Dec. 6, 1955 A. COLONNA 2,725,575

FOLDING WATER CLOSET

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Fig. 1

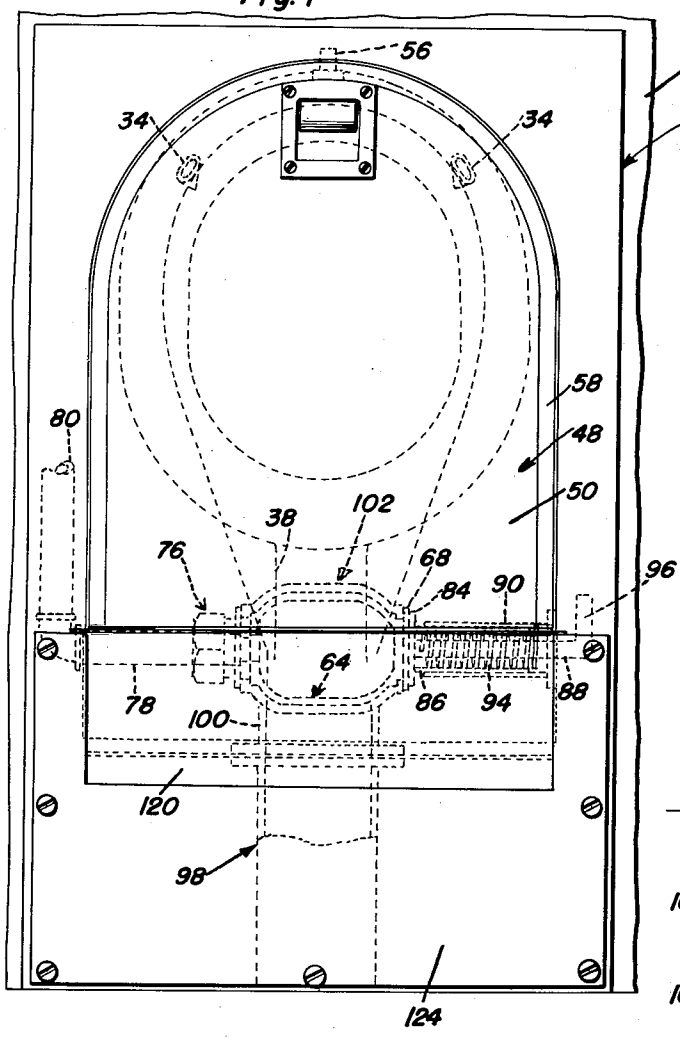


Fig. 5

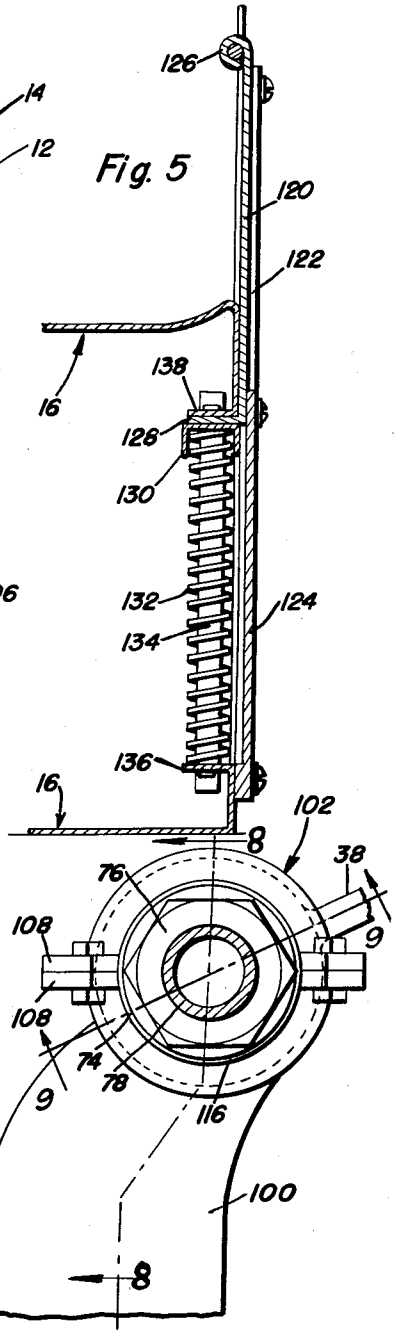


Fig. 7

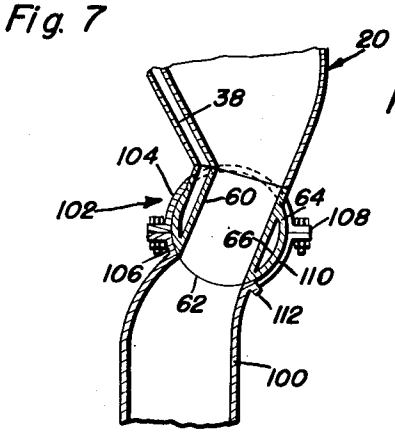


Fig. 6

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FOLDING WATER CLOSET

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Fig. 2

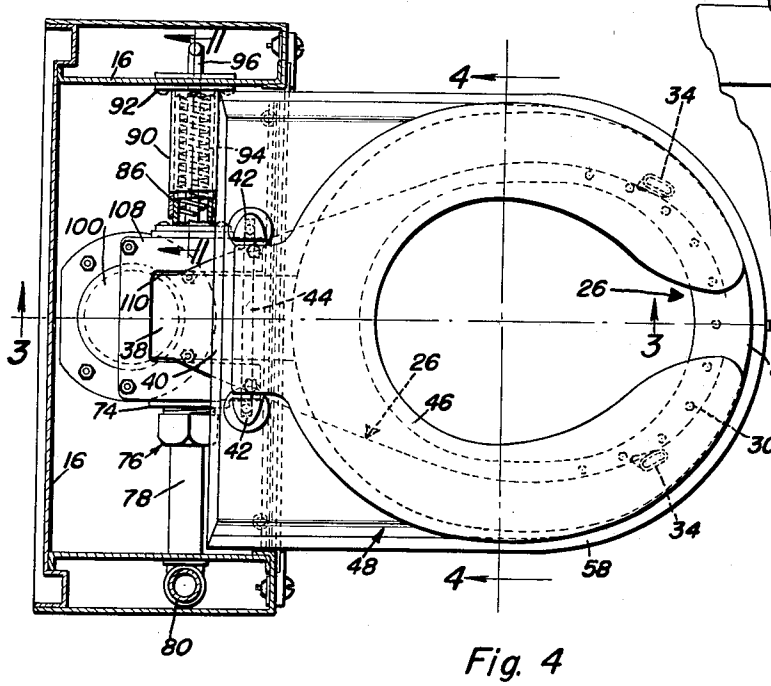


Fig. 10

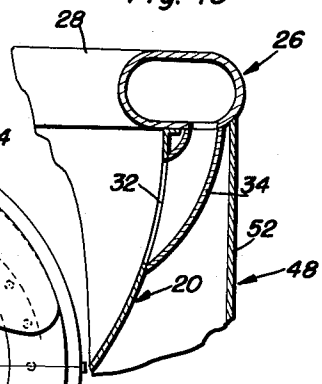
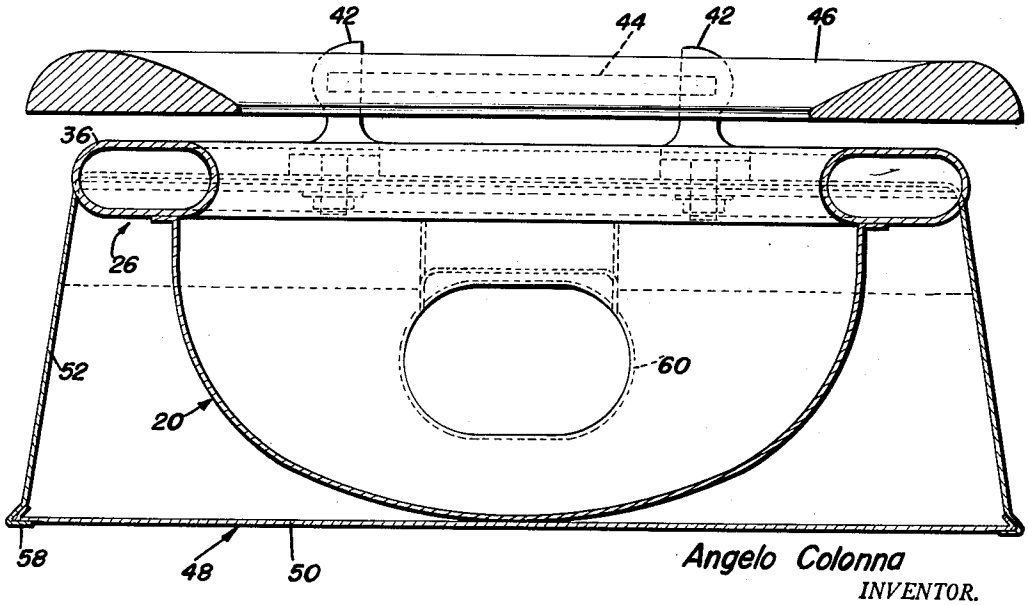


Fig. 4



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Fig. 8

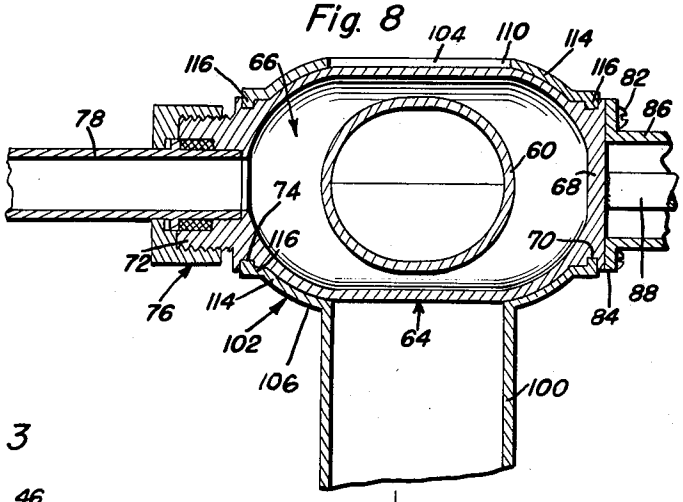


Fig. 3

Fig. 11

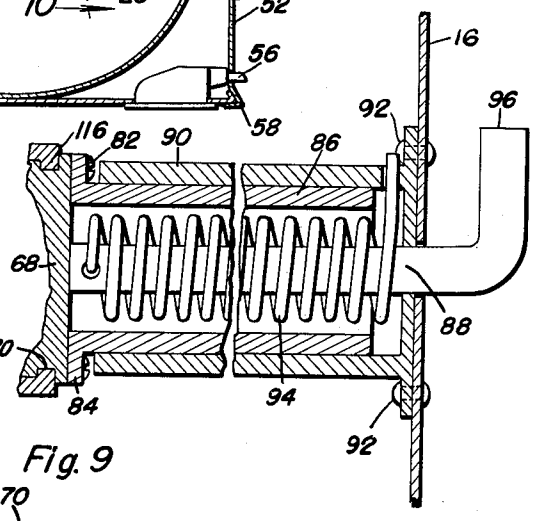
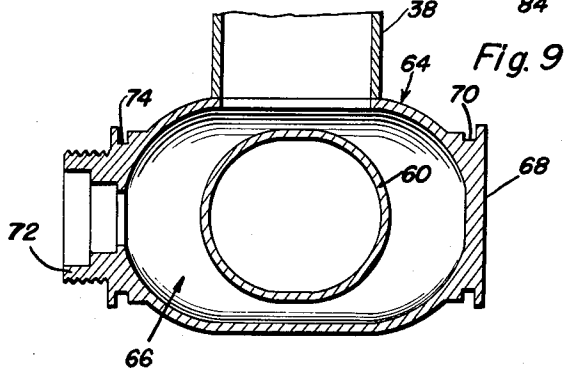


Fig. 9



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FOLDING WATER CLOSET

Angelo Colonna, Philadelphia, Pa.

Application October 30, 1952, Serial No. 317,748

6 Claims. (Cl. 4—76)

The present invention relates to certain new and useful improvements in flush-type water closets which are expressly adapted to be used in wash rooms and similar quarters of limited size on railway cars, airplanes, boats, submarines and similar conveyances and has more particular reference to a hingedly mounted toilet bowl or hopper of a so-called folding construction, that is, a structural adaptation wherein the bowl, when it is not in use, is swung up and into a storage and protective compartment provided therefor in a wall cabinet.

It is a matter of common knowledge to those skilled in the art to which the invention relates that many and varied styles, forms and constructions in the folding water closet field are old and well known. The purpose, generally speaking, of foldaway toilets is to provide practical and reliable toilet facilities of a compact and convenient character where the installation space therefor is, admittedly, quite limited. It is old in the art to provide a pivotally mounted toilet bowl and associated seat ring therefor, wherein the seat and bowl, as an assembly, fold into a storage compartment provided therefor in a cabinet when not in use. It is also recognized that constructions in this line of endeavor have been devised, so that when the bowl is folded up and into an out-of-the-way position, the fluid and fecal matter trapped in the bowl may be dumped into a relatively stationary waste or soil pipe for disposition, means being commonly employed to forcibly flush the bowl automatically or otherwise as it swings into its storage compartment.

In carrying out the principles of the instant invention and with a view toward structurally, functionally and otherwise improving upon similarly constructed and performing prior art adaptations, it is an objective here to utilize several or more distinctive improvements which are believed to be significant and advantageous compared to known prior art constructions. To this end, one achievement has to do with a health and sanitation promotion purpose, wherein a predetermined limited amount of clear water is doused into the bottom of the bowl as the latter is swung down to its horizontal useful position, the water which is thus spilled into the bowl providing a pool, the presence of which greatly aids in effectively scavenging the bowl when the latter is in its "up" or dumping position and is about to be further cleansed with flush water acting under suitable pressure.

Another object of the invention has to do with unique and practical means whereby the discharge end of the toilet bowl is communicatively and otherwise operatively connected to the upper intake end of a fixed vertical soil or waste pipe extending into the compartment of the cabinet. The means employed is in the form of a hinging joint between the bowl and soil pipe, and said joint includes a funnelling and drainage neck which is carried by and forms a part of the bowl and also is included in the hinge joint construction, so that said neck, when the bowl is folded up and out of the way, registers with and dumps the fluids and fecal matter into the soil pipe and, what is more important, takes a position at right angles

to the soil pipe when it then functions as a closed valve and effectively prevents communication between the bowl and soil pipe, whereby to effectually prevent odors and gases from flowing into the bowl while the latter is in use.

A still further object of the invention has to do with a spring-balance and bowl stabilizing adaptation which is included in the over-all pivoting or hinging means and which assists in raising the bowl to its upward position so that it may be conveniently folded into the compartment of the cabinet and positively latched in its closed position, the bowl including a pan-like enclosure which functions as a closing panel for the open front of the cabinet compartment.

In addition to the above, novelty is predicated on the adoption and use of a spring-biased vertically liftable and lowerable plate, which constitutes a draft and dust shield, which is mounted in and forms a part of the lower portion of the cabinet and which cooperates with the bottom of the stated pan, especially when the bowl is down and in use, and to thus afford the user protection against dampness and cold drafty currents of air which would otherwise circulate in and around the bottom of the bowl.

Considered more from a purely structural point of view, the contribution to the art herein under consideration appertains to a foldaway toilet for use on railway cars, boats, conveyances and the like comprising, in combination, a fixed vertical soil pipe whose upper end provides an intake for fecal matter, a folding commode bowl which is horizontal when in use and vertical when not in use, and means hingedly joining the fecal matter discharge end of said bowl to the intake end of said soil pipe, said means embodying a valve which is open when said bowl is in its vertical contents emptying position and is closed when said bowl is in its horizontal usable position, whereby to thus check and cut off the flow of foul gases and obnoxious odors from the soil pipe to the bowl when the latter is in use.

Additionally, novelty has to do with the aforementioned construction characterized by a valve including a reduced discharge neck which axially aligns itself with the soil pipe when the valve is open and takes a right angular position disaligned in respect to said soil pipe when the valve is closed.

More explicitly, the invention at hand is characterized by a projectible and retractible folding toilet for use in confined quarters on railway cars, boats, and similar conveyances which comprises, in combination, a stationary cabinet having a bowl receiving compartment, a fixed soil pipe having a fecal matter intake end which extends into the compartment, said intake end having a hollow head providing a valve casing, the latter having an arcuate slot, a commode bowl adapted to fold upwardly to a vertical out-of-the-way position in said compartment when not in use and adapted to swing downwardly and out of the compartment to a horizontal position when being used, said bowl having a flush water receiving, circulating and distributing rim around its top portion and having a reduced fluid and fecal matter funnelling and disposal neck at its discharge end operable in said arcuate slot, means connected with and hingedly joining said neck to said valve casing, the discharge end of said neck being in the form of a valve and being axially alignable and communicable with said soil pipe when said bowl is swung upwardly and into said compartment and being closed by a cooperating wall of said valve casing when said bowl is down and in use, whereby said bowl is then out of communication with said soil pipe.

Furthermore, novelty is thought to reside in the structural adaptations above comprehended particularly wherein the forward half-portion of the flushing rim is provided with water jets while the rear half-portion is wholly imperforate, whereby the latter half-portion is

permitted to serve as a reservoir for clear water which is trapped therein during the flushing stage and which is later used to be gravity-spilled into the bowl to provide the aforementioned bowl-scavenging and drainage assisting pool.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a front elevationa of a folding water closet or toilet bowl construction devised in accordance with the invention and showing the bowl in its folded out-of-the-way position and showing other parts in phantom lines;

Figure 2 is a top view showing the bowl in its extended ready-to-use position, which view may be said to be taken on the horizontal line 2—2 of Figure 3 looking in the direction of the arrows;

Figure 3 is a central vertical sectional view taken on the plane of the line 3—3 of Figure 2 looking in the direction of the arrows;

Figure 4 is an enlarged cross-section, with parts omitted, taken on the transverse line 4—4 of Figure 2 looking in the direction of the arrows;

Figure 5 is a fragmentary sectional view showing the details of construction employed in the spring-biased draft and dust intercepting plate or shield;

Figure 6 is a detail view essentially in elevation showing the hinging and valving means on the upper intake end of the vertical soil pipe;

Figure 7 is a detail sectional view illustrating the manner in which the funnelling neck or valve at the discharge end of the bowl registers with the intake end of the soil pipe when the bowl is in its up or folded position;

Figure 8 is an enlarged sectional view taken approximately on the plane of the irregular line 8—8 of Figure 6 looking in the direction of the arrows;

Figure 9 is a sectional detail taken approximately on line 9—9 of Figure 6, with certain of the parts omitted;

Figure 10 is an enlarged fragmentary section taken approximately on the line 10—10 of Figure 3 looking in the direction of the arrows; and

Figure 11 is an enlarged detail view taken on the line 11—11 of Figure 2.

By way of introduction to the detail description it is to be pointed out that the essential parts will be constructed of suitable sheet material, for example, stainless steel. The minor parts will be made of appropriate material. It is further to be pointed out that matters of exact shape, size and proportions are not too important, as will be understood. That is to say, the novelty in the instant presentation has to do with the structural adaptations and objectives set forth in the preliminary portion of the description and, more particularly, explicitly covered in the subjoined claims. The cabinet, for example, is of any appropriate size and shape and it is here denoted, in a general way, by the numeral 12. It is, of course, to be mounted in a wall or other support 14 as shown in Figures 1 and 3. In front elevation the cabinet may be said to be of general rectangular form and, as shown in Figure 3, the upper storage portion is of rectangular box-like construction and denoted by the numeral 16 and this is shaped up to provide a compartment or space 18 into which the toilet bowl or hopper 20 folds when not in use. The open front portion is denoted at 22. In the upper part there is a seat or suitable keeper 24 which serves in a manner to be hereinafter described. The bowl is of suitable material and shape and is provided at its open top with an encircling endless flush rim 26. The forward half-portion 28 of this rim is provided with a plurality of orifices

or jet ports 30. This same area has suitable slits 32 in the wall of the bowl which are fed by appropriate ducts 34 (see Figure 10) in an obvious manner. The rear half-portion of the rim is wholly imperforate and this is denoted by the numeral 36 in Figure 3. At the center of the rear there is a flat flush water delivery tube 38 to be more specifically described. Also attached to the rim is a suitable shelf-like flange 40 having appropriate fixtures or brackets 42 to accommodate a hinge pin 44 which serves to mount and hingedly attach the customary seat ring 46. This is provided with appropriate bumpers or rubber pads 47 to rest on the flushing rim in the manner shown in Figure 3. The major body portions of the bowl are housed in a pan-like member which is denoted by the numeral 48 and which has a flat bottom 50 and appropriate encircling marginal wall portions 52 at the front in Figure 3 and 54 at the back. The numeral 56 designates a spring-pressed latch which engages in the keeper 24 in Figure 3 to hold the bowl in its up out-of-the-way position as shown in Figure 1. In this position the flat bottom constitutes a closing door or panel for the opening 22. The seam 58 joining the wall portions 50, 52 and 54 provides an effective seal around the marginal edge portion of the opening 22. At the restricted discharge or rear end of the bowl there is an integral substantially cylindrical fecal matter outlet or pouring neck 60. The end of the neck at the right in Figure 3 communicates with the bowl proper while the opposite open end forms a valve 62 (Figures 3 and 7) in a manner to be described. This neck is actually formed with and becomes an integral part of an enclosing inner hollow head or manifold 64 of the shape best shown in Figures 8 and 9. This head may be said to be generally bulbous-shaped although it may be cylindrical or substantially spherical if preferred. While considering Figure 8 it is to be noted that there is a water by-passing or circulating space 66 around the neck and one end of the head is closed as at 68 and is provided with an external groove 70 (see Figure 9). This grooved end is also fashioned to form a sort of a journal. The screw-threaded neck or coupling 72 at the opposite end forms another journal and it too has an encircling groove 74. The aforementioned flush water delivery tube 38 is communicatively joined with space 66 of the manifold-like head 64. Projecting into the coupling or neck 72 and joined by a fluid-tight stuffing box 76 is the fixed horizontal branch 78 of the flush water supply line 80 (Figure 2). Secured at 82 by way of an attaching flange 84 to the closed end 68 is a tubular member forming a journal 86. Also, at the center of this and rigidly secured therein is a rod or shaft member 88 (see Figures 1, 8 and 11). Also, as shown in full lines in Figures 2 and 11 and in dotted lines in Figure 1, there is a stationary bearing sleeve 90 rigidly fastened in place at 92. The tubular journal 86 fits telescopically and rotatably into the fixed bearing sleeve 90 and provides a part of a hinge assembly to be more fully described. In this connection attention is called to a coil spring 94 which is suitably anchored to the cooperating parts whereby to provide not only bearing and hinging means but also spring-balance means which serves to lift the bowl and its components from a "down" to an "up" position. If desired, the laterally directed end 96 of the spring-accommating rod 88 may be laterally bent and employed as a trip for a flush valve construction (not shown). In connection with the flush valve it is believed that for the most part this will be located elsewhere at a distant point and will be automatically controlled in some well known manner. The flush valve and actuating means therefore provide no part of the instant invention.

The spring assembly and bearing means just described forms a part support for the hollow head 64 and bowl and the fixed branch pipe 78 forms a complemental support, the parts 78 and 86 being in axial alignment with

each other as well as with said head **64** and complemental expedients.

Attention is now directed to the soil pipe or disposal conduit which is fixed and vertically disposed and generally denoted by the numeral **98**. The upper end of this is communicatively connected with the compartment in the cabinet where a suitable elbow **100**, a complement of said conduit, is provided with a sectional hollow head **102**. This is made up of upper and lower complemental sections **104** and **106** joined by flange means **108** with the flange means properly bolted together (Figures 6 and 7). This outer head **102** encloses the inner head **64** and the two heads thus cooperating in the manner shown in Figure 8 provide a combination valving and hinging joint for the toilet bowl. There is a central arcuate slot **110** in the outer head **102** through which the neck **60** operates in an obvious manner and there is a stop flange or lip **112** (see Figure 7) at the bottom of the slot which serves as a stop for the downward or descending movement of the bowl. The respective end portions **114—114** of the outer head form bearings for the journal-like cooperating ends of the inner hollow head and the flanges **116—116** fit into the grooves **74** and **70** to effect a proper jointing relationship of the parts. As before stated the open end **62** of the neck **60** functions as a valve and, therefore, the adjacent wall portion of the outer hollow head **102** functions as a valve casing and therefore these coacting heads **64** and **102** and neck **60** provide the desired hinging joint and valving action.

Through the medium of this hinge jointing and valving coaction between the funnelling and discharge neck of the bowl and headed intake end of the soil pipe an unusually effective cooperation of parts is had. That is to say, when the bowl is up in its dumping position, as shown for example in Figure 7, the open end **62** of the neck **60** communicates or registers with the soil pipe **100** and whatever is in the bowl at the time is dumped or poured into the soil pipe. On the other hand, when the bowl is out and down in its horizontal useful position as shown in Figures 2 and 3, the open end **62** of the neck is closed by the wall portion of the head means or valve casing **102** and at this time communication between the soil pipe and bowl is cut off. This means therefore that by shutting off communication foul gases and odors are prevented from coming up through the soil pipe and flowing into the bowl.

As before stated, an equally important accomplishment in addition to the supplemental hinging means shown in Figure 8 is in reference to the feature wherein the flush water is delivered by the filler or supply pipe **78** into the space **66** in the inner head so that it bypasses the neck **60** and flows on into the flush rim **26** by way of the delivery tube **38** (Figure 3). This is accomplished when the bowl is folded upwardly into its out-of-way position. That is to say, as soon as the bowl is pushed into the compartment in the cabinet the flush valve means (not detailed) is operated and the flush water flushes around the rim **36** and empties into the bowl by way of the orifices **30** and **32**. It will be evident, however, that not all of the water goes into the flush rim and when the flush valve is cut off a certain amount of this clear water is trapped in the space **66**, tube **38** and the imperforate portions **36** of the flush rim. It follows that this reserve supply of clear water is ready to come into play when the bowl is swung down from its vertical to its horizontal position. When the bowl reaches the horizontal position the trapped water in the portion **36** of the flush rim then flows into the forward half-portion **28** of the flush rim and spills downwardly through the ports **30**, passages **34** and slits **32** into the bottom of the bowl where a limited water pool (not shown) is then had. This pool is a boon to proper drainage and conditions of sanitation and health, a feature not found, it is believed in any similarly constructed or performing foldaway water closet construction.

The other feature to be covered has to do with the structure seen best in Figure 5 in combination with Figure 3 and this is the automatic spring-returned or spring-biased closing and dust intercepting shield. This takes the form of a flat plate **120** slidably mounted in track means **122** provided in part by the detachable front panel **124** at the bottom of the cabinet construction. There is a rolled bead **126** at the top which contacts with and effectively cooperates with the flat bottom of the pan **48** when the device is as shown in Figure 3. It is evident, therefore, that this shield thus provides a satisfactory dust and draft interceptor. The lower end of the shield has a flange **128** carrying a channel-shaped clip **130** cooperating with the upper end of a coil spring **132** mounted on a guide rod **134**. The lower end of the rod is mounted in a support flange **136** and the upper end in a similar fixed ear or flange **138**. This provides automatically operating spring-biasing means which acts on the shield so that it is an automatic follower plate. That is to say, it stays in contact with the bottom of the pan **48** when the pan is down and then follows the pan and bowl when it is swung up to closed position as shown in Figure 1.

From the foregoing the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A projectible and retractible folding toilet for use in confined quarters on a railway car, boat or similar conveyance comprising, in combination, a stationary cabinet having a bowl receiving compartment, a fixed soil pipe having a fecal matter intake end situated in said compartment, said intake end having an enlarged hollow outer head open at opposite ends and fashioned at said ends into axially aligned bearings and formed between said ends with an arcuate slot, a commode bowl adapted to be swung up and into said compartment to assume a vertical out-of-the-way position in said compartment when not in use, said bowl having a hollow flush rim encircling the top of the bowl, the forward underneath side only of the rim having flush water discharging orifices leading to said bowl, the rear portion of said rim being imperforate and provided with a flush water delivery tube, a hollow bulbous-shaped water trapping inner head conformable in shape with said outer head and substantially confined for oscillation in said outer head, said inner head having end portions journaled in said bearings and having a water inlet with an associated stuffing box at one end, the opposite end of said inner head being closed, said delivery tube being joined with and communicable with the space in said inner head, said bowl being provided at its discharge end with a reduced bowl emptying neck, said neck being integrated with the central portion of said inner head, the intake end of said neck being confined and operable in said slot and the discharge end opening through the adjacent side of the inner head but being covered and thus closed when opposed to an adjacent wall portion of said outer head and being registrable with said soil pipe when said bowl is in its vertical emptying position in said compartment.

2. The structure of claim 1, and the combination therewith of a flush water supply pipe fixedly supported and having its delivery end communicable with said water inlet.

3. The structure defined in claim 2, and a tubular journal fixed to and extending beyond the closed end of

said jacket, said journal being axially aligned with said supply pipe, a stationary bearing sleeve, said journal being journaled for oscillation in said sleeve.

4. The structure defined in claim 3, in combination with a relatively fixed shaft telescoping into said tubular journal, a coil spring encircling said shaft and anchored at one end on the shaft and anchored at its other end to said journal, whereby to provide a spring loaded counterbalance device for said bowl.

5. A folding toilet comprising, in combination, a stationary soil pipe having a fecal matter inlet end embodying a hollow outer head constituting a valve casing and disposed with its horizontal axis at right angles to the vertical axis of said soil pipe, the respective ends of said head being open and provided with lateral endless flanges and defining axially alined bearings, said head being constructed of complemental half-sections separably bolted together and being provided with an arcuate clearance slot for a complemental element, a commode bowl having a hollow flush rim encircling the top of the bowl and provided with orifices for delivering water from the rim into the bowl, the rear portion of said rim having a constantly open flush water delivery tube communicatively joined thereto, a hollow inner flush water trapping head conformable in shape and size with said outer head and confined for oscillation in said outer head, the end portions of said inner head being formed into journals which are journalled for rotation in said bearings and having external endless grooves into which the aforementioned flanges extend and whereby said heads are satisfactorily keyed together for relative angular rotation, one end of said inner head having a stuffing box and a complemental flush water inlet adapted to accommodate a stationary water supply pipe, said bowl having a reduced bowl emptying neck at its discharge end, said neck being of a cross-section less than the

cross-section of said inner head and integral with passing centrally through said head and being open at its discharge end, the latter opening through one side of said inner head and having wiping contact with an imperforate wall portion of said outer head and optionally registerable with said soil pipe, there being a water trapping space around that portion of the neck which is encompassed by said inner head, said delivery tube being joined with said inner head and communicable with the trapping space in a manner to deliver water from said space into the circulating and distributing space of said rim.

6. The structure defined in claim 5, wherein the forward half-portion of said rim is provided with water jets and the rear half-portion of said rim is wholly imperforate, whereby the latter half-portion, said delivery tube, and said inner head conjointly serve to provide a clear water reservoir in which a limited amount of the flush water is temporarily trapped when the bowl is up, whereby when the bowl is swung down, the thus trapped water from said reservoir is gravity-spilled through said jets and allowed to flow and pool itself in said bowl before the latter is used.

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