

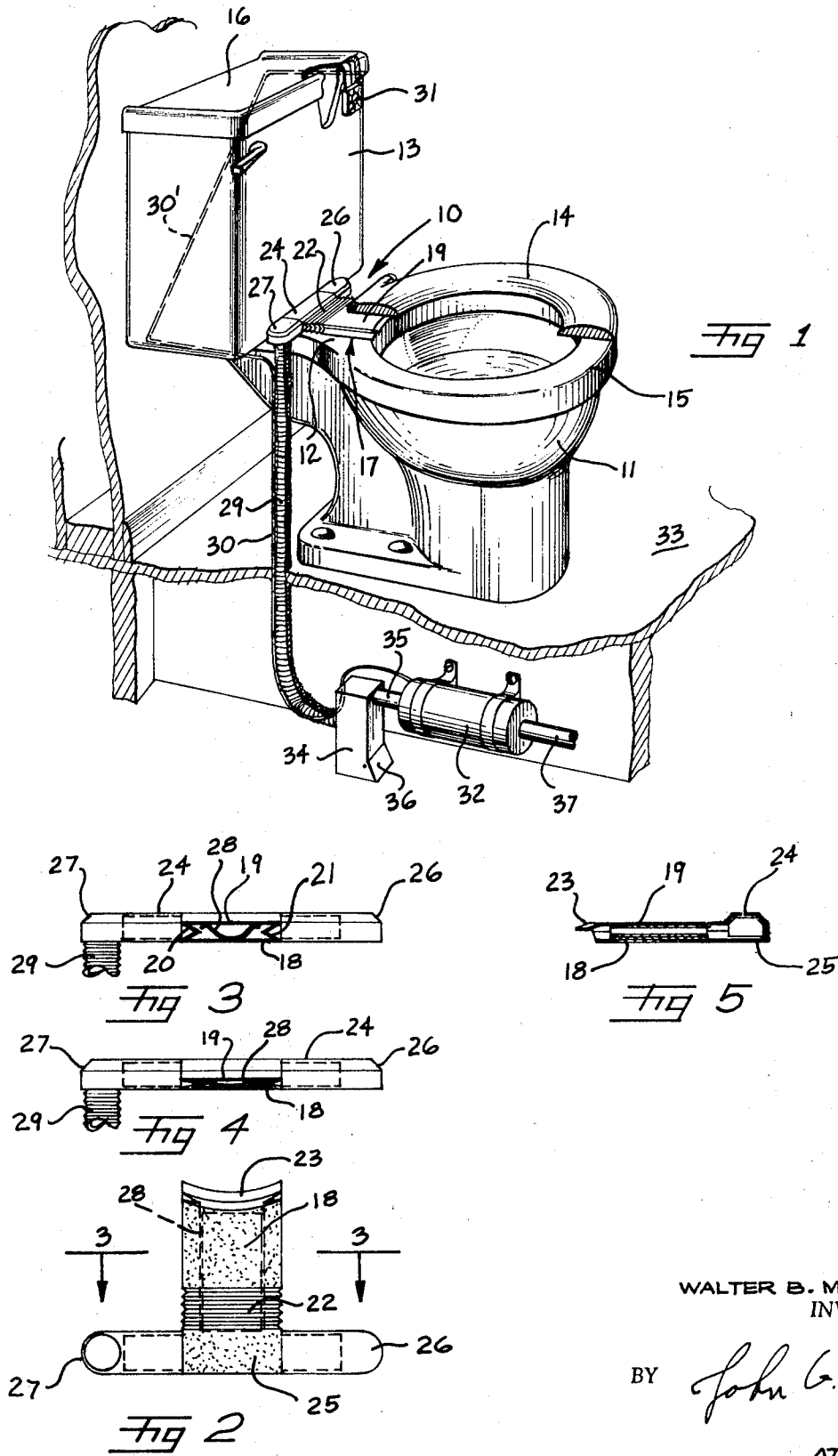
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TOILET EXHAUST SYSTEM

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TOILET EXHAUST SYSTEM

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ABSTRACT OF THE DISCLOSURE

In abstract, a preferred embodiment of this invention is an easily installable, readily adaptable air exhaust system for attachment to toilet bowls.

This invention relates to air exhaust systems and more particularly to ventilators which are adapted to be readily connected to toilet bowls or the like.

In the past, various devices have been devised to be used in conjunction with toilets to remove stale air from the surrounding area. These devices have included complicated built-in mechanisms both within the bowl itself and within the associated water reservoir. Other systems have been developed for attachment to the water closet with intake openings either in the seat thereof, on the side of the bowl, or on the rear of the bowl. These various ventilator devices have included various means for turning the units on and off as well as various manners of attachment being developed. None of these prior art systems, however, have been readily adapted to varying sizes of toilets nor have they been universally useable with toilets having varying space clearances between the seat and the bowl. The prior art also has not disclosed a system which is extremely simple to install and secure while at the same time providing a safety system for preventing water from overflow or other sources from entering the fan unit.

The present invention has been developed after much research and study into the above mentioned problems and is designed to be readily installable on all makes and models of toilets by either skilled or unskilled personnel. It includes means to allow maximum advantage to be taken of the distance between bowl and seat while also not obstructing the movement of the seat to a lowered or a raised position in units where the distance between the seat and the bowl is small.

Applicant's improved ventilation system also has the advantage of providing a means to prevent damage to the prime air mover such as a vacuum unit or fan should water enter the system due to toilet overflow or other reasons. A means is additionally provided for preventing the system from inadvertently being left on for long periods of time when the need for the same is greatly reduced or nonexistent.

It is, therefore, an object of the present invention to provide a toilet exhaust system which is readily installable by unskilled personnel.

Another object of the present invention is to provide an aesthetic toilet ventilating system which is adjustable as to location of the exhaust pipe as well as being adaptable to varying toilet sizes.

A further object of the present invention is to provide an improved inlet portion of an exhaust system which is adjustable both vertically and longitudinally while being biased vertically toward its most opened position.

Another object of the present invention is to provide in combination with a longitudinally adjustable exhaust inlet, a means for readily securing such inlet to the rear portions of a toilet bowl in the adjusted extending position.

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Another object of the present invention is to provide, in a toilet ventilating system, means for protecting the prime mover of such system by preventing water from entering the mover unit and also providing means for preventing inadvertent extended operation of such unit.

Another object of the present invention is to provide a protective means against small amounts of water being splashed or otherwise allowed to enter the system.

Other objects and advantages of the present invention will become apparent and obvious from a study of the following description and the accompanying drawings which are merely illustrative of the present invention.

In the drawings:

FIG. 1 is a perspective of a toilet after having the system of the present invention installed to operate in conjunction therewith;

FIG. 2 is a bottom plan view of the inlet and manifold portions of such system;

FIG. 3 is a section taken through lines 3-3 of FIG. 2;

FIG. 4 is a similar section to FIG. 3 except showing the inlet portion vertically compressed; and

FIG. 5 is a side elevational view of a modification of the inlet portion of the present invention.

With further reference to the drawings, FIG. 1 discloses a preferred embodiment of the overall system of the present invention as installed on a toilet indicated generally at 10. This toilet is of the usual type having a toilet bowl 11, a throat portion 12 and a water reservoir or tank 13. A seat 14 is provided having a diameter of approximately the same as the flush ring portion 15 of bowl 11. The upper portion of tank 13 has a removable tank cover 16 placed thereover.

The exhaust system of the present invention comprises an air inlet indicated generally at 17 composed of lower portion 18, upper portion 19, bifurcated side portions 20 and 21 and extensible and compressible portion 22. The extensible and compressible portion follows the general contours and sizes of the upper, lower and side portions. It may be formed from rubber, plastic or other flexible material by processes well known in the art.

The end of inlet 17 toward the opening in bowl 11 has a depending lip or shield 23 attached to upper portion 19 so that the opening into the interior of such inlet will be protected but not restricted.

Fixedly and communicatively secured to the rear portion of extensible and compressible portion 22 is manifold 24. This manifold in cross-section has a flattened bottom portion 25.

Adapted to adjustably fit into one end of manifold 24 is closure 26. The other end of manifold 24 is adapted to adjustably receive elbow 27. As will be obvious, the length of elbow 27 which inserts into manifold 24 may be varied to allow telescopic adjustment to compensate for varying widths in the throat portion 12 of various makes and models of toilets. If it is considered aesthetically desirable to have manifold 24 as extended by elbow 27 in one direction to be extended an equal distance in the other direction, closure 26 could likewise be telescoped. In any case, closure 26 and elbow 27 are adapted to interchangeably fit either end of manifold 24.

To maintain air inlet 17 in its most opened position as dictated by the maximum distance between seat 14 and flush ring 15, and to allow variations in this distance while maintaining a maximum use of the space available, a flattened, elongated spring 28 is disposed longitudinally within such inlet.

A flexible tube or line 29 is fixedly secured to the downward portion of elbow 27 as oriented in the drawings. Preferably fixedly secured to this tube is an electrically conductive wire 30. This wire is adapted to operatively connect metal, clip hung timer switch 31 to the motor

(not shown) within vacuum unit 32. As will be noted in FIG. 1, additional wiring 30' is used for completing the circuit between timer 31 and wire 30.

The portion 30' of the wiring is strung from the switch 31, around the side of tank 13 just under cover 16 to the rear portion of such tank, then downwardly and across the bottom of the same to a juncture with wire 30. This arrangement all but completely hides the wiring from switch 31 to vacuum unit 32.

A single hole must be made through the flooring 33 upon which the toilet 10 sits. At any convenient location below such floor may be mounted the box-shaped trap 34. To the lower portion of this trap is connected flexible tube 29. To the upper portion is connected line 35 which communicates between such trap and vacuum unit 32. A gravity closed, freely pivoted flap valve 36 is provided in the lower portion of trap 34 to allow the exit of water or other liquids which might accidentally be introduced into the exhaust system, thus preventing such liquids from entering vacuum unit 32. Obviously in the absence of liquids within the system, valve 36 will remain closed due to the combined effects of gravity and sub-atmospheric pressure within the system.

A tube or line 37 is also secured to vacuum unit 32 to vent the entire system either at the outer edge of the building or through the roof as is customarily done when venting plumbing systems.

As a modification to allow variations in the distance between shield 23 and manifold 24 required to compensate for varying throat lengths encountered from one toilet to another, the telescoping structure of FIG. 5 could be substituted for the extensible and compressible portion 22 of FIG. 2.

To install the exhaust system of the present invention on a toilet 10, manifold 24 would be placed at the rear of throat 12 adjacent tank 13 and secured in place by an adhesive which had previously been placed on or built into flattened portion 25. Air inlet 17 is then compressed and placed between the toilet seat 14 and flush ring 15. The extensible and compressible portion 22 allows a single configuration inlet to be placed on an infinite number of varying throat size toilets. The air inlet is held in proper predetermined location by an adhesive added to or built into the lower portion 18 of such inlet.

Once installed, inlet 17 is capable of varying in height, and thus open passage area, as the distance between the seat and flush ring varies according to said seat's horizontal or vertical position. By having this adjustable capability, the air inlet of the present invention will at all times utilize to the fullest extent the useable space available.

Once the air inlet and manifold have been installed on the toilet 10, closure 26 may be telescopically placed in one end of such manifold and elbow 27 may be telescopically placed in the other end. Once the opening has been made in flooring 33, flexible tube 29 may be connected at one end to elbow 27 and its other end, along with associated wire 30, passed through such opening and connected to the lower portion of trap 34. This trap is secured to any convenient structure such as floor joist 38. Line 35 is then connected between the upper portion of trap 34 and vacuum unit 32. This vacuum unit is secured to any convenient structure such as a joist. Exhaust tube or line 37 communicates between said unit and the exterior of the building.

Vacuum unit 32 may now be operatively attached to a power source (not shown) with the metal clip hung timer switch 31 and its associated wiring so connected as to control the operation of such unit.

In actual use of the exhaust system of the present invention, the timer 31 is activated to operate for a predetermined amount of time. This timer, when operating, makes the circuit to operate vacuum unit 32. The air in the immediate area of bowl 11 is thus moved so that it enters air inlet 17 under shield 23 and passes through

such inlet into manifold 24. The air then passes through elbow 27 and line 29 to trap 34. The air next passes from trap 34 through line 35 into the system's vacuum unit 32. The air is then exhausted through line 37 to the exterior (not shown) of the structure or building. Once the timer switch has maintained the closed circuit for the set amount of time, it opens such circuit to stop the operation of unit 32 and the air flow through the system. If it is desired to have the unit operate for a longer period of time, timer 31 may obviously be reset.

The present invention has the advantage of providing a toilet exhaust system which is easily and universally installable on toilets of all sizes and shapes while at the same time making provision for the most advantageous use of the space available between the flush ring and seat. The present invention has the further advantage of providing an exhaust system which does not require complicated tools nor skilled labor to install. The present invention has the additional advantage of providing protection means built into the system to prevent water damage to the system's prime mover as well as preventing possible failure due to extended operation.

The terms "upper," "lower," "forward," "rearward" and so forth have been used herein merely for convenience of the foregoing specification and in the appended claims to describe the toilet exhaust system and its parts as oriented in the drawings. It is to be understood, however, that these terms are in no way limiting to the invention since the system may obviously be disposed in a different position when placed in operation.

The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention. The present embodiments might, therefore, be considered in all respect as illustrative and all changes coming within the meaning and equivalency range are intended to be embraced herein.

What is claimed is:

1. In an air exhaust system for attachment to a toilet having a bowl, a flush ring about the periphery of such bowl, a seat pivotably mounted in space relation above said flush ring and a generally flat, throat area between said seat and a flush water tank, the improvement comprising: a hollow, open-ended, elongated inlet portion having means allowing said inlet portion to be extended or contracted in both longitudinal and vertical directions, said longitudinal extension taking place along the longitudinal axis of said inlet portion and lying juxtaposed to said throat area and extending into the space between said flush ring and said seat to a point generally adjacent the interior periphery of said flush ring whereby one end of said inlet portion may be disposed in the area adjacent the interior of said bowl; a vacuum producing means; and means for communicatively and operatively connecting the other end of said inlet portion to said vacuum means whereby stale air may be drawn from said bowl.

2. The exhaust system of claim 1 wherein the means for connecting said inlet portion to the vacuum means includes an elongated, open-ended manifold disposed laterally to the longitudinal axis of said inlet portion and lying generally juxtaposed to said throat adjacent said tank; a closure means lockingly inserted into one end of said manifold; and means for communicatively connecting a tube means from the end of said manifold opposite said closure means to said vacuum means.

3. The exhaust system of claim 2 wherein both ends of said manifold are telescopically adjustable parallel to the longitudinal axis of said manifold.

4. The system of claim 1 wherein the inlet portion is biased vertically to an open position whereby maximum utilization may be made of the air space between said seat and said flush ring.

5. The exhaust system of claim 4 wherein the biasing means is a spring.

6. The exhaust system of claim 1 wherein the open

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end of the inlet portion disposed toward said bowl is generally concaved in shape in plain view.

7. The exhaust system of claim 6 including an outwardly projecting splash shield connected to the upper portion of said concave opening.

8. The exhaust system of claim 1 wherein a liquid trap is operatively connected between said inlet portion and said vacuum means whereby liquid which inadvertently enters the system through said inlet will be intercepted prior to entering said vacuum means.

9. The exhaust system of claim 8 wherein the trap includes a generally vertically disposed elongated housing; an inlet opening in the lower portion of said housing; means for communicatively connecting said inlet portion to said lower inlet opening; an outlet opening in the upper portion of said housing; means for communicatively connecting said upper opening to said vacuum means; and an outwardly pivotable flap valve operatively constructed into the lower portion of said housing whereby air may pass from said inlet portion to said vacuum means while water and other liquids will be expelled from the system due to their weight overcoming the gravity biased closure of said valve.

10. The exhaust system of claim 1 wherein a timer switch is provided to cause the vacuum means to operate for variable, preset lengths of time.

11. The exhaust system of claim 1 wherein an attach-

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ing means is provided to secure said inlet portion of the throat area of the toilet.

12. The exhaust system of claim 11 wherein said attaching means is an adhesive.

13. The exhaust system of claim 2 including securing means for connecting said manifold to said throat area.

14. The exhaust system of claim 13 wherein said securing means is an adhesive.

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