in FIG. 3 the groove 81 may be formed between a shoulder 84 on the axially uppermost extent of the thimble 80 and a first, radially outwardly directed flange 85 of retainer ring 86. The retainer ring 86 has a generally T-shaped cross section with the upright portion thereof comprising an axially oriented, annular skirt 88 that embraces the cylindrical wall 89 of the thimble 80 that extends axially upwardly from the base of shoulder 84. A suitable adhesive means is preferably interposed between the skirt 88 and wall 89 to maintain the retainer ring 86 suitably positioned on the housing 71.

The retainer ring 86 has a second, radially inwardly directed flange 90 which cooperates with the thimble 80 to retain a drain valve seal 91. The radially inner side at the axially uppermost extremity of the thimble 80 is recessed, as at 92, to present an axially extending, annular, anchor rib 93 located medially of the outer wall 94 of recess 92 and the cavity 95 within the housing 71 which opens upwardly through the upper extremity of the thimble 80 as well as downwardly through the lower extremity of neck 72. The anchor rib 93 is received in a corresponding annular channel 96 in the body portion 98 of the drain seal 91. The location of the second flange 90 in spaced opposition to the anchor rib 93 precludes the seal 91 from being inadvertently removed, and the axially underside of the flange 90 is stepped, as at 99, to afford the fullest backing support to the seal without unnecessarily reducing the thickness of the material forming the seal at any point.

The seal 91 presents a plurality of, preferably four, annular beads 100 that engage the surface of the valve element 101 in spaced relation to effect a seal thereagainst. The valve element 101 is a spherical segment that may be satisfactorily made of a solvent resistant plastic. The valve element 101 must have sufficient area to engage the annular beads 100 and close the opening — i.e., drain 31 — to the cavity 95, said opening being delineated by the seal 91.

The spherical valve element 101 is selectively rotatable on one of its diametric axes and suitable rotation can be effected by providing a trunnion 103 that extends outwardly from one side of the valve element 101 to be rotatably received within a bearing boss 104 located between the collar 65 and thimble 80 of the valve housing 71.

Diametrically opposed to the trunnion 103 the valve element 101 presents a means for connecting the valve element 101 to a rotatable drive block 105. As best shown in FIG. 5, the valve element 101 may present a pair of spaced legs 106 and 108 that embrace the block 105, and a screw 109 may extend through the block 105 medially of the legs 106 and 108 to engage a nut 110 fixed within the valve element. The foregoing arrangement allows for selective rotation of the valve element 101 and also permits the valve element to be replaced with considerable ease.

Further to facilitate changing the valve element 101 an opposed pair of indentations 111 and 112 are provided on the radially outer surface, one adjacent to trunnion 103 and the second adjacent the spaced legs 106 and 108. To remove the valve element 101 the screw 109 is disengaged from nut 110 while the valve element is in the closed position, the valve element is then rotated 180° and by engaging the indentations 111 and 112 with the thumb and an opposed finger extending into the cavity 95 through collar 65, the valve element may be sufficiently flexed by pitching the thumb

and opposed finger together to rotate the legs **106** and **108** away from the block **105** and outwardly from the cavity **95.** The trunnion **103** can thereby be extricated from the bearing boss **104** and the valve elements removed. The same valve element, or a replacement, can be easily inserted by reversing the aforedescribed process.

It should be noted that the indentation **112** also provides a space into which that portion of the screw **109** threaded beyond nut **110** may extend.

when the block **105** is engaged by legs **106** and **108** the valve element **101** can be rotated, as desired, by manipulation of a handle **115** (FIG. 3) readily accessible from exteriorily of the toilet assembly **20.** In the embodiment depicted the handle is located at the front of the assembly **20** and is normally nested between the front wall **32A** of the seat section **21** and the front wall **63A** of the holding tank section **22.** In fact, the front wall **32A** has a recess **116** and the front wall **63A** has an opposed recess **118** to accommodate the handle **115** so that the outermost surface **119** thereon can remain flush with the walls **32A** and **63A.**

The block **105** is carried on a spindle **120** that extends through a boss **121** located in the housing **71** between the neck **72** and the thimble **80.** The journaled portion **122** of the spindle **120** within the boss **121** is cylindrical and is, therefore, rotatable within the boss **121** which serves as a bearing. To effect a liquid seal it is desirable that an annular recess **123** be provided in the journal portion **122** to receive an O-ring, or other suitable seal means, **124.**

Radially outwardly of the boss **121** the cross section of the spindle **120** is such as to effect a rotatable driving connection between the spindle and an extension shaft **125** while allowing the two elements to move axially of each other. As shown in FIG. **4,** the square cross section comprising the driving portion **126** of the spindle **120** which is matingly received within a square bore **127** in the extension shaft **125** effects the desired result.

The driving portion **126** of the spindle **120** and a portion of the extension shaft **125** are enclosed within a guide **128** that extends outwardly from the value housing **71** and terminates in an end wall **129** through which the outboard portion **130** of the extension shaft **125** protrudes.

A biasing means in the form of a compression spring **131** circumscribes the extension shaft **125** and acts to urge it toward its innermost position. This result may be accomplished by positioning the spring **131** between the end wall **129** and a shoulder **132** provided on the exterior of the extension shaft **125.**

The handle **115** is secured to the outboard end portion of the extension shaft **125.** As shown, the shank **133** of the handle is receivable over the outboard portion **130** of the extension shaft **125** and non-rotatably secured thereto. For example, the base of the shank **133** may present a square socket **134** into which the squared end **135** of the outboard portion **130** is received. The handle **115** may be fastened to the extension shaft **125** by virtue of a U-shaped spring clip **136** that snaps behind the head **138** on the stiffening rod **139** anchored within at least the outboard portion of the extension shaft **125.**

The biasing pressure applied by spring **131** normally maintains the handle **115** within the opposed recess **116** and **118,** and the combined configuration of those recesses in such that when the handle **115** is confined therebetween it cannot be rotated although a person may extend his fingers through recess **118** so as to be able to grasp the handle.

When the handle **115** is confined within the recesses **116** and **118** the valve element **101** is in its closed position. That is, the spherical valve element **101** is positioned fully across drain **31** and is engaged by the annular beads **100** of seal **91.** In this position communication between the drain **31** in bowl **30** and the interior of the holding tank section **22** is precluded.

To effect communication, and thereby transfer the contents of the bowl **30** into the holding tank section **22,** one must grasp the handle **115** and translate it axially outwardly beyond the influence of the recesses **116** and **118.** This axial translation of the handle **115** against the biasing action of spring **131** causes the extension shaft **125** to slide axially along the driving portion **126** of the spindle **120.** But even when the handle is translated to its outermost position the extension shaft **125** remains in driving contact with the spindle **120** so that rotation of the outwardly displaced handle **115** effects rotation of the valve element **101.**

After translating the handle to its outer position it is rotated through approximately 90° to align the diametrically opposed, semi-circular openings **140** and **141** in the valve element **101** with the drain **31** in order to allow the contents of the bowl **30** to pass through the drain **31,** through the cavity **95** in the housing **71** of the valve assembly **70** and into the holding tank section **22.**

Although it has heretofore been explained that the cooperative interaction of the handle **115** with the opposed recesses **116** and **118** precludes inadvertent opening of the valve assembly **70** when the seat and holding tank sections **21** and **22,** respectively, are assembled, it should also be appreciated that the recess **118** in wall **63A** of the holding tank section **22** will itself preclude rotation of the handle **115** unless the handle has been first translated to its fully outermost position. This way one is not inconvenienced by having the valve element **101** inadvertently open while the holding tank section **22** is being transported independently of the seat section **21.**

It should also be appreciated that the subject configuration permits the thimble to be of larger diameter without impairing the operation of the valve element or the seal therearound and also permits a sufficient penetration of the larger diameter thimble portion **80** within the recessed socket **34** that a fairly stable connection can be effected between the seat and holding tank sections **21** and **22,** respectively, which holding clamps **23** such as those disclosed in our aforesaid copending U.S. application Ser. No. 310,557 now U.S. Pat. No. 3,801,991 need merely maintain. In fact, the particular configuration depicted in the preferred embodiment can easily afford a thimble portion **80** of approximately four inches in diameter which penetrates the socket **34** at least three-quarters of an inch. This provides a very stable interconnection with sufficient interface area to permit the use of an O-ring **83** of sufficient cross sectional diameter to obviate any leakage of liquids or gas between the thimble portion and the socket in which it is received.

It should thus be apparent that a portable toilet embodying the concepts of the present invention fully accomplishes the objects thereof.

We claim:

1. A portable toilet comprising; a seat section and a holding tank section, said holding tank section having an inlet port, a flush valve housing, means to fasten said flush valve housing to said inlet port, a thimble formed on said valve housing and extending oppositely of said holding tank section, a passageway extending through said valve housing and thimble, a valve element comprising a portion of a sphere mounted for rotation within said thimble, means to rotate said valve element selectively to open and close said passageway, said seat section having a bowl portion that converges downwardly to a drain, a socket circumscribing said drain, the thimble presented from said valve housing being insertably receivable within said socket and means to effect a seal between said thimble and said socket.

2. A portable toilet, as set forth in claim 1, in which a handle is operatively connected to said spherical valve element such that rotation of said handle rotates said valve element and means are provided to preclude inadvertent rotation of said handle.

3. A portable toilet, as set forth in claim 2, in which a recess is provided in at least one separable section of said toilet, said handle being normally confined against rotation within said recess and means being provided to displace said handle outwardly of said recess for unrestricted rotation of said handle.

4. A portable toilet, as set forth in claim 3, in which the means to displace said handle comprise, a spindle secured to said spherical valve element, an extension shaft, means to effect a rotatable driving connection between said spindle and extension shaft while allowing the spindle and extension shaft to move axially of each other, said handle being fastened to said extension shaft.

5. A portable toilet, as set forth in claim 4, in which means are provided to bias said extension shaft in that direction along said spindle which retains said handle within the said recess.

6. A portable toilet, as set forth in claim 1, in which said spherical valve element has a diametric axis, a trunnion extending outwardly on one side of said valve element along said diametric axis and being rotatably received within said valve housing, means on said valve element diametrically opposed to said trunnion for selective connection to the means for rotating said spherical valve element.

7. A portable toilet, as set forth in claim 6, in which a pair of indentations are provided in said spherical valve element in proximity to said diametric axis in order to facilitate removal and insertion of the valve element with respect to the valve housing.

8. A portable toilet, as set forth in claim 1, in which an annular drain seal is retained within said thimble for engaging said spherical valve element.

9. A portable toilet, as set forth in claim 8, in which said drain seal is located along the radially innermost portion of said thimble, and a second seal means is provided along the radial outermost portion of said thimble to effect a seal between said thimble and said socket, a common retainer ring locating both said seals.

10. A portable toilet, as set forth in claim 8, in which said drain seal presents a plurality of annular beads for engaging said spherical valve element and a channel to receive an anchor rib presented from said thimble.

11. A portable toilet, as set forth in claim 1, in which a distribution ledge circumscribes said bowl portion, a source of flush fluid is provided within said seat section together with a means for pumping said flush fluid and a feed tube for communicating the flush fluid from said pump means to said distribution ledge, said feed tube being provided with a plurality of discharge orifices spaced along said distribution ledge.

12. A portable toilet, as set forth in claim 11, in which said distribution ledge progressively narrows to afford a spiral configuration and in which a first of said discharge orifices is directed obliquely inwardly with respect to a tangent to the distribution ledge at the point of discharge and in which a second of said discharge orifices is spaced circumferentially of said first discharge orifice along said distribution ledge.

13. A portable toilet, as set forth in claim 12, in which said second discharge orifice is spaced from said first discharge orifice at approximately one-quarter the circumference of said bowl portion.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,851,339

DATED : December 3, 1974

INVENTOR(S) : Vaughn D. Flinner; Richard W. Sprang; Dana D. Zody; and Howard A. Fulton.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 56, "vertical" should read --vortical--.
Column 4, line 18, "3,801,99)" should read --3,801,991--.
Column 7, line 11, "when" should read --When--; line 43, "value" should read --valve--; line 67, "recess" should read --recesses--.
Column 8, line 1, "in" should read --is--.

Signed and sealed this 20th day of May 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks