A ventilation system to remove odors from a toilet bowl has an odor collection receptacle coupled to the toilet bowl. A seal is formed between the odor collection receptacle and a toilet seat of the toilet bowl when the toilet seat is lowered. A skirting is coupled to a bottom section of the toilet seat. The skirting maintains the toilet seat in a level position and controls an amount of air into the toilet bowl to prevent odors from escaping. Tubing is coupled to the odor collection device to remove the odors from the toilet bowl. A fan is coupled to the tubing to draw the odors from the toilet bowl through the tubing.
Figure 1.

Residential Commercial Toilet with Standard Seat

- Toilet Tank
- Odor Collection Device Ducting 15
- Odor Collection Device Assembly 12
- Odor Collection Device Opening
- Standard Toilet Seat 14
- 28 Skirting
- Support 30
- Air Gap
Fig. 3

Toilet Bowl

Toilet Seat Hinge Nut + Bolt Assembly 16

Odor Collection Device Ducting 15

To Fan 30

Odor Collection Device Assembly 12

Seal

Toilet Seat 14

LED

Toilet Tank

Supports 30

Skirting 28

Residential/Commercial Toilet Standard Seat
RESIDENTIAL COMMERCIAL TOILET SPLIT SEAT

Fig. 7
TOILET ODOR REMOVAL SYSTEM AND METHOD THEREFOR

RELATED APPLICATIONS

[0001] This patent application is claiming the benefit of the U.S. Provisional Application having an application number of 60/307,806, filed Jul. 25, 2001, in the name of Kris A. Blanch and Becky D. Blanch, and entitled “TOILET ODOR REMOVAL SYSTEM”.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates to ventilation systems, and more specifically, to a toilet bowl ventilation system and method which will efficiently remove objectionable odors in and around the toilet bowl area.

[0004] 2. Description of the Prior Art

[0005] Objectionable odors produced during normal toilet use have long been a source of concern and embarrassment to many people. Thus, the elimination or diminution thereof has occasioned a great deal of effort and inventive energy. Despite the multiplicity of efforts spent on solving this problem, all prior solutions seem to be lacking in one or more of several important aspects.

[0006] The preponderance of prior art toilet ventilators use the approach of gathering odors from the space within a toilet bowl to either exhaust it to an exterior space or attempt to deodorize and return the air to the bathroom space or toilet bowl. In these types of systems, little or no attempt is made to provide a means of carefully controlled fresh air entry into the toilet bowl. Suffice to say that any exhaust system which constantly removes air from a space without adequate air replacement results in a system more aptly called an evacuation system. The sole purpose of an evacuation system is to create a vacuum. Odor removal efficacy is subject to the success or failure of creating and maintaining a vacuum condition. Unfortunately, a constant state of vacuum cannot be maintained at all times. If a person is using the toilet, a constant state of vacuum can be maintained only when a person of sufficient proportions is seated squarely on the toilet seat so as to completely seal the opening. If a substantial seal is not realized, objectionable odors can escape. Hence the necessity for a system that provides constant ventilation by removing and replacing sufficient quantities of air through the toilet bowl to establish and maintain a constant flow of air into the bowl. The system must not be affected by the presence of or the lack of a vacuum condition and which constantly and consistently captures and eliminates odors. Thus, a system which achieves toilet bowl “flow through ventilation” and consistently captures and controls odors is desired.

[0007] Another deficiency of prior art, specifically those which attempt to deodorize the air, is the inability of such systems to completely remove all obnoxious odor from the air because of insufficient filters or other devices. A system that does not require the use of filters is thus desired.

[0008] Some prior art systems attempt to add sufficient fragrance to the air to overcome objectionable odors. Reodorizing the air has resulted in the annoyance and/or discomfort of many people. Indeed, the addition of chemicals and fragrances to the atmosphere is becoming less and less acceptable to many people. Thus a system to remove and eliminate malevolent odors and makes no attempt to “cover-up” odors is preferred by most people.

[0009] Yet another deficiency of prior art is the inadequate quantity of air removed from the toilet bowl to maintain consistent odor control. If the proper amount of air is not removed from the toilet bowl area, odors are allowed to escape when a perfect seal is not achieved as when the user is small or as when a person lifts him/herself for cleaning at the end of toilet use. In such instances an adequate draft into the bowl is not maintained and odors can escape into the room. A number of attempts have been made to ratify the untenable concept of consistent odor control with insufficient air flow. Thus a system which provides a consistent draft into and out of the toilet at all times and controls odors is desired.

[0010] Still another deficiency of prior art systems is that many of these systems make little or no attempt to address the high friction CFM losses. High friction CFM losses are caused by the small tubing, fittings, apparatus or other venting contrivances intended to be used in confined and restrictive spaces and passages as between the toilet seat and toilet bowl rim or through tubing or plumbing inherent to a typical toilet or toilet ventilation system. Those skilled in the science of ventilation and air movement will quickly recognize that ducting and fitting size, configuration, materials and their inherent causes of friction loss, pressure drops and velocity reduction are vital considerations in the volume of air which can be moved through such apparatus. Thus a system which utilizes adequately sized air conduction contrivances to allow adequate and essential air circulation into and out of the toilet bowl to control odor is desired.

[0011] Yet another deficiency of some prior art systems, as in the case of mechanical draft systems, which is the majority of prior art, is the baleful diligence afforded the significance of IWC (Inches Water Column) developed by the mechanical draft mechanism and its inextricable exigency to the amount of air that can be moved through ducting systems whose capacities are further reduced by those limiting factors mentioned above. Thus, a system that recognizes that a means of mechanical draft capable of developing sufficient IWC is of paramount importance.

[0012] Any devise used in the proximity of the toilet bowl must be readily and easily accessible for thorough cleaning and sanitization. The prior art has not provided such access due to small inaccessible features and/or the use of devises which are not designed to be accessed for cleaning. Thus a system which utilizes devises which are not only open but are of sufficient size and properly positioned to allow easy, quick and thorough cleaning or sanitizing is desired.

[0013] Therefore, a need existed to provide an improved toilet bowl ventilation system and method therefor. The improved toilet bowl ventilation system and method must be able to overcome the problems associated with prior art systems as discussed above. The improved toilet bowl ventilation system must provide a safe, reliable, easy to manufacture and install odor elimination system that adapts to most modern toilets and provides the advantage of odor free toilet use. The improved toilet bowl ventilation system must eliminate the embarrassment some people feel concerning the lingering unpleasant odors associated with toilet
The improved toilet bowl ventilation system must eliminate the possible harmful health effects associated with inhaling methane gas and other odors and vapors.

SUMMARY OF THE INVENTION

[0014] In accordance with one embodiment of the present invention, it is an object of the present invention to provide an improved toilet bowl ventilation system and method therefor.

[0015] It is another object of the present invention to provide an improved toilet bowl ventilation system and method that is able to overcome the problems associated with prior art ventilation systems.

[0016] It is still another object of the present invention to provide an improved toilet bowl ventilation system and method which will provide a safe, reliable, easy to manufacture and install odor elimination system that adapts to most modern toilets and provides the advantage of odor free toilet use.

[0017] It is yet another object of the present invention to provide an improved toilet bowl ventilation system and method that must eliminate the embarrassment some people feel concerning the lingering unpleasant odors associated with toilet use.

[0018] It is still another object of the present invention to provide an improved toilet bowl ventilation system and method that eliminates the possible harmful health effects associated with inhaling methane gas and other odors and vapors.

BRIEF DESCRIPTION OF THE EMBODIMENTS

[0019] In accordance with one embodiment of the present invention, a ventilation system to remove odors from a toilet bowl is disclosed. The ventilation system has an odor collection receptacle coupled to the toilet bowl. A seal is formed between the odor collection receptacle and a toilet seat of the toilet bowl when the toilet seat is lowered. A skirting is coupled to a bottom section of the toilet seat. The skirting maintains the toilet seat in a level position and controls an amount of air into the toilet bowl to prevent odors from escaping. Tubing is coupled to the odor collection device to remove the odors from the toilet bowl. A fan is coupled to the tubing to draw the odors from the toilet bowl through the tubing. The fan is able to develop and maintain a desired IWC draft through the tubing to maintain constant air flow and odor control.

[0021] The foregoing and other objects, features, and advantages of the invention will be apparent from the following, more particular, description of the preferred embodiments of the invention, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, as well as a preferred mode of use, and advantages thereof, will best be understood by reference to the following detailed description of illustrated embodiments when read in conjunction with the accompanying drawings.

[0023] FIG. 1 is an elevated perspective view of the toilet bowl ventilation system of the present invention.

[0024] FIG. 2 is a side view of the toilet bowl ventilation system of the present invention.

[0025] FIG. 3 is a side view of the toilet bowl ventilation system of the present invention with the lid in a raised position.

[0026] FIG. 4 is an elevated perspective view of the toilet bowl ventilation system of the present invention having arrows to depict airflow in the toilet bowl.

[0027] FIG. 5 is an elevated perspective view of another embodiment of the toilet bowl ventilation system of the present invention.

[0028] FIG. 6 is a side view of the toilet bowl ventilation system depicted in FIG. 5.

[0029] FIG. 7 is a side view of the toilet bowl ventilation system depicted in FIG. 5 with the lid in a raised position.

[0030] FIG. 8 is an elevated perspective view of the toilet bowl ventilation system depicted in FIG. 5 having arrows to depict airflow in the toilet bowl.

[0031] FIG. 9 is an elevated perspective view of an odor collection device used in the toilet bowl ventilation system of the present invention.

[0032] FIG. 10 is a bottom view of the odor collection device used in the toilet bowl ventilation system of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0033] Referring to FIGS. 1-4, one embodiment of the toilet bowl ventilation system 10 (hereinafter system 10) is shown. The system 10 can be retrofitted to fit most existing toilets and/or produced as part of a new toilet devise. The system 10 consist of, but are not limited to, an odor collection receptacle 12 which is adaptably mounted on the flat upper surface of a conventional toilet bowl rim and beneath and behind a conventional toilet seat 14. The odor collection receptacle 12 is to be secured in place by use of the same coupling device 16 which secure a conventional toilet seat 14 and may be added to an existing toilet seat assembly or manufactured as part of a new toilet seat assembly. In general, the coupling device 16 is a nut and bolt
assembly. However, the listing should not be seen as to limit the scope of the present invention. When secured, a seal is formed between the toilet seat 14 and the odor collection receptacle 12.

[0034] Referring now to FIGS. 9 and 10, the odor collection receptacle 12 consists of a generally planar configuration with a top face 18 and a bottom face 20. The odor collection receptacle 12 has an entrance aperture 22 toward the toilet bowl, an exit aperture 24 fitted with a connector to accommodate exhaust ducting, tubing or piping and re-enforced apertures 26 to accept the toilet seat bolts. An advantage to this configuration is its easy adaptability to most modern toilets. The entrance aperture 22 may have a screen or other filter to prevent toilet paper lint or other debris from entering the odor collection receptacle 12.

[0035] Referring back to FIGS. 1-4, a skirting 28 is affixed to the underside of the toilet seat 14. The skirting 28 is used to maintain the seat in a level position. The advantage of this is to provide comfortable seating and to evenly meter fresh air into the toilet bowl around the entire periphery of the toilet bowl. An object of the skirting 28 is to meter a controlled amount of air into the toilet bowl thus preventing noxious odors from escaping.

[0036] In an embodiment depicted in FIGS. 1-4, a typical “closed seat ring” toilet seat 14 is shown. The toilet seat 14 is retrofitted with or manufactured to include the skirting 28 which will extend from a bottom side towards but abbreviated before contacting the rim of the toilet bowl. The skirting 28 is manufactured of materials that are pliable and easily manipulated into the desired configuration yet substantial enough to withstand normal toilet use. The skirting 28 is attached in a generally oval manner and follows the approximate shape of the toilet bowl rim and is edged approximately at the two hinges of the toilet seat 14. The lower edge of the outer side of the skirting 28 is in approximate alignment with the outer edge of the toilet bowl rim. The lower edge of the skirting 14 is held above the toilet bowl rim by means of a support devices 30 which provides a predetermined aperture and means of metering air into the toilet bowl. The function of the skirting 28 and support devices 30 is to maintain the toilet seat 14 in a horizontal fashion and to meter an appropriate amount of air into the toilet bowl from around the entire periphery of the toilet bowl rim.

[0037] Referring now to FIGS. 5-8, a “split seat ring” toilet seat 14 is shown. In this embodiment, the skirting 28 is extended to come in contact with the toilet bowl rim. In the case of “split ring seats” the object of the skirting 28 is to seal the area between the bottom of the toilet seat 14 and the top of the toilet bowl rim and cause the “split” at the front of the toilet seat 14 to become the air metering device so that air is metered into the toilet bowl through the opening at the front of the toilet seat 14. The advantage to this configuration is that strict control of toilet ventilation and odor control is maintained by constant positive control of the air entering the toilet bowl.

[0038] Referring to FIGS. 1-10, at the back of the toilet bowl, attached to the toilet bowl by means of typical toilet seat connectors 16 or other attachments is an odor collection receptacle 12. The odor collection receptacle 12 is of sufficient size and dimension to allow adequate flow of odor laden air to be drawn into and out of the odor collection receptacle 12 by means of conductive ducting 15, tubing, piping, or the like (hereinafter ducting 15).

[0039] The ducting 15 is in turn connected to an air conveyance device 30. The air conveyance device 30 needs to be capable of developing and maintaining the required IWC draft through the ducting 15, the odor collection receptacle 12 and toilet bowl by overcoming any inherent static or frictional losses in the system in order to maintain constant air flow and odor control. The air conveyance device 30 should be able to draw 3-5 CFM and develop a 2" water column. The air conveyance devise 30 is in turn connected to further ducting to facilitate the conveyance of odor laden air to an area where the odor will not be objectionable (i.e., expel the odor laden air away from the bathroom).

[0040] The system 10 can be controlled by a variety of switching devices which should reflect the preference of the owner.

[0041] The system 10 can easily be manufactured in several colors to match any toilet color. Ease of installation is facilitated by use of “adapter kits” or pre-manufactured assemblies which are quickly fastened into place.

[0042] New home installation is easily and quickly accomplished during the ventilation system installation phase of construction. Retro-fit applications are, in most cases, easily accomplished due to the adaptability and simplicity of components. A minimal level of electrical competency is required to install switch and air conveyance devise.

[0043] While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:
1. A ventilation system to remove odors from a toilet bowl comprising, in combination:
an odor collection receptacle coupled to the toilet bowl wherein a seal is formed between the odor collection receptacle and a toilet seat of the toilet bowl when the toilet seat is lowered;
a skirting coupled to a bottom section of the toilet seat wherein the skirting maintains the toilet seat in a level position and controls an amount of air into the toilet bowl to prevent odors from escaping;
tubing coupled to the odor collection device to remove the odors from the toilet bowl; and
a fan coupled to the tubing to draw the odors from the toilet bowl through the tubing.

2. A ventilation system to remove odors from a toilet bowl in accordance with claim 1 wherein the toilet seat is a standard toilet seat.

3. A ventilation system to remove odors from a toilet bowl in accordance with claim 2 further comprising support device coupled to the skirting for holding the toilet seat and the skirting above the toilet bowl to meter air into the toilet bowl.

4. A ventilation system to remove odors from a toilet bowl in accordance with claim 1 wherein the toilet seat is a split toilet, the skirting sealing an area between the bottom of the
toilet seat and a top of the toilet bowl rim, an opening in the split toilet seat metering air into the toilet bowl to control air entering the toilet bowl.

5. A ventilation system to remove odors from a toilet bowl in accordance with claim 1 wherein the odor collection receptacle has an entrance aperture positioned toward the toilet bowl and an exit aperture coupled to the tubing.

6. A ventilation system to remove odors from a toilet bowl in accordance with claim 1 wherein the fan is able to develop and maintain a desired IWC draft through the tubing to maintain constant air flow and odor control.

7. A ventilation system to remove odors from a toilet bowl in accordance with claim 6 wherein the fan is able to draw approximately 3-5 CFM and develop a 2" water column.

8. A ventilation system to remove odors from a toilet bowl comprising, in combination:

an odor collection receptacle coupled to the toilet bowl wherein a seal is formed between the odor collection receptacle and a toilet seat of the toilet bowl when the toilet seat is lowered, the odor collection receptacle having an entrance aperture positioned toward the toilet bowl and an exit aperture;

a skirting coupled to a bottom section of the toilet seat wherein the skirting maintains the toilet seat in a level position and controls an amount of air into the toilet bowl to prevent odors from escaping;

tubing coupled to the exit aperture of the odor collection device to remove the odors from the toilet bowl; and

a fan coupled to the tubing to draw the odors from the toilet bowl through the tubing wherein the fan is able to develop and maintain a desired IWC draft through the tubing to maintain constant air flow and odor control.

9. A ventilation system to remove odors from a toilet bowl in accordance with claim 8 wherein the toilet seat is a standard toilet seat.

10. A ventilation system to remove odors from a toilet bowl in accordance with claim 9 further comprising support device coupled to the skirting for holding the toilet seat and the skirting above the toilet bowl to meter air into the toilet bowl.

11. A ventilation system to remove odors from a toilet bowl in accordance with claim 8 wherein the toilet seat is a split toilet, the skirting sealing an area between the bottom of the toilet seat and a top of the toilet bowl rim, an opening in the split toilet seat metering air into the toilet bowl to control air entering the toilet bowl.

12. A ventilation system to remove odors from a toilet bowl in accordance with claim 8 wherein the fan is able to draw approximately 3-5 CFM and develop a 2" water column.

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