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Poister et al.

[11] **3,902,203**

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[54] **TOILET STOOL VENTILATING MEANS**

[76] Inventors: **Clarence E. Poister,** 2934 Lydia, Apt. 103, Topeka, Kans. 66614; **Philip A. Tyrrell,** 435 W. 88th Ter., Kansas City, Mo. 64114; **Walter D. Hodge,** 5237 Delmar, Shawnee Mission, Kans. 66205

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[21] Appl. No.: **441,453**

[52] **U.S. Cl.** **4/213;** 4/72

[51] **Int. Cl.**[2] **E03D 9/04;** A47K 13/00

[58] **Field of Search** 4/213, 214, 215, 217, 209, 4/72

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Primary Examiner—Henry K. Artis

[57] **ABSTRACT**

An improved toilet stool having an annular conduit seat with intake openings in communication with the inside of the toilet bowl. The improvement being a ventilating means which comprises an adapter plate situated underneath a tank. The adapter plate has a structure defining a conduit which is in communication with the toilet bowl through the intake openings of the seat. A means is attached within the tank or underneath a compartment attached to the adapter plate and removes normally contaminated air from the inside of the toilet bowl through the intake openings and the conduit of the adapter plate for passing it into the outside atmosphere through a means for conducting in communication therewith. A switch means is connected up to the upper rim of the toilet bowl and is operably connected to the means for removing such that pressure exerted on the top of the seat operates the switch means to activate the means for removing.

10 Claims, 10 Drawing Figures

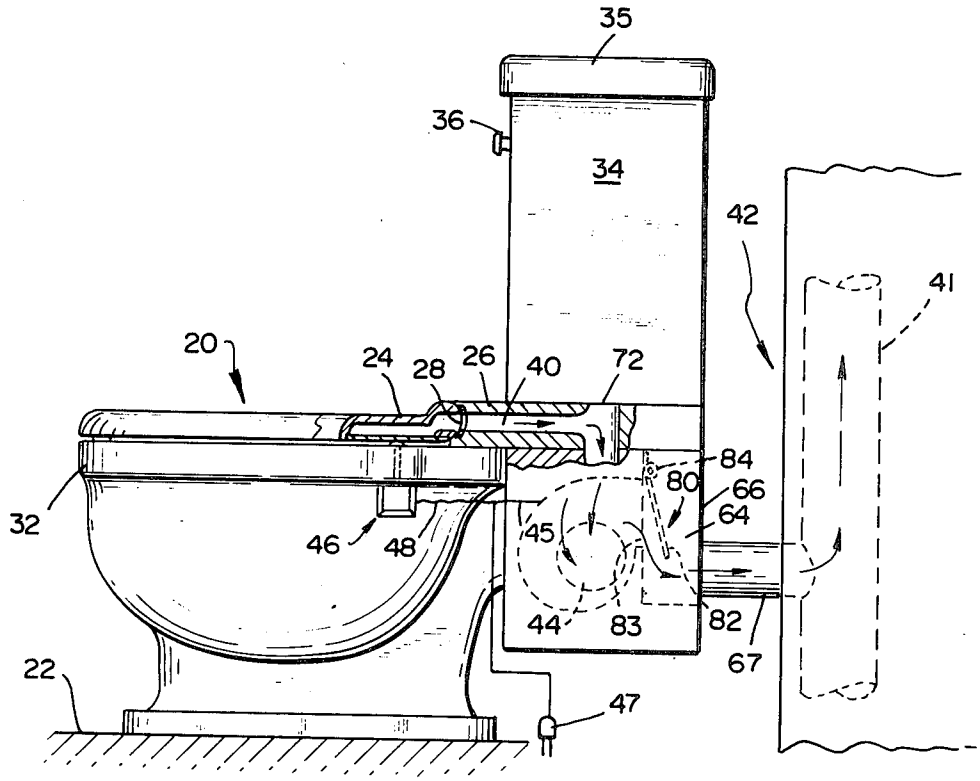


FIG. 1

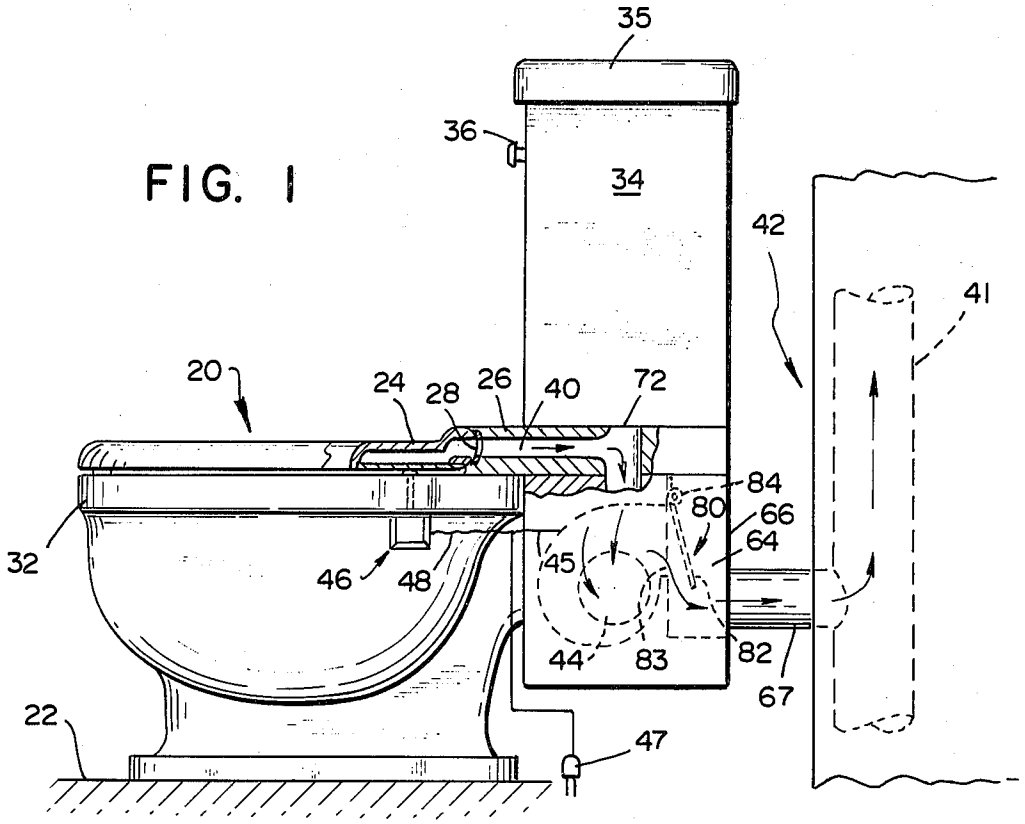
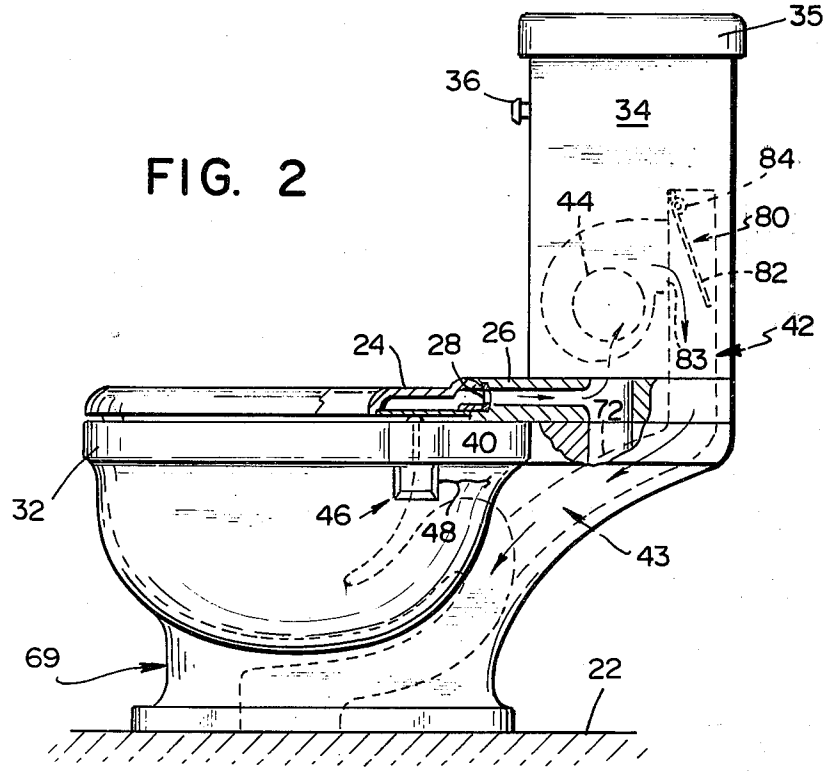

35
36
34
42
41
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24
28
26
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72
84
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67
22
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FIG. 2


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69
22

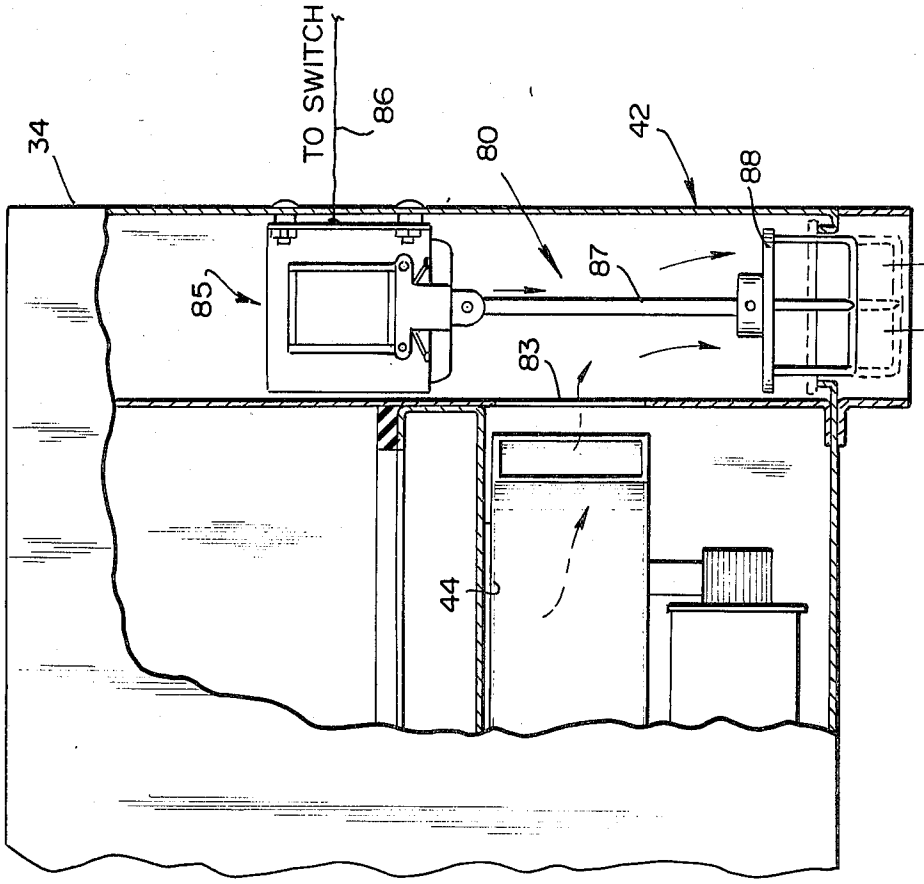

TO SWITCH
86
34
80
42
88
87
85
83
TO VENT STACK
OR SEWER
44

FIG. 4

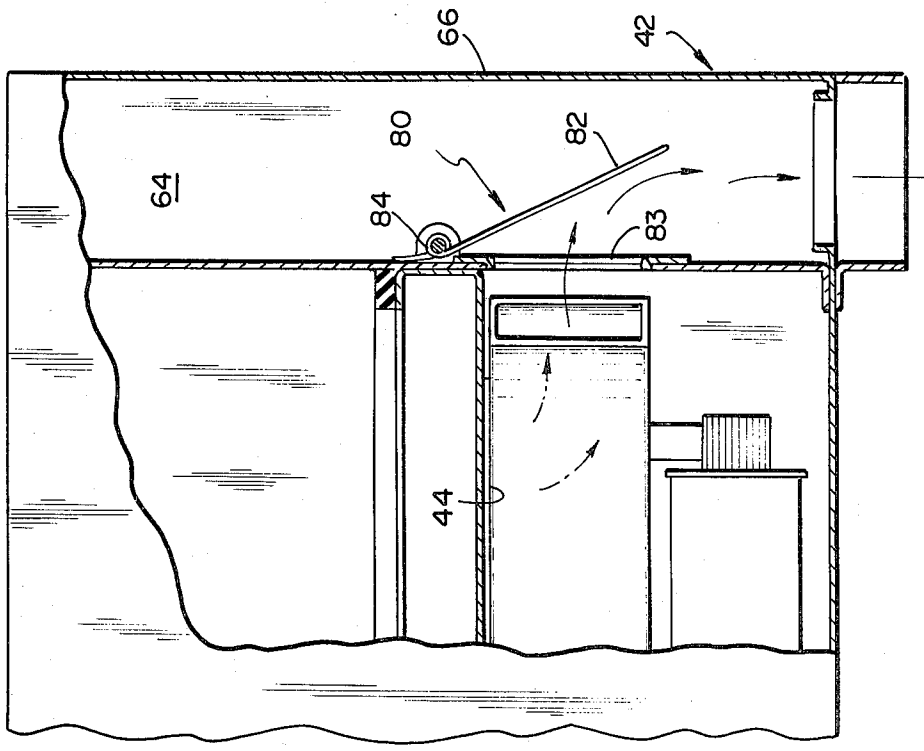

66
42
80
82
64
84
83
TO VENT STACK
OR SEWER
44

FIG. 3

FIG. 5

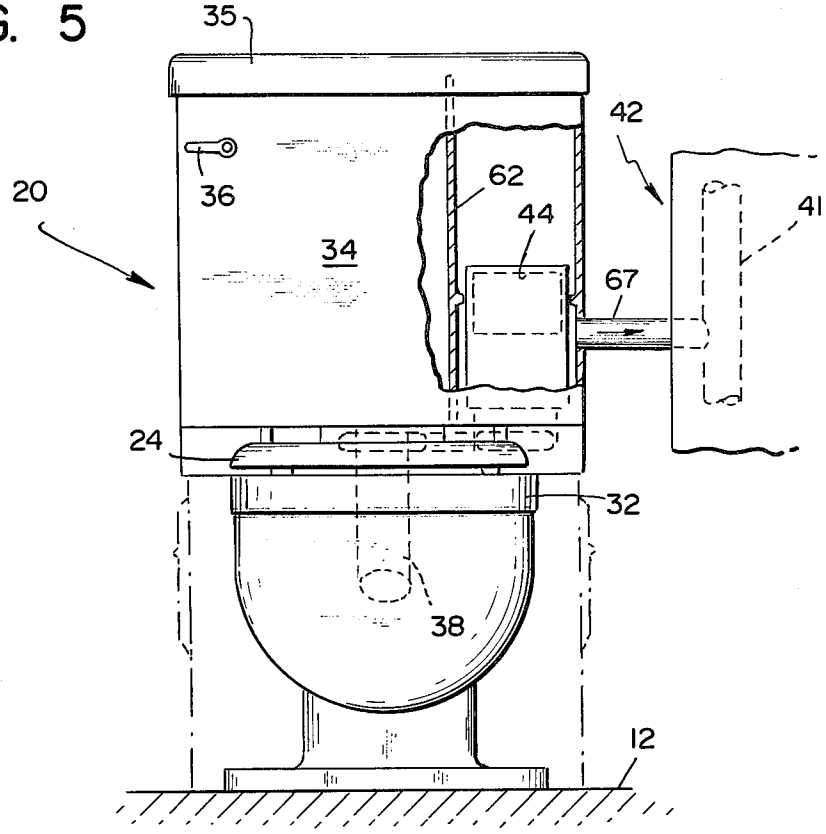


FIG. 6

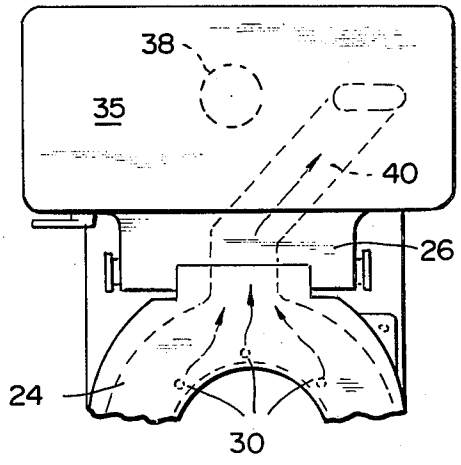


FIG. 7

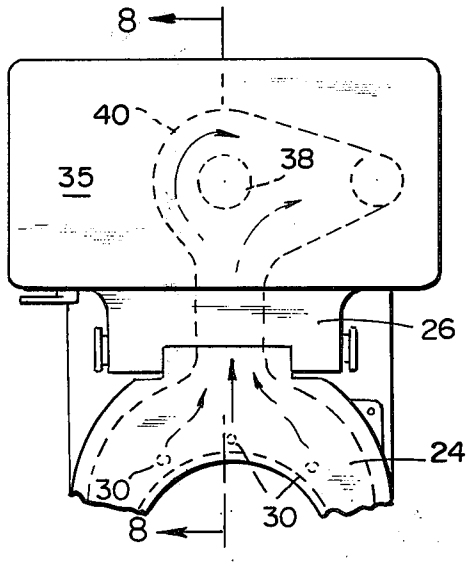
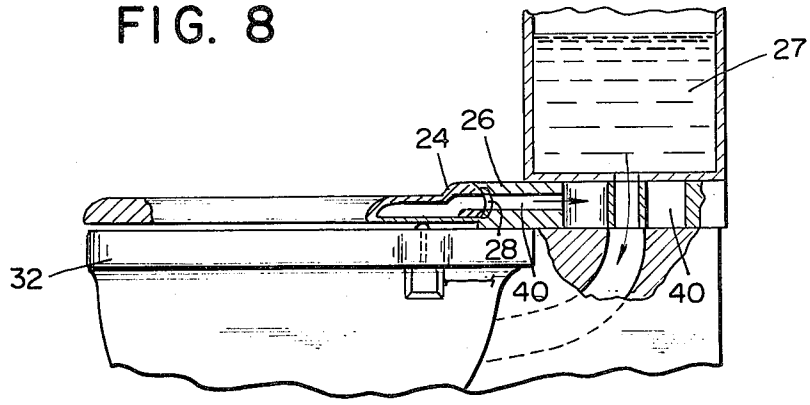


FIG. 8



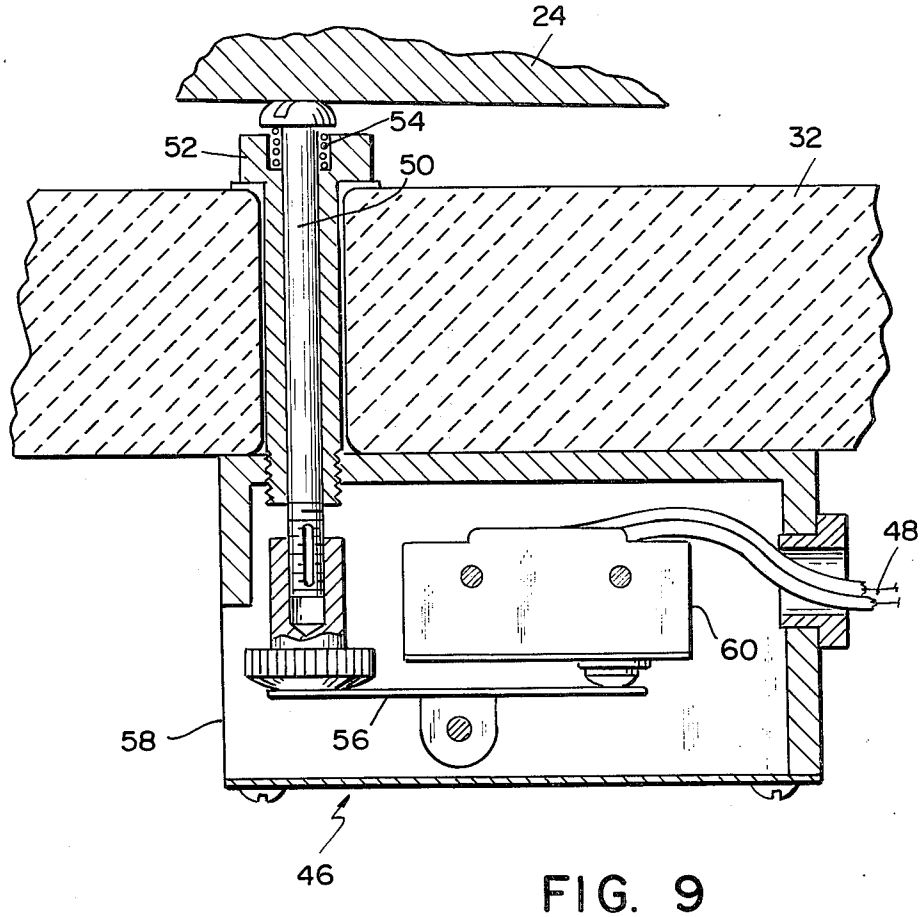
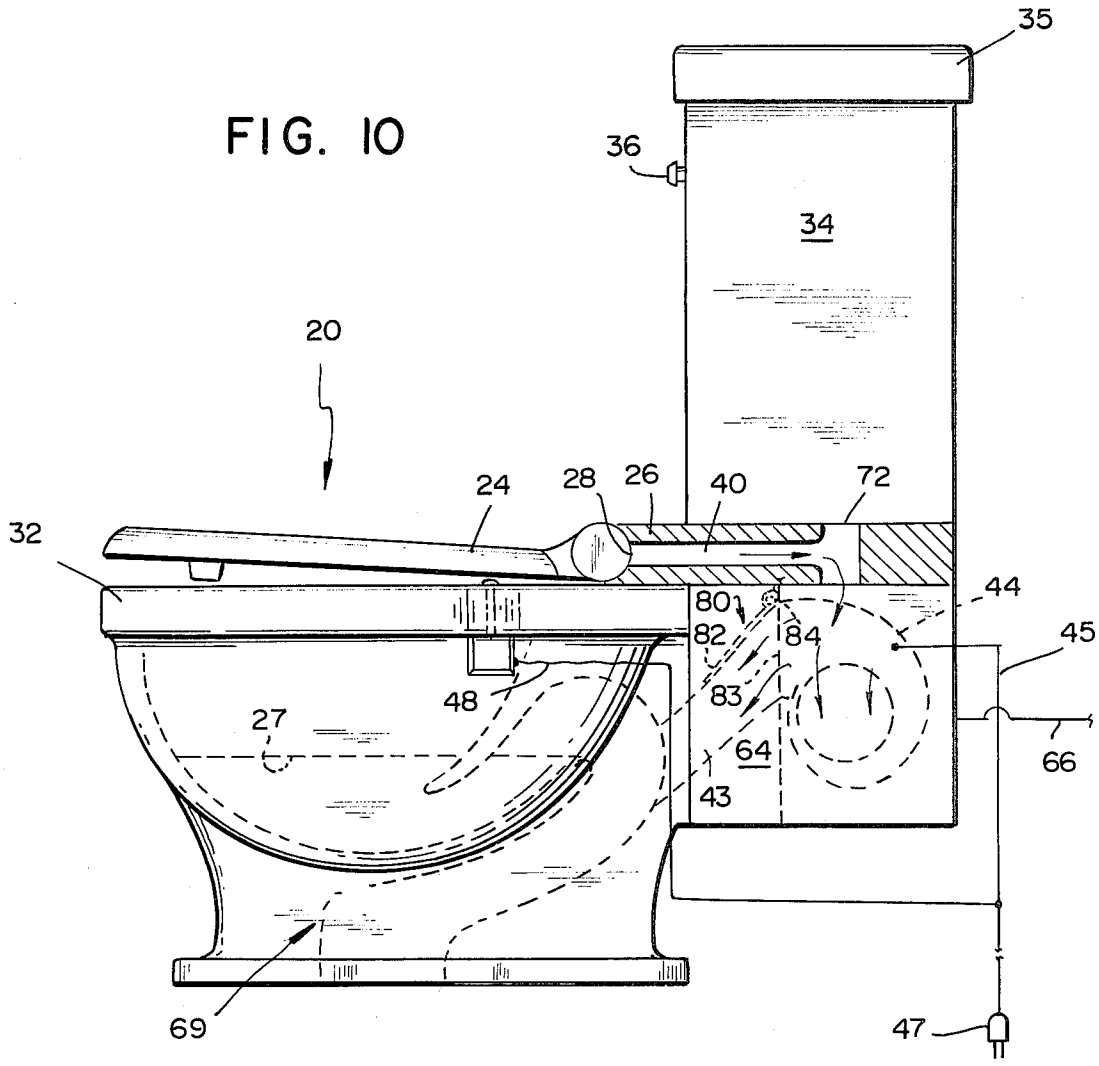


FIG. 9

FIG. 10



TOILET STOOL VENTILATING MEANS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a toilet stool ventilating means. More specifically, this invention provides an improved toilet stool ventilating means which utilizes no filtering means for passing normally contaminated air into the surrounding atmosphere.

2. Description of the Prior Art

Various other types of toilet stool ventilating devices are known in the prior art as operable for removing contaminated air and odors from within a toilet bowl. However, these devices are generally costly to manufacture and unsightly in appearance as well as requiring specially designed toilet bowls and additional air receiving rings or the like attached to the seats or the toilet bowl structure. Additionally, some of these prior art devices require mounting of the filter unit in a remote location not immediately adjacent to the toilet stool which often times then makes it not easily accessible for filter replacement. One known means of ventilating a toilet stool is to attach an inlet conduit to the seat or to the bowl area and connect the conduit to a filtering unit placed elsewhere; this is not generally satisfactory because of the general unsightly appearance of the additional structure needed to be added to the toilet stool and the remotely placed filtering unit. Another common means of ventilating a bathroom is by using ceiling or wall vents to carry contaminated air from the room; this is generally not satisfactory because of removal of a large quantity of heated or air-conditioned air which must be replaced. Therefore, what is needed and what has been invented by me is an improved toilet stool ventilating means without the foregoing deficiencies associated with the prior art.

SUMMARY OF THE INVENTION

The present invention accomplishes its desired objects by broadly providing an improved toilet stool mounted on a supporting surface and including a generally annular conduit having an exit aperture and intake openings in communication with the inside of the toilet bowl. The seat circumscribes the upper rim of the toilet bowl when in a lowered position. A tank is mounted on the toilet stool and includes a flushing liquid and means connected therein to supply the flushing liquid to the toilet bowl through a discharge conduit. The improvement is a ventilating means which comprises an adapter plate situated underneath the tank and having the conduit seat pivotally attached thereto. The adapter plate has a structure defining a conduit which is in communication with the exit aperture of the seat. The ventilating means also has a means for removing normally contaminated air from the inside of the toilet bowl through the intake openings, the exit aperture, the conduit of the adapter plate, in order stated, for deodorizing the normally contaminated air and passing it into the surrounding atmosphere through the means for conducting which is in communication with the means for removing. A switch means is connected to the rim and is operably connected to the means for removing such that pressure exerted on the top of the seat operates the switch means to activate the means for removing.

It is therefore an object of this invention to provide an improved toilet stool ventilating means which overcomes the aforementioned disadvantages associated with prior art devices.

It is another object of this invention to provide an improved toilet stool ventilating means which can be used within a conventional toilet stool structure without substantially altering its appearance.

It is yet another object of this invention to provide an improved toilet stool ventilating means which utilizes no filter, is easy to clean, and is also efficient and relatively economical to manufacture and operate.

These, together with various ancillary objects and features which will become apparent as the following description proceeds are obtained by this novel ventilating means for a toilet stool, a preferred embodiment being shown in the accompanying drawings, by way of example only, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial vertical sectional view disclosing the blower in communication with a conduit in the adapter plate and a vent stack and housed within a compartment attached underneath the adapter plate;

FIG. 2 is a partial vertical sectional view disclosing the blower housed within the tank behind a watertight partition and in communication with the conduit of the adapter plate and with the sewer below the toilet trap through a means for conducting having a means for preventing the backflow of contaminated air pivotally lodged therein;

FIG. 3 is a fragmentary vertical sectional view of the housed blower in communication with a conduit having a plate member pivotally lodged therein and leading to either the vent stack or to the sewer beneath the toilet trap;

FIG. 4 is an elevational view of the housed blower in communication with a conduit having a solenoid anti-backflow valve lodged therein to prevent the backflow of contaminated air;

FIG. 5 is a front elevational view of the toilet stool of FIG. 1 having a cutaway portion showing the watertight partition separating the flushing liquid from the blower which is in communication with the vent stack;

FIG. 6 is a partial top plan view of the stool and tank disclosing in dashed lines an embodiment of the adapter plate conduit;

FIG. 7 is a partial top plan view of another embodiment of the stool and tank disclosing in dashed lines the adapter plate conduit being pierced by a flushing liquid discharge conduit;

FIG. 8 is a partial vertical sectional view taken along the line 8—8 in FIG. 7;

FIG. 9 is a partial enlarged sectional view of the switch means which activates the blower and solenoid valve when pressure is applied to the toilet seat; and

FIG. 10 is a fragmentary vertical sectional view disclosing the blower in communication with the conduit in the adapter plate and a vent stack and housed within a compartment attached underneath the adapter plate.

DETAILED DESCRIPTION OF THE INVENTION

Referring in detail now to the drawings, wherein similar or like parts of the invention are identified by like reference numerals, a toilet stool, generally illustrated as **20**, is mounted on a supporting surface **22** and has an annular conduit seat **24** horizontally and pivotally attached to an adapter plate **26**, and is essentially aligned therewith when the seat **24** is in a lowered posi-

tion as shown in FIGS. 1, 2, 5, 8 and 10. Conduit seat 24 has exit aperture 28 and intake openings 30 which are in communication with the inside of the toilet stool 20. The seat 24 circumscribes an upper rim 32 of the toilet stool 20. A tank 34 with lid 35 is mounted on top of adapter plate 26 and has a flushing liquid 27 and means 36 connected therein to supply the flushing liquid 27 from the tank 34 to the toilet stool 20 through a discharge conduit 38. The adapter plate 26 has a conduit 40 which is in communication with exit aperture 28 and is sealed at 72. The discharge conduit 35 pierces conduit 40 in FIGS. 7 and 8 such that the contaminated air being removed from the toilet stool 20 generally flows around the conduit 38. FIGS. 1, 2, 5, 6 and 10 disclose the discharge conduit 38 as being conventional and not piercing conduit 40.

A means 44 for removing normally contaminated air from the inside of the toilet stool 20 is in communication with conduit 40 and removes the contaminated air from the stool 20 through the following: intake openings 30, exit aperture 28, conduit 40, in order stated, for passing the air into the atmosphere through a means for discharging generally illustrated as 42. Means 42 may be any suitable means but is preferably either a vent stack 41 or a conduit 43 leading to the sewer beneath a toilet trap generally illustrated as 69. Means 44 may also be any suitable means but is preferably a blower and has a conductor 45 with a plug 47 attached thereto for insertion into a source of power (not shown in the drawings).

A switch means, generally indicated as 46, is connected to rim 32 and is electrically operably connected by conductors 48 to conductor 45 such that when pressure exerted on the top of seat 24 operates switch means 46 to activate the means for removing 44. Switch means 46 may be any suitable switch which is capable of closing an electrical circuit. Preferably, switch means 46 is a plunger-type as fully disclosed in FIG. 9.

FIG. 9 shows seat 24 compressing a plunger 50 which is slidably lodged within a sleeve 52 having a spring 54 for upwardly biasing the plunger 50 against the seat 24 when it is not being used. Contact bar 56 is pivotally fastened within housing 58 and is pivoted against a micro-switch 60 (well known within the art) by the downward force of the plunger 50. Micro-switch 60 closes the circuit and activates the blower 44.

The location of means (or blower) 44 has two preferred embodiments. FIGS. 1 and 10 disclose a first embodiment showing the blower 44 removably housed in a compartment 66 which is attached underneath the adapter plate 26. FIGS. 2 and 5 disclose a second embodiment showing the blower 44 removably housed in the tank 34. A watertight partition 62 is attached to the internal sides of the tank 34 to prevent the blower 44 from being inundated with flushing liquid 27. Both embodiments (as shown in FIGS. 1, 2, 5 and 10) discharge contaminated air either into vent stack 41 via compartment 64 and conduit 67, or into the sewer (not shown in the drawings) underneath the toilet trap, generally indicated as 69, via conduit 43.

Means for conducting 42 additionally includes a means for preventing 80 the backflow of contaminated air which is connected therein in proximity to the means for removing 44. Means for preventing 80 may be any suitable means but is preferably a plate member 82 as shown in FIG. 3 which is pivotally connected to the means for conducting 42 and is contiguously situated to a point 83 where the means for removing 44 connects with the means for conducting 42 such as to entirely block the point 83 to prevent the backflow of the contaminated air. The plate member 82 is normally biased in a closed position by a spring 84 loaded at the pivot point. Air pressure caused by blower 44 opens plate 82 to allow the passage of contaminated air. Means for preventing 80 as shown in FIG. 4, may also be a solenoid valve, generally indicated as 85, electrically connected to the switch means 46 via conductor 86. Solenoid valve includes a shaft 87 and a stopper 88 and when pressure is exerted on the top of the seat 24 the switch means 46 opens the stopper 88 of solenoid 85 to allow the passage of the normally contaminated air from the means for removing 44 through the means for conducting 42. The plate member 80 is the most preferred means because of the cost element and ease of maintenance.

The two preferred aforementioned means for preventing 80 and 85, as well as any suitable means for preventing 80, may be utilized in any of the previously mentioned embodiments. For example, blower 44 removably situated in compartment 66, having conduit 38 piercing conduit 40 of adapter plate 26 (see FIGS. 7 and 8), or with conduit 38 not piercing conduit 40 (see FIG. 6), may have plate 80 or solenoid 85 to prevent the backflow of contaminated air when blower 44 discharges the contaminated air into the outside atmosphere via vent stack 41 (see FIG. 1) or via conduit 43 to toilet trap 69 (see FIG. 10). Similarly, blower 44 in tank 34 having conduit 38 piercing conduit 40 (or having the conventional discharge of FIG. 6) may also have plate 80 or solenoid 85 to prevent the backflow of contaminated air when blower 44 blows the contaminated air through vent stack 41 as shown in FIG. 5 (or through conduit 43 to toilet trap 69 as shown in FIG. 2) for discharge into the outside atmosphere.

With continual reference to the drawings for operation of the invention, seat 24 (normally biased upward by a spring which is not shown in the drawings) when used is lowered such that plunger 50 is driven against contact bar 56 which causes micro-switch 60 to close the electrical circuit on conductors 48 and 45, and activate the blower 44. When operating, the blower 44 creates a vacuum through conduit 40 such that contaminated air within stool 20 is sucked through intake openings 30, through conduit 40, and into the blower 44 from where it is discharged either into vent stack 41 via compartment 64 and conduit 67, or into the sewer situated underneath the toilet trap 69 via conduit 43. Discharge conduit 38 is contiguously situated with respect to conduit 43. Blower 44 is positioned either in compartment 66 or tank 34. The anti-backflow means 80 in preventing the flow back of contaminated air may be either spring biased plate member 82 or solenoid valve 85. If solenoid valve 85 is utilized, then when pressure is applied on top of seat 24 to drive plunger 50 against bar 56 to cause switch 60 to close the electrical circuit on conductors 48 and 45 and activate blower 44, the solenoid valve 85 is simultaneously caused to be open by the closing of the electrical circuit on conductor 86 which is electrically connected to conductors 48 of switch 60.

The path which the normally contaminated air takes to the blower 44 depends on whether the embodiment of FIG. 6 or FIG. 7 is used. The embodiment of FIG.

6 discloses the discharge conduit 38 as not piercing the conduit 30. Discharge conduit 38 pierces conduit 40 in the embodiment of FIG. 7 and contaminated air is swirled around conduit 38.

After pressure is released from the top of seat 24 it is upwardly biased by a spring (not shown in the drawings) such that seat 24 is lifted off the top of plunger 50. This causes spring 54 to upwardly bias the plunger 50 away from the contact bar 56 to open the electrical circuit on conductors 48 and 45 (and 86 if the solenoid 85 is used) and deactivate the blower 44 (and solenoid 85).

While the present invention has been described herein with reference to particular embodiments thereof, a latitude of modification, various changes and substitutions are intended in the foregoing disclosure, and in some instances some features of the invention will be employed without a corresponding use of other features without departing from the scope of the invention as set forth.

We claim:

1. An improved toilet stool mounted on a supporting surface and including a generally annular conduit seat having an exit aperture and intake openings in communication with the inside of the toilet bowl, said seat circumscribing the upper rim of said toilet bowl when in a lowered position, a tank having a flushing liquid and means connected therein to supply the flushing liquid to the toilet bowl through a discharge conduit, the improvement being a ventilating means which comprises:

a. an adapter plate situated underneath said tank and having said conduit seat pivotally attached thereto and including a structure defining a conduit which is in communication with said exit aperture of said seat, said adapter plate is horizontally attached to the rear of said seat and is essentially aligned therewith when said seat is in a lowered position, said adapter plate conduit discharging at a point disposed underneath one end portion of said tank,

b. means for conducting normally contaminated air into the outside atmosphere communicably connected with means for removing said normally contaminated air from the inside of said toilet bowl through said intake openings, said exit aperture, said conduit of said adapter plate, in order stated, for passing it through said means for conducting into the outside atmosphere,

c. means mounted with said means for conducting to prevent the backflow of contaminated air into said toilet bowl, and

d. switch means connected to said rim and electrically operably connected to said means for removing such that pressure exerted on the top of said seat operates said switch means to activate said means for removing.

2. The ventilating means of claim 1 wherein said discharge conduit pierces said conduit of said adapter plate such that contaminated air being removed from said toilet bowl generally flows around said discharge conduit.

3. The ventilating means of claim 1, wherein:

a. said tank additionally includes a watertight partition uprightly attached to the internal sides of said tank forming a watertight compartment separating said flushing liquid from the cavity of said compartment,

b. said means for removing contaminated air is removably lodged within said compartment and communicably connected with said conduit of said adapter plate, and

c. said means for preventing backflow of contaminated air comprises a plate member pivotally connected to said means for conducting and contigously situated to the point where said means for removing connects with said means for conducting such as to entirely block said point to prevent the backflow of contaminated air, said plate member being normally biased in a closed position by a spring loaded at the pivot point.

4. The ventilating means of claim 3 wherein:

a. said means for conducting comprises a vent stack connected to said means for passing said normally contaminated air into the outside atmosphere, and

b. said means for preventing being connected within said vent stack in proximity to said means for removing.

5. The ventilating means of claim 3 wherein said means for preventing comprises a solenoid valve electrically connected to said switch means such that pressure exerted on the top of said seat operates said switch means to open said solenoid valve to allow the passage of said normally contaminated air from said means for removing through said means for conducting.

6. The ventilating means of claim 3, wherein:

a. said means for conducting comprises a second conduit connecting said means for removing with the sewer below the toilet trap, and

b. said means for preventing being connected within said second conduit in proximity to said means for removing.

7. The ventilating means of claim 1, additionally including:

a. a compartment attached underneath said adapter plate wherein said means for removing removably lodges, said compartment being communicably connected with said conduit of said adapter plate,

b. said means for conducting comprises a second conduit connecting said means for removing with the sewer below the toilet trap, and

c. said means for preventing comprises a plate member pivotally connected to said means for conducting and contigously situated to the point where said means for removing connects with said means for conducting such as to entirely block said point to prevent the backflow of contaminated air, said plate member being normally biased in a closed position by a spring loaded at the pivot point.

8. The ventilating means of claim 7, wherein:

a. said means for conducting comprises a vent stack connected to said means for removing for passing said normally contaminated air into the outside atmosphere, and

b. said means for conducting additionally includes a means for preventing the backflow of contaminated air, said means for preventing being connected within said vent stack in proximity to said means for removing.

9. The ventilating means of claim 7, wherein:

a. said means for conducting comprises a second conduit connecting said means for removing with the sewer below the toilet trap, and

b. said means for preventing being connected within said second conduit in proximity with said means for removing.

10. The ventilating means of claim **7** wherein said means for preventing comprises a solenoid valve electrically connected to said switch means such that pressure exerted on the top of said seat operates said switch means to open said solenoid valve to allow passage of said normally contaminated air from said means for removing through said means for conducting.

* * * * *