June 22, 1948. H. FITZGERALD 2,443,705

VENTILATING DEVICE FOR WATER CLOSETS

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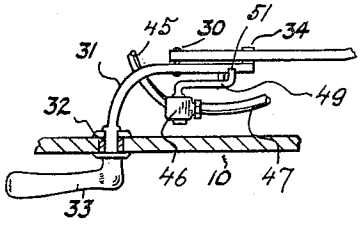


FIG. 3.

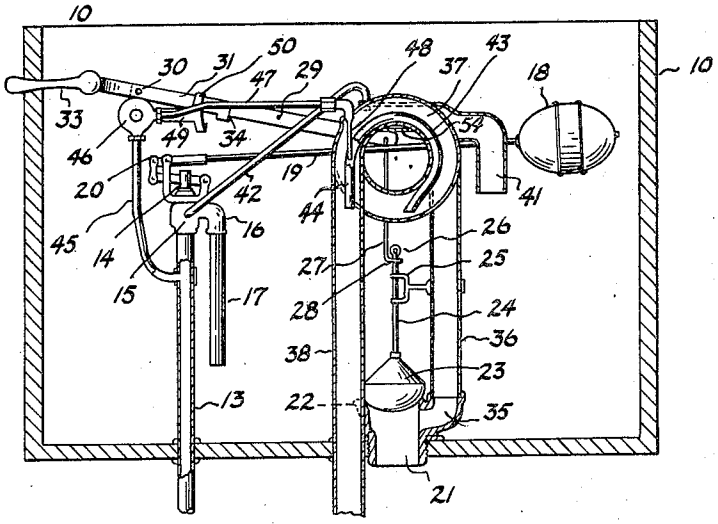


FIG. 1.

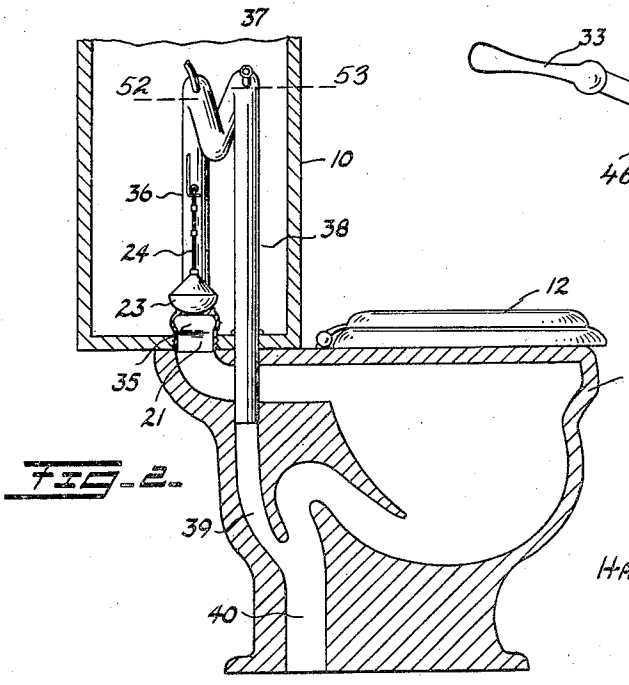


FIG. 2.

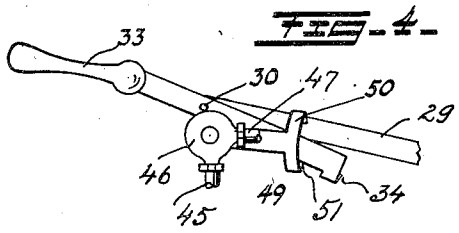


FIG. 4.

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VENTILATING DEVICE FOR WATER CLOSETS

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4 Claims. (Cl. 4—215)

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The purpose of my invention is to provide an improvement which may be incorporated into the flush boxes conventionally used in connection with the toilets, the specific object of the improvement being to equip the ordinary water closets with means of withdrawing from the toilet bowl foul air during the use thereof.

Another purpose of my improvement is to incorporate therein a water trap normally interposed between the bowl and the drain pipe through which said foul air may be disposed, said trap being provided with semi-automatic means to open same, when desired, for passage of foul air.

Still another object of my invention is to provide means to effect the above said purposes by a device of simple and inexpensive structure, calling but for slight changes in the construction in the present water closets.

I shall now describe my invention with reference to the accompanying drawings, in which:

Fig. 1 is a sectional view of a flush box showing the side elevation of the apparatus therein, including my improvement, parts of said apparatus and of my improvements being shown in section.

Fig. 2 is a sectional view of a toilet bowl and a flush box connected thereto, with a side elevation of a part of my improvement therein.

Fig. 3 is a fragmentary plan view, in an enlarged size, of means to actuate said apparatus shown in Fig. 1.

Fig. 4 is a side elevation, in an enlarged size, of a detail pertaining to a valve, being a part of my improvement.

Similar numerals refer to similar parts throughout the several views.

The improvement of my invention is located within the flush box 10 mounted upon a toilet bowl 11, as shown in Fig. 2, said bowl being provided with a conventional cover 12. As a rule, the flush box 10 is partly filled with water which is conveyed, under pressure, from a supply of water such as, for example, municipal water mains, through a pipe 13 to a head 15, including a goose neck 16, which terminates in a spout 17. The flow of water is controlled by means of a valve 14 within said head 15 and actuated by means of a float 18 supported by a rod 19 and hingedly connected at 20 in a position to bear against said valve. From said flush box the water therein is discharged into the bowl 11 by means of a tubular member 21 provided at its upper end with a seat 22 for a closing ball 23, which is disposed at the lower end of a stem 24. A guiding bracket 25 serves to maintain the stem in its up-

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right position. The stem, provided at its upper end with a loop 26, is suspended from a rod 27, having at its lower end an eye 28 enclosing said stem 24. The rod is pivotally connected to a bar 29 which, in turn, is pivotally affixed by means of a pin 30 to an actuating lever 31. The lever is controlled by a handle 33 and includes a lug 34 disposed transversely under said bar 29.

Returning now to member 21, serving to discharge water from the flush box, I wish to point out that said member branches into a conduit 35, which opens at its lower end into said member 21, below the level of said closing ball 23, and which is connected at its upper end to a ventilating tube 36. The last-named tube rises upwardly, forms a coil 37, and turns downwardly, the downward portion 38 of said tube extending through the bottom of flush box 10 into an outlet 39 in the bowl member 11 of the water closet to a drain passage 40 therein. The coil 37 forms a complete circular convolution including a substantially semicircular loop which is a continuation of a tube 36 and a semicircular loop where it connects to drain pipe 38. Here I wish to point out an important limitation, namely, that the return loop into drain pipe 38 is at a somewhat higher level than the initial loop of the coil which connects to ventilating tube 36 and which in Figure 1 is indicated by numeral 54. The respective levels are shown in Figure 2, where the lower level is indicated by numeral 52 and the higher level by 53. This arrangement allows drainage of water from the coil through tube 36 into bowl 11. It is the above-said ventilating tube 36 including coil 37 and a downward portion 38 of said tube that serve as a means by which the volume of air within the bowl may be withdrawn therefrom and discharged into the drain passage 40.

I wish to add that an elbow-shaped overflow spout 41 is connected to tube 36 at the point where it turns to form said coil 37, the outer end of the spout being located substantially below said levels 52 and 53 and being immersed in water filling up tank 10. The water forms a seal to prevent suction of air from the tank instead of from the bowl as above mentioned.

I shall now describe in more detail the means devised by me for the purpose of effecting withdrawal of air from said bowl. It will be noticed that head 15 on top of pipe 13 is connected by means of a tube 42 with the top of coil 37. This arrangement permits diversion of water from said pipe 13 into the coil in order that the same may be filled up to the level of overflow therein. It will be understood that said tube 42 will convey

water into said coil only when valve **14**, controlling inflow of water from pipe **13** into the tank, will be open. It will be also understood that, normally, the coil will be filled up with water to the level of overflow therein and that it is this water in the coil that forms a trap and serves as a seal between the ventilating tube **36** and the drain passage **40**. Obviously, in order to withdraw the foul air from the bowl, said coil must be emptied. I shall now describe the means for that purpose.

The means include an inversely positioned, U-shaped siphon **43**, one leg of said siphon being located at the bottom of coil **37**, the other leg **44** being open into tube **38**, while the looped end of the siphon will be located above the discharge level of the coil into ventilating tube **36** or return tube **38**. The location of that looped end of the siphon above said levels of overflow is necessary to prevent accidental self-siphonage.

Returning now to the inlet pipe **13**, I wish to point out that it opens into a pipe **45** leading to a valve **46**, and that the tube **47** leading from the valve is equipped at its outer end with a nozzle **48**, the outer end of said nozzle entering leg **44** of said siphon **43**. Valve **46** is controlled by means of a level **49**, the latter being provided with arms **50** extending laterally in opposite directions and turned outwardly at their respective ends, said ends being marked **51**.

Having described the operative parts of my improvement, I shall now describe its operation. It will be assumed that the flush box is filled with water to the level ordinarily required in conventional flush boxes, also that the coil **37** is filled with water to the full of its capacity and that the open end of spout **41** will be immersed in water. Being thus filled with water, the coil forms a liquid seal between the bowl of the toilet and between the drain pipe for said toilet. When the toilet is in use and when it is desired that the air from the toilet be withdrawn, the water from the coil has to be removed. In order to accomplish this, all that is necessary is to push handle **33** upwardly. This will cause lever **31** to swing in a downward direction from the bearing **32** against the lower arm **50** of lever **49**, swinging said lever downwardly to open valve **46**. Water delivered under pressure through inlet pipe **13** will be allowed to force its way through said valve, through pipe **47** into the discharge nozzle **48**, causing the outgoing stream of water to create a suction within siphon **43**, said suction being sufficient to remove all the water from coil **37** and to create a current of air from the bowl through said coil into the downward section **38** of the ventilating tube and finally into the drain passage **40**. The quantity of water so used for said spray through nozzle **48** is really very small and said discharge may be continued as long as the water closet is in use. It will be understood that prior to the operation of the nozzle **48**, the water level in the flush box **10** is high enough so that the mouth of spout **41** is immersed in said water, as otherwise suction created by the operation of said nozzle would cause the withdrawal of air not from the bowl but from the volume of air between the mouth of spout **41** and the level of water within said flush box. The operative position of the handle, lever **31** and its engagement of lever **49** which operates valve **46**, is shown in Fig. 4. Later on, when the bowl is to be flushed, handle **33** is swung downwardly from its bearing **32**. This causes the actuating lever **31** to swing upwardly so that it bears against the upper arm **50** of lever **49**, resulting in the closure of valve **46**. At the same time, however, lug **34** serves to raise bar **29**, thus causing ball **23** to be lifted from its seat **22** on member **21**. This allows water accumulated in the flush box to rush into bowl **11**. Upon the flushing of the bowl, the flush box **10** again becomes filled with water by means of pipe **13** through spout **17**, a quantity of water being delivered by means of tube **42** into the coil to fill same as above stated. The level of water within the box is regulated by float **18** and a valve in head **15**, these being the means commonly used in flush boxes.

It will be obvious that some changes may be made in the construction of my improvement without deviating from the inventive principle disclosed therein. What I, therefore, wish to claim is as follows:

1. In combination with a flush box for bowls of toilets, an improvement of the kind described, comprising a ventilating tube extending upwardly from the upper end of a bowl into the flush box, forming a coil at its upper end and turning downwardly into a drain pipe leading from said toilet bowl, said coil including a laterally extending overflow spout leading from the upper portion of the coil to a point below the opening of the coil into the ventilating tube, a valve controlled tube connected to a water supply to admit water into said coil, a U-shaped siphon to withdraw water therefrom, the siphon having an intake leg within the lower portion of the coil, the looped end above the level of discharge from the coil into the drain pipe and an outlet leg within the downwardly extending section of the ventilating pipe leading to a drain, a nozzle within the outlet end of the siphon, a pipe to convey water under pressure to said nozzle, and valve means for said pipe controlling the flow of water to the nozzle to form a spray in a downward direction, causing suction within the coil to clear same of water therein.

2. In combination with a flush box for the bowl of a toilet, ventilating means comprising, a ventilating tube leading from said bowl into the flush box, forming therein a vertically disposed coil and including a downwardly extending portion leading to a drain pipe from said bowl the opening of the coil into the ventilating tube being at a lower level than the opening of the coil into the drain pipe, said coil including a laterally extending overflow spout leading from the upper portion of the coil to a point below the opening of the coil into the ventilating tube, pipe means to admit water into the coil, to form a liquid seal therein between the bowl and the drain, a U-shaped siphon having its intake end in the lower portion of the coil, the looped end above the level of discharge from the coil into the drain pipe, and having its outlet end in the portion of the ventilating tube leading to the drain, a spray nozzle in the outlet end of the siphon, pipe means to supply water under pressure to said nozzle, and a valve to control the release of water into said nozzle, to create a spray and to cause a suction thereby within the coil to draw out the water therefrom.

3. In connection with a flush box for toilet bowls, a ventilating tube leading from the upper portion of the bowl of a toilet into the flush box, said tube including a vertically disposed coil therein, and a downwardly extending portion opening into a drain pipe from said toilet bowl the opening of the coil into the ventilating tube being at a lower level than the opening of the coil into the drain pipe, said coil including a laterally extending overflow spout leading from the

upper portion of the coil to a point below the opening of the coil into the ventilating tube, pipe means connecting the coil with water supply means, a siphon to withdraw water from the coil, the siphon having an intake end within the lower portion of the coil, the looped end above the level of discharge from the coil into the drain pipe, and a discharge end, equipped with a nozzle and disposed in the downwardly extending portion of the ventilating tube, pipe means to supply water under pressure to the nozzle to form a spray, downwardly towards the drain pipe, the spray creating a suction to remove water from the coil and to cause movement of air from the bowl through the coil into said drain pipe, valve means to cause a flow of water from the above said water supply means into the nozzle and valve means controlled by a float to fill the coil with water.

4. In combination with a flush box for toilet bowls, a ventilating tube leading from the upper portion of the bowl into the upper portion of the flush box, said tube including a vertically disposed coil therein, and a downwardly extending portion opening into the drain pipe for said toilet the opening of the coil into the ventilating tube being at a lower level than the opening of the coil into the drain pipe, said coil including a laterally extending overflow spout leading from the upper

portion of the coil to a point below the opening of the coil into the ventilating tube, pipe means to convey water into the coil from a water supply, under pressure, to create a water seal within said coil, a U-shaped siphon to withdraw the water from the coil, the siphon having an intake end within the lower portion of the coil, the looped end above the level of discharge from the coil into the drain pipe, and an outlet end equipped with a nozzle disposed within the downwardly extending portion of the ventilating tube, pipe means to supply water from said supply to the nozzle to form a spray, the spray creating a suction to remove water from the coil and to cause movement of air from the bowl, through the coil into the drain pipe, and manual valve means to direct a flow of water to the coil or to the nozzle, as desired.

HAROLD FITZGERALD.

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

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