H. C. FARRELL.

VALVE MECHANISM FOR VENTILATING WATER CLOSETS.

APPLICATION FILED JUNE 30, 1915.

1,241,614.

Patented Oct. 2, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

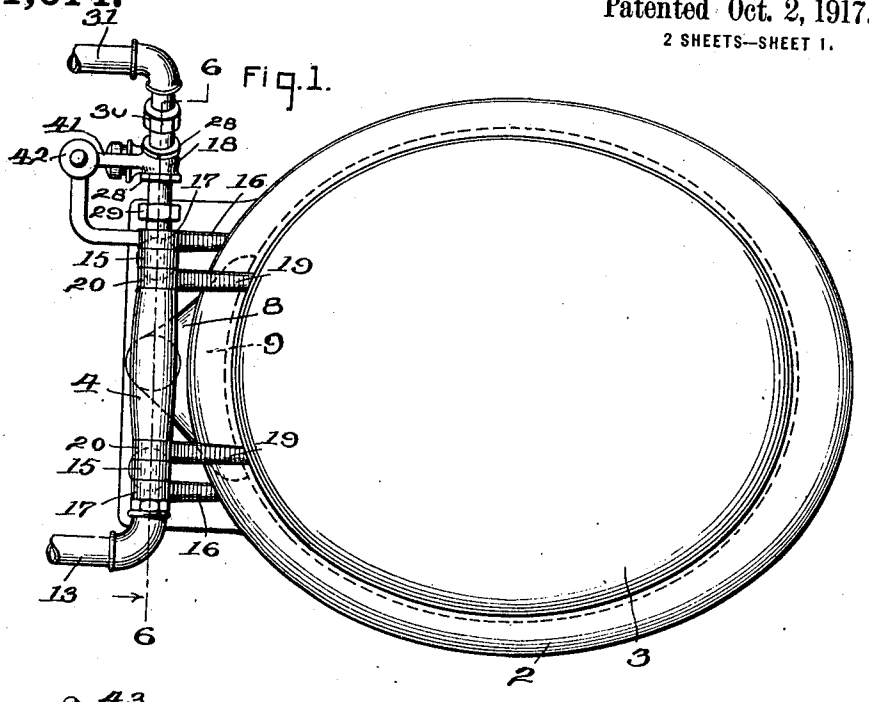
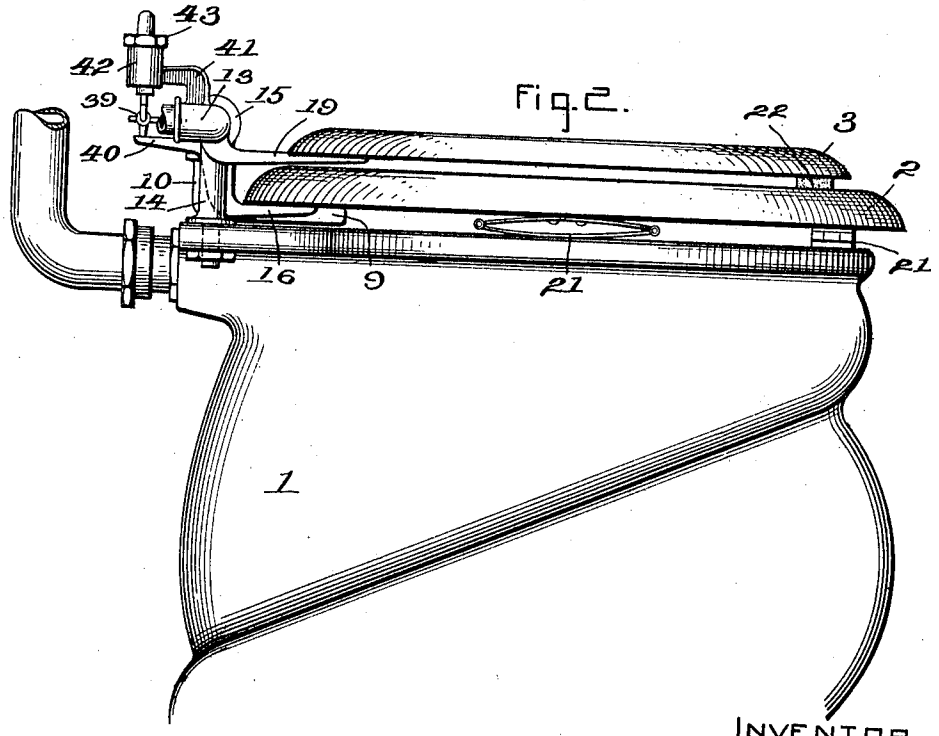


Fig. 2.



INVENTOR

Henry C. Farrell

BY Geyer & Popp

ATTORNEYS

H. C. FARRELL.

VALVE MECHANISM FOR VENTILATING WATER CLOSETS.

APPLICATION FILED JUNE 30, 1915.

1,241,614.

Patented Oct. 2, 1917.

2 SHEETS—SHEET 2.

Fig. 3.

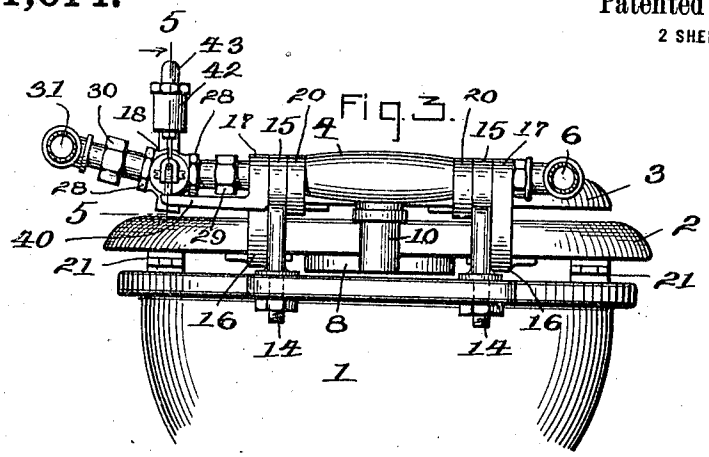


Fig. 4.

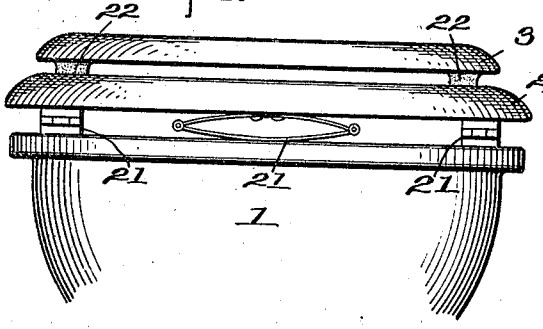


Fig. 5.

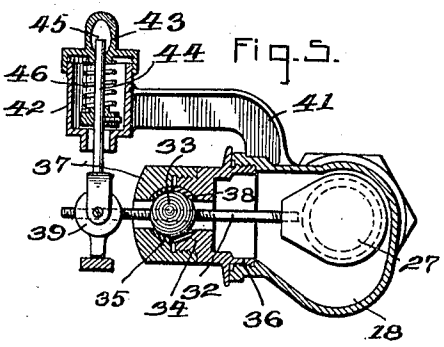
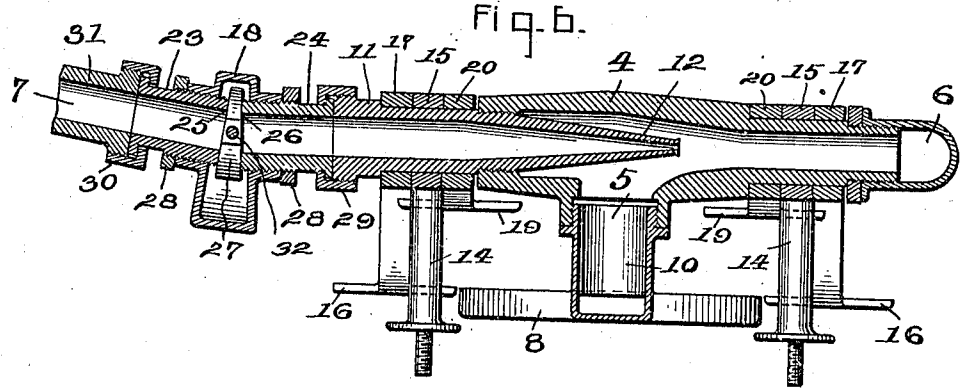


Fig. 6.



INVENTOR

Henry C. Farrell

by Cleper & Popp

ATTORNEYS

UNITED STATES PATENT OFFICE.

HENRY C. FARRELL, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO GEORGE B. BURD, OF BUFFALO, NEW YORK.

VALVE MECHANISM FOR VENTILATING WATER-CLOSETS.

1,241,614. Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed June 30, 1915. Serial No. 37,188.

To all whom it may concern:

Be it known that I, HENRY C. FARRELL, a citizen of the United States, and residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Valve Mechanism for Ventilating Water-Closets, of which the following is a specification.

This invention relates to a valve mechanism for ventilating water closets and has the object to provide simple, compact and efficient means for withdrawing odor laden air from the bowl and discharging the same to the outer atmosphere.

In the accompanying drawings: Figure 1 is a top plan view of a closet provided with my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a rear elevation thereof, partly in section. Fig. 4 is a front elevation of the same. Fig. 5 is a fragmentary vertical section, on an enlarged scale, taken on line 5—5, Fig. 3. Fig. 6 is a fragmentary vertical section taken on line 6—6, Fig. 1.

Similar characters of reference indicate corresponding parts throughout the several views.

1 represents the bowl of the closet which may be of any suitable construction, 2 the seat capable of swinging vertically over the top of the bowl and 3 the cover which swings vertically toward and from the upper side of the seat in the usual and well known manner. These parts are pivotally connected with each other for this purpose and in the preferred form of this pivotal connection the same is combined with the air ejecting device forming part of the ventilating apparatus. This air ejecting device, as best shown in Figs. 1, 2, 3 and 6, comprises an ejector having a casing 4 arranged transversely and horizontally over the rear part of the bowl and adjacent to the rear edges of the seat and cover and provided centrally on its underside with an air inlet 5 and at one end with an air outlet 6 and at its opposite end with a water inlet 7. Adjacent to the upper rear part of a bowl is arranged a suction spout 8 having a comparatively wide inlet mouth 9 which opens forwardly in the space of the bowl and an upwardly projecting rear neck 10 which connects with the inlet of the ejector casing for the purpose of carrying the odor laden air from the interior of the bowl into the casing of the ejector.

11 represents a water delivery nozzle which is preferably screwed into the water inlet end of the ejector casing and provided with a tapering delivery end 12 which extends lengthwise into the central part of the ejector casing and across the air inlet thereof so that when water is supplied to this nozzle the same will be delivered into the form of a jet into the ejector casing and cause air to be withdrawn from the bowl and delivered through the outlet of the ejector casing. This air is forced out to the exterior of the building or elsewhere through a ventilating pipe 13 which connects with the outlet of the ejector casing. This air carries with it any vapors absorbed by the air while the solid water which is separated from the air passes into the usual vent pipe leading upwardly to the atmosphere and also downwardly to the sewer or drain.

The ejector is mounted on the rear upper part of the bowl by means of two uprights or standards 14 which are secured at their lower ends to the upper side of the bowl while their upper ends are provided with eyes 15, 15 one of which surrounds the outlet end of the ejector casing while the other surrounds the water supply nozzle, thereby forming a reliable support for the ejector and the parts associated therewith. The seat is pivotally supported upon this ejector by means of two pivot arms 16, 16 projecting rearwardly from this seat and provided at their rear ends with pivot eyes 17, 17 which are journaled respectively on the water supply nozzle and the outlet of the ejector casing adjacent to the outer sides of the standard eyes 15, 15, as shown in Figs. 1, 3 and 6. The cover is also pivotally supported on this ejector by means of two pivot arms 19, 19 projecting rearwardly from this seat and provided at their rear ends with pivot eyes 20, 20 which are journaled respectively on the water supply nozzle and the outlet end of the ejector casing adjacent to the inner sides of the standard eyes, as shown in the last mentioned figures. By this means the seat and cover are held in place relatively to each other and the bowl and the ejector but are free to swing vertically as required. The seat is raised somewhat above its normal or lowermost position by spring pressure which is preferably secured by means of a plurality of elliptical springs 21 arranged between the

front and side portions of the bowl and the seat and each secured with its upper leaf or bow to the underside of the seat while its lower leaf or bow is adapted to engage loosely with the upper side or edge of the bowl, as shown in Figs. 2, 3 and 4. The cover is provided on its underside with the usual bumper 22 of rubber or other suitable material whereby the same may rest against the upper side of the seat without marring the latter.

A valve mechanism is provided which is so designed that water under pressure is admitted to the nozzle of the ejector when the seat is depressed into its normal lowermost or operative position and to cut off this water supply when the seat is raised into its inoperative position which valve mechanism is preferably constructed as follows:

18 represents a valve casing which is provided on its opposite sides with two nipples 23, 24 which are screwed into threaded openings in opposite walls of this casing. These two nipples have their axes arranged at an angle relatively to each other and are provided at their inner ends with valve seats 25, 26 each of which is arranged at right angles to the axis of the respective nipple, whereby the seats of both nipples are arranged at an angle to each other and form a V-shaped or wedge-shaped space between the same. 27 represents a valve gate arranged in the valve casing and movable transversely therein between the opposing inner ends of the valve nipples for the purpose of engaging with or disengaging from the seats on the inner ends of these nipples and thereby either opening or closing the passage through the valve casing. This gate is of V-shaped form in the direction of its movement so that the same is capable of engaging by a wedge action with the valve seats at the inner ends of both nipples. For this purpose one side of the valve gate is arranged in the same plane as the seat of one of the valve nipples while its opposite side is arranged in the same plane as the valve seat of the other valve nipple. By thus constructing the valve gate of wedge form and arranging the seats of the valve nipples also in the form of a wedge relatively to each other it is possible for the gate to firmly engage these seats for positively closing the valve and preventing leakage while at the same time this gate is capable of being opened freely and without undue friction. When any of the coöperating surfaces of the valve gate or the nipple seats become worn the same can be corrected by screwing in one or both of these nipples sufficient to take up this wear, after which the nipples may be again held firmly in their adjusted position by means of lock nuts 28 arranged on the external threads of the nipples and engaging with opposite sides of the valve casing. The outlet nipple of this valve is connected by a union 29 with the ejector nozzle and the inlet nipple of this valve is connected by means of a union 30 with a water supply pipe 31 which receives water under pressure from any suitable source, so that when the valve gate is opened water will be delivered to the nozzle for causing the same to withdraw the air from above the bowl and discharge it to the outer atmosphere and when the valve gate is closed this ejecting operation will cease.

The transverse movement of the valve gate is preferably produced by means of a rock lever 32 having its inner arm arranged within the valve casing and connected with the valve gate while its outer arm is arranged on the exterior of the valve casing and operatively connected with the seat so that when the latter is depressed the gate will be opened and cause the bowl to be ventilated but when the seat is again elevated the gate valve will be closed and arrest the ventilating operation. In the preferred means for pivotally mounting this lever on the valve casing this lever is provided between its arms with a spherical knuckle or ball 33 which is journaled in a corresponding shaped bearing composed of a semi-spherical inner bearing section 34 which receives the upper part of the knuckle or ball and a semi-spherical outer section 35 which receives this outer part of the knuckle or ball, the inner section being preferably formed on a bonnet 36 which is secured to the valve case by a screw joint while the outer bearing section is preferably formed on a cap 37 connected by a screw joint with the bonnet. In order to pack the joint between this spherical knuckle and its bearing a spherical packing 38 of leather or other suitable material is interposed between this ball and the ball-shaped bearing of the casing, as shown in Fig. 5. This knuckle or ball is preferably secured on the valve gate lever by providing the latter with an external screw thread which engages with an internally screw threaded equatorial opening in said ball, as shown in Fig. 5.

On its outer arm the gate lever is provided with a head or collar 39 which is preferably mounted thereon so as to be capable of lengthwise adjustment relatively thereto for which purpose this arm is provided with an external screw thread engaging with an internally threaded opening in this head. 40 represents a tappet or finger projecting rearwardly and laterally from one of the pivot arms 16 of the seat and engaging with the underside of the lever head 39 so that upon depressing the seat the tappet will be elevated together with the rear arm of the gate lever, thereby causing the front arm of this lever together with the gate to swing down-

wardly into its open position. When the downward pressure on the seat is relieved and the seat is raised the rear arm of the gate lever is again depressed for automatically closing the valve by means of a spring device which preferably comprises a bracket 41 projecting rearwardly from the upper side of the gate valve casing and provided at its rear end with a housing body 42 having an open lower end while its upper end is closed by a screw cap 43, a tension rod 44 pivotally connected at its lower end with the lever head 39 and passing with its upper part through the body of the housing and guided in an opening 45 in the cap thereof, and a tension spring 46 arranged in the housing and bearing at its upper end against the cap while its lower end bears against a collar 47 adjustably secured to the tension rod within the socket. Upon opening the gate valve the spring 46 is compressed and its tension is increased and when the gate is free the same will be moved into its closed position by the resilience of this spring. By screwing the cap 43 up or down on the housing the tension of the spring 46 may be adjusted as required.

It will be apparent from the foregoing explanation that this invention is applicable to the bowl, seat and cover and the arms of the latter as now commonly used so that no alteration in these parts is necessary, thereby permitting of equipping a closet with my improvements with a minimum additional expense.

As a whole my improved ventilating apparatus for water closets is very compact in construction and neat in appearance so that the same does not detract from the looks of the closet when associated therewith. Furthermore, the same is very effective in operation and is not liable to leak or otherwise get out of order, thereby avoiding expense or annoyance which otherwise would be necessary for its maintenance.

I claim as my invention:

1. A valve comprising a casing having inlet and outlet nipples which have their opposing inner ends arranged at an angle relatively to each other, a V-shaped gate arranged in the casing and movable transversely into and out of engagement with the inner ends of said nipples, and a rock lever pivoted on said casing and having its inner arm arranged within the valve casing and carrying said gate.

2. A valve comprising a casing, inlet and outlet nipples screwed into opposite ends of said casing and arranged at an angle relatively to each other and each of said nipples having its inner ends provided with a seat which is arranged at right angles to the axis of the respective nipple while its outer end is arranged outside of said casing, lock nuts arranged on said nipples and engaging the outer side of the casing, and a V-shaped gate arranged in said valve casing and movable transversely between said nipples and into and out of engagement with the seats thereof.

3. A valve comprising a casing having inlet and outlet nipples, a gate arranged in the valve casing and movable transversely into and out of engagement with the inner ends of said nipples, a rock lever pivoted on said valve casing and having its inner arm arranged within said casing and carrying said gate, and a spring operating on said valve for turning the same in the direction in which the gate engages with said nipples.

4. A valve comprising a casing having inlet and outlet nipples which have their opposing inner ends arranged at an angle relatively to each other, a V-shaped gate arranged in the valve casing and movable transversely into and out of engagement with the inner ends of said nipples, a rock lever pivoted on said valve casing and having its inner arm arranged within the casing and carrying said gate, and a spring operating on said lever for turning the same in the direction for moving the gate between said nipples.

5. A valve comprising a casing having inlet and outlet nipples which have their opposing inner ends arranged at an angle relatively to each other, a V-shaped gate arranged in the casing and movable transversely into and out of engagement with the inner ends of said nipples, a rock lever pivoted on said casing and having its inner arm arranged within the casing and carrying said gate, a bracket arranged on the casing and provided with a housing, a tension rod connected with the outer arm of said lever and guided in said housing, and a spring arranged in said housing and operating on said rod to shift said gate into its closed position.

6. A valve comprising a casing having inlet and outlet nipples which have their opposing inner ends arranged at an angle relatively to each other, a V-shaped gate arranged in the casing and movable transversely into and out of engagement with the inner ends of said nipples, a rock lever pivoted on said casing and having its inner arm arranged within the casing and carrying said gate, and a tappet adapted to engage the other arm of said lever for operating said gate.

HENRY C. FARRELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."