No. 654,160. Patented July 24, 1900.

J. KIRBY, JR.

WATER CLOSET.

(Application filed July 26, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 2.

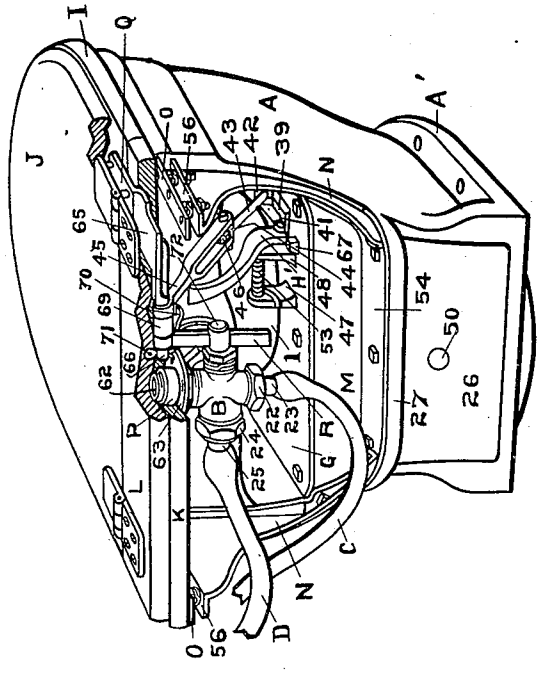
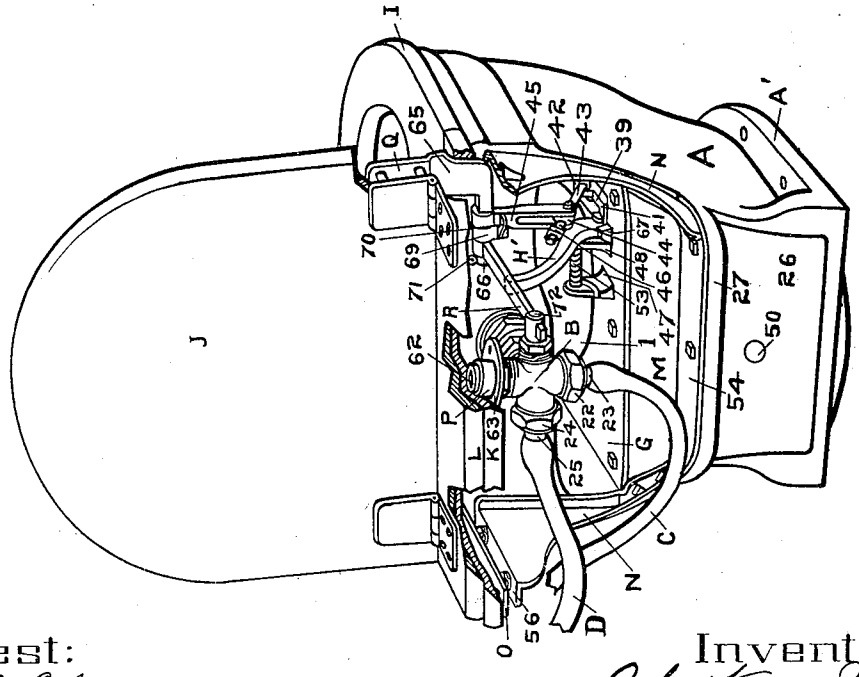


Fig. 1.



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Fig. 3.

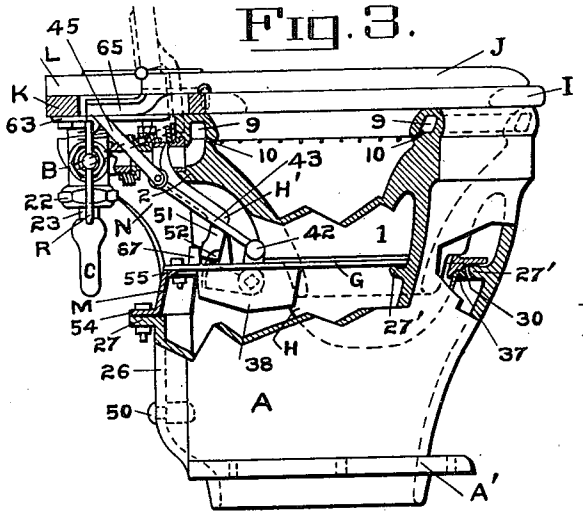


Fig. 4.

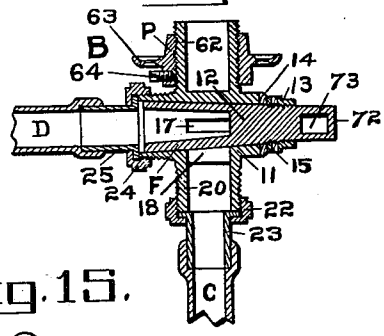


Fig. 15.

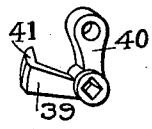


Fig. 5.

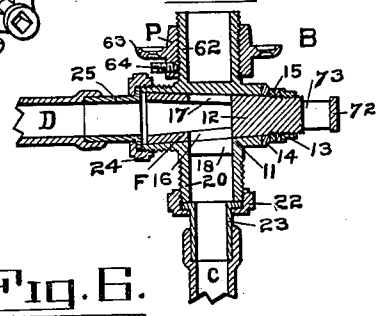


Fig. 10.

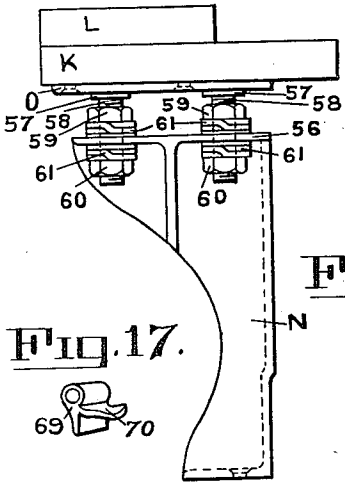


Fig. 11.

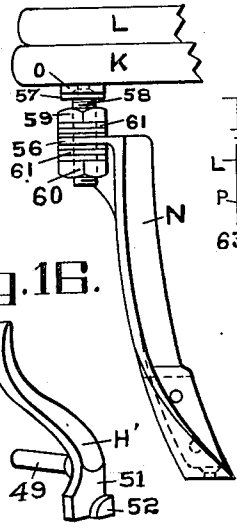


Fig. 6.

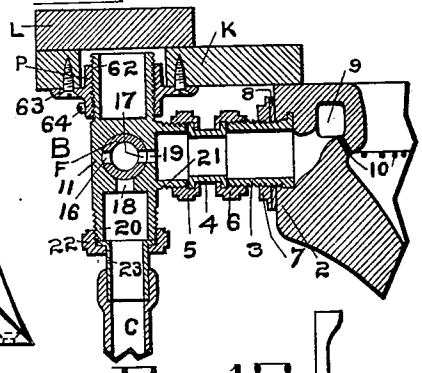


Fig. 16.

Fig. 17.

Fig. 13.

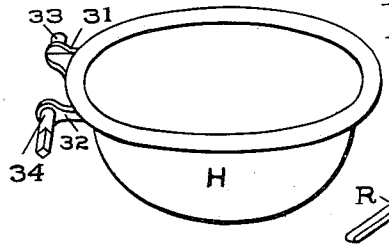


Fig. 14.

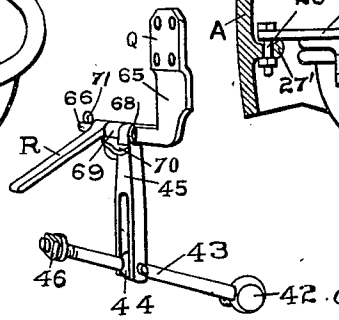
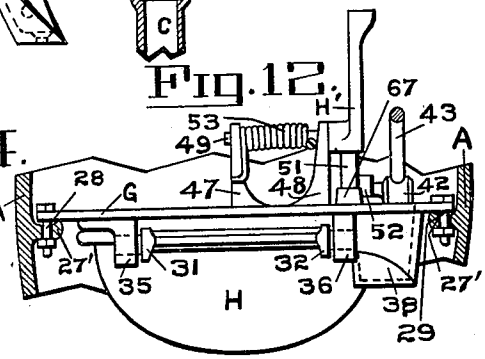


Fig. 12.



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Fig. 7.

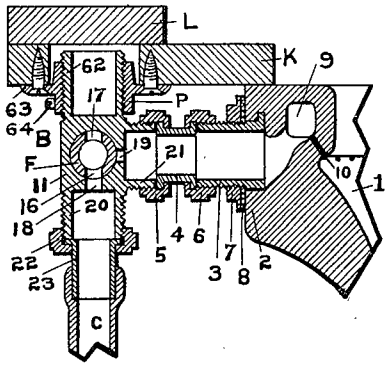


Fig. 8.

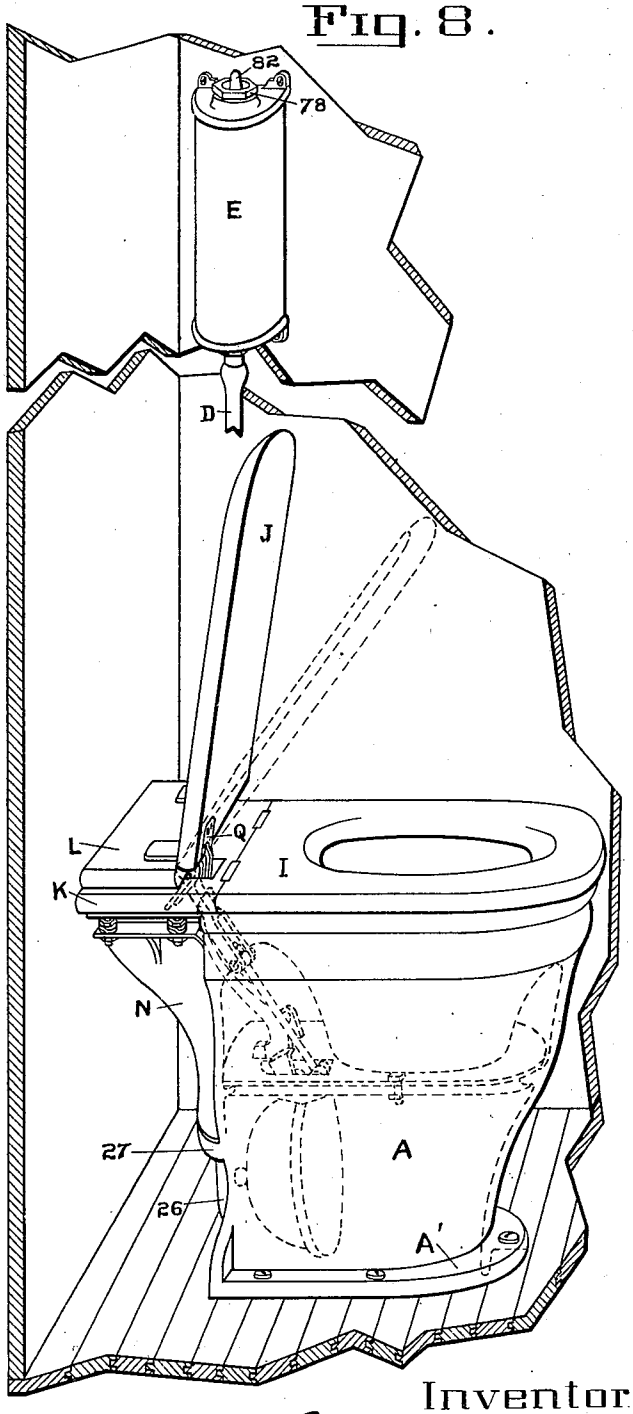
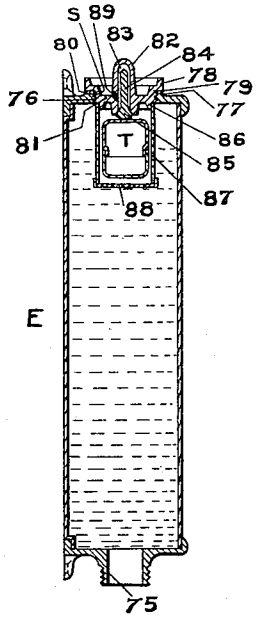


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN KIRBY, JR., OF DAYTON, OHIO, ASSIGNOR TO THE DAYTON MANUFACTURING COMPANY, OF SAME PLACE.

WATER-CLOSET.

SPECIFICATION forming part of Letters Patent No. 654,160, dated July 24, 1900.

Application filed July 26, 1899. Serial No. 725,186. (No model.)

To all whom it may concern:

Be it known that I, JOHN KIRBY, Jr., a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Water-Closets; and I do hereby declare that the following is a full, clear, and exact description of the invention.

My invention relates to improvements in water-closets designed more especially for use in railway-cars and other places where water for flushing the closet is measured with each flushing thereof, and more particularly to the class known as "automatically-operating" closets, and in which a valve for regulating the supply of water for flushing the closet and a dumping service-pan for retaining the deposit and a given quantity of water until the same has been emptied by dumping of said pan are employed and in which the said valve and the said service-pan are operated by the raising or lowering of the seat or lid through mechanism secured thereto and having differential engagement with said valve and service-pan, such closets being ordinarily provided with a seat mounted above the hopper and a lid mounted above the seat.

The objects of the invention are to provide a simple, inexpensive, and efficient valve adapted to be operated by the raising or lowering of the seat or lid of the closet, thereby opening and closing communication therewith; to provide simple and efficient mechanism for operating the valve-plug; to so construct the valve as to locate it below the usual support at the rear of the closet to which the seat or lid is hinged and where it will be obscured from view, thus saving the cost of polishing and otherwise finishing the valve and its connecting parts; to provide means whereby the seat-support can be readily adjusted to suit any irregularities that may exist in the earthen hopper and when properly adjusted secured permanently to place; to provide the valve-casing with adjustable means for securing it to its support, whereby all variation between its connection with the hopper and its point of attachment to its support can be equalized and undue strain on the parts thereby avoided; to provide a practical and efficient air-valve for the measuring-tanks of such closets, whereby I abolish the use of an air-tube leading from said tank to a point above the highest water-level in the main supply-tank, (usually through the car-roof,) and which tube has heretofore been employed in closets of this class for the want of a suitable air-valve the use of said tube being a source of much annoyance and trouble in setting the closets in position for use owing to the difficulties which present themselves, particularly in car construction, in locating said tube, and to otherwise improve upon water-closets which are at present in use.

My invention consists in certain novel features of construction and arrangement of parts, which, together with the manner in which I carry out the same, will be hereinafter fully described, and pointed out in the claims at the end of this specification.

Experience has demonstrated that the more satisfactory water-closet for railway-car service is the type in which the service-pan is normally closed, whereby cold air and dust are prevented from entering the bowl of the hopper, thus avoiding freezing in winter and filth in summer. Closets of this class are usually arranged so that the closing of the lid dumps the service-pan and returns it to a closed or normal position empty, at the same time closing communication between the water-supply and the hopper, so that when the lid is closed communication between the main supply and measuring tanks will be open and the latter filled with water, and the raising of the lid will cut off said communication and open communication between the measuring-tank and the hopper and permit the contents of the former to discharge into and flush the latter and supply the service-pan with water when the closet is about to be used. Therefore the valve should be so constructed as to discharge water into the hopper only while the seat or lid is up. For operating the service-pan I employ substantially the mechanism shown in United States Letters Patent Nos. 596,070 and 596,071 and covered by United States Letters Patent No. 440,030. Therefore in my present invention

I make no claim to such mechanism in so far as it relates to the performance of said function alone.

For the purpose of illustrating my invention I have shown the closet provided with a seat hinged above the hopper and a lid hinged above the seat. It is obvious, however, that the seat may be stationary or it may be formed integral with and of the same material as the hopper. It is also obvious that where the seat and lid are both hinged, as shown in the accompanying drawings, the pan and valve-operating mechanisms may be attached to either the seat or the lid, or part to one and part to the other. These parts of the closet are usually so constructed that the seat must be raised with the lid, but can be lowered independently thereof in order that the full capacity of the hopper shall be first exposed for use as a urinal. The valve-operating mechanism may therefore be attached to the seat and flush the closet when the same is lowered, and the pan-operating mechanism may be attached to the lid to dump the pan and return it to place by the lowering of the lid. Therefore in my reference herein to "seat" or "lid" I mean that the valve-operating mechanism may be attached to either of these parts of the closet.

In the accompanying drawings, which form a part hereof, Figure 1 is a perspective view of the rear of the closet with portions broken away to show parts which would otherwise be obscured and in which the seat is shown in its normal position and the lid in a raised position; Fig. 2, a similar view to Fig. 1, with the lid and seat both down; Fig. 3, a side elevation of the closet in position for use and in which a portion of the hopper is broken away, showing a section of same through the center of its back wall, also a section through one of its side walls, the position of the pan and valve operating mechanisms with relation to the lid when raised being represented by dotted lines, the support to which the seat is hinged shown in section through the opening cut out to accommodate the offset arm and shaft, the upper support to which the lid is hinged being shown in full, the forward bracket removed, and the valve being shown in full, but having its connection with the hopper broken away, showing its coupling therewith in section; Fig. 4, a longitudinal sectional view through the center of the valve casing and plug, showing also a portion of the connecting-pipes attached, the openings and ports in the casing and plug being shown in their respective positions as represented in Fig. 1; Fig. 5, a similar view to Fig. 4, with the openings and ports shown in their respective positions as represented in Fig. 2; Fig. 6, a vertical section through the center of the valve casing and plug and the portion of the hopper to which the casing is connected, the position of the plug being that represented in Fig. 1; Fig. 7, a similar view to Fig. 6, the casing and plug being shown in the position represented in Fig. 2; Fig. 8, a front perspective view of the closet and measuring-tank in position for use, the dotted lines representing the position of the lid and service-pan during the dumping operation; Fig. 9, a vertical section through the center of the measuring-tank from back to front; Fig. 10, a side view of one of the supporting-brackets with wood supports attached thereto; Fig. 11, a back view of one of the supporting-brackets and wood supports attached; Fig. 12, a rear view of the division-plate with the service-pan and its operating mechanism mounted thereon, the sliding rod being broken off midway of its length, a portion of the hopper being shown in section through the center thereof; Fig. 13, a perspective view of the service-pan detached; Fig. 14, a perspective view of the pan and valve operating mechanisms detached; Fig. 15, a perspective view of the pan-operating lever detached; Fig. 16, a similar view of the main operating-lever, shaft, and arm combined, and Fig. 17 a similar view of the trip-catch.

Similar letters and numerals of reference represent corresponding parts throughout the drawings.

A represents the hopper, having a base or flange A', by which it is secured to the floor and being provided with a bowl 1 and a water-inlet or neck 2, to which is attached a screw-threaded neck 3 for connection with a coupling 4, which connects a valve B with the hopper by means of coupling-nuts 5 6, a nut 7 and washer 8 being employed to make a water-tight joint between the said neck and the hopper in the usual manner. Water is supplied from a suitable and properly-located tank (not shown) through a supply-pipe C, the valve B, and pipe D into a measuring-tank E, from which it is discharged through the same pipe D and valve B into a flushing-conduit 9, which extends from the inlet entirely around the upper end of the hopper, the inner walls of the conduit being provided with a series of perforations 10, through which the water flows down over the inner surface of the bowl into a service-pan H. Instead of the perforations in the conduit, however, its lower wall may be entirely open when there is sufficient pressure to the water to force it around the hopper and to cause it to perform its required function of properly flushing the bowl; but I prefer to construct the conduit with the perforations as described.

The valve B consists chiefly of a casing 11, having a taper bore, in which is fitted a hollow valve-plug F, closed at one end, as shown at 12, and open at the opposite end, this plug being ground into the casing and held therein, preferably by means of a nut 13 and washer 14, with a spring-washer 15 between them. Openings or ports 16 and 17 are formed, with suitable relation to each other, in the wall of the plug, and the casing 11 is provided with corresponding openings 18 and 19, also with hollow connecting-shanks 20 and 21, which

form waterways to and from the valve, the water entering the latter through the pipe C, which is connected with the shank 20 by a nut 22 and swivel 23, thence through the opening 18 and port 16 into and through the plug F and pipe D, one end of which is connected with the open end of the valve-casing by a nut 24 and swivel 25 and which is a common manner of making such connections, the opposite end of this pipe D being similarly connected with the bottom of the measuring-tank E and into which the water flows before being discharged into the hopper, and thus when the opening in the valve-casing 18 and the port 16 in the plug are in register with each other a passage-way is formed through which the water will flow into the measuring-tank and fill the same, while a predetermined partial rotation of the valve-plug will close said passage-way and bring into register the opening 19 and port 17, thus cutting off communication with the supply-tank and opening communication between the measuring-tank and the hopper, whereby the contents of the former will be discharged into the latter. The upper portion of the back wall of the hopper is cut away to form an opening, the purpose of which will presently appear, and its lower portion is extended beyond the side walls, as shown at 26, and extending rearwardly from this projection is a lip or projection 27. About midway of the height of the hopper is an inwardly-projecting rib 27′, which extends around the inner wall thereof and forms a bearing for a division-plate G, which is preferably bedded in putty and bolted to the rib, as shown at 28 and 29, Fig. 12. This division-plate has a circular opening 30, through which protrudes the lower end of the bowl 1, and to its under side is attached a service-pan H, adapted to close the lower end of said bowl and having brackets 31 32 and journals 33 34, which oscillate in bearings 35 36, attached to the division-plate, the latter being provided with a circular shoulder 37, against which the service-pan closes. The division-plate is provided with a box or pocket 38, through the inner wall of which journal 34 projects and to the free end of which is attached a pan-operating lever having arms 39 40, arm 39 having an inwardly-projecting lug 41. To the arm 40 is pivoted a hub 42, to which is attached a pan-raising rod 43, the free end of which slides freely through a guide 44, rotatably mounted in a bifurcated arm 45 and having its free end screw-threaded to receive a nut 46, which forms a stop for the backward movement of said bifurcated arm and prevents its withdrawal from the rod. The top side of the division-plate is provided with standards 47 48, which form bearings for a shaft 49, to one end of which is secured the main operating-lever H′, having an arm 51, provided with a radially-surfaced lug 52 to engage with lug 41 of the arm 39. A coil-spring 53 surrounds the shaft 49, one end of the said spring being secured to the said shaft and the opposite end bearing against the back side of the standard 47, the function of this spring being to automatically return the shaft and its attachments to their normal positions after each operation and in the manner hereinafter more fully explained.

Immediately over the hopper there is mounted a seat I, above which there is mounted a lid or cover J, the seat being hinged to a support K and the lid to a support L at the rear of the hopper and in the manner shown. To close the space between the division-plate G and the lip 27 at the back of the hopper, there is a filling-plate M, having angle portions 54 55, which are bolted to the lip and to the division-plate, as shown, and thus it will be seen that when the service-pan is closed the hopper is divided into two separate compartments—an upper and lower—whereby cold air and dust are excluded from the upper compartment of the hopper and the room in which it is located. The object in cutting away the back wall of the hopper to the point shown is to obtain an opening of sufficient size through which the division-plate and its attachments can be inserted in its place within the hopper.

N N represent brackets carried by the hopper and which may be attached thereto in any convenient manner. At the top of each of these brackets there is an overhanging flange 56, and they are each provided with a plate O, having bosses 57 and screw-threaded studs 58, the latter passing through holes in the flanges 56, as more clearly shown in Figs. 10 and 11. The support K is secured to the plates O by screws or otherwise and, as will be seen, can be raised or lowered to locate the support with its under side in such relation to the top of the hopper as to cause the seat I to close down properly thereon. The plates O, together with the support K, are secured in place by means of nuts 59 60, having spring-washers 61 to prevent the working loose of the said nuts, which would otherwise be liable to occur from the motion of the car. The valve-casing 11 is provided with a screw-threaded shank 62, formed integral therewith, and which may extend through or partially through the support K, and which for the purpose of reducing its weight is made hollow. A correspondingly-screw-threaded nut P, having flange 63, engages the said shank, and when the valve is connected with the neck 3, as hereinbefore explained, the flange 63 of nut P is screwed up against the under side of the support K and then secured fast thereto by screws or otherwise, a set-screw 64 being employed to prevent undue turning of the valve. Thus irregularities common in the manufacture of earthenware hoppers is compensated for, and the hopper and its attachments are made to comprise, practically, a single structure, which can be shipped ready for piping.

A plate or bracket Q, having an offset arm

65 and a shaft 66, the latter extending at right angles to said arm, is attached to the under side of the lid, and the arm and shaft extend through the support K, which is cut out to accommodate the same. The upper end of the bifurcated arm 45 is journaled on the shaft 66 between a shoulder 68 and a trip-catch 69, which is also journaled on said shaft and which is provided with a projecting lug 70, adapted to overlap the bifurcated arm 45 and to form a stop for the movement of the trip-catch 69, so as to bring the latter in proper position to engage the upper end of the main operating-lever H′ when the lid is raised and to hold it in such position until released by the lowering of the lid. On the outer end of shaft 66 there is also journaled a valve-operating arm R, the bifurcated arm 45, trip-catch 69, and valve-operating arm R being held from lateral movement on the shaft by a cotter-key 71. The valve-plug F is operatively connected to a stem or shaft 72, (preferably formed integral with the plug,) projecting through and beyond the casing and through which there is an opening 73, in which the valve-operating arm R slides, and thus, the arm R being pivotally mounted on the shaft 66 and free to slide through the said opening 73 in stem 72, a sliding and pivotal connection is formed between the valve-plug and the lid, whereby the said arm and shaft are free to perform their respective movements caused by the raising and lowering of the lid, which will rotate the valve-plug and cause its said ports to register with said openings in the valve-casing, thereby establishing communication between the main supply-tank and the measuring-tank and between the latter tank and the hopper alternately, as hereinbefore explained.

As will be seen by reference to Figs. 2 and 3, when the lid is down the valve-operating arm stands in a vertical position, and when the lid is up its position will be as seen in Fig. 1 and by dotted lines in Fig. 3.

I will now more fully describe the operation of the closet. The service-pan is held up to its seat on the under side of the division-plate by the radially-surfaced lug 52, below which the forward end of the inwardly-projecting lug 41 of arm 39 engages, thus forming a lock which retains the pan in a closed position at all times, except during the downward movement of the lid, in which movement the trip-catch 69 is carried radially rearward, thereby rotating the main operating-lever H′ and the arm 51 of same, together with the radially-surfaced lug 52, until the lugs 41 and 52 become disengaged, lug 41, which is also radially formed, passing over the lug 52, which action is caused by the weight of the pan and its relation to its journals, and which when lugs 41 and 52 become disengaged is free to drop to the position shown in Fig. 8, an elastic cushion 50 being attached to the hopper for the pan to strike against. After the lugs 41 and 52 have become disengaged and the trip-catch 69 has released the main operating-lever H′ the latter, with its attachments, is at once returned to its normal position by the action of spring 53, a stop 67 limiting its return movement. When the lid is in an upright position, the bifurcated arm 45 hangs in a vertical position and rod 43 projects through the guide 44 a considerable distance, as in Fig. 14, and the dumping of the pan throws the hub 42 forward, carrying with it the rod 43, until nut 46 comes in contact with guide 44. Then as the lid proceeds downward, carrying with it shaft 66, which moves on a radial line in the opposite direction, the pan-journals 33 and 34 are rotated in a reverse direction, carrying with them the service-pan and the arms 39, 40 of the pan-operating lever, until the pan reaches its normal position and lugs 41 and 52 become reëngaged. Hub 42, rod 43, guide 44, and bifurcated arm 45 all being loosely connected, so adjust their respective positions during the movement of the lid as to permit the latter to be raised without affecting the pan-operating mechanism, and in raising the lid trip-catch 69 strikes the upper end of main operating-lever H′ and being loosely journaled on shaft 66 swings over it and drops back to its proper position behind the lever, as shown in Fig. 1, to trip it again on the next downward movement of the lid, and the same operation rotates the valve-plug, whereby its port 16 is caused to register with opening 18 in the valve-casing, when water will flow from the main supply-tank into and fill the measuring-tank, while a reverse movement of the lid will reverse the position of the valve-plug and cause its port 17 to register with opening 19 of the valve-casing, thus establishing communication between the measuring-tank and the hopper and cutting off same between the main-supply and measuring tanks.

It is desirable that the measuring-tank E should be located as far above the hopper as practical in order that the maximum fall of water therefrom may be had. This tank may be made of any desired form and size, and it may be provided with suitable means for attaching it to the wall or other support, the form and construction shown in Figs. 8 and 9 of the drawings being considered most desirable. The bottom of the tank is provided with a downwardly-projecting hollow neck 75, to which the pipe D is connected, and in the top thereof there is a screw-threaded opening 76, adapted to receive the valve and its attachments, and surrounding this opening there is a raised portion 77. S represents a screw-threaded collar adapted to engage said opening and having an overhanging annular portion 78, forming a shoulder or bearing 79, between which shoulder and the raised portion 77 there is placed a gasket 80, of rubber, leather, or other suitable material, by which an air-tight joint is formed. The center of the collar is closed by a blank 81, which is preferably formed integral with the collar

and which carries a stem 82, extending above and below said blank, and having a bore 83, which forms a guide for a valve-stem 84, provided with a valve 85, having a seat in the bottom of said stem and above the water-line in the tank. The collar S is provided with a downwardly-projecting annular flange 86, to which a tube or casing 87, closed at its lower end by a screen 88, is attached, and within this tube there is placed a float T, adapted to rise against and to close the valve 85 when the water reaches the proper level in the tank to cause the said float to perform such function. The valve opening by gravity as the water lowers, and as the downward movement of the float is controlled by the bottom 88 of the tube 87 the valve-stem 84 is thereby retained in its guide. An air-passage 89 is formed in the wall of the stem 82, and the diameter of the valve-stem 84 is made slightly less than that of the bore 83, so as to permit air to escape from the tank while the same is filling with water, the float closing the valve at the proper time to prevent any undue discharge of water from the tank. From the above description of this valve mechanism it will be observed that the float, together with its casing and the valve, is removable with the collar S and that it is not necessary to disturb the tank to gain access to these parts, and which is frequently required for the purpose of repairs and otherwise. The casing 87 may, however, be attached directly to the under side of the top of the measuring-tank, in which case it would not be removable with the valve and float.

In the foregoing I have described what I consider to be the best manner of carrying out the several features of my invention. Nevertheless it is obvious that the details thereof may be modified and departed from in various ways without departing from the spirit of the invention, and which I do not limit to such specific details of construction. It is also apparent that some features of the invention may be used independently of other features thereof.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a water-closet, a hopper, a seat or lid mounted above the same, a support at the rear of said hopper and to which support said seat or lid is hinged, a valve-casing located below said support and having a rotatable valve-plug fitted therein, said valve-plug having a shaft at one end thereof which extends through and beyond said casing, in combination with an actuating device for said valve-plug consisting of a bracket permanently secured to said seat or lid, and a valve-operating arm in pivotal connection with said bracket and in loose engagement with said shaft, whereby the seat or lid may be raised to a substantially-vertical position, and whereby the operation of raising the same to or lowering it from said position will rotate said valve-plug, substantially as set forth.

2. In a water-closet, a hopper, a seat or lid mounted above the same, a support at the rear of said hopper and to which support said seat or lid is hinged, a valve-casing secured to the under side of said support and having a rotatable valve-plug fitted therein, said valve-plug having a shaft at one end thereof which extends through and beyond said casing, in combination with an actuating device for said valve-plug consisting of a bracket permanently secured to said seat or lid, and a valve-operating arm in pivotal connection with said bracket and in loose engagement with said shaft, whereby the seat or lid may be raised to a substantially-vertical position, and whereby the operation of raising the same to or lowering it from said position will rotate said valve-plug, substantially as set forth.

3. In a water-closet, the combination with a hopper and a seat or lid mounted above it, of a casing, a valve therein, a rotatable shaft operatively connected to said valve, and an actuating device for said shaft pivotally connected to said seat or lid and having a sliding engagement with said shaft, substantially as set forth.

4. In a water-closet, the combination of a hopper having an inner bowl open at its lower end and a dumping service-pan adapted to close said lower end of said bowl, a seat or lid mounted above said hopper, a support at the rear thereof and to which support said seat or lid is hinged, a valve located below said support, a bracket secured to said seat or lid and having a shaft extending at right angles thereto, an actuating device for said valve pivotally connected to said shaft, and means connected to said bracket for operating said service-pan, whereby said valve and said service-pan are operated by movement of said bracket caused by the raising or lowering of said seat or lid, substantially as set forth.

5. In a water-closet, the combination of a hopper having an inner bowl open at its lower end and a dumping service-pan adapted to close said lower end of said bowl, a seat or lid mounted above said hopper, a support at the rear thereof and to which support said seat or lid is hinged, a valve located below said support, a bracket secured to said seat or lid and provided with a shaft extending at right angles thereto, an actuating device for said valve pivotally mounted on said shaft, and means mounted on said shaft for operating said service-pan, whereby said valve and said service-pan are operated by movement of said shaft caused by the raising or lowering of said seat or lid, substantially as set forth.

6. In a water-closet, the combination of a main supply-tank, a measuring-tank, a hopper having a flushing-inlet and an inner bowl open at its lower end, a dumping service-pan

adapted to close said lower end of said bowl, a seat or lid mounted above said hopper, a support to which said seat or lid is hinged at the rear of said hopper, a valve-casing located below said support and having openings and a rotatable inner hollow valve-plug provided with ports adapted to register with said openings, the said valve-casing being connected with said flushing-inlet and with said main supply and measuring tanks, a bracket secured to said seat or lid and having a shaft extending at right angles thereto, an actuating device for said valve-plug pivotally connected to said shaft, and means connected to said bracket for operating said service-pan, whereby said valve-plug and said service-pan are operated by movement of said bracket caused by the raising or lowering of said seat or lid, thereby opening and closing communication between said supply and measuring tanks and said flushing-inlet alternately, thus allowing water to pass from the supply-tank into and through said hollow of said plug to the measuring-tank and from the said latter tank through the hollow of said plug into said flushing-inlet, substantially as set forth.

7. In a water-closet, the combination of a main supply-tank, a measuring-tank, a hopper having a flushing-inlet and an inner bowl open at its lower end, a dumping service-pan adapted to close said lower end of said bowl, a seat mounted above said hopper, a support to which said seat is hinged at the rear of said hopper, a valve-casing located below said support and having openings and a rotatable inner hollow valve-plug provided with ports adapted to register with said openings, the said valve-casing being connected with said flushing-inlet and with the main supply and measuring tanks, a lid hinged above said seat to a suitable support at the rear of said hopper, a bracket secured to said seat or lid and having a shaft extending at right angles thereto, an actuating device for said valve pivotally connected to said bracket, and means connected to said shaft for operating said service-pan, whereby said valve and said service-pan are operated by movement of said bracket caused by the raising or lowering of said seat or lid, thereby establishing communication between said supply and measuring tanks and said flushing-inlet alternately, thus allowing water to pass from the supply-tank into and through the hollow of said plug to the measuring-tank and from the said latter tank through the hollow of said plug into said flushing-inlet, and whereby the contents of the measuring-tank will be emptied into the closet to flush the same and the measuring-tank will be refilled, substantially as set forth.

8. In a water-closet, a hopper, a seat or lid hinged above the same, a valve-casing having provisions for connections with a main supply-tank a measuring-tank and said hopper, and having openings therein, a rotatable hollow valve-plug closed at one end and open at the other and having ports adapted to register with said openings in said casing alternately, whereby when one of said ports is in register with one of said openings communication will be established between said main supply and measuring tank connections through the center of said hollow plug, and when the other of said ports is in register with the other of said openings said communication will be closed and communication opened between said measuring-tank and said hopper connections through said center of said hollow plug, in combination with a bracket attached to said seat or lid and having a shaft extending at right angles thereto, and a valve-operating arm in pivotal connection with said shaft and having engagement with said valve-plug, whereby said seat or lid may be raised to a substantially-vertical position and the operation of raising the same to or lowering it from said position will rotate said valve-plug, substantially as set forth.

9. In a water-closet, a hopper, a seat or lid mounted above the same, a support at the rear of said hopper and to which support said seat or lid is hinged, a valve located below said support, a measuring-tank adapted to be filled with water from a main supply-tank and to discharge its contents into said hopper by the operation of said valve, an air-valve located above the water-line in said measuring-tank, a float adapted to close said valve, and a casing within which said float is contained, in combination with a bracket attached to said seat or lid and having a shaft extending at right angles thereto, and a valve-operating arm in pivotal connection with said shaft and having engagement with said valve, whereby said seat or lid may be raised to a substantially-vertical position and the operation of raising the same to or lowering it from said position will operate said valve, substantially as set forth.

In testimony whereof I hereunto subscribe my name this 21st day of July, A. D. 1899.

JOHN KIRBY, JR.

Witnesses:
N. EMMONS, Jr.,
E. R. KIRBY.