

(No Model.)

2 Sheets—Sheet 1.

J. W. HALE.

VALVE MECHANISM FOR LAVATORY APPARATUS.

No. 524,989.

Patented Aug. 21, 1894.

Fig. 1.

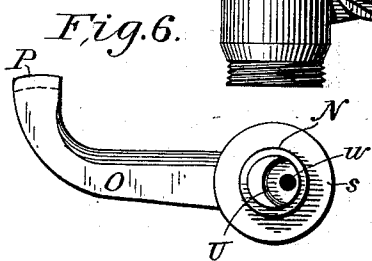
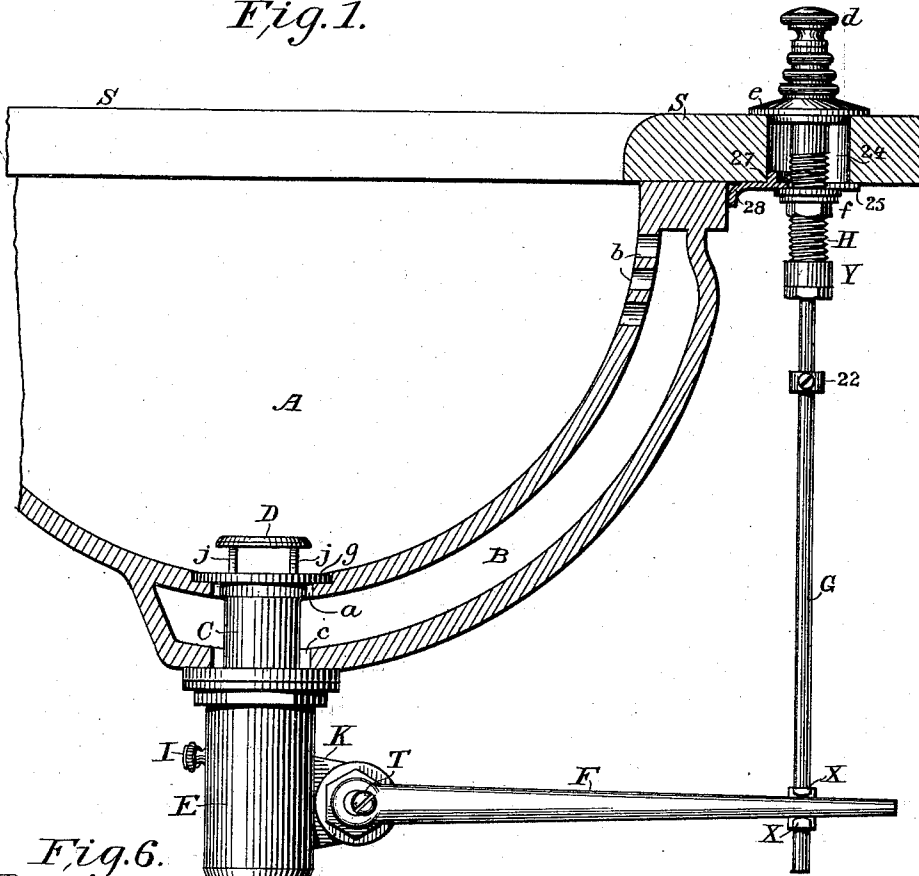


Fig. 11.

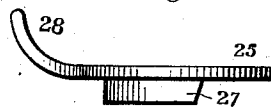


Fig. 14.

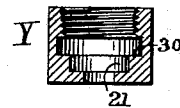


Fig. 7.

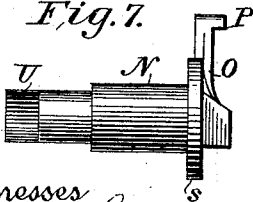
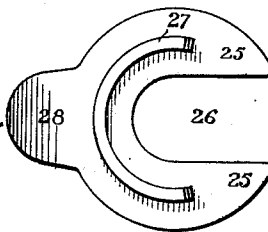


Fig. 12.



Witnesses
Joe. S. Latimer
Charles E. Snell

Inventor
James White Hale
 by *Arthur B. Brown*
 his Attorney

J. W. HALE.

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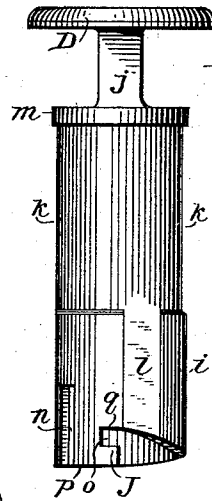
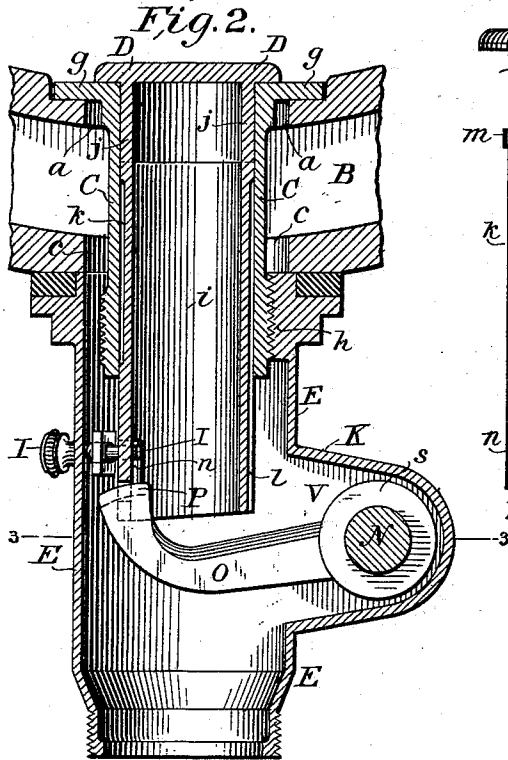


Fig. 5.

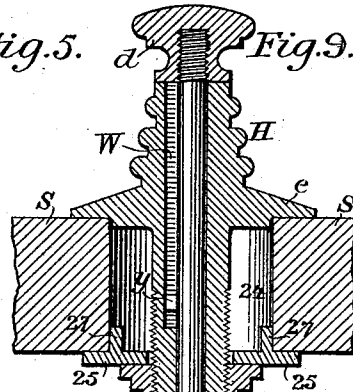


Fig. 9.

Fig. 8.

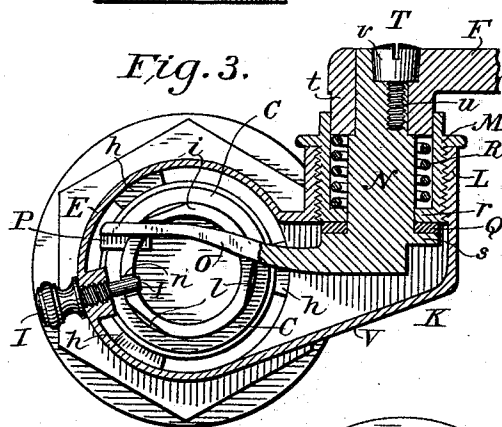
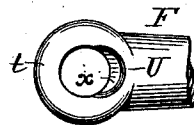


Fig. 3.

Fig. 13.

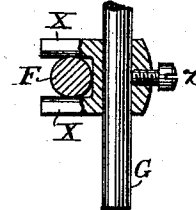
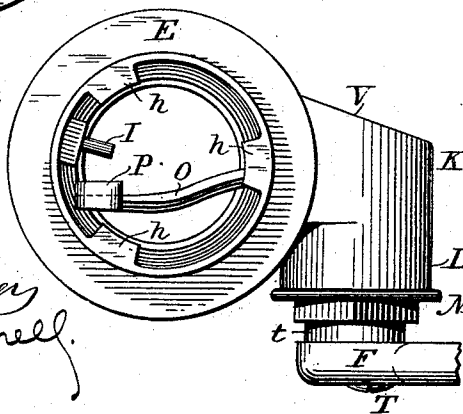


Fig. 10.

Fig. 4.



Witnesses

Jos. S. Latimer
Charles C. Snell

Inventor

James White Hale

Arthur D. Stone
 His Attorney

UNITED STATES PATENT OFFICE.

JAMES WHITE HALE, OF NEWBURYPORT, MASSACHUSETTS.

VALVE MECHANISM FOR LAVATORY APPARATUS.

SPECIFICATION forming part of Letters Patent No. 524,989, dated August 21, 1894.

Application filed December 29, 1893. Serial No. 495,036. (No model.)

To all whom it may concern:

Be it known that I, JAMES WHITE HALE, of Newburyport, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Valve Mechanism for Lavatory Apparatus, of which the following is a specification.

The present improvements relate to that class of wash-basins, bath-tubs, and similar vessels, wherein the outlet valve or stopper is operated from beneath by connection with a push-knob above the slab or frame surrounding the basin or tub. The class of devices referred to is illustrated, for example, in Letters-Patent of the United States No. 439,818, granted to me November 4, 1890, and No. 484,423, granted to me October 18, 1892.

The objects of the present improvements are to furnish a lavatory valve mechanism which shall be sanitary and cleanly, which shall leave the interior of the lavatory vessel unobstructed, which shall be simple and effective in operation, which shall not get out of order, and which can be readily put in place and taken apart. The valve mechanism is constructed throughout to eliminate places where dirt and foul matter may lodge and accumulate, so that the lavatory vessel provided with it shall be cleanly and sanitary. The only portion of the valve mechanism within the lavatory vessel is the valve itself which is a flat disk having a simple vertical rise and fall to empty and close the vessel. The operation of the valve is extremely simple and effective. As far as the user of the vessel is concerned, there are only two parts to the valve mechanism which are accessible, the valve itself and a manipulating knob therefor. The manipulating knob has a simple vertical rectilinear movement, and no other. It is moved up to close the valve and moved down to open the valve. The valve and knob thus have two principal operative positions and they maintain themselves securely in any position in which they may be placed. The valve cannot be removed from its place by the user of the vessel, and hence cannot be lost. And in manipulating the valve it is not necessary to hold on to the knob to discharge the contents of the vessel, or to twist or turn it to enable the valve to be held open. And no manipulation of the parts which are ac-

cessible can injure the valve mechanism or get it out of order. Hence as far as the users are concerned the mechanism has the extreme simplicity of construction and mode of operation. These circumstances render the improved mechanism particularly applicable to hotels, railway stations, and other places frequented by the public. Likewise, as far as the plumber is concerned the valve mechanism is simple in construction and operation and it can be taken apart and put in place readily even by a person wholly ignorant of its construction without danger of injury to the valve mechanism.

In order to enable the construction and mode of operation to be understood, the improved valve mechanism will be shown and described as applied to an ordinary stationary wash basin.

The improvements are illustrated in the accompanying drawings, wherein—

Figure 1, is a vertical section through a wash basin to which the improved valve mechanism is shown attached for the purposes of illustration, the valve mechanism being shown in side elevation. Fig. 2, is a vertical section through the valve, the outlet tube which passes through the basin constituting the waste outlet thereof, and the coupling connecting the same to the waste pipe. Fig. 3, is a horizontal section in a plane indicated by the line 3—3 in Fig. 2. Fig. 4, is a plan view of the coupling detached from the basin or bowl. Fig. 5, is a side view of the valve detached. Figs. 6, and 7, are detail views of the rock-shaft and crank arm which act immediately upon the valve. Fig. 8, is a detail view of the end of the connecting rod which is connected with the said rock-shaft. Fig. 9, is a vertical section through the handling mechanism. Fig. 10, is a cross-section thereof. Figs. 11, and 12, are detail views of the washer. Fig. 13, is a detail view of the gripper. Fig. 14, is a detail sectional view of the terminal nut constituting the housing for said gripper.

A, is the wash-basin of a usual and well-known type, having waste outlet *a*, overflow holes *b*, and overflow passage *B* leading from the overflow holes to the overflow outlet *c* beneath and in line with the waste outlet in a well-known manner. The basin is secured

beneath the usual slab S, in any usual or well-known manner.

C, is the outlet tube extending through the waste outlet *a*; D, is the valve having its stem within the tube C; E, is the coupling surrounding the outlet tube and connecting it with the waste pipe; F, is the valve-operating connecting-rod; G, is the manipulating rod of the handling device, having operating knob *d*; and H, is the exteriorly screw-threaded guide-sleeve for said manipulating rod, which extends through a hole in the slab S and is secured to said slab by a flange *e* and a nut *f*. All of these parts, except as herein-
 15 after specified, are similar to corresponding parts in my said Patent No. 484,423.

The outlet tube C, has a flange *g* which fits in the bottom of the basin around the waste outlet *a*, and its tubular part extends
 20 through the waste outlet, through and beneath the overflow outlet, and at its lower end it is exteriorly screw-threaded so as to be engaged by the mutilated screw *h* of the coupling E. The outlet tube C, is smaller
 25 in diameter than the overflow outlet and the coupling E, so that an annular outlet passage for the overflow is formed independent of the waste passage for the contents of the basin, the result being that unclean water from the
 30 basin can not back up into the overflow passage and foul the same. The construction in this respect is the same as in Letters-Patent of the United States No. 451,324, granted to me April 28, 1891.

The tubular stem *i* of the valve D, fits and slides vertically within the outlet tube C, extending a considerable distance below the same. The valve proper is a flat disk-like valve above the outlet tube C, within the
 40 basin, which co-operates with the flange *g* of the outlet tube, said flange *g* constituting the valve-seat. The co-acting faces of the flange *g* and valve D, are ground true, so as to provide a ground joint. The valve is integrally
 45 connected with its tubular stem by posts *j j*, so that openings are provided for the passage of water into the interior passage of the tubular stem *i*. The main body of the tubular stem fits within the outlet-tube C, so as to be
 50 guided thereby, but it has a contracted portion immediately below its upper edge, and its lower end is shaped relatively to the inner surface of the outlet tube C so as to constitute ways or channels *l l* which extend
 55 from the annular space *k* (formed between the valve stem and the outlet tube C by the contracted portion) downwardly below the lower edge of the outlet tube. These ways *l l* are preferably formed by slicing off portions
 60 of the outer periphery of the valve-stem. The object of the annular space *k* and of the ways *l l* is to prevent the lodgment between the outlet tube and the valve-stem of any grit or other foreign substance which would
 65 interfere with the free movement of the valve. Any grit or other matter which might pass the upper full-sized portion *m* of the valve-

stem and hence find its way between the outlet tube and the valve-stem, would be washed
 70 down through the space *k* and ways *l l* into the waste pipe. The space *k* and ways *l l* might be formed by properly shaping the interior of the outlet tube, either alone or in conjunction with the illustrated valve-stem, but preferably the bore of the outlet tube is
 75 smooth and the space and ways are formed in the outer surface of the valve-stem. The improved valve-stem differs in its self-cleaning aspect from the valve-stem of my said Patent No. 484,423, by reason of the presence
 80 of the upper guide-portion *m* which excludes the passage of grit and other foreign materials between the valve-stem and outlet-tube, and also in its specific construction.

The valve-stem has a vertical guide-slot *n*,
 85 which is entered by a radially-projecting guide-stud I, which is carried by the coupling E and projects inwardly from the inner surface thereof. The guide-stud I, is removable from the coupling, and for this purpose
 90 has a screw-threaded shank (passing through the wall of the coupling) and a milled head. This guide-stud I, and the guide-slot *n*, permit the free vertical movement of the valve while preventing any rotation of the valve
 95 when in use, an important feature as will hereinafter appear. The present improved valve-stem differs in this respect from the valve-stem of my said Patent No. 439,818, by reason of the fact that the guide-slot *n* is
 100 open at the bottom. If the guide-slot *n* were not thus open at the bottom, it would be necessary to first unscrew the guide-stud I far enough to clear the valve-stem before the coupling E could be unscrewed from the outlet tube C. Since plumbers unacquainted with the construction of the valve mechanism may be called in to take the coupling E off, for cleaning the usual trap or for other purposes, they neglect to unscrew the stud I, and consequently injure the mechanism.
 110 With the present improved construction however, the coupling can be freely unscrewed without paying any attention to the guide-stud I.

Adjacent to the guide-slot *n*, the valve-stem is provided with a hook J, having a retaining notch *o*. The outer plane *p* of the hook is flush with the lowest portion of the valve-stem from which the guide-slot *n* extends.
 120 From this plane *p*, the lower edge of the valve-stem inclines upwardly to the highest plane *q* of the notch *o*, so that the lower edge of the valve-stem is a cam. The purpose of this construction will hereinafter appear.

The coupling E, is formed with a chambered or hollowed box or extension K, communicating with the interior of the coupling and located opposite the lower edge of the valve stem when the valve is closed. This box K, has an outwardly and horizontally projecting boss L, interiorly screw-threaded, into which screws the bearing sleeve M, of the rock-shaft N. This rock-shaft N extends horizontally,
 130

and it carries at its inner end an interiorly-projecting operating crank-arm O, the free end of which extends into and across the coupling E, to beneath the edge of the valve-stem most remote from the box K, so that the maximum leverage is obtained with the minimum projection of the box K from the coupling. The free end of the crank-arm O, curves upwardly and is provided with a laterally-projecting curved, flange or hook P, which engages the hook J of the valve, extending into the retaining notch *o* thereof. Consequently when the rock-shaft N, is oscillated the crank-arm O raises and lowers the valve D, the action being positive in both directions. The curved shape of the hook P accommodates the curved motion of the crank-arm O to the rectilinear movement of the valve D. Since, when the parts are in operative position, the hook P engages the hook J and the valve is prevented from rotation by the stud I, the valve can not be lifted out of the basin by the casual user or by anyone ignorant of the construction. If, however, an initiated person wishes to remove the valve, all that is necessary to be done is to partially unscrew the stud I until it clears the slot *n*. The valve D, can then be turned until the hooks J, P, are cleared from each other, when the valve can be lifted out. To replace the valve it is sufficient to simply drop it into position and turn until it stops. In turning, it will stop only when it is turned in the proper direction, which will cause the cam or inclined lower edge of the valve-stem to ride on the hook P until the hook J engages therewith, whereby the rotation is stopped. When so stopped the slot *n* is in register with the stud I, which can then be screwed in to lock the valve from accidental or willful removal. The presence of the cam or inclined lower edge insures the proper co-action of the hooks J, P, and hence the correct register of the slot *n* and stud I. The mouth of the slot *n* is of less width than the width of the upper face of the hook P, so that the latter can not enter said slot.

The bearing sleeve M, has on its inner end an annular flange *r* having a central circular opening through which the rock-shaft N passes, said flange thus constituting a portion of the bearing for said shaft. Inside of the box K, the shaft N has an annular flange *s* between which and the flange *r* an elastic packing-ring or washer Q, of leather or other suitable material, is interposed. The valve-operating connecting-rod F has a hub *t* which is fastened to and fits over a reduced outer portion of the rock-shaft, and this hub enters and occupies the outer portion of the bearing sleeve M, so that the forward part of said sleeve also serves as a portion of the bearing for said shaft. Surrounding the shaft N, within the sleeve M, is a coiled compression spring R, which bears against the flange *r* and the hub *t* and thereby forces the washer

Q, against the flange *r* thus preventing any leakage at this point.

The connecting-rod F is rigidly fastened to the rock-shaft by a key T, having a screw shank *u* and a (preferably tapering) head *v*. The threaded aperture *w* for the shank *u* is located entirely in the rock-shaft and eccentrically to the axis thereof. When the connecting-rod F is in place on the rock-shaft, a (preferably tapering) socket U, is formed for the reception of the head *v* of the key, a portion of this socket being in the rock-shaft and a portion in the connecting-rod. The aperture *w* for the reception of the shank *u* is at the bottom of the portion of the socket U in the rock-shaft; and the portion of the socket in the connecting-rod terminates at a shoulder *x*. The key T, consequently not only serves the purpose of holding the connecting-rod rigidly upon the rock-shaft, but it also serves to force the connecting-rod into place against the resilience of the spring R, since, if the connecting-rod is not fully on the rock-shaft when the key T is inserted, the head of the key comes in contact with the shoulder *x*, and on being further inserted it forces the connecting-rod in against the force of the spring until said shoulder *x* is flush with the end portion of the rock-shaft in which the aperture *w* is formed. The tapering of the key-head and of the socket U, enables a rigid connection to be made between the connecting-rod and rock-shaft at all times, and compensates for wear.

By having the boss L, for the bearing-sleeve M, project outwardly from the box K, instead of inwardly as in my said Patent No. 484,423, and by inclining the rear wall V, of the box K, the box is reduced to minimum dimensions so as to afford as little space as possible for the lodgment of dirt.

The manipulating-rod G where it passes through the guide-sleeve H, has a rigid projecting stud *y*, which is always located (when the valve mechanism is in place) within a rectilinear way W in the guide-sleeve, so that the rod G is prevented from rotation and is capable of rectilinear movement only. Near its lower end the rod G carries also two projecting prongs X, X, which are preferably connected together and adjustably held upon the rod G by a set screw *z*. This adjustment is desirable only when the valve mechanism is to be put in place to accommodate the same to different sizes of bowls and thicknesses of slabs. When the valve mechanism is in place, the prongs X, X, are for all operative purposes rigid component parts of the rod G. Between these prongs is located the free end of the connecting-rod F, the fit being as close as the accommodation of the oscillating movement of the rod F to the rectilinear movement of the rod G will permit, so that there is little lost motion. Since the rod G has a rectilinear movement only, there is no liability of disconnecting the rod F from the

prongs X, X, in using the valve mechanism.

Fitting and screwing upon the lower end of the sleeve H and embracing the manipulating-rod G, is a terminal nut Y, which when 5 screwed home upon the sleeve H has an annular chamber 21 beneath said sleeve H, surrounding the rod G. The terminal nut has a shoulder 30, above the chamber 21, which abuts against the lower end of the sleeve H, so that said sleeve cannot enter the chamber 10 21. Within this chamber 21, is a frictional gripper Z, which clasps and grips the rod G. This gripper (see Fig. 13) is a split ring slightly smaller in interior diameter than the 15 diameter of the rod G, so that when forced upon the rod it clamps the same with a spring pressure. This gripper Z, is held within the chamber 21 from longitudinal movement with the manipulating-rod G. When, therefore, 20 the rod G is moved either up or down the gripper Z holds it securely in place, and consequently the valve D is held either open or shut as the case may be. As the result, therefore, of the general arrangement of the valve 25 mechanism, the valve and its manipulating rod (which are the only parts in sight or accessible to the user of the basin) have each a rectilinear movement, and the valve is held either open or shut. In this way I avoid the 30 necessity of using the valve-closing spring, and the bayonet joint operating in connection with the rotary movement of the manipulating rod to hold the valve open, of my Patent No. 484,423. The user has simply to 35 push or pull the knob of the manipulating rod.

To prevent the manipulating-rod being pulled up violently so far as to bend the connecting-rod, it is provided with an adjustable stop-collar 22, secured by a set screw 23 below the terminal nut Y. This stop-collar is 40 located so as to permit the valve D to close tightly, but should the rod G be then pulled upward the collar 22 would come in contact with the terminal nut Y before the connecting-rod F could be bent. The rod F has 45 enough elasticity to insure a tight-closing of the valve before the collar 22 acts to stop the upward movement of the rod G.

To enable the rod G, and sleeve H with 50 their various accessories to be placed in position on the slab and to be removed therefrom without necessitating the removal of the collar 22, prongs X, X, and terminal nut Y from the rod G, and the removal of the locking nut *f* from the sleeve H, the aperture 24 55 in the slab S is made large enough to permit the passage through it of all of these parts. Then to enable the sleeve H to be fastened to the slab S, by the flange *e* and nut *f*, the 60 special washer 25 (see Figs. 11 and 12) is employed. This washer is larger than the slab aperture 24, and it has a slot 26, just large enough to enable the washer to be slipped over the sleeve H, between the nut *f* and the 65 under side of the slab. Then when the nut *f* is screwed up, the washer is clamped tightly against the under side of the slab, and thus

the sleeve is held firmly in place. To enable the washer to be held firmly in place, it has 70 on its upper surface a projecting curved rib or flange 27, extending through the arc of a circle concentric with the slab aperture 24, and of a size to fit therein. Consequently when the flange 27, is within the aperture 24 the washer can not be removed as long as the 75 nut *f* is in its locking position. The washer 25 has also a projecting handle 28 which enables it to be easily manipulated and which is turned back out of the way, as shown in Fig. 1, to enable a wrench to be applied to 80 the nut *f*.

To remove the entire valve mechanism, all that the plumber has to do is to unscrew the nut *f* far enough to remove the washer 25. The manipulating rod G, sleeve H, and all 85 the parts associated therewith can be turned to disengage the prongs X from the rod F, and can then be lifted out of the way. Then by simply unscrewing the coupling E it together with the valve D and outlet tube C 90 are entirely disconnected from each other and can be removed. The valve mechanism is hence simple as far as the plumber is concerned.

I claim as my invention— 95

1. The combination of the outlet tube, the valve having a tubular stem fitting and sliding within said outlet tube, the adjacent surfaces of said stem and tube being relatively 100 shaped to provide a guiding fit between them at the upper part of said valve-stem, an annular recess below said guiding fit, a guiding fit beneath said annular recess and ways or channels leading from said annular recess to below said outlet tube, substantially as set 105 forth.

2. The combination of the outlet tube having a smooth interior bore, and the valve having a tubular stem within said outlet tube, said stem having an upper and a lower 110 portion fitting said tube, a contracted middle portion forming an annular chamber between said stem and tube, and longitudinal ways leading from said contracted portion to below said tube, substantially as set forth. 115

3. The valve with a stem having a hook, said valve having a vertical movement in opening and closing, in combination with the operating device for said valve having a hook engaging said hook on the valve-stem, the 120 hook of said operating device moving in the same direction as said valve and said hooks being engaged and disengaged by rotating said valve-stem, substantially as set forth.

4. The valve with a stem having a hook, 125 said valve having a vertical movement in opening and closing, in combination with a rock-shaft, and a crank-arm thereon having a curved hook engaging said hook on the valve-stem, said hooks being engaged and disengaged by rotating said valve-stem, substantially as set forth. 130

5. The valve having a tubular valve-stem having a cam-shaped lower edge terminating

in a hook and having a longitudinal guide-slot with an open mouth at said lower edge of said stem, and an adjustable guide-stud for engaging said guide-slot, in combination with an operating device for said valve having a hook upon which the lower cam edge of said valve-stem rests and which engages the hook on said valve-stem when said guide-slot registers with said guide-stud, the width of said slot being less than the width of said hook of the operating device, substantially as set forth.

6. The combination of the shaft, a hub fitting over said shaft, and the screw-key connecting the same and preventing the rotation of said hub upon said shaft, said screw-key screwing into an eccentric threaded aperture located wholly in said shaft, substantially as set forth.

7. The shaft, and the hub fitting over said shaft, said shaft with said hub having a socket eccentric to the axis of said shaft, said socket being partly in said shaft and partly in said hub, in combination with a screw having a head fitting in said socket and a screw shank entering an eccentric threaded aperture wholly in said shaft, substantially as set forth.

8. The shaft and the hub having an eccentric tapered socket partly in said shaft and partly in said hub, in combination with a screw-key having a tapered head fitting in said socket, and a screw shank entering an eccentric threaded aperture wholly in said shaft, substantially as set forth.

9. The shaft, the rod or arm having an eccentric socket partly in said shaft and partly in the hub of said rod or arm, and a spring tending to separate said shaft and rod or arm, in combination with a screw key having a head fitting in said socket and seating against the bottom of the part of said socket in said hub, and having a screw shank fitting in an eccentric threaded aperture wholly in said shaft, substantially as set forth.

10. The guide-sleeve having a rectilinear guide groove, and the connecting rod, in combination with the manipulating rod within said guide-sleeve having a fixed stud traveling in said rectilinear guide-groove whereby said manipulating rod has when in operation a rectilinear movement only, said rod having two rigid prongs between which said connecting-rod is located and by which it is moved in opposite directions, and a frictional gripper acting upon said manipulating rod, substantially as set forth.

11. A lavatory vessel, its slab or frame, the valve for the discharge outlet of said vessel having a rectilinear movement only in opening and closing, the manipulating rod for said valve having a rectilinear movement only, and intermediate connections between said valve and rod, said intermediate connections being located wholly outside the vessel and beneath said slab or frame and being connected with said valve beneath the said dis-

charge outlet, in combination with a frictional gripper acting upon said manipulating rod for holding said valve and rod in their several positions, substantially as set forth.

12. A lavatory vessel, its slab or frame, the valve for the discharge outlet of said vessel having a vertical movement only in opening and closing, the manipulating rod for said valve having a vertical movement only, said rod being accessible above and extending beneath said slab or frame and wholly exterior to the said vessel, and a lever located outside said vessel and beneath the same and said slab or frame and connecting the lower ends of said valve and manipulating rod, in combination with a frictional gripper surrounding said manipulating rod and acting upon the same to maintain said valve in its different positions, substantially as set forth.

13. The slab or frame having an aperture, the guide-sleeve extending through said aperture, and the locking-nut for said sleeve smaller than said aperture, in combination with a washer larger than said aperture, said washer having a slot which slips over said sleeve between the locking nut thereof and said slab or frame, substantially as set forth.

14. The slab or frame having an aperture, the guide sleeve extending through said aperture, and the locking nut for said sleeve smaller than said aperture, in combination with a washer larger than said aperture, said washer having a slot which slips over said sleeve between the locking nut thereof and said slab or frame, said washer having upon its upper face a curved rib or flange capable of entering said aperture and surrounding said sleeve, substantially as set forth.

15. The slab or frame having an aperture, the guide sleeve extending through said aperture, and the locking nut for said sleeve smaller than said aperture, in combination with a washer larger than said aperture, said washer having a slot which slips over said sleeve between the locking nut thereof and said slab or frame, said washer having a downwardly projecting handle, substantially as set forth.

16. The guide-sleeve H, having locking nut *f* and terminal nut Y, and the manipulating rod G, having stop collar 22 with set-screw 23, and prongs X, X, with set-screw *z*, in combination with the frame or slab having an aperture 24 larger than said parts on said sleeve and rod, and the washer 25, having slot 26 which slips over said sleeve above said nut *f*, curved rib 27 which fits in said aperture 24, and handle 28, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES WHITE HALE.

Witnesses:

CHARLOTTE E. HALE,
LUCY B. HALE.