A system, device, and kit to vent noxious odors emanating from within the bowl of a commode. The device comprises a toilet seat with intake vent holes in fluid communication with exhaust vent holes. The system includes a commode, the toilet seat, an electric motor-driven exhaust fan, a filter that absorbs odors, and a switch to turn on and off the exhaust fan. The toilet seat exhaust holes are in fluid communication with the filter and exhaust fan. The toilet seat intake holes are located such that when the toilet seat is lowered, the intake holes are on the bottom or sides of the toilet seat; thus the exhaust fan aspirates the noxious odors contained within and near the toilet bowl. A kit comprises the described components, except the commode, such that the toilet seat and exhaust components can be attached to a conventional commode.
FIG. 3.

FIG. 3a. Top view

FIG. 3b. Side view

FIG. 3c. Bottom view

TOILET-SEAT EQUIPPED WITH EXHAUST DEVICE
TOILET-SEAT EQUIPPED WITH EXHAUST DEVICE

FIG. 4

FIG. 4a. Top view

FIG. 4b. Side view

FIG. 4c. Bottom view
TOILET-SEAT EQUIPPED WITH NOXIOUS ODOR EXHAUST DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS


FIELD

[0002] The present invention relates to room ventilation and more particularly to a toilet and toilet seat ventilation device for venting noxious odors from within, and in the vicinity of, a commode.

BACKGROUND

[0003] The odors emanating from a toilet bowl, particularly when in use and soon after use, are often noxious and offensive. Aside from the odors being disturbing to the persons inside or in the vicinity of the restroom, the odors are often a source of embarrassment to the persons utilizing the restroom facilities, or otherwise being the cause of the noxious odors.

[0004] Also, persons suffering from certain medical conditions may produce particularly strong and noxious odors, being of further personal mortification to the individual.

[0005] Furthermore, when the restroom facilities are closely located to kitchen or dining areas; when the restroom facilities are situated in small apartments or otherwise cramped or highly occupied dwellings, e.g., hotel rooms, the noxious odors become more objectionable to the inhabitants of the dwelling, and more cause of embarrassment to the person using the restroom facilities.

[0006] Several toilet and restroom ventilation, freshening, and deodorizing systems are known in the art of toilet ventilation systems. However, most of the ventilation systems aspire (and contemporaneously exhaust) the air from within the room in which the commode is located; that is, aspirate (and contemporaneously exhaust) the ambient air. These systems do not aspirate the noxious air directly from its source, the toilet bowl.

[0007] A typical toilet bowl has an internal volume of air of less than one cubic foot; that is to say, less than 0.9 ft³ x 0.9 ft³ x 0.7 ft³ = 0.5 ft³ (using a 3-dimensional rectangle, as an approximation of the internal volume of a typical toilet bowl).

A very small toilet facility, such as the enclosed space inside a small restroom that only contains the commode (e.g., when the sink and shower or bath are outside the toilet facility), would typically measure 3 ft x 2 ft x 8 ft, thus having a volume of 44 ft³. While a conventional small facility, one that contains a commode, sink, and shower, would measure at least 7 ft x 10 ft x 8 ft, thus having a volume of 560 ft³. Accordingly, the air volume contained within the confines of a small bathroom is hundreds of time larger than the air volume contained within the confines of a toilet bowl.

[0008] If the noxious odors escape from within the toilet bowl and permeate the ambient air, then the odors permeate a volume that is hundreds of times larger.

[0009] Conventional toilet ventilation systems do not aspire (and contemporaneously exhaust) most of the air from or within the toilet bowl. Instead, the conventional toilet ventilation systems essentially rely on the noxious odors escaping the toilet bowl and permeating the air space within the restroom before ventilating the odorous ambient air.

SUMMARY

[0010] The present device and kit according to the principles disclosed herein, overcomes shortcomings of the current toilet and restroom ventilation, freshening, and deodorizing systems by providing a new and improved system, device, and kit of exhausting noxious odors from within the confines of a toilet bowl, and in the immediate vicinity of a toilet bowl, before said noxious odors permeate the air space within the restroom facilities.

[0011] The system and method use a toilet seat that resembles standard toilet seats except for being equipped with a plurality of air intake (aspiration) holes on the bottom and/or sides of the seat in fluid communication with one or more exhaust holes on said toilet seat. More specifically, the aspiration or intake vent holes should be situated such that when a person is sitting on top of the toilet seat, the intake vent holes do not come in contact with the person. Also, said intake vent holes should be situated to reduce the likelihood that as a person sits on the toilet his or her clothing blocks the intake vent holes and thus prevents, or attenuates, aspiration. Therefore, such intake vent holes should preferably be situated behind the person sitting on the toilet seat to avoid a shirt or blouse from obstructing the intake vent holes.

[0012] The toilet seat may be hollow inside or alternatively have ducts that enable fluid communication among the intake vent holes and the exhaust holes.

[0013] The toilet seat may be equipped with an on/off switch to turn on and off the exhaust fan. The on/off switch may be a manually operated on/off switch. However, the toilet seat may be equipped with automatic on/off switching devices, such as pressure switches, that turn on the exhaust fan when a person sits on the toilet seat. Furthermore, the on/off switch could constitute, or be integrated with, a timer switch allowing the user to set the exhaust fan to run for a set period of time.

[0014] The air intake holes on the toilet seat should preferably be located on the bottom, sides, or both bottom and sides of the toilet seat, or should otherwise be placed such that a person sitting on the toilet seat will not obstruct the holes. Since most of the noxious odors emanate when a person is covering most of, or a large portion of, the main access opening of the toilet seat (namely, a person is sitting down on top of the toilet seat) then the majority of the noxious odors are confined to and within the toilet bowl and have little opportunity to escape into the ambient air. Thus, from within the confines of the toilet bowl, upon switching the exhaust fan, the air is aspirated from within the toilet bowl and the immediate vicinity of the toilet bowl. The aspirated air travels from the intake holes of the toilet seat, through the exhaust holes of the toilet seat, into the intake holes of the exhaust plenum in fluid communication with the electric fan, then exhausted either indoors or outdoors. If exhausted indoors (that is, within the confines of the restroom facilities), somewhere within the toilet seat intake holes and the electric fan exhaust, preferably an odor absorbing filter absorbs the noxious odors before exhausting the air. If the air is exhausted outdoors, there would be less need to have odor absorbing filter.

[0015] As discussed above, a typical toilet bowl has an internal volume of about 0.5 ft³; while a very small toilet facility, one that only contains the commode (e.g., when the...
sink and shower or bath are outside the toilet facility), would have a volume of 144 ft³. While a conventional, yet small toilet facility, one that contains a commode, sink, and shower, would have a volume of 560 ft³. Thus, the air volume contained within the confines of a small bathroom is hundreds of time larger than the air volume contained within the confines of a toilet bowl.

[0016] However, to adequately ventilate the air from a restroom versus ventilating the air from within the confines of a toilet bowl, requires a volume flow rate hundreds of times larger, or alternative, requires several minutes to ventilate the space, and even so, the ventilation may be inadequate. For example, a typical inexpensive bathroom fan may have a flow rate of 80 cubic feet per minute (“CFM”). Even if the bathroom door is closed, as the fan operates exhausting air, air enters the bathroom from the air openings around and particularly on the bottom (beneath) the bathroom door, which space may be as much as 36 square inches. Therefore, for a toilet facility having internal volume of 140 to 560 cubic feet, and considering that as a typical exhaust fan operates, additional air enters into the toilet facility through the openings around the bathroom door, it would take an 80 CFM fan several minutes to exhaust the offensive odors from the toilet facilities.

[0017] However, as described herein, even a small fan, for example a fan with a flow rate of 5 CFM (16 times smaller than the commercially available and inexpensive bathroom fans) would still exhaust offensive odors twenty times faster from within the toilet bowl, thus reducing the amount of noxious odors permeating the restroom ambient air.

[0018] In one embodiment of the invention, the exhaust fan, which is in the proximity of the toilet bowl, is equipped with an air filter, such as an activated carbon filter or other filter suitable for eliminating or reducing the odors. Such filters could be replaceable filters or washable filters. This embodiment would be particularly useful where there is no simple and inexpensive access to exhaust the air outdoors.

[0019] In another embodiment, it is essentially the same as above, except that the exhaust from the exhaust fan is conducted outdoors via exhausting means. The exhausting means could include those typically used for venting indoor air to the outdoors, such as those used for bathroom exhaust fans, or for exhausting stove top exhaust fans, or for venting a cloth dryer.

[0020] Yet another embodiment of the invention is the same as described above, but with the exhaust fan and motor being located remote to the restroom facilities, thus reducing or eliminating the noise from the exhaust fan.

[0021] The invention herein has been described rather broadly, such that the more important features of the invention are easily followed and understood, and that the present contribution to the art may be better appreciated.

[0022] Those skilled in the art will appreciate that the concept described herein may readily be used as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention.

[0023] Therefore, it is the object of the present invention to provide a new and improved toilet exhaust device and system that incorporates the advantages of the prior art toilet exhaust systems, but operates more effectively in achieving the purpose of reducing offensive odors; that is cost effective in its manufacturing and use.

[0024] Another object of the present invention is to provide a new and improved kit comprising the unassembled components of the device disclosed herein, such that it is cost-effective and practical to retrofit current commodes, to provide them with an effective means to reducing offensive odors.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The invention will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

[0026] FIG. 1 is a perspective view of a first embodiment of the toilet seat equipped with exhaust device, where the toilet seat is in the down (horizontal) position. In this embodiment, the noxious air from within and near the vicinity of the toilet bowl is absorbed through the holes on the bottom of the toilet seat (not shown; but see FIG. 2), conducted through the plenum, and then through the electric fan, which is equipped with an internal odor absorbing filter, and the air subsequently exhausted into the ambient air of the restroom facilities.

[0027] FIG. 2 shows the same first embodiment as FIG. 1 with the hinged toilet seat in an up position showing intake (aspiration) holes on the bottom of the toilet seat.

[0028] FIG. 3 illustrates a schematic drawing showing a top, side, and bottom view of the toilet seat equipped with exhaust device wherein the exhaust is indoors into the ambient air of the restroom facilities.

[0029] FIG. 4 illustrates a schematic drawing showing a top, side, and bottom view of the toilet seat equipped with exhaust device wherein the electric fan exhausts the noxious air outdoors.

[0030] FIG. 5 illustrates a block diagram of the toilet seat equipped with exhaust device as used for indoor exhaust.

[0031] FIG. 6 illustrates a block diagram of the toilet seat equipped with exhaust device as used for outdoor exhaust.

[0032] FIG. 7 illustrates a cross-sectional view of a toilet seat.

DETAILED DESCRIPTION

[0033] Referring now to the drawings, FIGS. 1 and 2 shows a preferred embodiment; generally designated with the numeral 10. FIGS. 1 and 2 illustrate the toilet bowl 20, on top of which rests a toilet seat 30. For illustrative purposes, toilet seat 30 is shown pivotally attached to the toilet bowl 20. The figure also shows a plenum 40, in fluid communication with the toilet seat 30, an electric fan 50, and an on/off switch 52 to turn on and off the electric fan.

[0034] Referring now to FIG. 2, the figure shows the same components mentioned above for FIG. 1. In the aspect illustrated in FIG. 2, the toiled lid is shown in an up-right or vertical position, further showing the toilet seat intake vent holes 34, essentially a plurality of holes for the intake or absorption of air, when the seat is in the down or horizontal position. In addition, the raised toilet seat of FIG. 2 shows the pressure switches 36.

[0035] On/off switch 52, as illustrated, could be a conventional on/off switch, or could be a timer, such as a rotary timer on/off switch. Thus, a person using the facilities could simply turn on the electric fan 50, leave it on for the desired period of time, then turn it off; or the person using the facilities could simply turn (rotate) a rotary switch, to set the desired operation time of the electric fan 50, which, upon expiration of the time, the switch would then turn off the electric fan 50.
The activation of the electric fan could also be accomplished via the pressure switches 36. Pressure switches 36 would be selected such that a certain minimum pressure would be required to activate pressure switches 36. For example, it might be desirable for pressure switches 36 to activate only if the weight on top of toilet seat 30 exceeds twenty pounds. That way, lowering a toilet lid (not shown in the figures) or placing small amount of weight on top of the toilet lid would not activate pressure switches 36.

Through the aspect in FIG. 2 uses three pressure switches 36, any number of switches may be used. The advantage of having two or more pressure 36 is that the switches would operate more reliably even if the load on top of toilet seat 30 has uneven distribution, or if toilet seat 30 were to be crooked or uneven.

Turning now to FIG. 3, the figure shows a graphic representation of the first embodiment, via three cross-sectional views, a top view (FIG. 3a), a side view (FIG. 3b), and a bottom view (FIG. 3c). FIG. 3a shows that the toilet seat cavity 32 within the toilet seat 30 is in fluid communication the plenum cavity 42. FIG. 3b shows the electric fan 50, an odor absorbing filter 54, and an exhaust grid 58. Filter 54 is detachably interposed and in fluid communication between toilet seat 38, exhaust holes, and electric fan exhaust 56.

FIG. 3b shows that the toilet seat cavity 32 is in fluid communication the plenum cavity 42, which in turn, is in fluid communication with the electric fan intake 55 and electric fan air exhaust 56. FIG. 3b also shows an odor absorbing filter 54. In FIG. 3c, the filter is shown at the intake of electric fan 50. However, it should be understood that filter 54 can be located anywhere between the intake vent holes 34 and the electric fan air exhaust 56. For example, the filter could be located inside plenum cavity 42.

In FIG. 3c, the bottom view of the device shows the openings on the underside toilet seat 30. Together, FIGS. 3a, 3b, and 3c: also show the flow path of the air, from the toilet bowl 20, into the toilet seat cavity 30, from intake vent holes 34, through the toilet seat cavity 32, entering the plenum cavity 42, flowing through filter 54, then through the electric fan, exhausting into ambient air. Exhaust grid 58 is a safety grid to block little fingers or other things coming into contact with the electric motor or blades of the electric fan.

Turning now to FIG. 4, the figure shows a graphic representation of the second embodiment, via three cross-sectional views, a top view (FIG. 4a), a side view (FIG. 4b), and a bottom view (FIG. 4c).

The second embodiment illustrated in FIG. 4, essentially follows the same description and operation as described in FIGS. 1 through 3; the difference being that the electric fan does not exhaust inside the same room as the toilet facilities, but rather the air is ducted to a location outside the restroom facilities via duct 60. Since the vent is outside, there is less need for odor absorbing filter 54 shown in FIG. 3.

FIGS. 5 and 6 illustrate block diagrams of the toilet seat equipped with an exhaust device as used for indoor exhaust, and outdoor respectively.

FIG. 7 illustrates a cross-sectional view of a toilet seat 30, illustrating the intake vent holes 34, the pressure switches 36, toilet seat cavity 32, and the toilet seat air exhaust opening 38.

A third embodiment of the invention is substantially similar to the second embodiment, wherein the noxious exhaust vents outside the restroom facilities. In such case, it may be desirable to have the electric motor and fan at the exhaust point, thereby relieving the restroom user from noise associated with the operation of the electric fan.

Regarding operation, referring to the above-described figures, as a person sits on top of toilet seat 30, the person naturally obstructs most of the opening of toilet seat 30. At any time during the process, the person may turn on the electric fan 50 via on/off switch 52. It should be noted that even if the activation is via pressure switches 36, it may still be desirable to have an on/off switch 52, as the user may not wish to always have electric fan 50 running, whenever the person is seated.

When electric fan 50 is running, the air inside toilet bowl 20 is absorbed through toilet seat intake vent holes 34 located on the bottom of toilet seat 30. Since the electric fan creates a negative pressure (a vacuum), however small, the air within the toilet bowl 20, instead of escaping into the ambient air of the restroom facilities, is absorbed into and inside toilet seat 30 where it travels through toilet seat cavity 32, exhausting through opening 38 and enters the plenum through plenum cavity 42, proceeding to flow through filter 54, then through the electric fan 50, exhausting into ambient air.

It should be noted that the plenum 40 is just a fluid connection between the toilet seat 30 and the electric fan 50. Thus, the plenum is not essential for the operation of the described embodiments, as it could be substituted with a simple duct, or eliminated. For example, the plenum could be replaced with an enclosure that contains the electric fan and filter.

While preferred embodiments of Toilet-Seat equipped with Noxious Odor Exhaust Device have been described in detail, it should be apparent that modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention. With respect to the above description one will appreciate that the toilet seat intake vent holes and the electric fan exhaust fluidly communicate with each other. Such fluid communication can be achieved via various methods, including variations in materials, shape, ducting, housing, form, function and manner of operation. Thus, all equivalent relationships to those illustrated in the drawings and described in this specification are contemplated thereby.

It will be appreciated that the invention described herein is susceptible to variations and modifications other than those specifically described. The invention includes all such variations and modifications that fall within its spirit and scope. Therefore, the foregoing is considered as illustrative of the principles of the invention and all suitable modifications and equivalents may be resorted to, and presumed as falling within the scope of the invention.

1 claim:

1. A system comprising:
   a toilet seat defining one or more intake vent holes, the toilet seat also defining one or more air exhaust holes, said toilet seat defining a cavity that fluidly couples the one or more intake vent holes with the one or more air exhaust holes.

2. The system of claim 1 further comprising:
   an electric fan assembly having a housing defining an air intake opening and an air exhaust opening; said air intake opening in fluid communication with said air exhaust opening;
a filter detachably interposed and in fluid communication between said toilet seat exhaust holes and said electric fan exhaust opening; and an on/off switch electrically connected to said electric fan to turn on and off said electric fan.

3. The system of claim 2 further comprising one or more pressure switches attached to said toilet seat, said pressure switches operatively connected to said on/off switch.

4. The system of claim 2 wherein said on/off switch is connected to a timer.

5. The system of claim 1 further comprising: an electric fan having an air intake opening and an air exhaust opening; said air intake opening in fluid communication with said air exhaust opening; means for said electric fan to exhaust the air outside of the restroom facilities; and an on/off switch electrically connected to said electric fan to turn on and off said electric fan.

6. The device of claim 5 further comprising one or more pressure switches attached to said toilet seat, said pressure switches operatively connected to said on/off switch.

7. The device of claim 5 wherein said on/off switch is connected to a timer wherein a person can set the desired duration of operation of said electric fan.

8. The device of claim 5, wherein said electric fan is located outside the restroom facilities.

9. The device of claim 6, wherein said electric fan is located outside the restroom facilities.

10. The device of claim 7, wherein said electric fan is located outside the restroom facilities.

11. An exhaust vent kit to be used in conjunction with a commode, said kit comprising: a toilet seat defining one or more intake vent holes, the toilet seat also defining one or more air exhaust holes; said toilet seat defining a cavity that fluidly couples the one or more intake vent holes with the one or more air exhaust holes; an electric fan assembly defining one or more intake vent holes, the electric fan also defining one or more air exhaust holes; said air intake vent holes in fluid communication with said air exhaust holes; an on/off switch electrically connected to said electric fan to turn on and off said electric fan.

12. The device of claim 11 further comprising a filter suitable for absorbing odors, said filter detachably interposed and in fluid communication between said toilet seat exhaust holes and said electric fan exhaust holes.

13. The device of claim 11 further comprising one or more pressure switches mounted onto said toilet seat, said pressure switches operatively connected to said on/off switch.

14. The device of claim 11 wherein said on/off switch is connected to a timer wherein a person can set the desired duration of operation of said electric fan.

15. The device of claim 12 further comprising one or more pressure switches mounted onto said toilet seat, said pressure switches operatively connected to said on/off switch.

16. The device of claim 12 wherein said on/off switch is connected to a timer wherein a person can set the desired duration of operation of said electric fan.

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