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SELF VENTILATING TOILET

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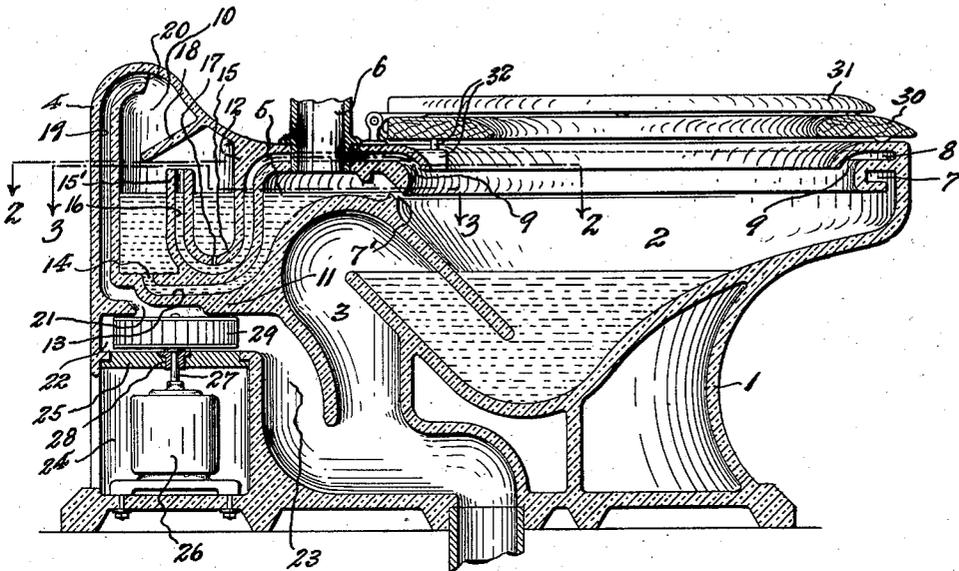


Fig. 1

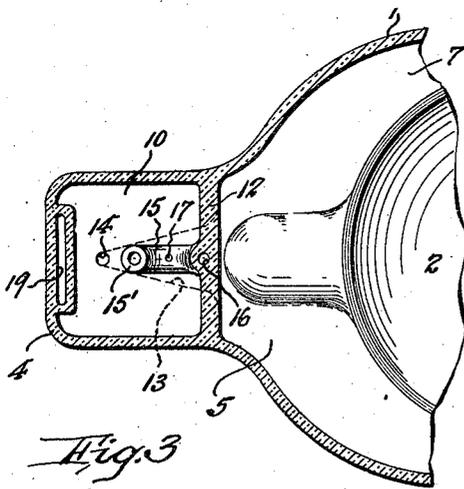


Fig. 3

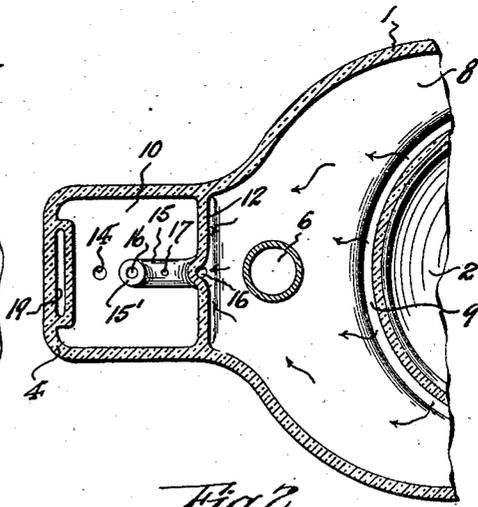


Fig. 2

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## SELF-VENTILATING TOILET

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5 Claims. (Cl. 4—213)

This invention relates to improvements in toilets or water-closets; and the invention has reference, more particularly, to a self-ventilating toilet or water-closet.

5 This invention has for an object to provide a novel construction of toilet bowl having a novel built-in ventilating system for withdrawing fumes from the bowl interior when in use; the arrangement of the ventilating exhaust passages being so designed that the same are adequately and efficiently water-sealed against back flow of sewer gases, etc., when the toilet is not in use.

10 Another object of this invention is to provide a ventilating system for toilet bowls which is so arranged and incorporated in the toilet bowl structure as to be fully enclosed therein, without unduly altering the symmetrical and more or less conventional exterior appearance of the toilet bowl structure, so that the requirements of neat and compact appearance, so necessary in meeting the demands of modern bath-room designs and arrangements, are attained.

15 Another object of the invention is to provide, in the novel ventilating system referred to, means for providing a large capacity of water supply for sealing the ventilating passages, so as to assure both the efficiency of the seal as well as its maintenance over long periods of non-use of the toilet; in other words providing assurance against breaking of the seal by evaporation of the water or similar causes; and, furthermore, the arrangement being such that conservation of the sealing water without waste upon breaking of the seal during a ventilating operation is also assured.

20 Another object of the invention is to provide a water seal arrangement for the ventilating passages which, although served by a comparatively large volume of water, nevertheless requires movement of but a comparatively small volume thereof in the breaking of the seal per se to open the same to the discharge of fumes and gases therethrough during a ventilating operation.

25 Other objects of this invention, not at this time more particularly enumerated, will be understood from the following detailed description of the same.

30 An illustrative embodiment of the invention is shown in the accompanying drawing, in which:—

35 Fig. 1 is a longitudinal vertical section through a toilet bowl equipped with the novel ventilating system according to this invention; Fig. 2 is a fragmentary horizontal section, taken on line 50 2—2 in Fig. 1; and Fig. 3 is another fragmentary

horizontal section, taken on line 3—3 in Fig. 1.

Similar characters of reference are employed in the hereinabove described views, to indicate corresponding parts.

Referring to the drawing, the reference character 1 indicates the complete body of the toilet, which is usually cast as an integral structure, and is shaped interiorly to provide the upwardly open bowl chamber 2, from which leads the siphonic discharge passage 3 which is connected to the sewage collecting system. At its rear, the body 1 is narrowed down to form a vertical housing 4 of reduced width, within which is arranged the operative elements of the ventilating system. Intermediate the bowl chamber 2 and housing 4 is formed a water intake chamber 5, with which communicates the water delivery pipe or duct 6 leading from the usual flush-tank (not shown). Arranged between the bowl interior and said water intake chamber 5 is the water delivery passage or port 7 for operatively delivering flushing water into the bowl interior. Extending around the upper marginal portions of the bowl chamber 2 is an annular water passage 7 which also receives flushing water from intake chamber 5, when the bowl is flushed, and which serves to discharge cleansing water over the exposed interior sides of the bowl. Also extending around the upper marginal portions of the bowl chamber 2, above water passage 7, is an annular fume collecting passage 8, having an annular intake mouth 9 coincident therewith which opens toward the bowl interior.

35 Provided in the upper interior of the housing portion 4 is a chamber 10, the bottom of which is formed by a transverse horizontal partition 11. Said chamber 10 is separated from the water intake chamber 5 by a transverse vertical partition 12. Formed in said bottom partition 11 is a water delivery duct or passage 13, the receiving end of which communicates with said water intake chamber 5, and the discharge end 14 of which opens upwardly into the interior of said chamber 10 at the bottom thereof. The lower portion of said chamber 10 provides a combined reservoir and catch-basin for sealing water, having a capacity many times exceeding the actual amount of water required for initial sealing, and consequently providing for a large reserve of sealing water against loss thereof through evaporation or similar causes.

45 The reference character 15 indicates a U-shaped water seal element, having an internal duct or bore 16 of relatively small cross-sectional area which extends in communication between 50

the fume collecting passage 8 surrounding bowl chamber 2 and the upper interior of chamber 10. This U-shaped water-seal element 15 is formed integrally with the partitions 11 and 12, but is provided with an upwardly projecting discharge leg 15' upstanding within chamber 10 with its discharge end above the maximum or highest level reached by reserve sealing water contained in the lower portion of said chamber 10. Provided in the bottom of its U-shaped formation, the exposed wall of said water-seal element 15 is provided with a small orifice or port 17 communicating between the duct or bore 16 thereof and the lower interior of said chamber 10. This orifice or port 17 is considerably smaller than duct or bore 16 in cross-sectional area. Within the upper interior of chamber 10, and disposed in opposition to but spaced from the discharge end of water-seal element 15, is a deflecting baffle 18. The provision of this baffle 18 is desirable but is not essential, and, when employed, serves to deflect water withdrawn from the water-seal element duct or bore 16 for gravitation into the combined reservoir and catch basin provided by the lower interior portion of chamber 10.

Formed in connection with a wall of said housing 4 is a fume venting passage or duct 19, the receiving end 20 of which communicates with the upper interior of chamber 10, and the discharge end 21 of which terminates at the underside of partition 11 above and in communication with an exhaust fan housing chamber 22; the latter being provided in housing 4 beneath chamber 10. Extending from said fan housing chamber 22 is a discharge passage 23 which extends to and communicates with bowl discharge passage 3 which connects with the sewage collection system.

Below fan housing chamber 22 is a motor compartment 24, the latter being separated from the former by a removable partition 25. Mounted within said compartment 24 is an electric motor 26, the shaft 27 of which extends upwardly through a bearing 28 connected with partition 25, and thence into said fan housing chamber 22, being there connected in driving relation to an exhaust fan 29 of any suitable type. Hingedly connected with body 1, to extend over the open top of toilet bowl 2, is a seat member 30 of any suitable type, cooperative with which is a hinged cover 31. Suitably connected with the body 1, so as to be actuated by pressure of weight on the seat member 30, when the toilet is in use, is any convenient form of electrical circuit make or break means 32, which controls the electrical energy serving circuit (not shown) by which the motor 26 is put in operation when the toilet is in use. This or equivalent electrical control of the motor may be such as is well within the skill of an electrician to provide.

In operation, when the toilet bowl is in use, the weight of the occupant upon seat member 30 will close the circuit make and break means 32, thus serving operating current to the motor 26. Motor 26 thereupon actuates exhaust fan 29. When thus actuated, exhaust fan 29 initially creates a strong suction effect within the fume venting passage 19 and within the upper interior of housing chamber 10. Owing to the comparatively small volume of water contained in the U-shaped passage 16 of water-seal element 15, the suction effect quickly withdraws the water from the latter, while the large reserve volume of water in the lower portion of the chamber 10 is substantially unaffected. As the water is discharged from passage

or duct 16 of the water-seal element 15, upon emission thereof from the discharge leg 15', the same strikes the baffle 18 and is quickly deflected by the latter so as to fall into the reservoir and catch basin provided by the lower interior of chamber 10. Upon withdrawal of the water from the water-seal element 15, the passage 16 thereof is opened for communication between the fume collection passage 8 and fume venting passage 19 leading from the upper end of chamber 10. Since the refilling orifice or port 17 of water-seal element 15 is of relatively small area, the water is cleared from passage 16 faster than it can enter through orifice 17, and consequently during continued actuation of exhaust fan 29 said passage 16 is kept open to the flow of fumes therethrough. Any fumes tending to rise in the bowl 2, because of the suction effect of the exhaust fan 29 thus communicated to the collection passage 8, are sucked through the annular mouth 9 of the latter and are caused to flow through collection passage 8, and thence through open duct or passage 16 and upper portion of chamber 10 so as to be continuously vented through vent passage 19, and thereupon discharged by exhaust fan 29 through the fume discharge passage 23 to the sewage collection system.

After use and flushing of the toilet bowl, upon removal of the weight of the occupant from seat member 30, the circuit make and break means 32 automatically interrupts the motor circuit, thereby stopping operation of exhaust fan 29, thus terminating its suction effect upon venting passage 19 and upper interior of chamber 10. Upon such occurrence, the reserve sealing water, which is contained in the lower portion of said chamber 10, resupplies, through the intercommunicating orifice 17, the passage or duct 16 of water-seal element 15, thereby sealing off communication between the fume collection passage 8 and the sewage collecting system through connecting passage 19-23, and thus preventing any back-flow into and escape from the toilet bowl of fumes or gases from the sewage collecting system.

Any losses of reserve sealing water contained in the reservoir and catch basin portion of chamber 10 is replaced when flushing water is delivered to the bowl 2 through intake chamber 5, since the latter also communicates with the lower portion of said chamber 10 through passage 13. Owing to the comparatively large volume of sealing water contained in the reservoir and catch basin portion of chamber 10, which exceeds by many times the relatively small volume of water required to fill passage 16 of the water-seal element 15, there is little or no risk of breaking of the water-seal through evaporation or similar causes in the event of any relatively long interruption of the use of the toilet bowl. The arrangement providing a reserve of sealing water is attained by this invention without substantially increasing the weight and volume of water actually used for sealing effect; in fact, the volume of sealing water per se is reduced to a minimum, and consequently a seal is provided which is sufficiently sensitive and which quickly and easily responds to the fan suction effects so as to assure both quick initial breaking of the seal as well as maintenance of the required open condition of the fine discharging passages throughout a given period of use and occupation of the toilet bowl. Another advantage of the arrangement lies in the fact that sealing-water is not lost from the system each time the seal is broken, but being discharged upon such occurrence back to the res-

ervoir supply, is consequently usable over and over again.

In addition to the above-mentioned functional advantages, the novel arrangement and construction of self-ventilating means according to my invention is such that the same is all self contained in the toilet bowl body in a very compact arrangement without necessity for spoiling the neat symmetrical and more or less conventional appearance of the toilet structure as a whole, all of which is highly desirable considering the demands for good and pleasing appearance as well as satisfactory functional operation which is required in modern toilet and bath-room facilities.

I am aware that many changes could be made in the above described constructions, and that apparently widely different embodiments of this invention could be made without departing from the scope thereof; consequently it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:—

1. In a toilet bowl structure for connection to a sewage collecting system and having a flushing water intake chamber and distributing means serving the bowl interior, a housing at the rear of the bowl structure having a closed chamber in its upper end, the lower portion of said housing chamber providing a reservoir and catch basin for a reserve sealing water supply, means providing water communication between said intake chamber and said lower portion of said housing chamber, a water-sealed fume passage means having a discharge end above the normal water level in said housing chamber reservoir and a small water intake orifice leading thereinto from said reserve sealing water supply, the toilet bowl having fume collection means leading from its interior to the intake end of said water-sealed fume passage means, means to provide fume venting passages leading from the upper interior of said housing chamber and discharging to the sewage collecting system, and an exhaust fan operative in the line of said latter passages.

2. In a toilet bowl structure for connection to a sewage collecting system and having a flushing water intake chamber and distributing means serving the bowl interior, a housing at the rear of the bowl structure having a closed chamber in its upper end, the lower portion of said housing chamber providing a reservoir and catch basin for a reserve sealing water supply, means providing water communication between said intake chamber and said lower portion of said housing chamber, a water-sealed fume passage means having a discharge end above the normal water level in said housing chamber reservoir and a small water intake orifice leading thereinto from said reserve sealing water supply, the toilet bowl having fume collection means leading from its interior to the intake end of said water-sealed fume passage means, means to provide fume venting passages leading from the upper interior of said housing chamber and discharging to the sewage collecting system, and an exhaust fan operative in the line of said latter passages, said housing having a segregated compartment in its lower portion, and an electric motor within said compartment for actuating said fan.

3. In a toilet bowl structure for connection to a sewage collecting system and having a flushing water intake chamber and distributing means serving the bowl interior, a housing at the rear

of the bowl structure having a closed chamber at its upper end, the lower portion of said housing chamber providing a reservoir and catch basin for a reserve sealing water supply, means providing water communication between said intake chamber and the bottom of said housing chamber, a U-shaped water-sealed fume intake passage means of comparatively small cross-sectional area, the discharge leg of said passage means upstanding within said housing chamber with its discharge mouth terminating above the normal water level within said housing chamber reservoir, said fume-intake passage means having a small water intake orifice leading thereinto from said reserve sealing water supply, the toilet bowl having about its open marginal portion a fume collecting passage having an intake mouth open to the bowl interior, said fume collecting passage communicating with the intake end of the fume intake passage means, means to provide fume venting passages leading from the upper interior of said housing chamber and discharging to said sewage collecting system, and an exhaust fan operative in the line of said latter passages.

4. In a toilet bowl structure for connection to a sewage collecting system and having a flushing water intake chamber and distributing means serving the bowl interior, a housing at the rear of the bowl structure having a closed chamber at its upper end, the lower portion of said housing chamber providing a reservoir and catch basin for a reserve sealing water supply, means providing water communication between said intake chamber and the bottom of said housing chamber, a U-shaped water-sealed fume intake passage means of comparatively small cross-sectional area, the discharge leg of said passage means upstanding within said housing chamber with its discharge mouth terminating above the normal water level within said housing chamber reservoir, said fume-intake passage means having a small water intake orifice leading thereinto from said reserve sealing water supply, the toilet bowl having about its open marginal portion a fume collecting passage having an intake mouth open to the bowl interior, said fume collecting passage communicating with the intake end of the fume-intake passage means, means to provide fume venting passages leading from the upper interior of said housing chamber and discharging to said sewage collecting system, and an exhaust fan operative in the line of said latter passages, said housing having a segregated compartment in its lower portion, and an electric motor within said compartment for actuating said fan.

5. In a toilet bowl structure for connection to a sewage collecting system and having a flushing water intake chamber and distributing means serving the bowl interior, a housing at the rear of the bowl structure having a closed chamber at its upper end, the lower portion of said housing chamber providing a reservoir and catch basin for a reserve sealing water supply, means providing water communication between said intake chamber and the bottom of said housing chamber, a U-shaped water-sealed element providing a fume-intake passage of comparatively small cross-sectional area having its discharge leg upstanding within said housing chamber with its discharge mouth terminating above the normal water level within said housing chamber, said water-sealed element having a small water intake orifice leading thereinto

from said reserve sealing water supply, the toilet bowl having about its open marginal portion a fume collecting passage having an intake mouth open to the bowl interior, said fume collecting passage communicating with the intake end of the fume-intake passage provided by said water-sealed element, means to provide fume venting passages leading from the upper interior of said housing chamber and discharging to said sewage collecting system, and an exhaust fan operative in the line of said latter passages, said housing having a segregated compartment in its lower portion, an electric motor within said compartment for actuating said fan, a seat over the open upper end of the toilet bowl, and a motor circuit control means actuated by occupancy of said seat.

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