United States Patent [19]

Fulton et al.

[11] **3,801,991**

[45] **Apr. 9, 1974**

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

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[73] Assignee: **Mansfield Sanitary, Inc.**, Perrysville, Ohio

[22] Filed: **Nov. 29, 1972**

[21] Appl. No.: **310,557**

[52] **U.S. Cl.** **4/115**, 4/10, 4/76, 4/78, 4/80, 4/116

[51] **Int. Cl.** **E03d 5/16**

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

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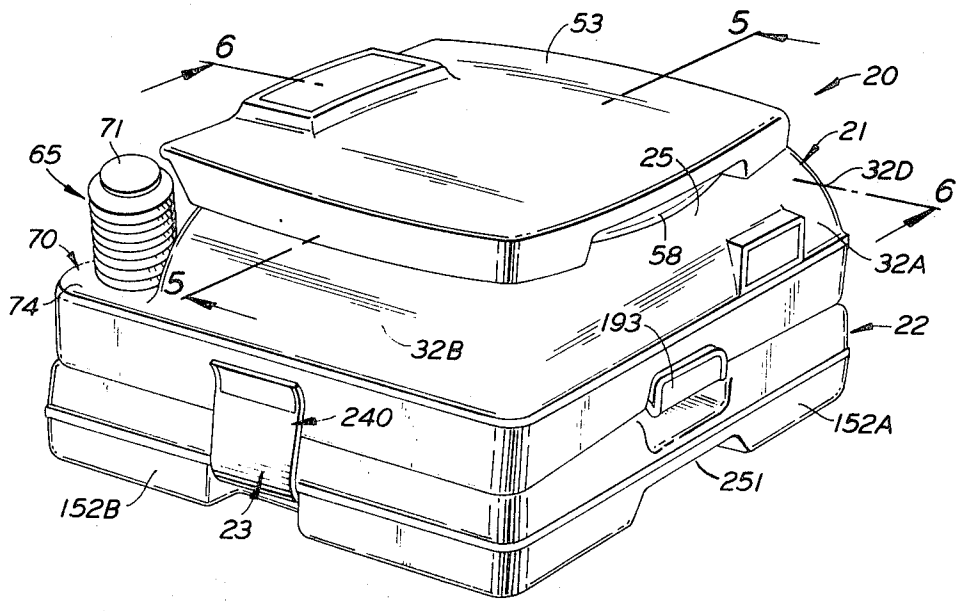
Primary Examiner—Henry K. Artis

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; a bowl portion extending downwardly of the rim to a drain through the base wall; a plurality of exterior side walls in spaced relation radially outwardly of said bowl portion; a flush fluid reservoir defined by a cavity formed between the bowl and exterior walls; a flush pump that is constructed for facile mounting in the seat section to transfer flush fluid from the reservoir into the bowl, said flush pump incorporating a unique check valve in conjunction with the outlet port particularly to facilitate priming; a separately interchangeable lid, seat, rim and hinge means by which such components are interconnected; and, a thimble associated with the bowl drain by which to effect an assured seal between the seat section and a flush valve demountably secured to the holding tank section. The flush valve assembly has a neck portion with novel thread means and a sealing wall that cooperatively engage corresponding thread means and a seal presented from a collar associated with the inlet port of the holding tank section. The pouring spout on the holding tank section, like the filling port in the flush fluid reservoir, are selectively closed with a unique cap and seal combination, and a clamp assembly assures joinder of a seat section to one or more holding tank sections and, if desired, to the supporting surface on which the portable toilet rests. The clamp assembly is uniquely constructed to permit it to be detachably secured to a seat section, a holding tank section and, if desired, a supporting surface.

37 Claims, 25 Drawing Figures



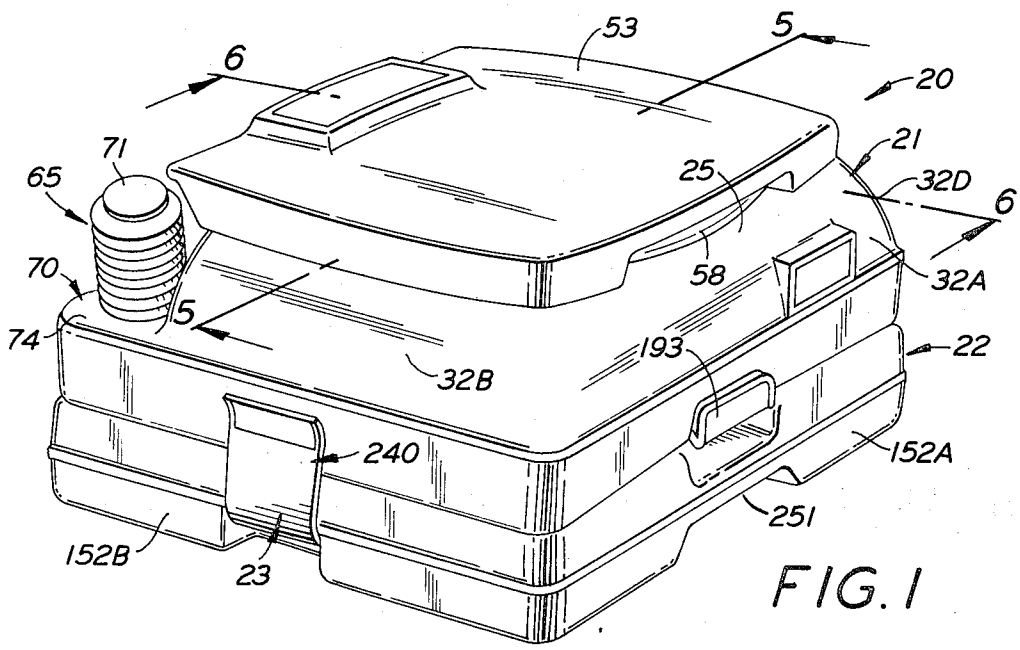

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FIG. 1

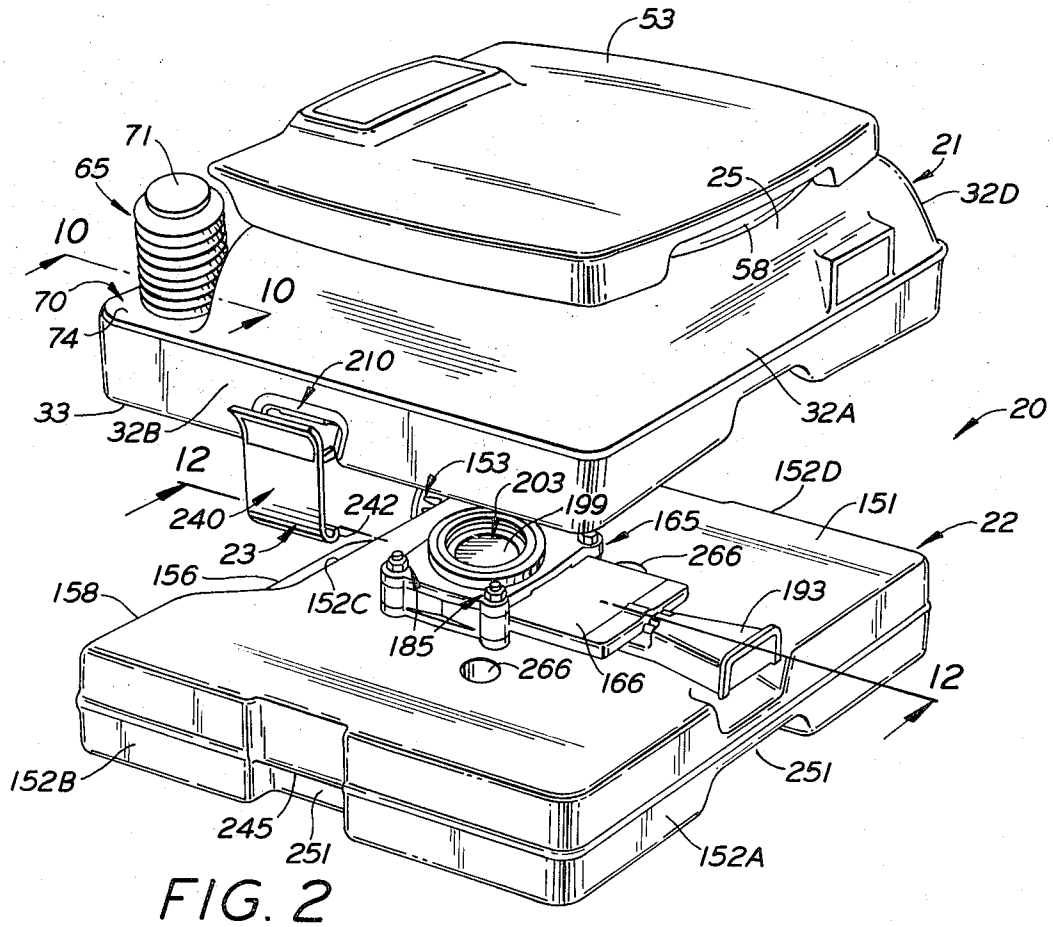
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FIG. 2

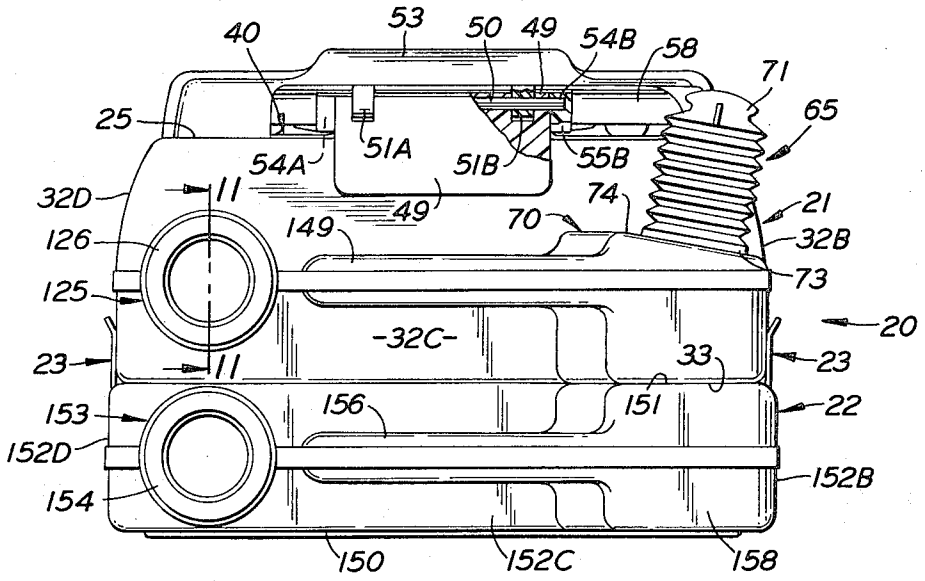
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FIG. 3

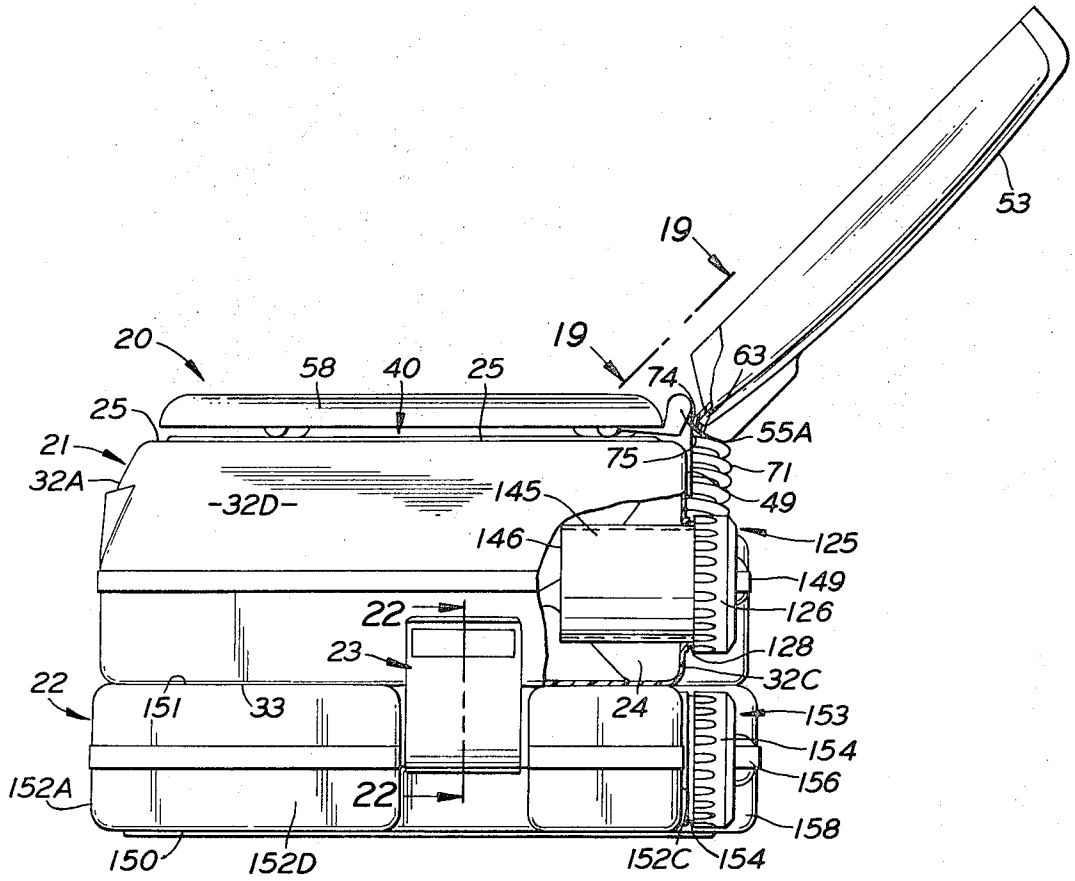
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FIG. 4

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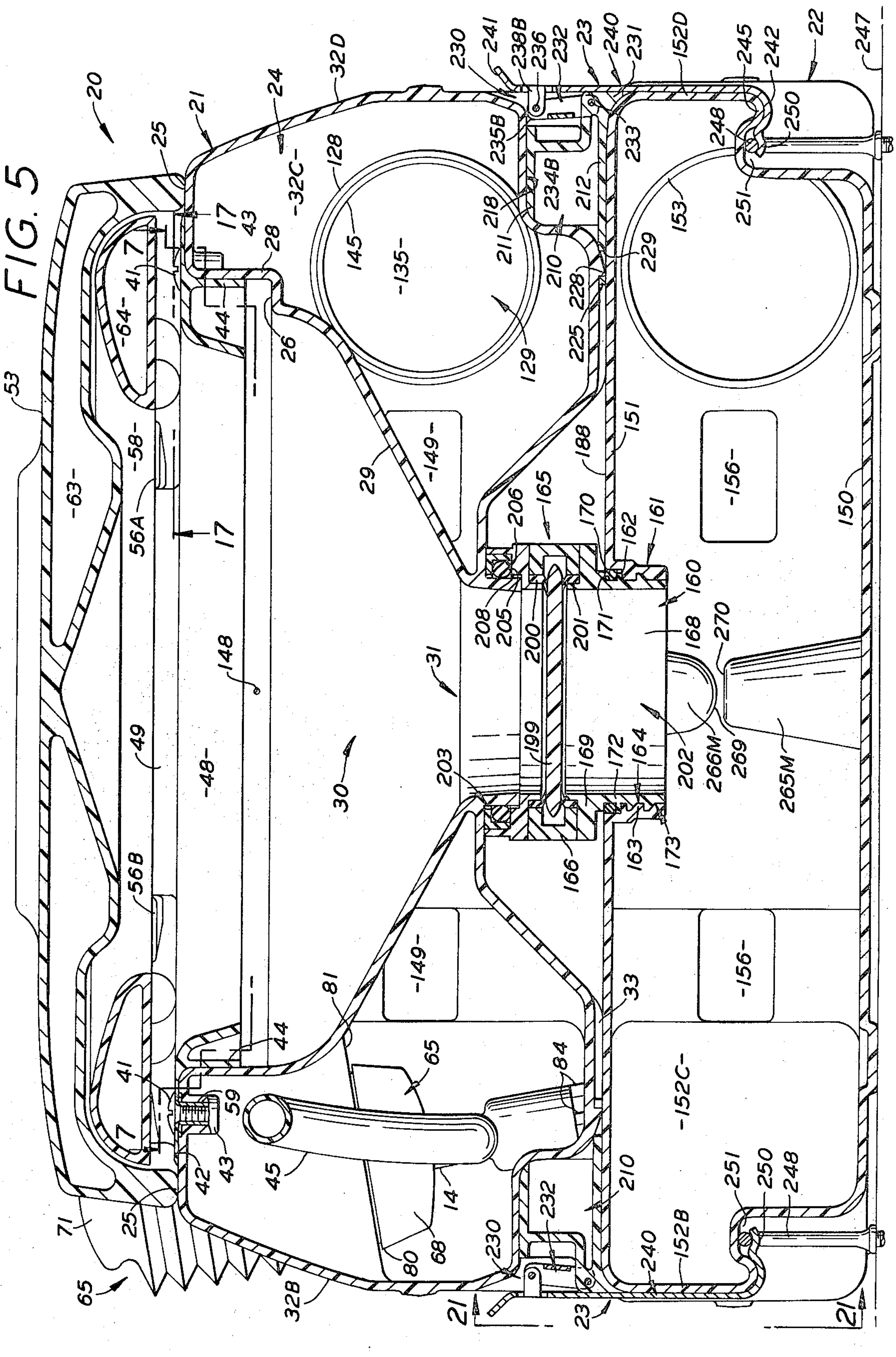

FIG. 5

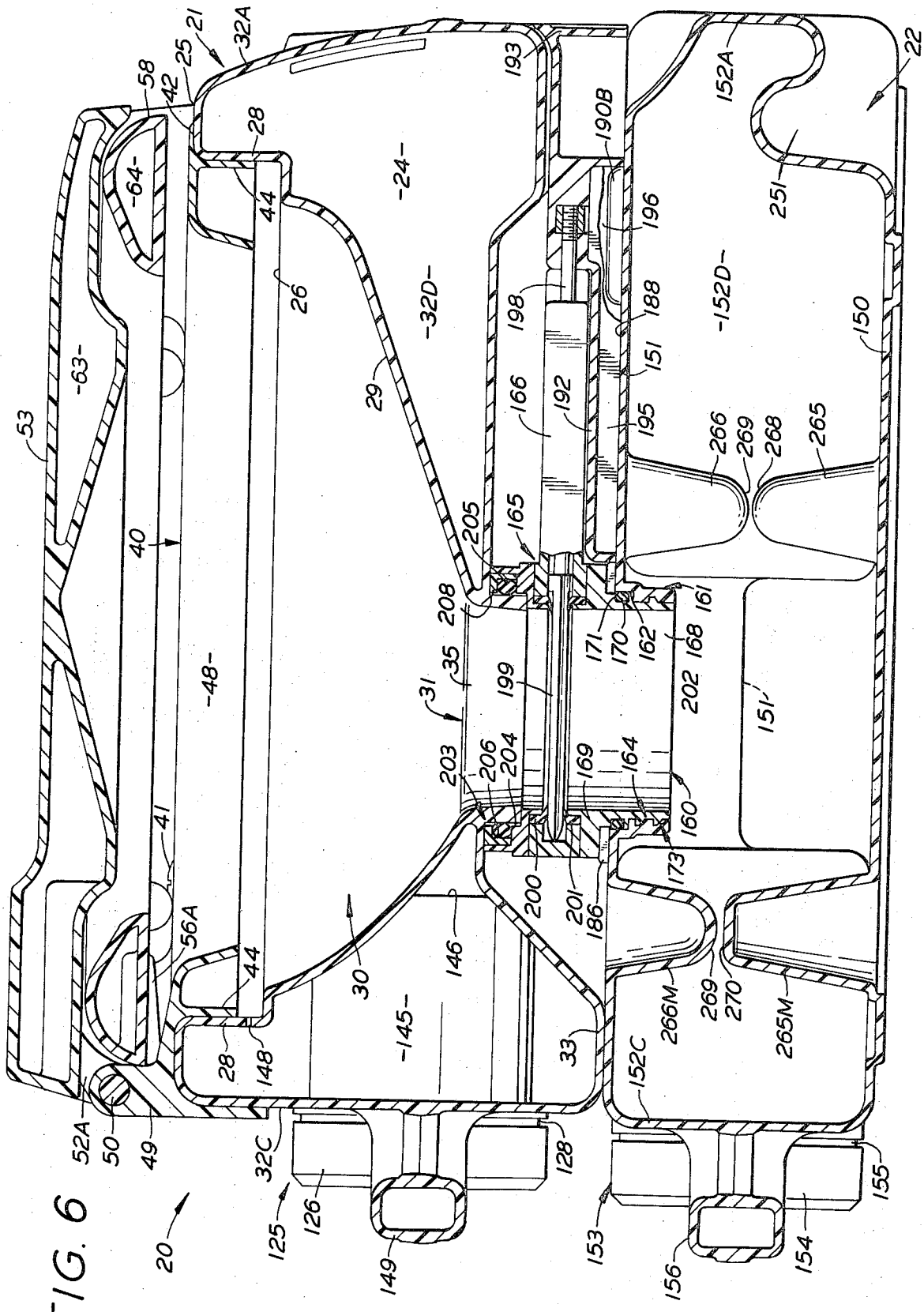
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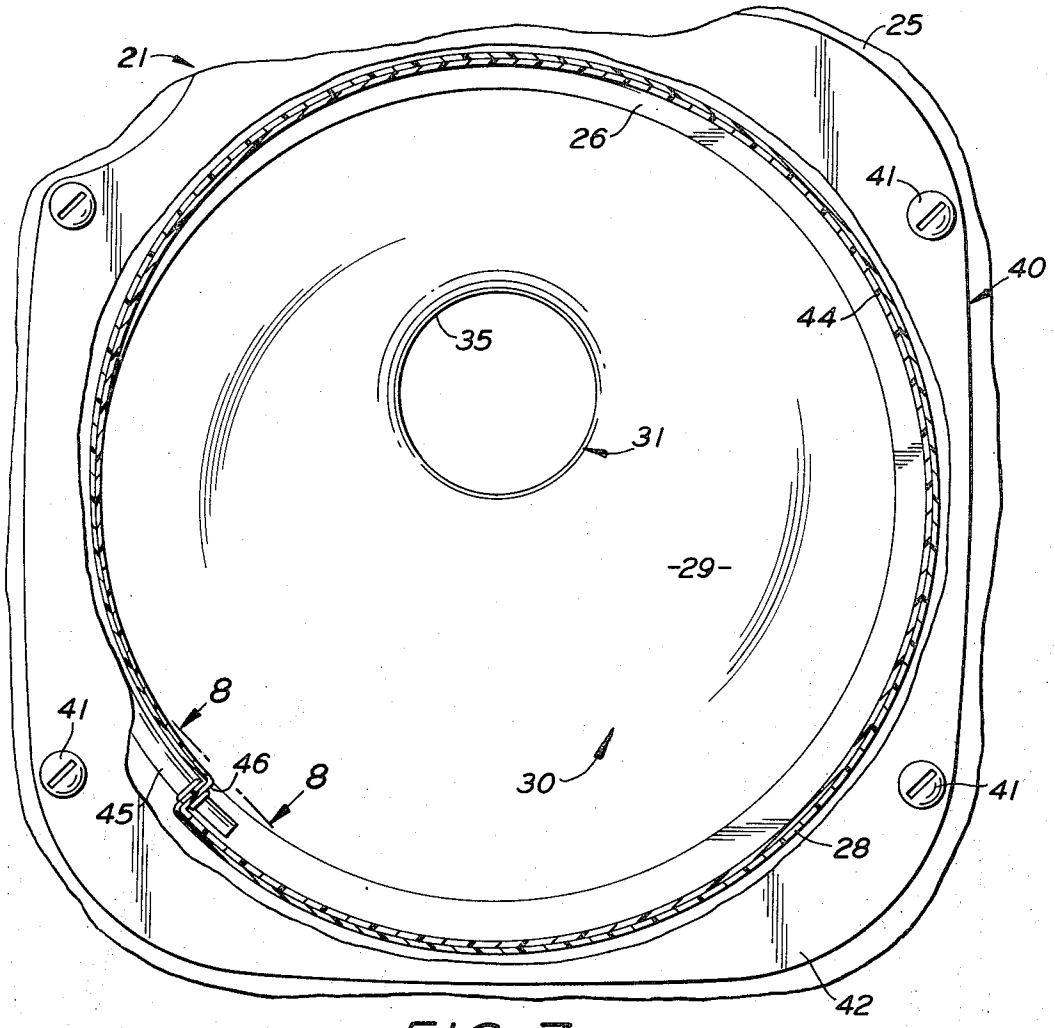
FIG. 6



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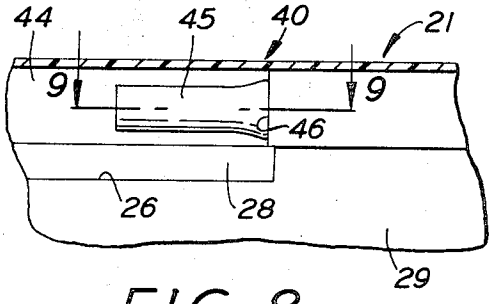

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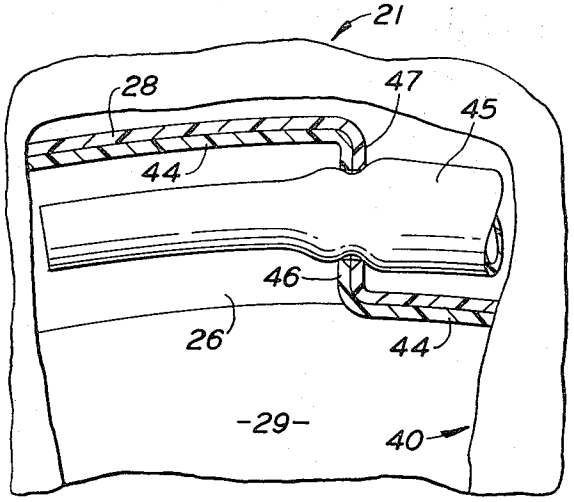

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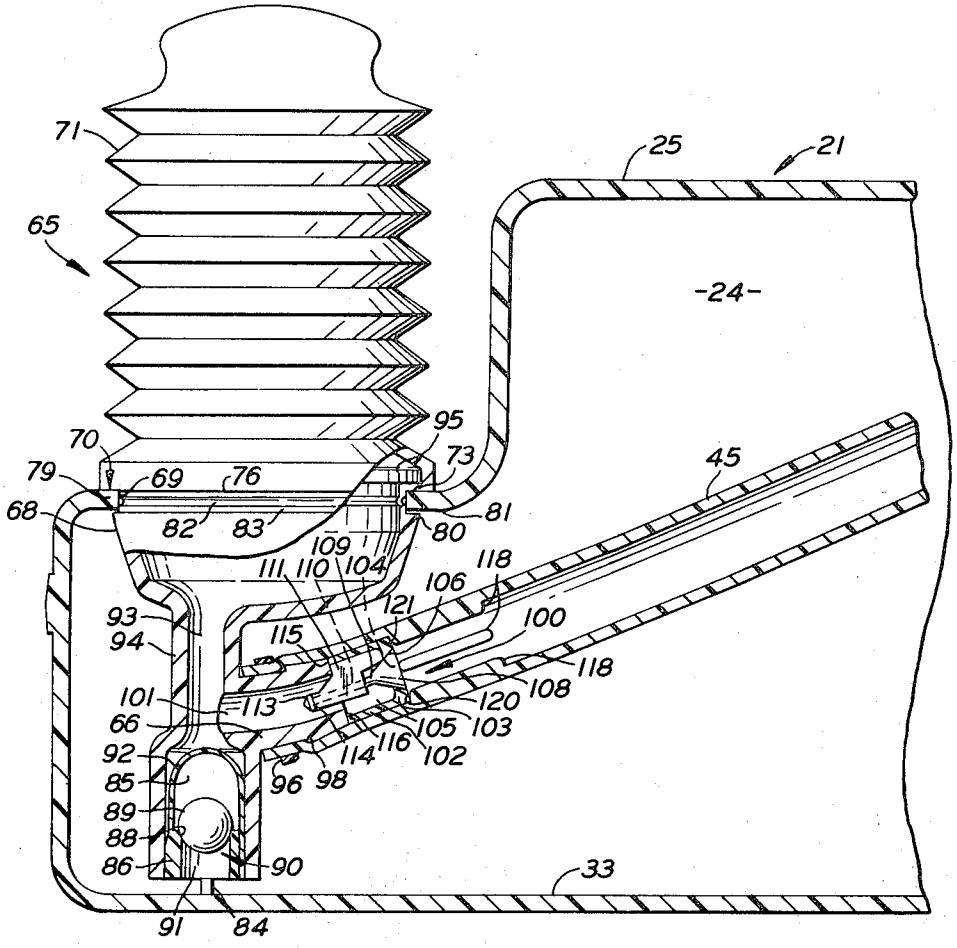
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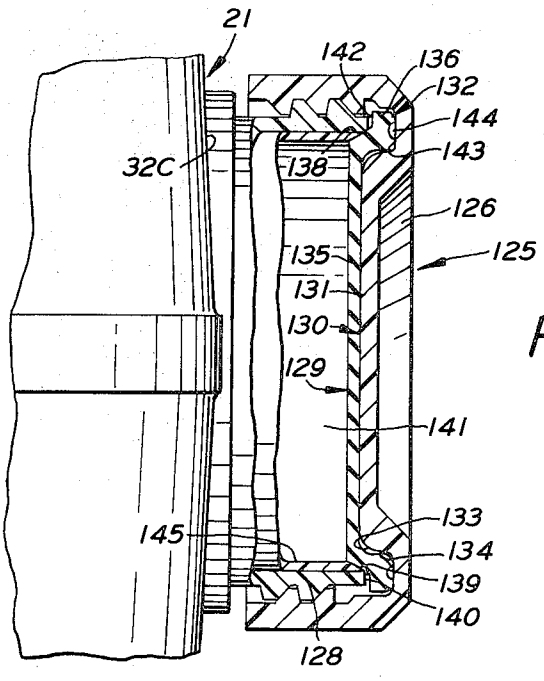
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FIG. 11

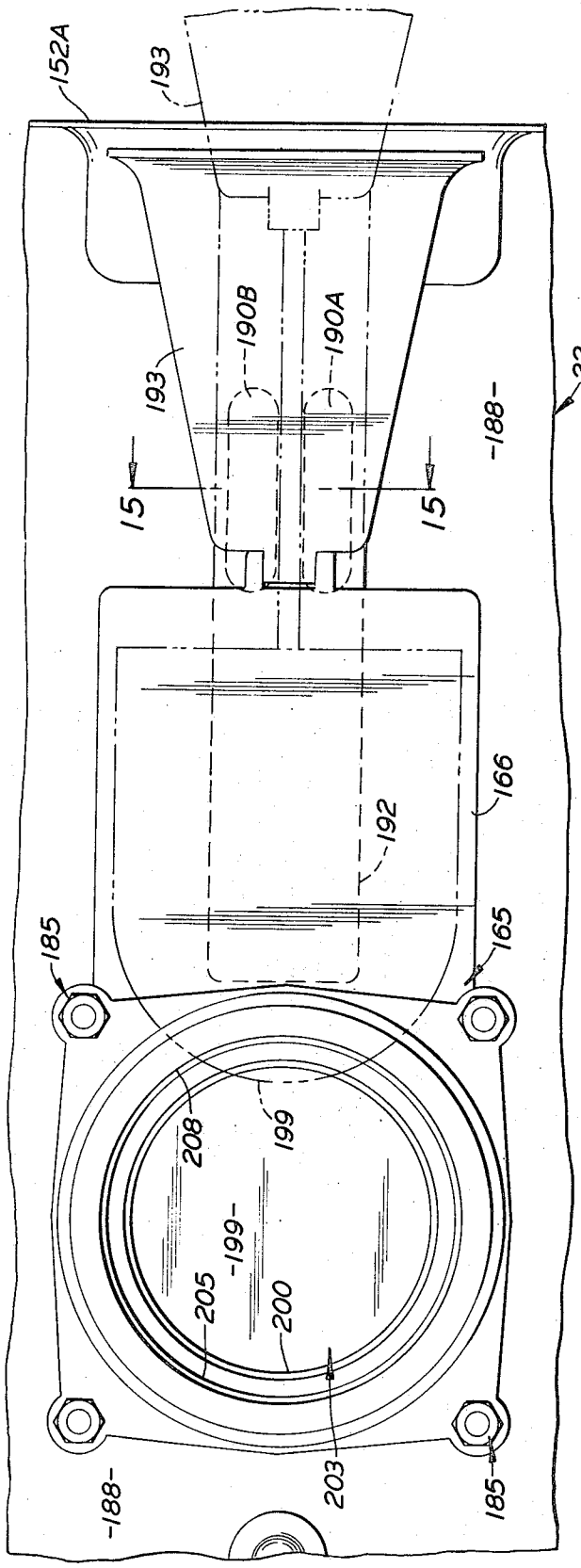
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FIG. 13

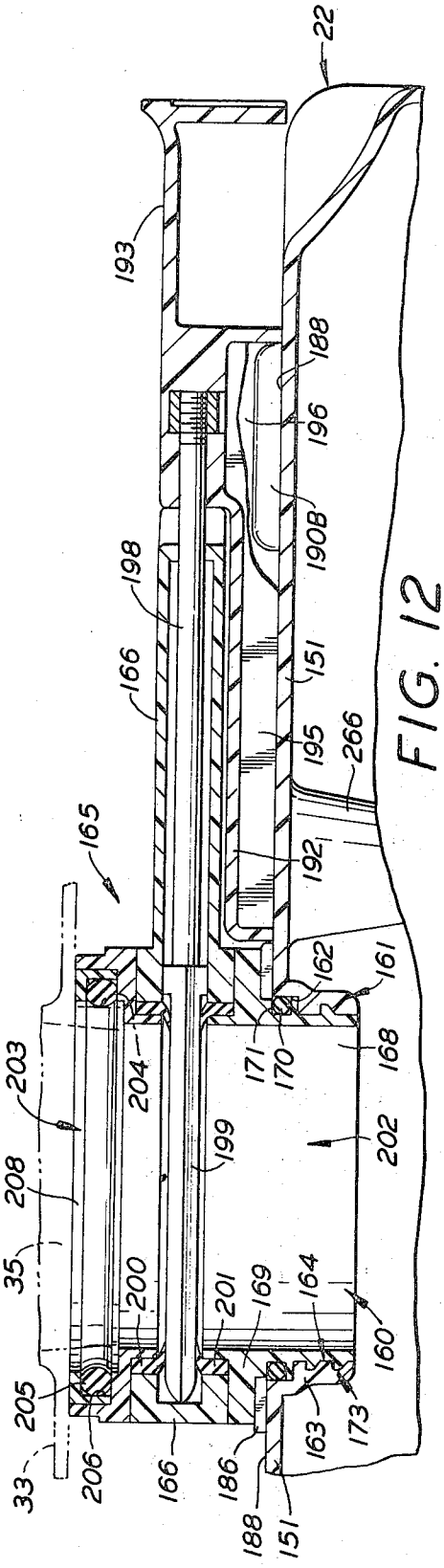
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FIG. 12

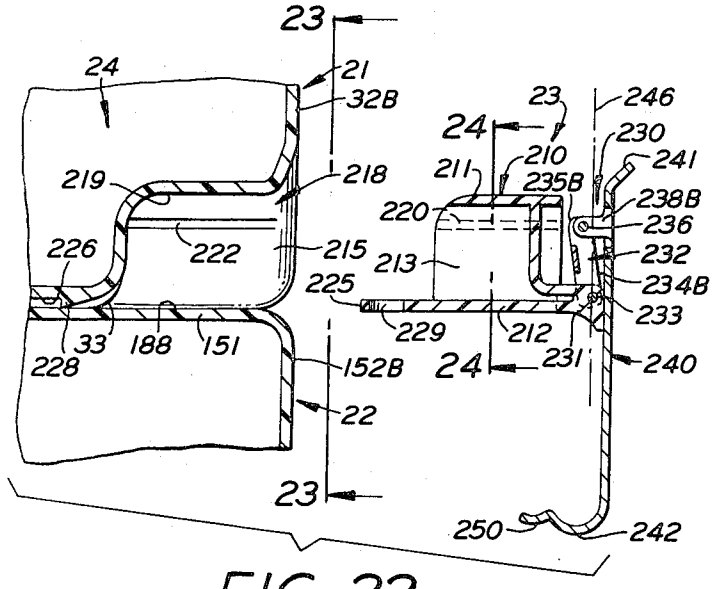
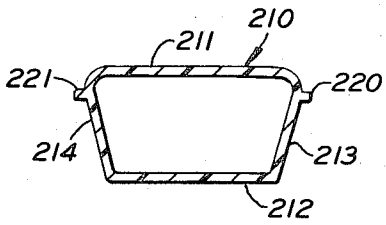


FIG. 22



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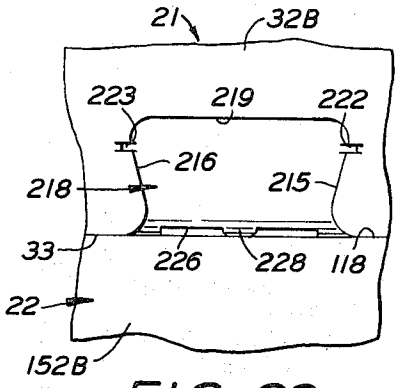

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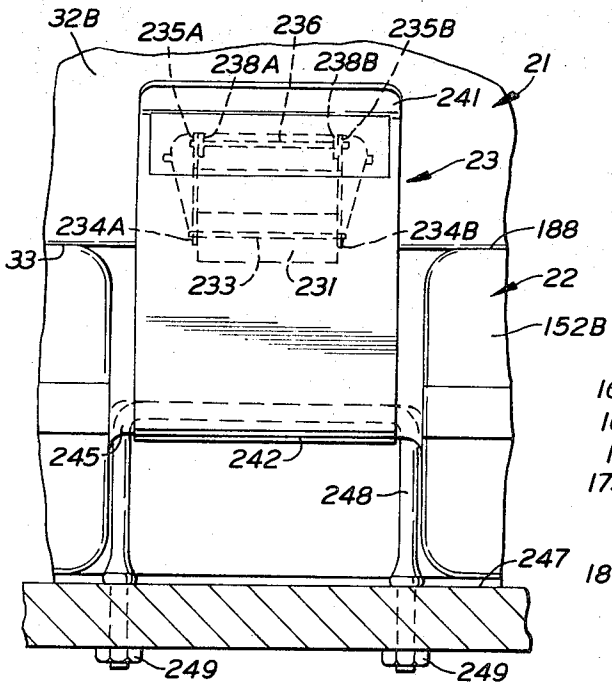


FIG. 21

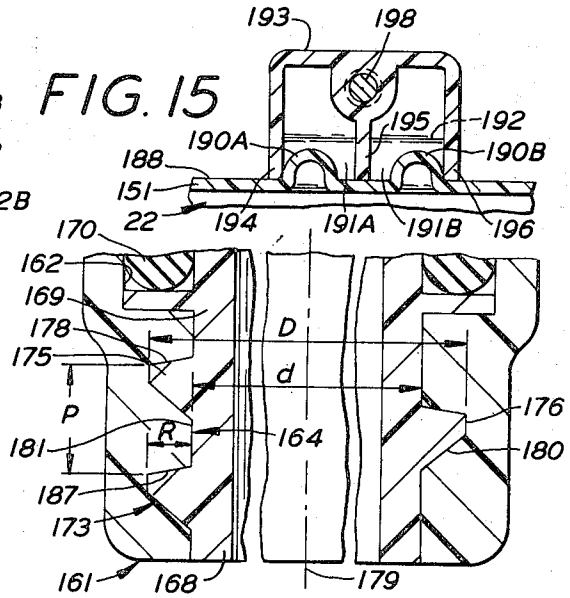


FIG. 14

FIG. 15

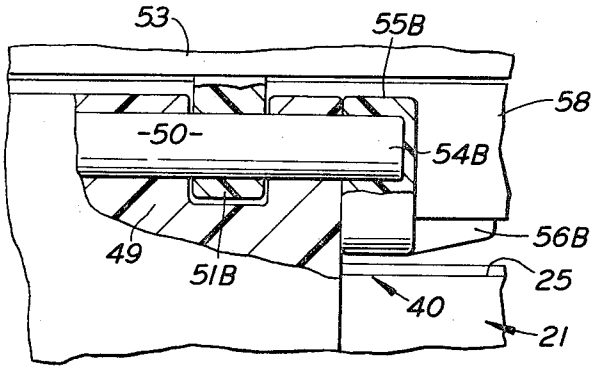
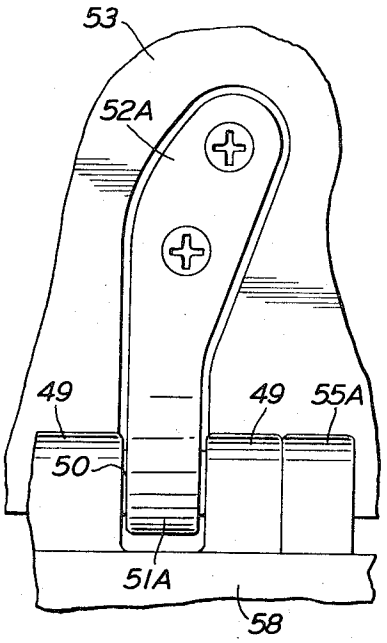


FIG. 16



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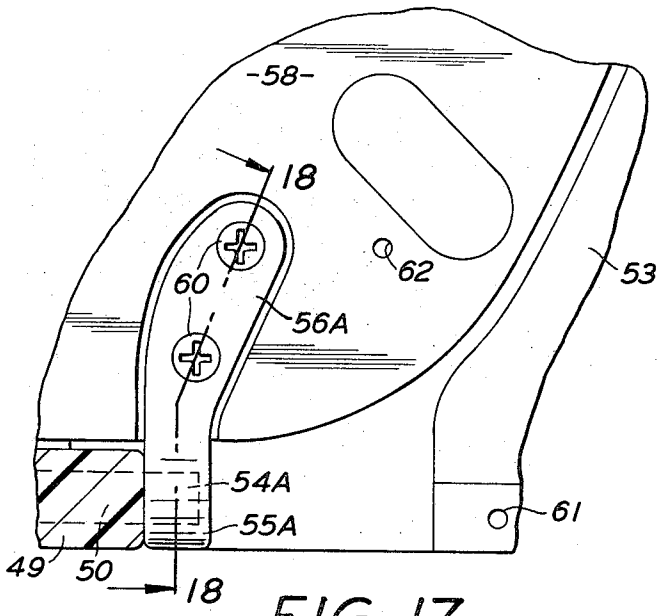

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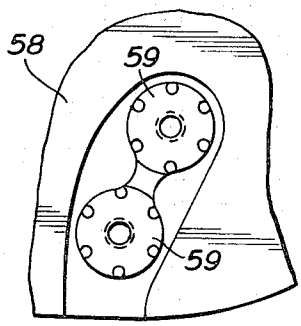

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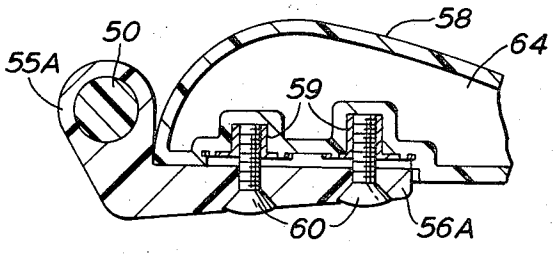

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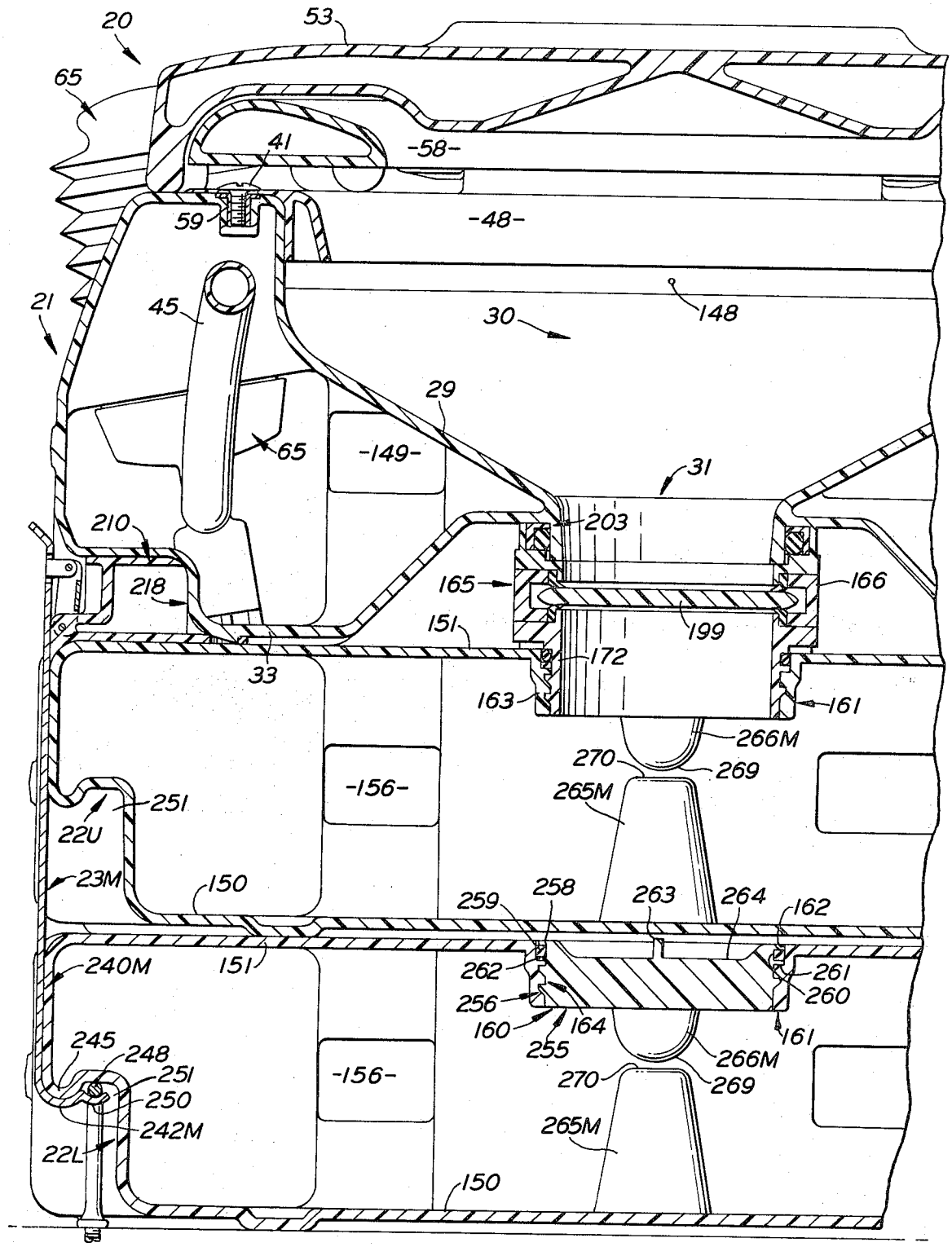
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PORTABLE, SELF-CONTAINED TOILET

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. Portable toilets of this general character have been developed in the past, but all known constructions leave much to be desired.

One of the primary drawbacks experienced with prior art constructions has been the nature of the seal between the holding tank section and the bowl. Probably the most popular of the prior art approaches bolted a valve assembly to the holding tank section. The use of circumferentially spaced bolts with a relatively flat washer interposed between the valve assembly and the holding tank requires the application of considerable tension to the bolts in order to effect a satisfactory seal. Moreover, the relatively permanent nature of the connection militates against repeated removal of the valve assembly. In order for the holding tank section to be removably secured to the bowl in this prior known construction a special seal ring of Y-shaped cross section was developed. The stem of the Y-shaped seal is intended to be received in an annular groove on the top surface of the valve assembly with the branches of the "Y" intended for engagement with a relatively flat, horizontal surface defining the rim of the bowl drain. In theory, such a seal should be quite effective, but in practice fuild passing from the bowl into the holding tank section would seep between the branches of the "Y." As an unpleasant result, any shifting of the weight supported on the seat would effect a pumping action such that the fluid captured between the seal and the rim of the drain would be forcibly expelled outwardly from between the adjacent bowl and valve assembly.

The various prior art constructions universally required the use of a removable screw means to secure the portable toilet to a supporting surface. The use of screw means for this purpose is not only inconvenient, but after such means are tightened and released a few times to permit the holding tank to be removed for emptying, they tend to become ineffective.

In addition, numerous other drawbacks are prevalent in prior art constructions. For example, it is too easy to overfill the flush fluid reservoir in prior constructions; the caps used to seal the filling port for the flush fluid reservoir and the emptying port of the holding tank are prone to leakage unless excessively tightened; it is difficult, if not impossible, to replace broken parts with facility; and, the pumps employed to transfer flush fluid from the reservoir to the bowl were inconvenient to install and difficult to prime, the latter difficulty being engendered chiefly because of the ineffective check valve arrangement available for such pumps.

Particularly in view of the rapid growth in camping and other recreational activities that are generally centered in regions remote from sanitary facilities, the need for self-contained, portable toilets has compounded over the last several years and is expected to continue. In addition, the current proliferation of anti-pollution laws directed to the protection of lakes and streams will require the availability of self-contained toilets on more and more boats.

SUMMARY OF THE INVENTION

It is, therefore, a primary object of the present invention to provide a greatly improved portable toilet that is completely self-contained and constructed in such a way that a holding tank section can be readily disconnected from the seat section and transported independently to a situs where the contents cabe properly emptied.

It is also an object of the present invention to provide a portable toilet, as above, in which the interconnection between the seat and holding tank section effects an assured seal for the flush passage therebetween, permits the assembled toilet to present a low profile, allows assembly and disassembly of the seat and holding tank sections with rapidity and yet is durable and substantially impervious to wear by repeated use.

It is another object of the present invention to provide a portable toilet, as above, in which those subassemblies that are particularly prone to damage — such as the lid, seat, rim and hinges by which such components are interconnected — can be readily, and individually, replaced.

It is still another object of the present invention to provide a portable toilet, as above, that is readily, and releasably, secured to a supporting surface.

It is a further object of the present invention to provide a portable toilet, as above, that may be assembled in conjunction with at least one reverse holding tank section in such a way that the reserve holding tank section may be releasably secured to the portable toilet and to a supporting surface.

It is still a further object of the present invention to provide a portable toilet, as above, in which the self-contained flush fluid reservoir is constructed to provide, during the actual filling process, a mechanical indication as to when the optimum volume of flush fluid has been introduced and in which the filling port for the flush fluid reservoir, as well as the emptying port for the holding tank section, may be assuredly sealed by hand tightening a unique cap and seal construction.

It is an even further object of the present invention to provide a portab;e toilet, as above, that is light in weight and relatively inexpensive to manufacture and maintain.

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 holding tank section that is preferably provided with two ports, both of which are adapted to be readily opened and closed. The one port constitutes a pouring spout by which the contents of the holding tank section may be conveniently emptied. A unique cap may be employed to permit the pouring spout to be opened or assuredly sealed by the application of moderate hand-applied pressure.

The second port in the holding tank section constitutes an inlet to which a valve assembly may be releasably secured. The valve assembly employs an uncomplicated slide element to open and close the passage therethrough. The valve assembly is not only preferably attached to the inlet by a unique thread means but also presents an upwardly directed socket by which to effect a novel interconnection with the seat section of the

portable toilet embodying the concept of the present invention.

The seat section has a bowl that converges downwardly to a drain, and the drain incorporates a thimble that is insertably receivable within the socket of the valve assembly. As such, the slide element of the valve assembly permits selective communication between the bowl and the interior of the holding tank section.

The seat section is preferably hollow so that the cavity provided between the bowl and the external walls forms a flush fluid reservoir. A hand operated pump means with at least one novel check valve arrangement dispenses the flush fluid into the bowl, and the cover ring, seat, lid and hinge members are separably incorporated in the seat section to facilitate replacement. In addition, a unique clamp assembly is demountably anchored in the seat section for engaging one or more holding tank sections and securing them to the seat section and, if desired, to a supporting surface and/or to a reserve holding tank section.

One preferred embodiment of a portable toilet embodying the concept of the present invention, in conjunction with two alternative embodiments of a clamp assembly used to join the seat and holding tank sections of such a toilet, are 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 view of a portable toilet embodying the concept of the present invention;

FIG. 2 is also a perspective view similar to FIG. 1 but exploded to show the seat section vertically separated from the holding tank section;

FIG. 3 is a rear elevation of the portable toilet with a portion broken away partially to reveal the construction of the hinge by which the lid and seat are mounted to the seat section;

FIG. 4 is a side elevation of the portable toilet with the lid swung open and partially broken away to reveal the arrangement by which the angled disposition of the lid is maintained the open position, a portion of the seat section is also broken away to reveal the sleeve associated with the filling port of the flush fluid reservoir by which a mechanical signal is effected to indicate that a proper volume of flush fluid has been introduced into the reservoir;

FIG. 5 is an enlarged cross section taken substantially on line 5—5 of FIG. 1;

FIG. 6 is an enlarged cross section taken substantially on line 6—6 of FIG. 1 and is, therefore, oriented transversely with respect to the orientation of FIG. 5;

FIG. 7 is a reduced view taken substantially on line 7—7 of FIG. 5 to depict the cover ring and flush fluid distribution ledge 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;

FIG. 8 is an enlarged side elevation taken substantially on line 8—8 of FIG. 7 to depict the disposition of the flush fluid feed tube above the distribution ledge in association with the bowl portion;

FIG. 9 is a further enlarged horizontal section taken substantially on line 9—9 of FIG. 8 and depicting the passage of the flush fluid feed tube from the reservoir cavity through the offset portions of the drop wall and locating flange into communicating position with the distribution ledge;

FIG. 10 is an enlarged cross section taken substantially on line 10—10 of FIG. 2 depicting the internal construction of the flush pump but with the bellows thereof represented substantially in side elevation;

FIG. 11 is an enlarged section taken substantially on line 11—11 of FIG. 3 depicting the details of the interconnection between the sealing cap, gasket and stub of the filling port for the flush fluid reservoir;

FIG. 12 is an enlarged section taken substantially on line 12—12 of FIG. 2 and depicting, in solid line, the interrelationship of the flush valve assembly with the holding tank section of the portable toilet, the interrelationship of the flush valve assembly with the thimble on the seat section is also depicted, but in chain line;

FIG. 13 is a top plan of the flush valve assembly depicted in FIG. 12;

FIG. 14 is an enlarged area of FIG. 12 depicting the profile of the preferred thread means between the neck on the flush valve assembly and the collar on the holding tank section;

FIG. 15 is an enlarged transverse section taken substantially on line 15—15 of FIG. 13;

FIG. 16 is an enlarged portion of FIG. 3, specifically that portion of FIG. 3 broken away to depict the hinge construction.

FIG. 17 is a view taken substantially on line 17—17 of FIG. 5 to depict the connection of the hinge to the seat in bottom plan;

FIG. 18 is a vertical section taken substantially on line 18—18 of FIG. 17;

FIG. 19 is an enlarged view taken substantially on line 19—19 of FIG. 4 to depict the connection of the hinge to the lid in bottom plan, the top and bottom of the lid itself serving as a frame of reference for the designation "bottom plan";

FIG. 20 is a partial area of FIG. 17 with the hinge arm removed to reveal the flanged metallic nut anchored in the plastic seat;

FIG. 21 is a view taken substantially on line 21—21 of FIG. 5 and depicting a clamp assembly in elevation and appearing on the same sheet of drawings as FIGS. 14 and 15;

FIG. 22 is an enlarged, exploded section taken substantially on line 22—22 of FIG. 4 depicting the configuration of the clamp assembly, the means by which the clamp assembly is mounted to the seat section, the means by which the clamp assembly engages the holding tank section and the means by which the clamp assembly engages a stirrup on a supporting surface and appearing on the same sheet of drawings as FIGS. 14 and 15;

FIG. 23 is a partial side elevation taken substantially on line 23—23 of FIG. 22 depicting the receptacle cavity in the seat section into which a plug on the clamp assembly is received and appearing on the same sheet of drawings as FIGS. 14 and 15;

FIG. 24 is a vertical section through the plug portion of a clamp assembly taken substantially on line 24—24 of FIG. 22 and appearing on the same sheet of drawings as FIGS. 14 and 15; and,

FIG. 25 is a view similar to FIG. 5, depicting a modification in which two holding tank sections are disposed beneath a single seat section.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

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 secured to one or more lower holding tank sections 22 by a pair of clamp assemblies 23.

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 (FIGS. 5 and 6) 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. 5 and 7–9) 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 side walls 32A, 32B, 32C and 32D slope downwardly, and moderately outwardly, in an aesthetically pleasing configuration to join the horizontal base wall 33 which extends radially inwardly and then upwardly from all four side walls to converge at the drain 31. The drain itself presents an annular thimble 35 that extends below the convergence of the wall 29 delineating bowl 30 and the base wall 33 for a purpose more fully hereinafter explained.

A cover ring 40 is demountably secured the the seat section 21 by a plurality of flat head screws 41. A mounting flange 42 overlies at least a portion of the rim 25, and the screws 41 pass through the mounting flange 42 and are anchored in corresponding bosses 43 located on the underside thereof within the reservoir cavity 24. A vertically oriented, substantially helical locating flange 44 is frictionally received against the corresponding configuration of the drop wall 28 to position and stabilize the cover ring 40. As best shown in FIGS. 7 and 9, a flush feed tube 45 passes through the offset walls 46 and 47 which accommodate the radial discontinuity effected by the spiral configuration of the locating flange 44 as it engages the horizontally spiralled drop wall 28, respectively.

A splash deflecting lip 48 extends radially inwardly and downwardly from the mounting flange 42 and terminates in radially inwardly spaced relation with respect to the locating flange 44.

As best seen in FIGS. 3 and 16–20, a hinge section extends upwardly from the rear of the cover ring 40 and slidably receives a hinge pin 50. The hinge section 49 is recessed at preferably two locations medially the ends thereof to expose the hinge pin 50 and permit the collars 51A and 51B of two hinge arms 52A and 52B, respectively, to be rotatably mounted thereon. The hinge arms 52A and 52B may be demountably secured to the toilet lid 53.

The opposite ends 54A and 54B of the hinge pin 50 extend beyond the hinge section 49 a sufficient distance to permit the cap collars 55A and 55B of two hinge arms 56A and 56B, respectively, to be rotatably mounted thereon. The hinge arms 56A and 56B are secured to the seat 58 so that it too may swing about the hinge pin 50. It must be appreciated that if at least one of the hinge arms 56A or 56B is demountably secured to the seat 58 the corresponding cap collar 55A or 55B may be demounted and the hinge pin 50 may be thereby readily removed from the hinge section 49 in order to permit selective replacement of the cover ring 40, the lid 53 or the seat 58. As such, if the seat 58 is molded from a plastic material, suitably perforated flanged nuts 59 may be encapsulated therein to receive the screws 60 by which at least one of the hinge arms 56A or 56B is secured to the seat 58. In fact, it has been found highly advantageous to have all the hinge arms 52A, 52B, 56A and 56B demountably secured to their respective components to facilitate their replacement should the occasion arise, and similar flanged nuts 59 may also be incorporated in bosses 43 to facilitate replacement of cover ring 40.

In order to maintain the portable toilet 20 as light as possible it is feasible to blow mold both the lid 53 and the seat 58 to provide a hollow construction, but if such a construction is used it is suggested that weep holes 61 and 62 be provided in the lid 53 and seat 58, respectively, to dissipate any condensation that might otherwise be present within the interior cavity 63 of the lid 53 or the interior cavity 64 of the seat 58.

It was hereinbefore mentioned that the flush fluid feed tube 45 extends through the offset walls 46 and 47. As best seen in FIGS. 5 and 10, the flush fluid feed tube 45 originates within the reservoir cavity 24 where it is secured to a flush pump 65, specifically, the outlet stub 66 thereof.

The body portion 68 of flush pump 65 extends through, and is sealed to, an aperture 69 in the seat section 21 of the toilet 20. As is best seen from FIGS. 1, 2 and 3 a shelf 70 is provided at the right, rear corner of the seat section 21, and, as shown in FIG. 10, the aperture 69 pierces the shelf 70.

A flexible bellows 71 is disposed exteriorly of the seat portion 21 for hand operation. Specifically, the base of the bellows 71 comprises a flange 73 that extends radially from the body portion 68 and overlies the upwardly directed surface 74 of the shelf 70. To assure a liquid seal, a ring of uncured butane rubber is generally interposed between the flange 73 and the shelf 70.

In order to minimize interference between the bellows 71 and the lid 53, the shelf 70 is preferably inclined at approximately 10° (as best shown in FIG. 3) to direct the bellows 71 laterally outwardly and away from the lid, particularly when the lid is disposed in the tilted, or open, position represented in FIG. 4 — a position that may be maintained by engagement of the lower, rear edge 74 on the lid 53 with the rearwardly directed surface 75 on the hinge section 49.

Below the flange 73 the body portion 68 is provided with an annular recess (FIG. 10) within which the edge of the shelf wall 79 defining the aperture 69 is received. Beneath the recess a retaining head 80 engages the downwardly directed surface 81 of the shelf 70. When the body portion 68 is made of a resilient plastic material, mounting the flush pump 65 into operative position through aperture 69 may be facilitated by making provision for the retaining head 80 to collapse as it is inserted through the aperture 69 and then expand to engage surface 81. This result may be accomplished by

providing a hinge action medially the vertical extent of the recess **76**. In the preferred embodiment the hinge action is the result of a peripheral concavity **82** incorporated in the radially outwardly directed surface **83** of recess **76**.

The body portion **68** extends from the shelf **70** downwardly to the base wall **33** which is engaged by a three-legged pedestal **84** presented at the lowermost extremity of the body portion **68**. The body portion **68** thus also serves the function of a reinforcing post.

Upwardly of the pedestal **84** the body portion incorporates a cylindrical inlet chamber **85**. An annular ring **86** is received within the lowermost portion of the chamber **85** and provides a seat **88** on the upper extremity thereof with which a ball **89** cooperates to provide a check valve **90**. The passage **91** through the ring **86** comprises the inlet port of the pump **65**, and, as can be observed from FIG. **10**, the inlet port opens in close proximity to the lowest boundary of reservoir cavity **24** —**0** base wall **33**.

A tab **92** arches across the inlet chamber **85** from one side of the ring **86** to the other in order to restrict upward movement of the ball **89** and thereby prevent it from inadvertently closing communication between the inlet chamber **85** and the passageway **93** leading from the chamber **85** upwardly through the stem **94** of the body portion **68** and into the interior chamber **95** of the bellows **71**. The tab **92** must not, of course, restrain the ball **89** from freely moving into, or out of, engagement with seat **88**.

The outlet stub **66** of the flush pump **65** extends laterally outwardly from the stem **94**, and the feed tube **45** may be secured thereto by a clamp **96**. In order to enhance the stability of the connection between the feed tube **45** and the outlet stub **66** a friction ridge **98** may be incorporated about the outer periphery of the outlet stub **66**.

A check valve assembly **100** is also provided in conjunction with the duct **101** that extends through the outlet stub **66** and communicates with the passageway **93** in the stem **94**. Specifically, a comparatively rigid, annular supporting frame member **102** is received within the feed tube **45** in proximity to the outlet stub **66**. In the embodiment depicted the outer diameter of the annular supporting frame member **102** is sufficiently larger than the inner diameter of the feed tube **45** that when the supporting frame member **102** is insertably received within the tube **45** the flush fluid will not be able to pass therebetween. A base wall **103** extends transversely across the downstream end of the supporting frame member **102**, and an axial passage **104** through the base wall **103** communicates with the hollow interior **105** of the supporting frame member **102** to permit the flow of flush fluid therethrough.

The edge of the base wall **103** that circumscribes the passage **104** presents a conical valve seat **106** on the downstream side thereof that cooperatively interacts with a conical plug **108**. The apex **109** of the plug **108** is connected to a resilient member **110** that biasingly urges the plug **108** into sealing engagement with the valve seat **6**. As shown, the resilient member **110** may comprise an elastomeric filament which extends from the apex **109** of the plug **108** through a collar **111** located concentrically with respect to the support frame member **102** by at least one arm **111** that extends radially inwardly from the supporting frame member **102**. The end of the resilient filament **110** distal with respect to the plug **108** terminates in a head **113** that engages the upstream end **114** of the collar **111** to anchor the plug **108** in sealing engagement with the valve seat **106**.

The supporting frame member **102**, and its location, may be stabilized by positioning the peripheral edge **115** on the upstream end of the supporting frame member **102** in engagement with the outer edge **116** of the outlet stub **66**. This engagement may be maintained by providing a plurality of locating ribs **118** on the inner surface **119** of the flush feed tube **45**, the upstream ends **120** of the ribs **118** engaging the downstream surface **121** of the base wall **103**.

To operate the flush pump **65** one depresses and then releases the bellows **71**. As the bellows **71** is depressed for the first time after the reservoir cavity **24** is filled with flush fluid the air within the interior chamber **95** of bellows **71** is forced to enter passageway **93**. The pressure increase within passageway **93** presses the ball **89** firmly against seat **88** and precludes the flow of air from passageway **93** into the passage **91** comprising the inlet port of the flush valve **65**. The increase in pressure transmitted from passageway **93** through duct **101** and against that portion of the conical plug **108** exposed to the hollow interior **105** of the supporting frame member **102** urges the plug **108** away from its seat **106** against the biasing action of the resilient filament **110** so that the air can escape through the feed tube **45**.

As the bellows **71** is released subsequent to its first depression it tends to revert to its original shape, creating a subatmospheric pressure within chamber **95** and the passageways communicating therewith. The plug **108** is immediately forced into sealing contact with the seat **106** by virtue of the biasing action of resilient filament member **110**, and this sealing engagement is enhanced by the atmospheric pressure within the feed tube **45** so that the atmospheric pressure within reservoir cavity **24** forces flush fluid to enter the passage **91** comprising the inlet port of the flush valve **65**, to lift ball **89** from seat **88** and to flow through the passageway **93** and into chamber **95** until the air pressure internally of bellows **71** together with any pressure resulting from a differential in the height of the liquid column within the flush pump **65** as compared to the liquid level in reservoir cavity **24** equals the external atmospheric pressure. The configuration of check valve assembly **100** thereby facilitates the priming and operation of the flush pump **65**.

So long as a sufficient volume of flush fluid is available within the reservoir cavity **24** to charge the flush pump **65**, any subsequent depression of the bellows **71** will force fluid past the check valve **100** and through the flush fluid feed tube **45**.

The flush fluid emitted from the feed tube **45** is directed along the horizontal distribution ledge **26**, thereby imparting a circumferentially oriented flow vector defined by the horizontal disposition of the ledge **26**. As best seen in FIG. **7**, the radial dimension of the ledge **26** progressively diminishes as the ledge **26** extends circumferentially of the bowl. This configuration causes the flush fluid to be introduced along the full periphery of the bowl, and 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 the bowl

30 to the drain 31, thereby most effectively cleaning the bowl 30.

To facilitate the admission of flush fluid to the reservoir cavity 24, a uniquely constructed filling port 125 is provided in the rear wall 32C of the seat section 21. As shown in FIGS. 3, 4 and 11, a sealing cap 126 is threadably secured to an annular stub 128 that extends outwardly of the wall 32C. A gasket 129, or other suitable sealing means, is preferably interposed between the cap 126 and the stub 128 to effect a sealed closure for the filling port 125 of reservoir cavity 24.

The inwardly directed closure wall 130 of the cap 126 has a central portion 131 that is displaced axially inwardly with respect to a peripheral channel portion 132. The surface 133 at the edge of the central portion 131 is rounded as it joins the wall 134 forming the radially innermost boundary of channel portion 132.

The body portion 135 of the gasket 129 fully spans the central portion 131 of the cap 126, and the peripheral bead portion 136 on the gasket 129, which is axially offset with respect to the body portion 135, is received within channel portion 132 of the cap 126. A bevelled transitional face wall 138 extends between the body portion 135 and the bead portion 136. The transitional face wall 138 engages the radially innermost corner 139 on the outer edge 140 of stub 128 adjacent the opening 141 through the stub 128 before the inwardly directed face 142 on the bead section 136 is engaged by the opposed outer edge 140 of the stub 128 (the position depicted in FIG. 11). Continued tightening of the cap 126 after the original contact is made between the transitional face wall 138 and the corner 139 will stretch and compress the gasket along the rounded surface 133 on cap 126 and bring the outer edge 140 of the stub into engagement with the inwardly directed face 142 on the bead section 136. Still further tightening of the cap 126 compresses the bead section 136 between the outer edge 140 of the stub 128 and the base wall 143 of the channel portion 132. A concave depression 144 extending annularly of the bead section 136 in opposition to the base wall 143 enhances the ability of the bead section 136 to conform to the configuration of the outer edge 140 on stub 128 and thereby assures a complete seal between the cap 126 and the stub 128 on which it is received.

A sleeve 145 disposed within and/or defining the opening 141 extends a short distance (generally on the order of approximately 3 to 4 inches) into the reservoir cavity 24 in opposition to the stub 128 to obviate undesirable overfill of the reservoir cavity 24. When the reservoir cavity is to be filled, the seat section 21 is rested on wall 32A so that the filling port 125 is directed upwardly. With the cap 126 removed flush fluid may be poured, or otherwise directed, through the opening 141 into the reservoir cavity 24. As with any fluid, the flush fluid will seek its own level within the cavity 24 until such time as its level reaches the lowermost edge 146 of sleeve 145, and at that time continued introduction of flush fluid will tend to trap air in that portion of the cavity 24 located above the lowermost edge 146 of the sleeve 145 and cause the sleeve 145 to fill independently of the remainder of the cavity 24, thereby signalling that the reservoir cavity 24 is filled to the desired level.

It should be appreciated that in order for the flush pump 65 to operate there must be some means whereby the volume of flush fluid discharged from the reservoir cavity 24 durong each flush will be replaced by an equivalent volume of air. This purpose is satisfied by the provision oa breather hole 148 that extends through the drop wall 28 at that portion thereof which would be uppermost when the seat section 21 is oriented for replenishing the supply of flush fluid within the reservoir cavity 24 — i.e., when the seat section 21 is resting upon wall 32A. As such, the breather hole 148 would be located adjacent the rear portion of the bowl 30. This location is also the most desirable in view of the fact that a hollow carrying handle 149 may be disposed outwardly of the wall 32C between the filling port 125 and the shelf 70 from which the flush pump 65 projects. As such, when the seat section 21 is being transported by means of the handle 149 the breather hole 148 is disposed virtually to preclude spillage of flush fluid therethrough. In addition, by locating the breather hole 148 through the drop wall 28 any excess flush fluid within the reservoir cavity 24 will drain into the bowl 30 when the seat section 21 is oriented for use. It should be appreciated that the location of the breather hole in proximity to the bowl 30 constitutes a further safety precaution inasmuch as the provision of sleeve 145 should readily obviate the introduction of excessive flush fluid into the reservoir cavity 24. For the sleeve 145 to effect a suitable signal, however, the breather hole 148 must be sufficiently restricted that the air within the reservoir cavity 24 can not escape as rapidly as the flush fluid normally introduced during a filling operation.

Turning now to a consideration of the holding tank section 22, it may also be molded from a durable plastic material such as high density polyethylene to provide a hollow construction bounded by a base wall 150, an upper wall 151 in vertically spaced, parallel relation to the base wall 150 and four exterior side walls 152A, 152B, 152C and 152D.

Wall 152C may well generally duplicate the appearance of wall 32C on the seat section 21. That is, a pouring spout 153 may extend outwardly therefrom in the form of a stub 155 on which a sealing cap 154 may be threadably secured. A gasket, not shown, or other suitable sealing means, is preferably interposed between the stub 155 and the cap 154 to effect a sealed closure for the holding tank section 22. The cap 154 and the gasket associated therewith preferably duplicate the construction of the cap 126 and gasket 129 heretofore described in conjunction with the filling port 125 in seat section 21. In addition, a handle 156 may be presented between the pouring spout 153 and an offset portion 158 of the wall 152C which conforms to the offset created by the provision of shelf 70 on the seat section 21.

An inlet port 160 is provided in the upper wall 151 of the tank section 22. A collar 161 circumscribes the inlet port 160 and extends inwardly from the upper wall 151. The radially innermost surface of the collar 161 presents a cylindrical sealing wall 162 at the uppermost extent thereof. At the lowermost extremity of the sealing wall 162 a section 163 of reduced internal diameter presents thread means 164 that extend radially inwardly with respect to the cylindrical sealing wall 162.

A valve assembly 165 is provided to open and close the inlet port 160, and the housing 166 of the valve assembly 165 cooperatively interacts with the collar 161 to permit facile mounting and demounting of the valve

assembly 165. Specifically, an annular neck 168 extends downwardly from the housing 166 and is removably received within the collar 161.

The upper portion 169 of the neck 168 has an outer diameter that approximates the inner diameter of the sealing wall 162 so that engagement of the wall 162 by an O-ring 170 received within an annular groove 171 in the upper portion 169 of the neck 168 effects a gas and liquid tight seal therebetween.

The lower portion 172 of the neck 168 is of lesser diameter than the upper portion 169 and presents thread means 173 that extend radially outwardly thereof to engage the thread means 164 on collar 161. The thread means 164 and 173 are designed to effect a mounting and demounting of the valve assembly 165 in preferably less than one revolution and at the same time interact to effect a tightly wedged seal between the neck 168 and collar 161. In the embodiment disclosed this result is effected by employing unique threads of asymetric cross section on at least the neck 168. As best seen in FIG. 14, the profile of the successive teeth in the thread means 173 reveals that each tooth 175 has a flat crest 176 at the major diameter "D." The contacting, or work, face 178 of each tooth 175 is inclined at approximately 80 degrees with respect to the axis 179 of the thread, and the opposite, or release, face 180 on each tooth 175 is inclined at approximately 50 degrees with respect to the axis 179. The flat 181 at the minor diameter "*d*" is approximately twice the axial extent of the flat crest 176 at the major diameter "D," and the flat crest 176 is approximately one quarter the pitch "P," whereas the depth, or radial dimension "R," of each thread is approximately three eighths the pitch. It must be appreciated that the major diameter of the thread means 173 should be less than the outer diameter of the upper portion 169 on the neck 168 — i.e., of lesser magnitude than the inner diameter of the sealing wall 162 — to permit insertion of the neck 168 within the collar 161. The thread means 164 must be compatible with thread means 173 but need not be identical.

As best seen in FIGS. 12 and 13, the components of the housing 166 for the valve assembly 165 may be joined together by a plurality of nut and T-bolt combinations 185 the flat head portions 186 of which engage the upwardly directed surface 188 of the upper wall 151 on the holding tank section 22 in opposition to the wedging engagement of the contacting face 178 on the thread means with contacting face 187 on thread means 164 when the valve assembly 165 is secured to the tank section 22.

In order to assure that the valve assembly 165 will remain secured firmly to the tank section 22, a pair of lock lugs 190A and 190B extend upwardly from the upwardly directed surface 188 of the upper wall 151 on tank section 22. The lugs 190A and 190B are received in slideways 191A and 191B, respectively, presented on the under side of the guide extension 192 that extends inwardly from the handle 193 by which one may actuate the valve assembly 165. The moderate flexibility of the upper wall 151 in tank section 22 allows the guide extension 192 to be raised above the level of the upwardly directed surface 188 by the application of lifting pressure to handle 193 so that the slideways 191A and 191B may be selectively snapped onto, and off of, te lock lugs 190A and 190B, but only when the seat and holding tank sections are separated, thereby precluding inadvertent lossening or removal of the valve assembly 165. In addition, the three vertically oriented walls 194, 195 and 196 that define the slideways 191A and 191B are oriented in parallel relationship to the rod 198 which connects the handle 193 to the valve element 199. As such, the interaction of the fixed lock lugs 190A and 190B with the corresponding slideways 191A and 191B maintain the valve assembly 165 firmly mounted on the tank section 22 even as the handle 193 is moved selectively to slide the valve element 199 between its open (the solid line representation in FIG. 13) and closed positions (the chain line representation in FIG. 13).

Whereas the valve element 199 may itself be standard, relatively thin blade that is slidable between seals 200 and 201 selectively to open or close the passageway 202 which passes through the valve assembly 165, the remainder of the valve assembly 165, including the upwardly directed socket 203 into which the thimble 35 on the seat section 21 is received, is quite unique. The outer diameter of the thimble 35 approximates the inner diameter of the socket 203 so that engagement of the exterior surface 204 on the thimble 35 by an O-ring 205 received within an annular groove 206 recessed within the interior surface 208 of the socket 203 effects a suitably sealed connection between the seat and tank sections 21 and 22. The unique interrelationship between the seat section 21, valve assembly 165 and holding tank section 22 permits a relatively low profile for the toilet 20, thereby facilitating storage of the assembled unit.

In order to assure that the thimble 35 will remain sealed within the socket 203 even though the weight supported on the seat section 201 may be eccentrically applied, the thimble 35 should extend approximately one half an inch into the socket 203.

In addition to the joinder effected between the seat and tank sections 21 and 22 by virtue of the insertion of the thimble 35 within the socket 203, a pair of claim assemblies 23 may also be employed to advantage. As best seen in FIGS. 5 and 21–24, each clamp assembly 23 has a connecting plug 210 that is removably secured to the seat section 21. The plug 210 is preferably of trapezoidal cross section with parallel upper and lower walls 211 and 212. The normally non-parallel side walls 213 and 214 not only converge from the wider upper wall 211 toward the narrower lower wall 212 (each side wall being inclined at approximately 73° with respect to the upper wall 211) but also converge toward the front of the plug 210 at approximately 2° to 3° in order to provide a wedging engagement with the correspondingly tapered side walls 215 and 216 of the receptacle cavity 218 into which the plug 210 is removably received.

A receptacle cavity 218 is provided in each exterior side wall 32B and 32D of the seat section 21. The upper wall 219 of the receptacle cavity 218 conforms to the wider upper wall 211 of the plug 210, and the side walls 215 and 216 of the receptacle cavity 218 converge downwardly from the upper wall 219 and then merge into the base 33 of the seat section 21 so that each receptacle cavity 218 opens through the base wall 33 as well as the appropriate side walls 32B and 32D.

In order to stabilize the plug 210 against undesirable tilting about any horizontal axis oriented transversely with respect to the plug 210 because of the eccentric loading applied thereto when the clamp assembly 23 is operatively positioned on the portable toilet 20, stabi-

lizing fins 220 and 221 project laterally of the converging side walls 213 and 214 on plug 210 and extend longitudinally along the plug 210 to be received in corresponding grooves 222 and 223 recessed into the embracing side walls 215 and 216 of the receptacle cavity 218.

A tongue 225 extends forwardly from the narrower lower wall 212 of the plug 210 to overlie an upwardly offset portion 226 in the base wall 33 of seat section 21. An anchor lug 228 extends downwardly from the offset portion 26 of base wall 33 and is received within an appropriate aperture 229 through the tongue 225. When the seat section 21 properly rests upon the holding tank section 22 the tongue is pressed between the offset portion 226 on the seat section 21 and the upwardly directed surface 188 on the upper wall 151 of the holding tank section 22 so that the engagement of the anchor lug 228 within the aperture 229 locks the plug 210 within the receptacle cavity 218.

A toggle assembly 230 is attached to a mounting flange 231 that extends rearwardly from the narrower lower wall 212 of the plug 210. One element of the toggle assembly 230 is a link member 232 one end of which is mounted to swing on a first hinge pin 233 received within the mounting flange 231. For stability, this swinging connection is effected by a pair of laterally spaced ears 234A and 234B on the link member 232 that embrace the ends of the mounting flange 231 and are rotatably mounted on the first hinge pin 233.

Similarly, a pair of laterally spaced ears 235A and 235B on the opposite end of the link member 232 are rotatably mounted on a second hinge pin 236 rotatably supported on a pair of ears 238A and 238B presented from the rear of clamp arm 240.

A flange 241 flares outwardly from the upper portion of the clamp arm 240 to facilitate engagement with the fingers, or hand, of a user. The lower portion of the clamp arm 240 turns inwardly and upwardly in the form of a hook 242 that engages a downwardly directed rib 245 formed on the appropriate side walls 152B and 152D of the holding tank section 22.

With the plug 210 properly received within the receptacle cavity 218, the hook 242 is engaged beneath the rib 245 and pressure is applied to the flange 241 to contract the toggle assembly 230. That is, the clamp arm 240 swings about the rib 245 and the link member 232 swings about the first hinge pin 233. When the second hinge pin 236 swings inwardly through a vertical plane 246 encompassing the first hinge pin 233, an overcenter lock is effected. The clamping force is thus transferred between the plug 210 and the toggle assembly 230 through the first hinge pin 233. As such, the load received by plug 210 is eccentrically applied, and the fins 220 and 221 serve to stabilize the plug 210 against the eccentricity of this loading.

A pair of such clamp assemblies 23 associated with the opposite sides of the portable toilet 20 have been found quite adequate to join the seat and holding tank sections 21 and 22, respectively, together under virtually all conditions.

As will be appreciated, there are many situations where it is desirable that the portable toilet 20 be releasably secured to a supporting surface. This result can be readily accomplished in conjunction with the aforesaid clamp assemblies 23. Suitable stirrups 248 may be secured to a supporting surface 247 by screws, or other fastening means, 249, and a second hook 250 is provided on the clamp arm 240 to engage the appropriate stirrup 248. As can be seen from FIG. 22, the hooks 242 and 250 are oriented in parallel relationship and the hook 250 is at a generally higher elevation than hook 242 in order to facilitate engagement of both the rib 245 and the stirrup 248 without imposing undue strain on any component of the portable toilet 20 during the clamping operation.

The provision of ribs 45 in opposite sides of the holding tank section 22 also serves to provide a suitable means by which one can grasp and carry the holding tank section 22 while it is horizontally disposed if the occasion should arise. As such, the side walls 152B and 152D should be recessed inwardly of the ribs 245, as at 251. The recesses 251 provide finger room behind the adjacent rib 245 and also provide clearance for the hook 242 and/or 250 as well as a stirrup 248 when the recess 251 extends through the base wall 150 of the holding tank section 22. For convenience a similar recess 151 may be provided in wall 152A.

On occassion it may be desirable to have a second holding tank section 22 available in the event that it is not immediately convenient to empty the first holding tank section when required. The parallel disposition of the base and upper walls 150 and 151 of the tank sections 22 allow multiple tank sections to be stacked, one on top of the other, and, as shown in FIG. 25, an upper and lower holding tank section 22U and 22L may be stacked with a single seat section 21 operatively positioned in communication with the upper holding tank section 22U.

A pair of modified clamp assemblies 23M may be employed which have plugs 210 insertably received within receptacle cavities 218. However, the clamp arm 204M on each clamp assembly 23M is modified to span downwardly past the upper holding tank section 22U and position the hook 242M to engage the appropriate rib 245 on the lower holding tank section 22L. In this embodiment, as well, a hook 250 may be provided on the clamp arm 240M to engage a stirrup 248.

A bung 255 may be provided to seal the inlet port 160 of the lower holding tank section 22L. The bung 255 may be provided with thread means 256 similar to the thread means 173 on the valve assembly 165 that extend radially outwardly cooperatively to engage the thread means 164 on collar 161. The bung 255, like the neck 168 on valve assembly 165, also has an upper portion 258 the outer diameter of which approximates the inner diameter of the sealing wall 162 so that engagement of the wall 162 by an O-ring 259 received within an annular groove 260 in the upper portion 258 will effect a gas and liquid tight seal for the port 160. It should be appreciated that engagement of the substantially horizontal shoulder 261 on the underside of the upper portion 258 with the ledge 262 at the lower extremity of the sealing wall 162 provides the force reaction cooperating with the thread means 256 and 164 to lock the bung 255 in sealed relationship with the port 160. Turning of the bung 255 may be conveniently effected by the provision of a gripping ridge 263 that extends diametrically across the recessed face 264 thereof.

In order to reinforce the lightweight holding tank section 22 a plurality of posts may be provided between the base and upper walls 150 and 151. For example, a plurality of conical posts 265 (FIG. 6) may extend up-

wardly from the base wall **150** in opposition to similar posts **266** that extend downwardly from the upper wall **151**. The opposed posts **165** and **266** may terminate in spherical contacting faces **268** and **269**, respectively. However, it should be appreciated that because the upper wall **151** should have some resiliency in order to permit the guide extension **192** to be raised above the level of the upwardly directed surface **188** so that the slideways **191A** and **191B** may be selectively snapped on to, and off of, lock lugs **190A** and **190B** any posts placed in alignment with the orientation of the valve assembly **165** when the guide extension **192** must be raised should not preclude the required flexibility of the upper wall **151**. For this reason the post **266M** aligned with valve assembly **165** should be modified such that it terminates in moderately spaced relationship with respect to the flat contacting face **270** of the top of the opposed, truncated, conical post **265M**. By employing the flat contacting face **270** in opposition to spherical contacting face **269** the required flexibility of wall **151** will not be restricted even at such time as the faces **269** and **270** are in contact, and moreover, the flexing of wall **151** can not destroy the contact between faces **269** and **270** even though the post **266M** should be misaligned by the flexing of wall **151**.

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

What is claimed is:

1. A portable toilet comprising; a seat section and a holding tank section, said holding tank section having an inlet port, a collar circumscribing said inlet port, a flush valve assembly, said flush valve assembly presenting a neck, said neck being insertably received within said collar, connecting means releasably securing said neck within said collar, said flush valve assembly presenting a socket in a direction oppositely of said neck, a passageway extending through said socket and neck with a valve element operative between said neck and socket selectively to open and close said passageway, said seat section having a bowl portion that converges downwardly to a drain, a thimble circumscribing said drain, said thimble being insertably received within said socket to present a substantially cylindrical interface, and means effecting a radial seal between said substantially cylindrical interface presented by said thimble and socket.

2. A portable toilet, as set forth in claim **1**, further comprising; at least one clamp assembly releasably securing said seat section to said holding tank section.

3. A portable toilet, as set forth in claim **1**, in which the connecting means releasably securing said neck within said collar comprises; thread means extending radially inwardly of said collar and thread means extending radially outwardly of said neck to engage the thread means on said collar.

4. A portable toilet, as set forth in claim **3**, in which lock lugs presented from said holding tank section selectively and releasably engage said flush valve assembly.

5. A portable toilet, as set forth in claim **3**, in which the collar has an upper sealing wall and thread means, the thread means on said collar being located at a level lower than said sealing wall, said neck having an upper wall portion receivable interiorly of said sealing wall, thread means on said neck at a level lower than said upper wall portion to engage the thread means on said collar.

6. A portable toilet, as set forth in claim **5**, in which the thread means on said neck have a major diameter, the major diameter of said thread means being of lesser magnitude than the inner diameter of said sealing wall and in which the outer diameter of said upper wall portion approximates the inner diameter of said sealing wall.

7. A portable toilet, as set forth in claim **3**, in which the teeth in at least one of said thread means have a pitch dimension and a thread axis, the profile of the cross section for said threads comprising; a work face on each said tooth, said work face being inclined at approximately 80° with respect to said thread axis, a release face on each said tooth, said release face being inclined at a lesser degree than said work face.

8. A portable toilet, as set forth in claim **7**, in which said teeth have a major and minor diameter and a flat at each said diameter, the dimension of the flat measured parallel to said thread axis at the minor diameter being equal to approximately twice the dimension of the flat at said major diameter.

9. A portable toilet, as set forth in claim **8**, in which the radial dimension of said teeth is equal to approximately three-eighths the dimension of said pitch.

10. A portable toilet, as set forth in claim **9**, in which means on said flush valve assembly engage the holding tank assembly in opposition to the engagement of the work faces on the intermeshed teeth between said collar and neck.

11. A portable toilet, as set forth in claim **10**, in which seal means are interposed between said neck and collar.

12. A portable toilet, as set forth in claim **1**, in which a recess is provided in said socket, a seal is received in said recess to engage said thimble when said thimble is received in said socket.

13. A portable toilet, as set forth in claim **11**, in which at least one clamp assembly connects between said seat and holding tank sections, said clamp assembly comprising; a plug releasably secured to said seat section, a toggle assembly mounted to swing from said plug, means on said toggle assembly to engage said holding tank section, and means to contract said toggle assembly whereby releasably to secure said holding tank section to said seat section.

14. A portable toilet, as set forth in claim **13**, in which said plug is of geometric cross section and in which a receptacle cavity is provided in said seat section matingly to receive said plug.

15. A portable toilet, as set forth in claim **14**, in which said plug presents a tongue that extends between said seat and holding tank sections, a lug presented from at least one of said sections engages said tongue to anchor said plug in operative position.

16. A portable toilet, as set forth in claim **14**, in which said plug is of trapezoidal cross section and in which stabilizing fins project laterally of said plug, grooves being provided in said receptacle cavity to receive said stabilizing fins.

17. A portable toilet, as set forth in claim **16**, in which a mounting flange extends from said plug outwardly with respect to the seat section in which said plug is received, said toggle assembly comprising; a link and a clamp arm, a first hinge pin mounting said link

to said mounting flange, and a second hinge pin mounting said clamp arm to said link.

18. A portable toilet, as set forth in claim **17**, in which said clamp arm presents a first hook and said holding tank section presents a rib, said first hook being selectively engageable with said rib.

19. A portable toilet, as set forth in claim **18**, in which said clamp arm presents a second hook, a stirrup secured to a supporting surface, said second hook being selectively engageable with said stirrup.

20. A portable toilet, as set forth in claim **18**, in which said clamp arm extends from a seat section past a first holding tank section to engage a rib on a second holding tank section.

21. A portable toilet, as set forth in claim **1**, in which said seat section has exterior walls and in which a cavity is defined between said bowl and said exterior walls to form a flush fluid reservoir.

22. A portable toilet, as set forth in claim **21**, in which a filling port in the form of a stub is presented to replenish the fluid in said reservoir, a cap being removably secured to said stub.

23. A portable toilet, as set forth in claim **22**, in which a sleeve is secured to and extends inwardly of said reservoir cavity from said filling port.

24. A portable toilet, as set forth in claim **22**, in which a pouring spout in the form of a stub is provided to permit facile emptying of said holding tank section, a cap being secured to said stub.

25. A portable toilet, as set forth in claim **24**, in which at least one said cap has a central portion displaced axially inwardly with respect to a peripheral channel portion, a gasket having a body portion and a peripheral bead portion, said body portion fully spanning the central portion of said cap, said bead portion being received in said peripheral channel.

26. A portable toilet, as set forth in claim **25**, in which a bevelled transitional wall extends between the body and the bead portions of said gasket, said transitional wall being disposed to engage an axially outer, radially inward portion of said stub as the cap is tightened thereon.

27. A portable toilet, as set forth in claim **26**, in which a rounded surface joins the central and channel portions of said cap, said rounded surface engaging the transitional wall of said gasket.

28. A portable toilet, as set forth in claim **27**, in which a concave depression extends annularly of the bead section in opposition to the channel portion of said cap.

29. A portable toilet, as set forth in claim **21**, in which a pump means directs flush fluid from said reservoir into said bowl, said pump means employing at least one check valve, said check valve having a supporting frame member, a seat presented from said supporting member, a conical plug and resilient means biasing said plug into sealing engagement with said seat.

30. A portable toilet, as set forth in claim **29**, in which said resilient means comprises an elastomeric filament.

31. A portable toilet, as set forth in claim **29**, in which said conical plug terminates in an apex and the resilient means comprises an elastomeric filament extending from said apex, a collar being carried from said supporting frame member, said filament being anchored in said collar.

32. A portable toilet, as set forth in claim **29**, in which said seat section has a wall with oppositely directed surfaces, an aperture pierces said wall, said pump means has a body portion, a flange on said body portion engaging one surface of said wall peripherally of said aperture, a retaining head on said body portion in spaced relation below said flange, said retaining head engaging the opposite surface of said wall peripherally of said aperture.

33. A portable toilet, as set forth in claim **32**, in which a hinge is provided in said body portion between said flange and said retaining head.

34. A portable toilet, as set forth in claim **33**, in which said hinge comprises a recess presenting a radially outwardly directed surface between said flange and said retaining head, a peripheral concavity incorporated in said radially outwardly directed surface.

35. A portable toilet, as set forth in claim **1**, in which a cover ring is removably secured to said seat section, a seat and a lid swingably mounted from said cover ring.

36. A portable toilet, as set forth in claim **35**, in which a hinge section extends upwardly from said cover ring, a hinge pin slidably received in said hinge section, first hinge arms removably carried on said hinge pin, means securing a lid to said first hinge arms, and second hinge arms removably carried on said hinge pin, means securing a seat to said second hinge arms.

37. A portable toilet, as set forth in claim **36**, in which said hinge pin has opposed ends, said opposed ends extending beyond said hinge section, at least one set of hinge arms presenting cap collars, said cap collars mounted for swinging movement on the opposed ends of said hinge pin, the means securing at least one of the hinge arms presenting a cap collar to the member carried thereon being readily removable.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,801,991 Dated April 9, 1974

Inventor(s) Howard A. Fulton; Vaughn D. Flinner; Richard W. Sprang; and Dana D. Zody.

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

Column 2, line 8, "cabe" should read --can be--; line 29, "reverse" should read --reserve--; line 43, "portab;e" should read --portable--; line 58, after "cap" insert --and seal--.

Column 3, line 46, after "maintained" insert --in--.

Column 5, line 37, "the the" should read --to the--.

Column 6, line 58, after "recess" insert --76--.

Column 7, line 20, "-0" should read -- -- the --; line 61, "seat 6" should read --seat 106--.

Column 10, line 1, "durong" should read --during--; line 3, "oa" should read --of a--; line 29, after "fluid" insert --is--.

Column 11, line 65, "te" should read --the--.

Column 12, line 13, after "be" insert --a--; line 38, "claim" should read --clamp--.

Column 14, line 10, "ribs 45" should read --ribs 245--; line 36, "204M" should read --240M--.

Column 15, line 3, "165" should read --265--.

Column 17, line 21, (claim 22), after "replenish the" insert --flush--.

Signed and sealed this 5th day of November 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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