Sept. 4, 1951 O. C. OSTERHAGE 2,567,025

FOLDING CLOSET BOWL

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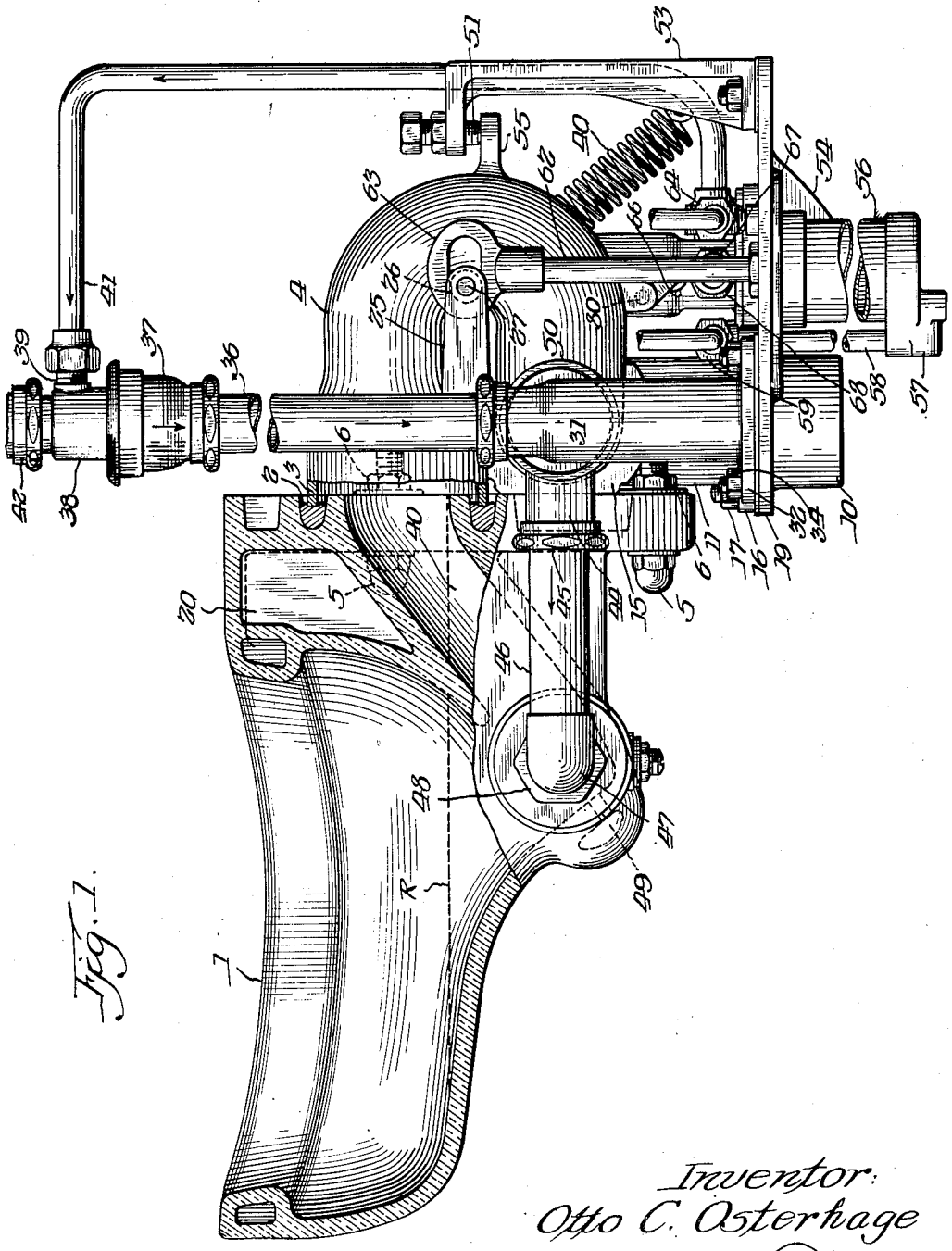


Fig. 1.

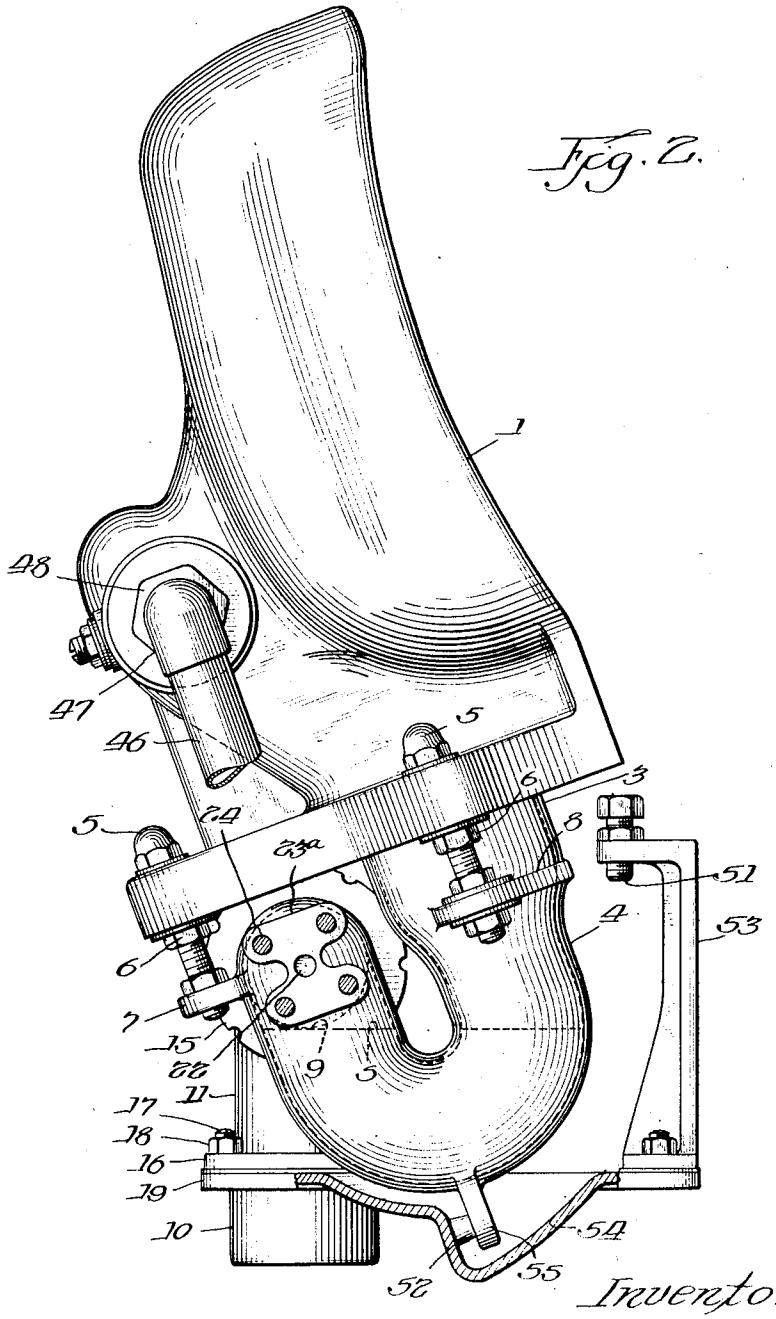
Inventor:
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Fig. 2.



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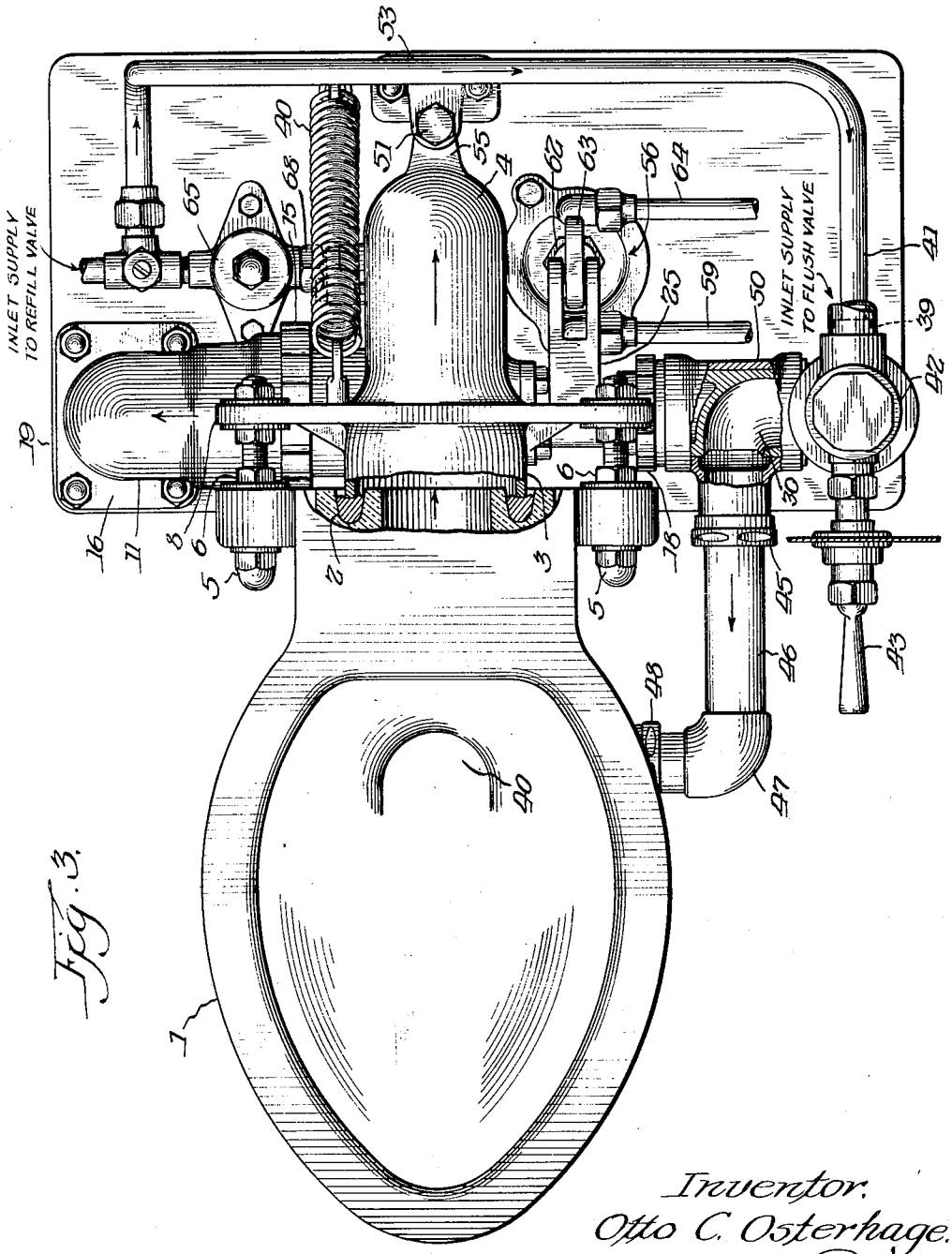


Fig. 3.

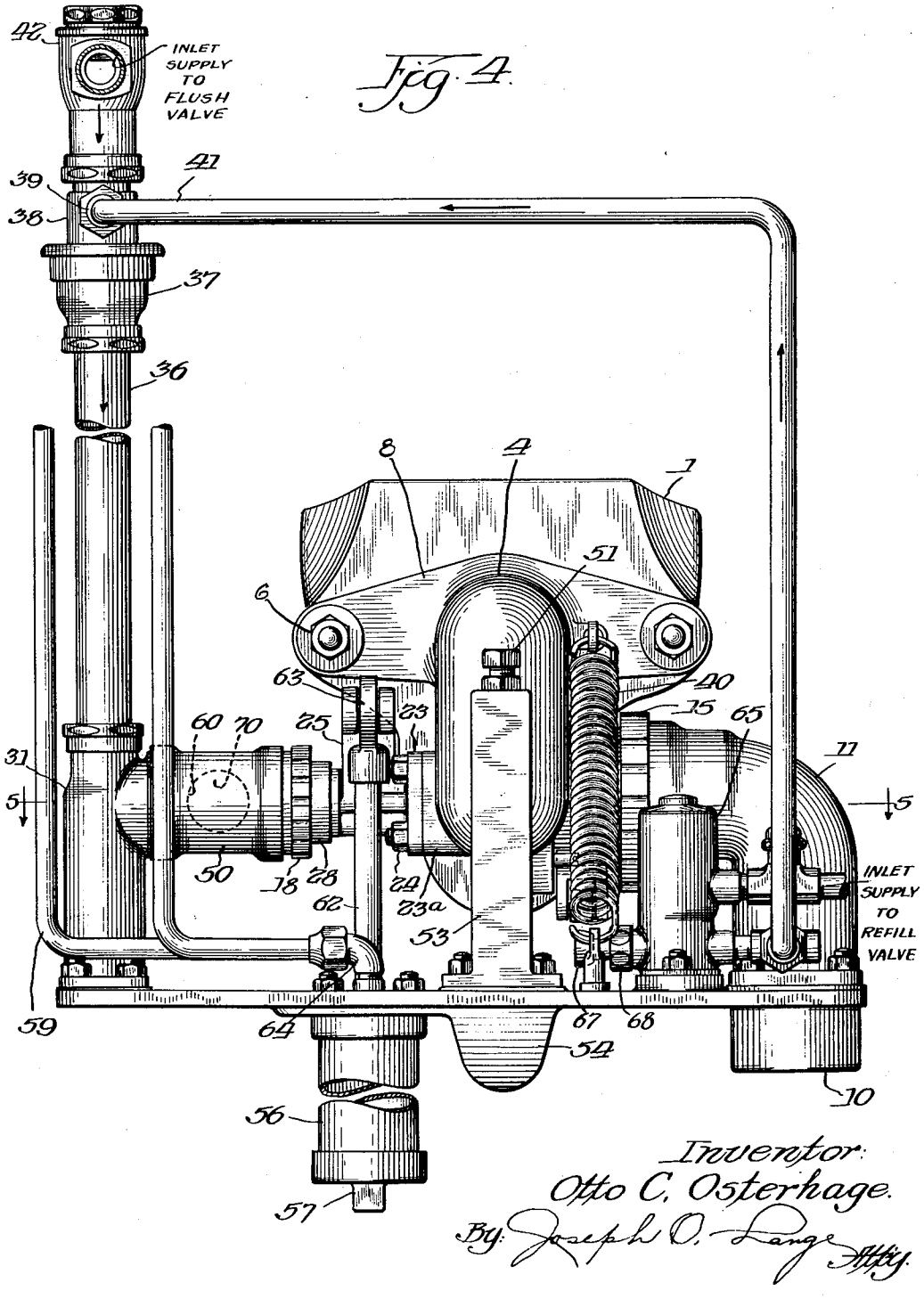
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Fig. 4.



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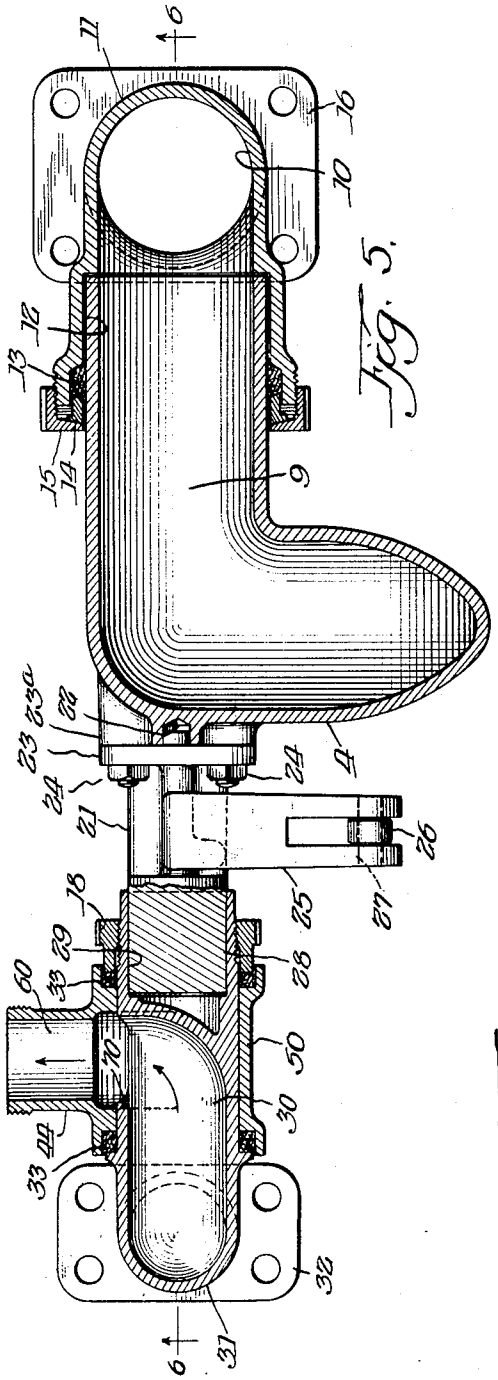


Fig. 5.

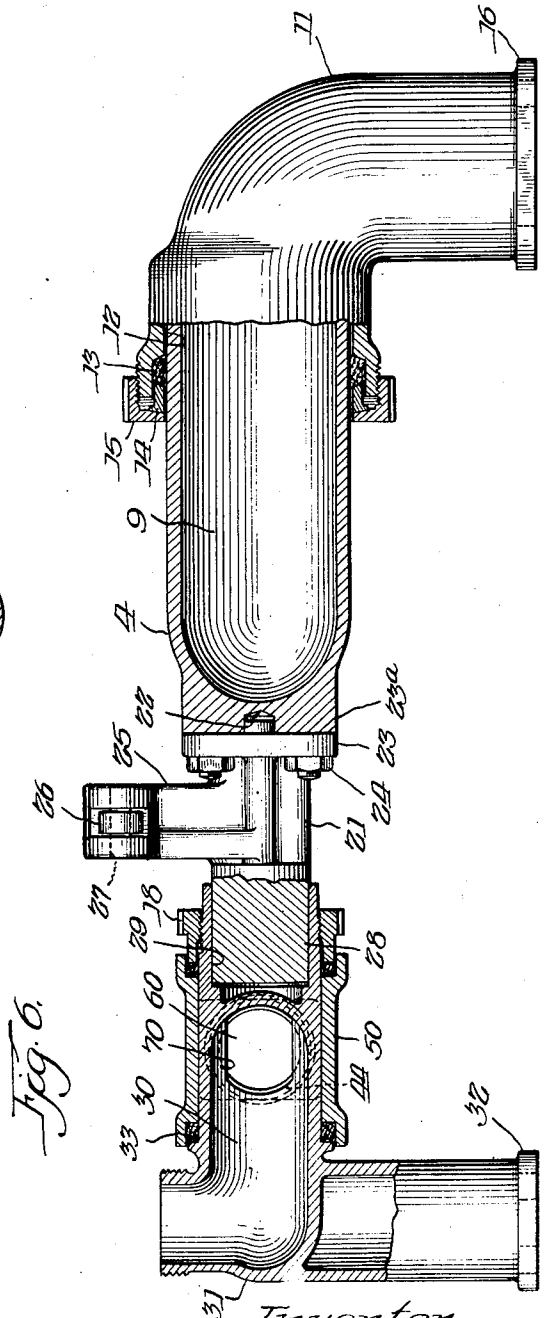


Fig. 6.

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FOLDING CLOSET BOWL

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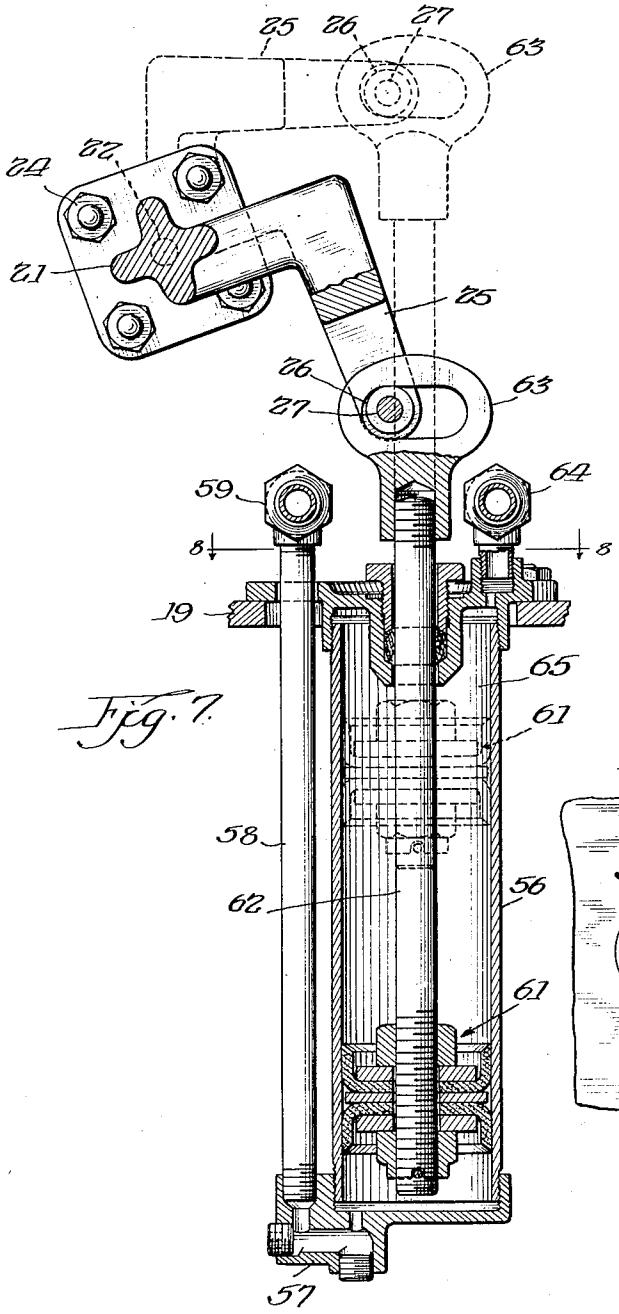


Fig. 7.

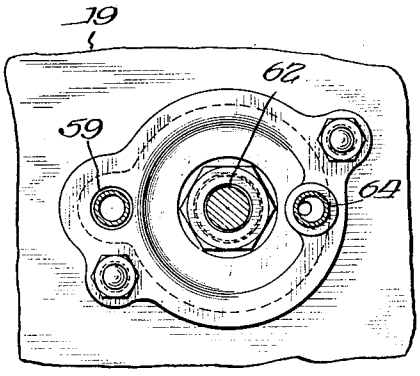


Fig. 8.

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Fig. 9.

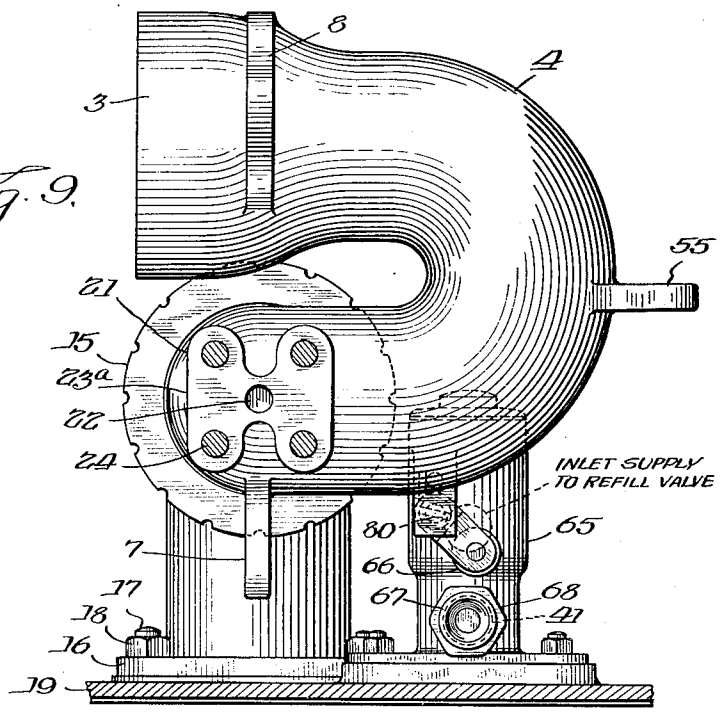
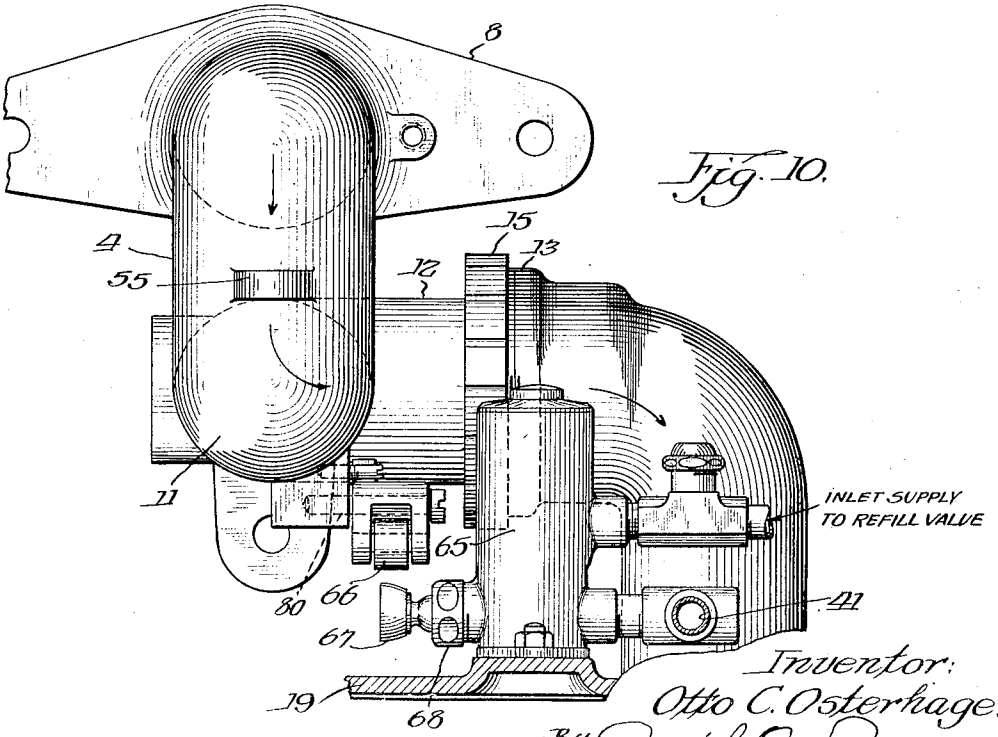


Fig. 10.



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UNITED STATES PATENT OFFICE

2,567,025

FOLDING CLOSET BOWL

Otto C. Osterhage, Chicago, Ill., assignor to Crane Co., Chicago, Ill., a corporation of Illinois

Application July 1, 1947, Serial No. 758,275

9 Claims. (Cl. 4—10)

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This invention relates to folding closet bowls, that is, of the type in which a pivotal mounting is employed so that the bowl may be conveniently disposed in a concealed and out of the way position. At the same time the novel construction permits of its being easily withdrawn and brought into operative position whenever desired.

It is realized that a variety of folding type closet bowls have heretofore been employed, as for example of the type exemplified in U. S. Patent 1,560,386 to J. F. Langston granted November 23, 1925 and in Patent 2,219,437 to Leif Andersen et al. on October 29, 1940. However, in several important aspects these prior constructions have lacked the important features present in the instant invention. Heretofore such folding closets have not been provided with siphon-breaking or backflow preventive means and therefore have been susceptible to the seriously objectionable contamination of fresh-water supply lines in the event of the occurrence of backflow through leaky valves on the fresh-water or flushing water supply system. It should be appreciated in the latter connection that in the event negative pressure or suction occurs in a fresh water flushing line it can draw sewage in the closet bowl back through leaking suply valves or through the flushing valve when the bowl is in operating position to such extent as to actually jeopardize the general health of a relatively large area or community through the spread of typhoid fever, dysentery or the like. To my knowledge no folding type closet bowl previously has been provided with such positive assurance of backflow prevention.

In addition an important object of the current invention is to provide a folding type of closet bowl in which the flush valve and the refill valve are independently mounted and preferably but not necessarily, supplied by separate inlet supply sources.

Another important object is to provide a type of folding closet construction in which the swivel joints upon which the closet bowl is supported are not under constant pressure, but are only under back pressure when the valves are operating thereby avoiding the objectionable line leakage heretofore encountered.

Another object is to provide a folding closet bowl in which the bowl supporting member has a hollow discharge only and the flush from the valve proper or from the refill does not pass entirely through such supporting means.

A further object is to provide a type of mounting for a folding bowl in which a resilient member such as a spring or the like retains the latter

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in normal vertical position and the tension increases as the bowl is lowered to thus compensate for the weight of the bowl when the closet is being raised or lowered.

A further object is to provide for a construction in which the folding bowl can be easily supported, assembled and mounted on a plate, the latter preferably employing stops at each end of the travel of the bowl so as to limit the movement thereof in either direction, thus requiring no critical or exacting location of the unit in relation to the cabinet in which it is installed.

Another object is to provide in a bowl of the character hereinabove described, a fluid means of operation whereby the bowl may be simply and easily moved by fluid control from one limit of its movement to the other by the mere opening of a valve by means of a lever or push button.

A further important object is to provide a type of swiveling construction for a folding closet bowl in which a T or similar fitting will provide a direct connection between the source of flushing and refill water supply and the closet bowl and further which swivelable connection does not support the bowl. The said swivelable connection is preferably but not necessarily constructed so as to provide an open passage for the flushing and refill water supply only when the closet bowl is in operative position, thus preventing flushing of the closet when in inoperative or raised position and the consequent possible spillage of water. Instead a separate supporting member having a blind end separated by partition from the source of water supply actually supports the bowl, cooperating with the discharge outlet bearing and fitting.

A further object is to provide a type of construction for a folding closet bowl in which a substantially self-sufficient plate and angular member may be employed for the positioning of the bowl and supporting members whereby the fluid actuating means preferably used for operating the bowl member may be suitably disposed beneath the frame or plate so as to require a minimum amount of space during the installation and subsequent operation of the device.

Another object is to provide a folding closet bowl construction in which when the closet is lowered a portion of the supporting member will actuate a refill valve to seal the trap in the bowl and whereby normal operation of the flush valve will flush the closet, it being further provided that water remaining in the bowl after flushing flows into and seals the trap fitting or return bend in the horizontal supporting member when the closet is raised.

Other objects and advantages will become more readily apparent upon proceeding with the following specification read in connection with the drawings in which:

Fig. 1 is a side exterior view of a folding closet bowl embodying my invention in which the bowl is shown in fragmentary section.

Fig. 2 is a side elevation of the folding closet bowl, plate and stop with the bowl in the raised or folded position.

Fig. 3 is a plan exterior view of the folding closet assembly with the bowl in the lowered position as shown in Fig. 1.

Fig. 4 is a rear exterior view of the folding closet bowl assembly embodying my invention with the bowl in lowered position.

Fig. 5 is a fragmentary sectional view of the supporting means assembly for the bowl including the inlet and discharge fittings taken on the line 5—5 of Fig. 4.

Fig. 6 is a sectional view of the supporting means taken on the line 6—6 of Fig. 5.

Fig. 7 is a fragmentary sectional assembly view of the fluid actuating mechanism employed for raising and lowering the closet bowl.

Fig. 8 is a fragmentary sectional view taken on the line 8—8 of Fig. 7.

Fig. 9 is a side exterior fragmentary assembly view of the refill valve and tripping mechanism therefor together with the bowl discharge fitting.

Fig. 10 is a rear exterior view of the mechanism referred to and described in Fig. 9.

Similar reference characters refer to similar parts throughout the several figures.

Referring now to Fig. 1, the folding closet bowl which is generally designated 1 is assembled in leak-proof relation by means of the soft gasket 2 cooperating with the cylindrically-shaped end 3 of the trap fitting or return bend 4 by means of through bolts and nuts 5 and 6 at sides and bottom respectively engaging the flange portion 7 and 8 of the discharge return bend 4, which is more clearly shown in Figs. 2 and 3. Of course the detailed manner in which such connection is made between the bowl and the return bend is not material to the instant contribution and may be accomplished in various ways. The trap fitting 4 is revolvable limitly around its horizontal axis and the chamber 9 to allow for the folding movement of the bowl 1, the axis about which such rotation occurs being perhaps more clearly shown in the sectional views Figs. 5 and 6. The return bend 4 serves as a substantial portion of the discharge means for the contents of the said bowl, and also for the direct support of the bowl, as shown more clearly in Figs. 2, 5 and 6. At opposite end portions supporting angular fittings are provided with the elbow 11 engaging an end portion of the trap fitting 4 to provide the packed bearing 12 and having the stuffing box 13 and the packing gland and nut 14 and 15 respectively. The fitting 11 is provided with lower horizontally extending integral flange 16 having the bolting means 17 for attachment of the fitting to the foundation plate 19 (see Fig. 1).

Attached in non-rotatable relation to the opposite end of the return bend 4 is the extension actuating portion 21 having the centering pin 22 engaging the boss 23*a* and the flange 23 held by the studs 24 in non-rotatable relation to the bend 4, as more clearly shown in Fig. 2. The bowl actuating extension portion 21 comprises an integral transverse arm 25 preferably with a roller 26 journaled as indicated at 27 for suitable rotation. The latter arm and parts constitutes the principal actuating mechanism, the operation of which will be described hereinafter in greater detail.

At the opposite end of the actuating extension member 21 the solid end portion 28 is journaled for pivotal mounting within the hollow portion 29 for rotation relative to the other end supporting fitting 31 having the inner angularly extending passage 30. As shown more clearly in Fig. 6, the latter fitting serves as the opposite leg support for the closet bowl 1 and return bend 4, cooperating with the oppositely disposed elbow fitting 11. Suitable packing 33 and compression means 18 for effecting a fluid sealed joint as illustrated are provided and similar to the fitting 11 the fitting 31 is provided with a suitable flange 32. It is also supplied with the bolting means 34 for attachment to the plate 19 as more clearly shown in Fig. 1.

While the passage 10 serves as the outlet discharge from the closet bowl by means of the trap fitting 4 the fitting 31 serves as a means for supplying the flushing water from an inlet supply pipe 36 preferably furnished through a flush valve control 42 at a level substantially above the highest attainable water level or flood level rim of the bowl with a vacuum breaker or backflow preventer 37 similarly positioned. The latter vacuum breaker or backflow preventer member is not shown in cross-section because it is not deemed to be necessary in view of the fact that the interior details are clearly disclosed in U. S. Patent 2,028,581 granted January 21, 1936. It should of course be understood that while the patent referred to shows a vacuum breaker having movable parts it is also convenient frequently to use one employing no movable parts such as that disclosed in U. S. Patent 2,047,163 granted July 7, 1936.

Immediately above the vacuum breaker is a coupling member 38 having a side inlet connection 39 for reception of the bowl refill and seal piping 41, the purpose of which will be hereinafter explained in greater detail. Immediately above the coupling fitting 38 is the lower portion of a flush valve 42 not clearly shown in Fig. 1 but more completely illustrated exteriorly in Figs. 3 and 4. The flush valve is provided with an actuating handle 43 shown more clearly in Fig. 3 for purpose of setting in motion the bowl flushing supply cycle also described later. Here similarly because a prior patent shows the interior details of the flush valve 42 which is preferably of the non-hold-open type such construction is not disclosed since it is not a part of this invention and its detailed principle of operation for a purpose of reference is more completely set forth in expired U. S. Patent 1,114,398 granted October 20, 1914.

The fitting 31 having the interior angular passage 30 serves as a connecting means at 70 with the interior passage 60 of the side outlet 44 which is more clearly shown in Figs. 5 and 6 and is connected by the coupling 45 to the piping 46 by means of the elbow 47 at its side outlet connection 48 with the lower jet portion of the bowl 1 and with the upper chamber 20, as shown in Fig. 1, the latter providing for the necessary rim flush.

It should of course be understood that while reference is made to a bowl having a combined jet and rim flush, the interior details of the bowl may vary quiet substantially from that shown and described without affecting the structure and function of the invention claimed. The

discharge passage 40 of the bowl communicates with the interior passage 9 of the return bend 4 which in turn leads to the elbow fitting 11 with its discharge outlet 10. It will of course be apparent that mounting the bowl in the manner hereinabove described, the tubing length 46 together with the elbow 47 is moved pivotally around the central axis of the return bend when the bowl is moved to a folded position as in Fig. 2, the fitting 50 rotating about the fitting 31. Thus the lower flanged end portion of the fitting 31 is fastened at 34 to the plate 19 and therefore it will be apparent that the latter remains stationary while allowing the T fitting portion 50 having the side outlet 44 to move pivotally with the bowl around the horizontal axis above referred to. As more clearly shown in Fig. 2, the range of tiltable motion of the bowl 1 and the trap fitting 4 together with the connections previously described is controlled by the respective stops at 51 and 52 provided by the plate 19 and the vertical extension thereof 53, the plate being preferably recessed as at 54 to provide the lower projecting portion and stop, the lug 55 on the return bend 4 serving as the limiting means in either direction for the pivotal movement of the bowl.

In connection with obtaining the latter pivotal or folding movement of the closet bowl 1, it is obvious that this may be done manually by simply pressing the bowl back as desired into a cabinet or behind a wall or the like. However, it has also been found desirable to move the bowl by means other than by human hands for purposes of greater sanitation and convenience. Specifically, reference is made to the actuating mechanism which is more clearly shown in Figs. 1, 7 and 8 to the linkage and piston arrangement in which a fluid operated cylinder 56 preferably installed below the plate 19 is employed, having the usual connections by means of the respective piping and fittings to a source of fluid supply, such as air, water or other convenient fluids. On a train for example the actuating cylinder may be connected to the compressed air line on the braking system or the water supply. In any event the lower portion of the cylinder 56 is provided with an end connection 57 and is attached to the piping 58 controllable by an inlet connection 59 whereby upon opening the latter member through a four-way valve (not shown) the fluid enters below the piston generally referred to as 61 and thereby causes the reciprocably movable rod 62 with its connecting eyelet 63 to move upwardly. The latter eyelet member engages the roller 26 journalled as at 27 in the extension actuating arm 25 as previously referred to, whereby upon such axial movement of the piston rod 62 the trap fitting or return bend 4 upon which the bowl 1 is fixedly attached will be caused to rotate in a counterclockwise direction upon upward movement and thereby place the bowl 1 in a horizontal position (see dotted lines of Fig. 7). Obviously upon opening the inlet member 64 by actuating the same four-way valve (not shown) and which communicates with the member 59, the actuating fluid will also be caused to flow into the upper chamber 65 thereby compelling the piston 61 to be moved downwardly. The arm 25 is thus moved in the same direction carrying the bowl to the raised or folded position as shown in solid lines in the same figure. Of course the detailed manner per se in which the fluid operating mechanism is applied to the plate 19 and to the bowl 1 may vary substantially from the specific details shown and described.

As previously referred to when calling attention to the side inlet piping 41 for the bowl refill mechanism, it should initially be understood that whenever the bowl is lowered into horizontal position for use, a predetermined amount of flushing water must immediately enter the bowl to serve as a seal for the bowl and also at the same time facilitating the sanitary use of such plumbing fixture. The preferred level of such water seal in the bowl as indicated by the line R shown in Fig. 1 is also applicable to the installation with relation to the bowl when the latter is placed in its raised or folded position as shown by the dotted line S in the trap fitting or return bend in Fig. 2. That is to say in the lowered position of the closet bowl, the lower chamber of the bowl should be sealed while in the raised or folded position the trap fitting should be sealed as indicated so as to avoid the passage of odors through the folded closet. Also when on trains or buses or the like vehicles, road noises are eliminated, which otherwise enter through the discharge outlet 10.

Immediately upon lowering the bowl 1 into the position shown in Fig. 1, the trap in the closet bowl is sealed by water from the refill valve 65, the valve being actuated as shown more clearly in Figs. 9 and 10 by means of the tripping mechanism to deflect the handle 67 (Fig. 10) and thereby operating the valve on the same principle as that described in connection with the main flush valve 42 and having the same internal mechanism referred to in the expired patent. It should be understood that as more clearly shown in Fig. 9 the roller 66 upon moving past the projecting portion 67 connected as at 68 to the flush valve causes the handle to be deflected to effect valve operation. The internal mechanism of the refill valve 65 is also of the type known as non-hold-open and as previously described thus operates to seal the bowl by desired tilting of the actuating stem 67 (Fig. 10). The lever supporting the roller 66 is mounted to move pivotally in the opposite direction so that when the bowl is raised to folded position the roller 66 moves idly past the handle 67 without deflecting it. Thus operation of the refill valve is provided only in the lowered position of the bowl.

As to a general description of the valve 65 and its manner of functioning, the refill valve 65 upon the occurrence of such lever actuation as above described allows for the flow of the seal and refill water in the indicated direction of the arrows in the pipe 41, past the joint 39 into and past the backflow preventer means 37, thence into the tubing 36 and into the passage 30 of the fitting 31, out through the side opening 70 and into the passage 60. Out past the side outlet 44 the refill and sealing liquid moves past the joint 45 and into the tubing 46 to move into the elbow 47 and fill the bowl up to the indicated level of the line R to form the initial water seal.

In order to observe the detailed method of operation of the main valve 42 controlling the bowl flushing operation while the latter is in the horizontal or lowered position, let it be assumed that the flushing mechanism of the valve is now to be operated. The handle 43 of the valve 42 is first depressed, thereby causing the release of flushing water through the backflow preventing means, into the tubing 36 and thence into the fitting 31 through the curved passage 30 into the tubing 46 connecting directly with the bowl which latter

portion of liquid travel is also of course the path described of the refill and seal water.

It should be noted that the bowl in its pivotal movement downwardly to a horizontal position is preferably held resiliently in relative restraint by means of the coiled spring 40. Stuffing boxes 33 as illustrated and applied to the T member 50 serve to prevent any leakage through the passage 30.

Thus it will be apparent that there are preferably two independent sources of supply for the bowl, one for the refill and seal means and the other for the actual flushing of the closet bowl following in the order named. It should also be noted that the bowl raising and lowering mechanism is preferably separate and distinct from the flushing and refill means, with the advantage that no leakage can occur and thereby interfere with the efficient operation of the refill and the flushing of the bowl.

It should be clear also that in view of the differences in the broad purposes of the respective valves such as the trip-operated mechanism for the refill and sealing valve 65 and the manually operated flushing means 42 through the handle 43 there may be numerous changes made in the detailed structure. For example in view of the amount of water necessary for supplying the refill and maintaining a water seal in the horizontal or lowered position of the bowl and also in the trap fitting in the raised position, the former is not nearly as large a volume of water as is required in the flushing of the bowl. Therefore, the affected proportions of the refill valve 65 may be arranged somewhat different in order to provide for the throttling of the water and reducing the amount of water flowing past the refill valve when the latter is in its open or unseated position due to prior deflection of the handle 67.

From the general arrangement of the flushing and refill paths as indicated by the respective arrows in the pipe lines 41, 36 and 46, it should be apparent a relatively simple manner of providing a folding bowl construction has been accomplished which is capable of being rigidly mounted for pivotal movement, suitably sealed in raised or non-operative position and adequately refilled and flushed for further use. It is also capable of being easily accommodated behind a wall or within a recess or cabinet whether aboard ship, on a train or in a bus or even in certain classes of relatively confined land housing.

While only a single preferred embodiment of the invention has been described, it should of course be understood too that the invention is capable of a great variety of modifications. Therefore changes in the construction and in the arrangement of the various parts may be made without departing from the spirit or the scope of the invention as determined by the claims appended hereto.

I claim:

1. In a closet bowl mounted for swinging movement in a substantially vertical plane, the combination including valved supply means for flushing the bowl including a flush pipe, supporting means for the said bowl comprising a pair of oppositely disposed fittings connected by a shaft, the said shaft having a portion hollowed to communicate with the bowl discharge, the latter portion including a fitting permitting a discharge through one of said fittings, bearing members provided by the said fittings to permit the swinging movement of the said bowl, one of the bearing members forming a part of a fitting connected to the flush pipe from said valved supply means.

2. In a folding closet bowl having jet and rim flush means, supporting means for the said closet bowl, the said supporting means including oppositely disposed fittings, the said fittings having bearings to allow for the pivotal movement of the said bowl, one of the said bearings being in communication with the discharge from the bowl and connected to a substantially solid end shaft portion forming a support for the bowl.

3. In a folding closet bowl, supporting means for the said bowl comprising a pair of oppositely disposed angularly extending fittings, bearings provided by the said fittings to permit pivotal movement of the said bowl, fluid means for actuating the said bowl from raised to lowered position and vice versa, one of the said angular fittings having direct communication with a side portion of the bowl to provide for the flushing of same, backflow preventing means above the said bowl and cooperating with the supply to the latter member, refill means automatically operated when said bowl is lowered to operative position to seal the latter member, the said refill means discharging through the said backflow preventing means above the highest attainable water level within the said bowl.

4. In a folding closet bowl having jet and rim flush means, supporting means for the said closet bowl, flushing means therefor, the said supporting means including oppositely disposed fittings and a shaft portion, the said fittings having bearings to allow for the pivotal movement of the said bowl, one of the said bearings being in communication with the discharge from the bowl and having an end connection to a substantially solid portion of said shaft, one of said bearings being hollow and being directly connected to the said flushing means.

5. In a closet bowl mounted for swinging movement in a substantially vertical plane, valve supply means therefor, a flush pipe cooperating with the said supply means, the combination including supporting means for the said bowl comprising a pair of oppositely disposed fittings separated by a shaft having a solid portion therebetween, the said shaft having a hollow end portion communicating with the said bowl discharge, the latter portion including a fitting permitting a substantial discharge therethrough, bearing members provided by the said fittings to permit the said swinging movement of the said bowl, one of the hollow bearing members being connected to the flush pipe from said valve supply means and having a transverse apertured portion registering in the lowered position of the bowl with a similarly apertured portion of the said supply means.

6. In a closet bowl, the combination comprising supporting means including a shaft for the said bowl comprising a pair of oppositely disposed fittings connected to the said shaft, the latter member having a passage communicating with the said bowl discharge, the latter portion including a fitting permitting a substantial discharge through one of said fittings, bearing members cooperating with the said fittings to permit the swinging movement of the said bowl, one of the said bearing members forming a part of a fitting having telescoping relative rotating portions with transverse apertures matching when the said bowl is positioned in a horizontal plane to flush the bowl, and fluid means for actuating

the said bowl in swinging movement in a substantially vertical plane.

7. In a closet bowl mounted for swinging movement in a substantially vertical plane, flush pipe means, valve supply means therefor, the combination including supporting means for the said bowl comprising a pair of oppositely disposed fittings separated by a shaft, the said shaft having a portion arranged to communicate with the said bowl discharge, the latter portion including a trap fitting permitting a substantial discharge through one of said fittings, bearing members provided by the said fittings to permit swinging movement of the said bowl, one of the hollow bearing members being connected to the flush pipe from said valve supply means, the said trap fitting forming a water seal in the supporting means when the bowl is in inoperative position.

8. In a folding closet bowl having jet and rim flush means, supporting means for the said closet bowl, water supply means, the said supporting means including oppositely disposed fittings, the said fittings having bearing means to allow for the pivotal movement of the said bowl, one of the said bearing means including a swivelable T-fitting in direct communication between the source of said water supply means and the bowl, the said supporting means including a shaft member having a blind end and thereby separated from said source of water supply means.

9. In a folding closet bowl, supporting means

for the said closet bowl, the said supporting means including oppositely disposed fittings, actuating means therebetween for raising and lowering said bowl, the said fittings having means to allow for the pivotal movement of the said bowl, one of the said fittings being in communication with the discharge from the bowl and connected to a blind portion forming a further support for the said bowl.

OTTO C. OSTERHAGE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
14,902	Bookhout et al.	May 20, 1856
456,678	O'Brien	July 28, 1891
1,560,386	Langston	Nov. 3, 1925
1,961,795	Sheridan	June 5, 1934
2,117,389	Yoder	May 17, 1938
2,145,435	Smith	Jan. 31, 1939
2,205,801	Newman	June 25, 1940
2,303,037	Frederickson	Nov. 24, 1942
2,370,247	Kenney	Feb. 27, 1945
2,394,911	Griswold	Feb. 12, 1946

FOREIGN PATENTS

Number	Country	Date
28,612	Great Britain	Dec. 30, 1903