An improved utility transfer and stowage system for recreational vehicles and other passenger vehicles or the like, comprising a baffled toilet holding tank and respective permanently installed, self-supporting, telescopic drain line assembly, in which the latter is provided with the inherent flexibility to enable its transfer from a stowage to a drain position. The distal end of the above drain line is provided with a water tight plug-in coupling, for connecting to the park sewer receptor, and its upstream end is provided with a permanently installed water wash down jet; a bathtub and integral baffled holding tank, of which the latter is cross connected with the kitchen sink and lavatory drains through suitable piping and valves, thereby providing for the sanitary isolation and controlled diversion of the accumulated drains into either a catch bucket or into the above mentioned toilet holding tank drain line assembly as deemed appropriate; a baffled potable water holding tank and respective permanently installed, precoiled, self-supporting, potable water hose, in which the distal end of the latter is provided with a plug-in adapter coupling, for connecting to the park potable water valve; a precoiled self-supporting electrical entrance cable and a pair of hinged covered carrying tubes for retention of the above mentioned cable and water hose.

4 Claims, 13 Drawing Figures
RECREATIONAL VEHICLE UTILITY STOWAGE AND TRANSFER SYSTEM

PRIORITY CLAIM

I hereby claim the priority provided by my Disclosure Document No. 002350, filed June 17, 1970.

BACKGROUND OF INVENTION

This invention relates to an improvement of the utility system for recreational vehicles, passenger buses or the like.

The chief aim of the present invention is to provide for a more manageable, sanitary and safer utility stowage and transfer system.

SUMMARY AND OBJECTS OF INVENTION

A general object of the present invention is to provide an improved toilet holding tank and respective drain line; a sink and bathtub holding tank and respective drain lines; a potable water holding tank and respective self-supporting hose; a self-supporting electric entrance cable; and a pair of carrying tubes for the above mentioned cable and hose.

In known types of flexible toilet holding tank drain lines, they are, in the main, not entirely satisfactory due to their inherent encumbrance in connecting, disconnecting, draining, washing, handling and stowing. It is not uncommon to be confronted with the horrendous task of cleaning up the parking site after an accidental spillage caused by the retraction of the drain hose from non-secure connections at the holding tank or at the park sewer receptor when dumping the contents of the holding tank or when lifting the hose to drain out low pockets prior to disconnecting for travel, and further to encounter, the unsanitary and revolting job of disconnecting from the toilet holding tank, washing out and ultimately stowing the wet limb sewer drain hose into its remote carrying tube for travel, invariably resulting in contamination of yourself and your potable water hose.

It is an object of the present invention to eliminate the above mentioned filthy and degrading job, by providing a permanently installed toilet holding tank sewer drain line, supported within a hinged and swiveled series of telescopic tubes, to insure proper gravitational draining, combined with adequate flexibility to facilitate handling and stowing, and further, by providing for a water wash down jet permanently installed within the above mentioned toilet holding tank drain line.

It is another object of the present invention to eliminate the need for carrying an extra length of flexible sewer drain hose to reach the occasional distant park sewer receptor, and to reduce the number of hose fittings required to make connections to the varied park sewer receptors, and further to reduce the discomforting, time consuming job of changing the conventional type couplings. In the present invention, connecting and disconnecting to the varied park sewer receptors are facilitated by the use of a combination internal-external quick change coupling mounted to the distal end of the telescopic tubes. The internal portion of the quick change coupling readily permits interchange of the varied type sewer couplings. The external portion of the quick change coupling facilitates disengagement from the distal end of the telescopic tubes, thereby permitting withdrawal of the quick change coupling and the attached flexible drain hose to reach the occasional distant park sewer receptor, located beyond the normal extended range of the telescopic tubes. The above extended range also provides the flexibility required to connect with the occasional park sewer receptor, whose direct access is obstructed and further, to provide the necessary flexibility to connect with a sewer receptor located in the bottom of an anti-freeze box.

When the recreational vehicle park sewer receptors become nationally standardized a more self-contained modification of the above mentioned toilet holding tank drain line is provided for in this invention. In its present form the above modification can be plugged into all of the standard vertical sewer receptors. During the transition to standardization, certain interim modifications of the sewer couplings are also provided for in this invention.

The above mentioned toilet holding tank drain line assembly and the principal modification thereto, will transform a degrading, time consuming job into a relatively clean task as easy to plug in and out as the electrical entrance plug. The above mentioned telescopic drain line assemblies could be feasibly used on liquid carrying vehicles, transporting gasoline, milk and the like.

A further object of this invention is to reduce pollution of our recreational areas caused by the uncontrolled draining on our camp sites of seemingly harmless lavatory, kitchen sink and bathtub drains which are frequently contaminated with human refuse, introduced directly into the drain system or indirectly contaminated from residue deposited in the open cross-connected drain lines from previous occasions when dumping the toilet holding tank. The above unsanitary conditions are averted in the present invention by the installation of an independent lavatory, sink and bathtub drain holding tank, connected by suitable piping and valves to maintain a sanitary isolated storage and to control the diversion of the respective drain waters into either, a catch bucket for ultimate carrying to a designated disposal station, in parks where hook ups are not available or by diverting the drains through a stop and check valve into the toilet holding tank drain line where park hook ups are provided.

It is another object of the present invention to dispense with the need for washing, coiling, and tying the electric entrance cable and the potable water hose prior to stowing for travel. Washing the above disconnected cable and hose is necessary because the utility area is frequently wet and contaminated with human refuse. In the present invention the above undesirable task is eliminated by preforming a resilient electric cable and potable water hose into resilient helical coils having built-in memories biasing them into contracted states, or by encasing them in or building thereinto suitable plastic coated coil springs having sufficient tension to provide self-support above the ground level between the park utility receptors and the recreational vehicle. When released from the park utility receptors the above mentioned cable and hose will readily recoil into their respective carrying tubes for travel, and further, the distal end of the above mentioned water hose is provided with an adapter coupling, making the connection to the park water valve as easy to plug in and out as the above mentioned electrical entrance plug.
More generally, an object is to provide a tubular housing containing a spring biased helical conduit which will retract itself into its housing after being withdrawn therefrom and released.

A further object of this invention is to diminish the dangerous and damaging forces created by the free surface effect of a fluid in motion. This condition is very prevalent in partially filled potable water, toilet, and bathtub holding tanks where suitable baffle plates are non-existent, thus contributing to the upsetting moments of force as the recreation vehicle turns a corner, sways due to wind action, or uneven road surfaces. In addition, acceleration and deceleration of the vehicle creates similar forces which contribute to escalated wear of the vehicles power train and brakes, thereby causing premature repairs. In the present invention these safety hazards and undue wear are greatly reduced by the installation of longitudinal and transverse divisional baffles within the holding tanks.

Another object of this invention is to eliminate the extraneous fittings and rust frozen retainer nuts and studs on the inlet and outlet flanges to the toilet holding tank. In the present invention non-ferrous retainer rings with integral studs are embedded in the tank flanges thereby permitting the toilet and the holding tank drain valve to be connected directly to the tank surfaces, thus contributing to compactness and easy removal of the retaining nuts when effecting repairs.

It is another object of the present invention to conserve space and cost by fabricating the bathtub and its associated holding tank into an integral unit.

The foregoing objects, advantages, features and results of the present invention, together with various other objects, advantages, features and results thereof which will be evident to those skilled in the art to which the invention relates in the light of this disclosure, may be achieved with the exemplary embodiments of the invention illustrated in the accompanying drawings and described in detail hereinafter.

DESCRIPTION OF DRAWINGS

In the drawings:

FIG. 1 is a fragmentary side elevation view, of one form of a recreational vehicle, illustrating the improved electric, potable water, and toilet holding tank, transfer and trash storage facilities;

FIG. 2 is an enlarged fragmentary plan view, partly in section, taken as indicated along the angled arrows II—II of FIG. 1, illustrating a portion of the improved toilet holding tank drain assembly, sink and bathtub drain assembly, potable water holding tank, electric cable, and potable water hose assemblies;

FIG. 3 is an enlarged fragmentary view, partly in section, taken as indicated along the angled arrows III—III of FIG. 1, illustrating an improved toilet holding tank with the respective drain assembly, and the combination bathtub with the respective drain holding tank;

FIG. 4 is an enlarged fragmentary view, partly in section, taken as indicated along the angled arrows IV—IV of FIG. 3, illustrating the toilet holding tank baffle plates, embedded bolt rings and a portion of the water wash down jet;

FIG. 5 is an enlarged fragmentary view, partly in section, taken as indicated along the angled arrows V—V of FIG. 4, illustrating details of the water wash down jet;

FIG. 6 is an enlarged fragmentary view, partly in section, taken as indicated along the angled arrows VI—VI of FIG. 3, illustrating the bathtub holding tank baffle plates, drain trap and non-return valve;

FIG. 7 taken with FIG. 6, constitutes an end portion of the bathtub holding tank, illustrating the tank vent and access cover;

FIG. 8 is an enlarged fragmentary plan view, partly in section, taken as indicated along the angled arrows VIII—VIII of FIG. 1, illustrating the toilet holding tank drain hose, supporting telescopic tubes and the dual quick change coupling;

FIG. 9 is a fragmentary view in section, taken as indicated along the angled arrows IX—IX of FIG. 8, illustrating details of the dual quick change coupling and associated attachments;

FIG. 10 is a side elevational view, partly in section, illustrating the adapter coupling for the distal end of the potable water hose;

FIG. 11 is a fragmentary view, partly in section, corresponding to FIG. 3, illustrating a modification to the toilet holding tank drain along with the combination toilet and sink drain assembly;

FIG. 12 is a fragmentary view, partly in section, corresponding to a portion of FIG. 11, illustrating a modification to the terminal elbow of the telescopic tube assembly; and

FIG. 13 is an enlarged fragmentary view, in section, corresponding to FIG. 5, illustrating a modification to the water wash down jet.

DESCRIPTION OF EXEMPLARY EMBODIMENTS OF THE INVENTION

Referring to FIG. 1 of the drawings, the vehicle 1 is provided with a built-in locker 2, whose access door 3 is mounted flush and hinged at 4 to the exterior hull plating. The door 3 is provided with a resilient gasket 8 and a locking device 9. The contents of the locker 2 will be described hereinafter.

Toilet Holding Tank Drain Assembly

Housed within the previously mentioned locker 2 is the telescopic toilet holding tank drain hose 25, supported within the hinged and swiveled telescopic tube assembly T, and associated quick change couplings, to be described later. When the door 3 is in the open position the telescopic tubes T may be withdrawn from the spring retaining clips 11 and lowered from a stowage to a draining position on the affixed offset hinges 14, rotating downwardly about fulcra 15 (FIGS. 2 and 3), in turn supported by the rotatable swivel bracket 16, in turn secured to the swivel fulcrum 17, which in turn is secured to the swivel plate 18 and the latter in turn is secured as by screws 19 to the lower surface of the vehicle's floor boards 20. The trap door 5 is normally closed by the spring-biased hinge 6. The door 5 is mechanically urged into the open position as the telescopic tubes T are lowered, at first being urged by hose 25 and subsequently by the plastic lug 7, which is secured to the hinge 14 and the telescopic tube 21. The above arrangement facilitates handling, stowing and draining of the hose 25, by providing stowage for the telescopic tubes T, and the drain hose 25 without disconnecting from the vehicle 1, and further, to be wholly contained within the exterior hull plating for road travel or readily lowered into a draining position below the overhang of vehicle 1, thereby permitting horizontal rotation of the telescopic tube assembly T within a scope of 360° for
alignment with the varied park sewer receptors, and further providing a supported incline that will assure proper gravitational draining of the drain hose 25. Retracting and stowing of the telescopic tubes T, for road travel, automatically permit the trap door 5 to close against suitable stops 12, thence when door 3 is manually closed it will in turn overlap the door 5, and form an interlocking cover over the bottom of the locker 2, thus restoring the streamline characteristics to the exterior hull plating of the vehicle 1. The upstream end of the drain hose 25 is permanently secured by clamp 26 to the elbow 27 insuring a secure connection between the flexible hose 25 and the stationary elbow 27, however, the clamp 26 is readily removed to effect repairs to the toilet drain system. A lightening hole 24 in the vehicle frame 31 (FIG. 2) is utilized to effect passage of the hose 25.

Jet Assembly

Referring to the FIGS. 2, 3, 4 and 5, the water wash down jet assembly J is integral with elbow 27, comprising a jet orifice 35, and a centrally positioned diffuser ball 36, (as best seen in FIG. 5) which the latter in turn is secured to the removable strainer plate 37, which in turn is retained by the flanged nipple 38, the latter in turn is made water tight by the neoprene O-ring 39 and the threaded throat bushing 40. The water for the jet assembly J is supplied from the vehicles potable water piping system 45, (FIG. 1) through the cut out valve 46 located in locker 2. The potable water system is safeguarded from contamination by the anti-siphon valve 47, and the swing check valve 49 (FIG. 2) which are installed in the wash water pipe line 48 between the potable water cut out valve 46 and the water wash down jet assembly J. The activation of the jet assembly J is controlled by cut out valve 46 and should be preferably opened prior to dumping the contents of the toilet holding tank 31, by means of the reach rod 29 and cut out valve 30, thereby intensifying the flow of its contents and preventing a back surge into the jet assembly. After the contents of the tank 31 have been evacuated, the holding tank valve 30 should be closed, then subsequently the closing of the valve 46 will insure a clean and adequately drained hose 25, and in addition insure a fully charged potable water system prior to disconnecting from the park utilities.

The above arrangement of the toilet holding tank drain assembly and respective water wash down jet, precludes the need for disconnecting, handling, hand washing, and storing a wet limp hose in its remote carrying tube after each use as currently practiced.

Toilet Holding Tank Assembly

Referring now to FIGS. 3 and 4, the toilet holding tank 31 is rectangular in plan and is constructed of fiber glass or other suitable material. Integral with tank 31, is the reinforced lower outlet flange 55 and the upper reinforced inlet flange 56. Embedded within the above mentioned flanges are stainless steel or other suitable nonferrous type retaining rings 57, and integral studs 58, threaded on the distal ends, which facilitate securing of the dump valve 30 and the toilet 69 directly to the tank 31, which will eliminate extraneous fittings, provide compactness and facilitate removal of the stainless steel nuts 70 to effect repairs. There are certain type toilets that can be attached directly to the upper flange 56, however an adapter spool 63 is provided (FIG. 4) to accommodate those toilets with different base configurations. The tank 31 is further provided with a baffle plate assembly which comprises the vertical transverse and longitudinal baffle plates 65, which relate to a series of rectangular boxes diminishing in size which are open at the top and bottom and held an equal distance apart by webs 66. The inner bottom of tank 31 supports the feet 64 of the webs 66. The webs 66 in turn are secured to and support the baffle plates 65 in which in turn support the top of tank 31, the latter in turn supports the integral toilet mounting flange 56 and in turn supports the toilet 69 (FIG. 3) secured thereto. The lower core of the baffle plates 65 and webs 66 are pyramidal in configuration to permit dispersal of the larger solid wastes as the liquid level rises in the tank 31, thus preventing the total accumulation of waste being trapped in the central cell directly under the toilet discharge. The tops of the baffle plates 65 and the webs 66 are provided with grooves 67 to permit air equalization. The vent pipe 68 provides for gas escape and pressure equalization of tank 31. The configuration of the baffle plates 65 and the webs 66, facilitates draining of the solid wastes and reduces the upsetting moments of force created by the free surface effect of a fluid in motion.

Telescopc Tube Assembly

Referring now to FIGS. 1, 8 and 9, the telescopic tube assembly T comprises a series of tubes increasing in diameter to provide sufficient clearance between sections to receive the low friction stationary guide rings 73, the stationary stop rings 74 and the slidable guide rings 75. The rings 73 and 74 are secured to the inside of the tube 21 and the ring 75 is secured to the outside of tube 22. As the tube 22 is extended, the ring 75 is slidingly engaged with the tube 21 until terminated by striking against the stop ring 74. The overlapping distance, between rings 73 and 75 provide for the mutual support of their respective tubes. In the interest of brevity, identical stop and guide rings mentioned above are located between the tubes 22 and 23 but are not illustrated. Total retraction of the telescopic tubes 22 and 23 are prevented by the lug 7 and the handle 79 respectively.

A cylindrical cam plate 76 is secured to the distal end of the tube 23, and is provided with a helical groove 77 to receive the hose clamp housing 81, as will be described later. Integral with the cam plate 76 are the hinge brackets 78, provided to support the telescopic tube handle 79.

Quick Change Coupling Assembly

Referring now to FIGS. 8 and 9, the dual quick change coupling assembly C, comprises the coupling 82 of which the upstream portion 83 receives the distal end of the flexible drain hose 25, secured thereon by means of the hose clamp 80. The hose clamp worm gear housing 81 is inserted in the helical groove 77 of the cam plate 76 and is rotatably engaged by gripping the hand grip grooves 84 and the handle 79, to effect a semi-rigid connection between the coupling 82 and the telescopic tube 23. The semi-rigid connection permits limited flexibility to properly align the interchangeable couplings with the park sewer receptors to be described later. The dual quick change coupling assembly serves a two-fold function in that it provides an expeditious means to disengage the coupling 82 from...
the telescopic tube 23, for the purpose of withdrawing the drain hose 25, in order to reach the occasional distant park sewer receptor located beyond the normal extended range of the telescopic tubes, or when additional flexibility is required to connect to the occasional obstructed, or to the deep set sewer receptor located in the bottom of an antifreeze box. The above mentioned extended range is achieved by the utilization of a close-wound tension type sewer drain hose, in which the extended length is equivalent to two lengths of the more common open-wound compression type sewer hose. The self-retracting feature of the close-wound drain hose readily permits retraction into the telescopic tubes when released from the sewer receptor.

The other function of the dual quick change coupling 82 is to provide a means for receiving the interchangeable couplings 85, 86 and 87 and further to provide a water tight coupling seal. As seen in FIGS. 8 and 9 the coupling 85 is engaged to the dual coupling 82, and the straight couplings 86 and 87 are stowed in locker 2 of FIG. 1. The coupling 82 is further provided with the internal segmented threads 88 and the O-ring 90. The interchangeable couplings 85, 86 and 87 are provided with external segmented threads 89 and when rotatably engaged against the threads 88, a water tight seal will be effected between the coupling 82, the O-ring 90 and the above mentioned interchangeable couplings 85, 86 and 87.

The couplings 85 and 86 are constructed of ABS plastic or other suitable material, and secured therein, are the tapered neoprene stopper rings 91 or other suitable resilient material, and when forced into the park sewer receptor, a substantial degree of water tight integrity is created. The coupling 87 is constructed of brass or other non-ferrous metals, in order to resist damage to the standard tapered pipe threads 92. The coupling 87 will provide a water tight seal when engaged with like standard threads of the park sewer receptors; however, in view of the varied sizes and damaged threads encountered in many parks, the threaded coupling 87 is not always satisfactory. The coupling 86 is the least preferable, however, there are a few non-threaded horizontal park sewer receptors that will require the above type coupling for some undetermined future.

The coupling 85 is the most preferred type in view of its quick plug in and out connection to the park sewer receptor, the anti-retraction feature, the water tightness and the close proximity to the grade level thereby providing a maximum drainage slope and accessibility to the preferred vertical sewer receptor, which has been approved by the State of California.

The terminal cap 97 (FIGS. 1 and 9) is provided with a neoprene O-ring 98 to effect a drip and odor proof seal when engaged to the distal end of the interchange coupling. The cap 97 is secured to the telescopic tube handle 79, by the lanyard 99.

The coupling 87 is further provided with an annular lip 95 to receive the above mentioned terminal cap 97.

Sink and Bath Drain Holding Tank Assembly

Referring now to FIGS. 3 and 6, the sink and bath drain holding tank, comprises a main drain line 124 common to the holding tank drain line 121, lavatory sink drain line 122 and the kitchen sink drain line 123. When the vehicle is parked the cross connection valve 125 is manually opened by reach rod 126, permitting free communication between the lavatory drains with the holding tank drains. The valve 125 is secured while traveling to isolate the holding tank 106 to prevent possible surging of the drain water into the sink and lavatory.

It appears feasible to install vertical non-return valves in the drain lines 122 and 123, to prevent back surging in lieu of the manual cut out valve 125.

The reach rods 29 and 126 previously mentioned are protected from damage by the vehicle bumper 32 and could be enclosed to prevent unauthorized use.

When the vehicle is hooked up to a park sewer receptor, the accumulated sink and bath drains may be diverted into the toilet holding tank drain line 25 through cut out valve 130 which is operated by reach rod 131 located in locker 2 (see also FIG. 1) thence through the horizontal swing check valve 132, in turn through nipple 133, thence discharging into the elbow 27 of the toilet holding tank drain line assembly, as previously described.

When the vehicle is parked at a campsite in which sewer hookups are not available, the accumulated drains may be diverted through the drain valve 135 thereby controlling the flow of the drain water into a
catch bucket for ultimate carrying to a designated disposal station. The terminal cap 136 is secured to the valve 135 when not in use to prevent unauthorized draining.

**Potable Water Holding Tank Assembly**

Referring now to FIG. 2, the potable water holding tank 140 is rectangular in plan and comprises an identical baffle plate system with commensurate safety features as previously described for the sink and bath drain holding tank 106. The exterior plating of the tank 140 is provided with the conventional filling and discharge pipe connections.

**Electrical and Potable Water Transfer Assembly**

Referring now to FIGS. 1 and 2, the inboard ends of the electric entrance cable and the potable water hose 145 and 146 respectively are secured to the vehicle frame 31 as by clamps (not shown) to prevent total withdrawal from their respective carrying tubes 147 and 148. The cable 145 and hose 146 are resilient and preformed into helical coils which inherently bias themselves into contracted states. The above arrangement provides a self-storing feature, facilitating withdrawal and self-recoil into their respective carrying tubes. The carrying tube cover doors 149 and 150 are hinged at 151 and 152 respectively. The recesses 143 are provided in the bottom overhang of the tubes 147 and 148 to receive the cable 145 and hose 146 after a sufficient length has been withdrawn to reach the park electric and water receptors. The doors 149 and 150 are then closed and locked to retain the unused coils within the carrying tubes, which are not required for that particular hookup. The above locking arrangement provides an adjustable means to maintain adequate tension on the cable and hose to permit self-support above the contaminated ground level. A lanyard may be required to secure the electrical plug of the cable 145 to some of the older type park receptors.

Referring now to FIG. 10, the adapter 154 provides a means to facilitate connecting and disconnecting the quick change coupling 144 attached to the distal end of the hose 146 to the conventional park garden hose valve.

The adapter 154 comprises a standard garden type threaded female coupling 155, a hose gasket 156 and the male portion 157 of the standard quick change coupling. The adapter 154 is further provided with finger tightening spokes 158 to facilitate tightening the adapter to the park water valve. The adapter is further provided with a retaining ring 159 which in turn is secured to the hose 146 by lanyard 160 to prevent loss. The above adapter will be required until national standardization of the park water valves are provided with the male portion of the quick change coupling. The conventional precoiled nylon air hose 146 and its attached quick change coupling 144 are readily adaptable for use as a recreational vehicle water hose, in addition the female portion of the quick change coupling serves as a non-return check valve to retain the water pressure in the vehicles potable water system when disconnected from the male portion of the adapter 154.

The foregoing electrical and water transfer assembly eliminates the need to disconnect the water hose from the vehicle water system, and further to preclude the need to wash, tie and stow the cable and hose in a conventional locker, amid other entangled paraphernalia, thus transforming a dirty discomforting job into a clean expeditious task.

**Modified Toilet Holding Tank Drain Assembly**

FIG. 11 illustrates a modified telescopic toilet holding tank drain assembly constructed of ABS plastic or other suitable material. The components having their counterparts in the first embodiment of the invention are identified by the same reference numerals and only those features requiring a change of parts are identified by new reference numerals of the "200" series. The principal change is in the water tight structure of the telescopic tubes and their supporting vertical and horizontal rotatable elbows, which provide the required flexibility for alignment with the park receptor, and further provides for the proper gravitational draining and stowage for traveling in a like manner described in the first embodiment of the invention. The telescopic tube assembly 7, comprises an elbow 200 with an integral handle 201. The elbow 200 is secured to the distal end of the telescopic tube 202, which the latter in turn is slidably engaged within the telescopic tube 203, the latter in turn is slidably engaged within the supporting tube 204. The water tight integrity is achieved between the telescopic tubes by the means of a slidingly engaged neoprene stop and guide ring 206 which is secured in an annular recess 205 on the upstream end of the telescopic tube 203. The ring 206 is provided with a conical inlet 209, to minimize the restriction of flow, and to prevent the accumulation of waste particles. The ring 206 fits snugly against the inner wall of tube 204 and in conjunction with the peripheral grooves 207 and the lands 208 provide a water tight means, permitting the extension and retraction of the tube 203 within the tube 204. A threaded terminal bushing 210 is secured to the distal end of the tube 204. The bushing 210 is further provided with integral stop and guide rings 211 and 214. The extension of tube 203 is terminated when the stop and guide ring 206 strikes the stationary stop and guide ring 214, thereby providing suitable overlap between the tubes 203 and 204 for mutual support. The threaded end portion of ring 210 receives the hand tightened ring nut 212, which in turn is provided with an O-ring 213, which the latter in turn is seated against the stop and guide ring 211. An annular recess 215 is provided between the stop and guide ring 214 and 214 to reduce frictional contact with the slidably engaged tube 203. The hand tightened ring nut 212 is tightened when the tube 203 has been extended to the desired length thus insuring maximum water tight integrity from any small quantity of water that may have leaked past the stop and guide ring 206. The stop and guide rings 206, 211 and 214 further provide support and concentric guidance for the tube 203.

An identical water tight sealing assembly as described above is installed between the telescopic tubes 202 and 203, but are not described or illustrated in the interest of brevity. If and when the standardization of the park sewer inlets become more exacting, only one telescopic section may be required in lieu of the two sections mentioned above.

The supporting tube 204 is secured to the threaded end of the elbow 220 and made water tight by O-ring 221 or other suitable gasket material. The elbow 220 is rotatably engaged to nipple 223 and secured thereto by the retaining bolt 224. The distal end of the bolt 224
rotates within the annular groove 225 of the nipple 223. A water tight seal is provided between the rotatable elbow 220 and the fixed nipple 223 by the means of a pair of O-rings 227, thus permitting the elbow 220 and the attached telescopic tube assembly, to rotate horizontally about the fulcrum nipple 223, for appropriate alignment with the park receptor. The nipple 223 is secured to the elbow 230, which in turn is secured to the nipple 231 (partially shown) in an identical manner as previously described for the rotatable end of the elbow 220. The vertical rotation of elbow 230 about its fulcrum nipple 231, enables the telescopic tube assembly to be transited from the draining to the stowage position as previously described in the first embodiment of this invention. The nipple 231 is secured to the elbow 232 which in turn is secured to the nipple 233 which the later in turn is supported by bracket 234. The bracket 234 should be secured to nipple 231, however for purposes of clarity it is attached to the nipple 233. The bracket 234 is secured to the vehicle frame 31. The nipple 232 is secured to the elbow 27, which in turn houses the water wash down jet assembly J as previously described in the first embodiment of this invention.

The above arrangement facilitates handling, connecting, disconnecting, draining, washing and stowing of the toilet holding tank drain transfer assembly, in addition it further provides for adequate water tight integrity, supported drain incline and the flexibility required to achieve its prescribed function. In the event that future standardization may require the recreational vehicle toilet drain line to be threadedly engaged to a park receptor, comprising a 90° elbow, connected to a vertical sewer stand pipe, the necessary provisions have been made in this invention to modify the terminal coupling as provided for in FIG. 12, comprising a threaded ball socket 233, secured to the distal end of the telescopic tube 202. The hand tightening nut 234, is threadedly engaged to the ball socket 233. An O-ring 235 is secured within an annular recess in the ball socket 233, to effect water tight integrity between the socket and the ball 236 when compressed by the ring nut 234. Integral with the hollow ball 236 is a hollow shaft 237, the latter in turn is externally provided with the hand tightening grooves 238 and standard pipe threads 239 for engagement to the park threaded elbow receptor.

In the event that standardization should turn toward a vertical park sewer receptor, requiring a threaded connection, the elbow 200, previously described, could be mutually modified to receive the above mentioned ball socket 233, in order to vertically orient the axis of the ball shaft 237 for engagement of its threaded end portion 239 to the vertical park sewer receptor.

Modified Jet Assembly

FIG. 13 illustrates a modified water wash down jet assembly. The components having their counterparts in the first described embodiment of the invention are identified by the same reference numerals and only those features requiring a change of parts are identified by new numerals of the "300" series. The principal change is that the combination jet and non-return valve 301, is a substitution for the swing check valve 49, the diffuser ball 36 and the strainer plate 37. The valve 301 is shown in the open position, as caused by the exertion of the wash-water pressure. The valve 301 is provided with the tangential orifices 302 and a diffuser cone 303 which impart a whirling motion to the water wash spray cone. The valve 301 is slidably engaged with the valve body 304, which has a conical outlet that provides a seat for the diffuser cone 303. When the potable water cut off valve 46 is secured, the valve 301, will be automatically urged into a closed position by the coil spring 305, thus preventing the entry of waste particles into the jet orifices 302.

Although two exemplary embodiments and modifications of the invention have been disclosed herein for purposes of illustration, it will be understood that various other changes, modifications and substitutions may be incorporated without departing from the spirit of the invention as defined by the claims which follow.

1. A tank draining system, the combination of:
   a. a tank having a drain;
   b. telescoping conduit means;
   c. swivel means mounting said conduit means for swiveling movement relative to said drain;
   d. said swivel means including a swivel plate fixed relative to said tank, and a swivel bracket pivotally connected to said swivel plate for pivotal movement about a vertical axis;
   e. said swivel means further including hinge means fixedly connected to said conduit means and pivotally connected to said swivel bracket for pivotal movement about a horizontal axis perpendicular to and intersecting said vertical axis; and
   f. an extensible and contractible hose in said conduit means and connected at one end to said drain.

2. A tank draining system according to claim 1 including means for injecting a flushing liquid into said drain.

3. In a tank draining system, the combination of:
   a. a tank having a drain;
   b. telescoping conduit means connected to said drain;
   c. swivel means mounting said telescoping conduit means for swiveling movement relative to said drain;
   d. an extensible and self-contractible helical hose within said telescoping conduit means;
   e. said hose being connected at one end to said drain;
   f. said hose having connected to its other end a fitting detachably connected to the outer end of said telescoping conduit means, whereby said fitting may be detached from said telescoping conduit means to permit extension of said hose and withdrawal of said hose from said conduit means; and
   g. said hose embodying self-contracting means biasing it into said telescoping conduit means, whereby said hose will retract itself into said telescoping conduit means upon being withdrawn therefrom and released.

4. A tank draining system according to claim 3 including means for injecting a flushing liquid into said drain.