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Ivancevic

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[54] **TOILET VENTILATING APPARATUS IN KIT FORM**

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[52] **U.S. Cl.** **4/213;** 4/72; 4/217; 4/236; 4/241

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

[58] **Field of Search** 4/213, 236, 209, 241, 211, 4/240, 217, 216, 72, 93

[56] **References Cited**

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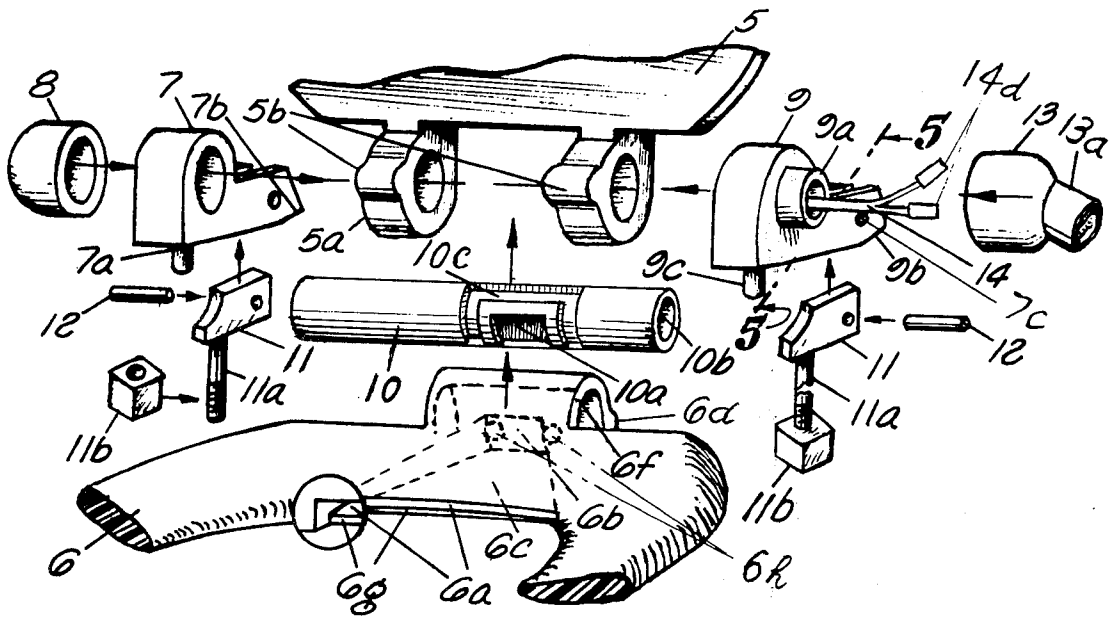
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Primary Examiner—Henry K. Artis

[57] **ABSTRACT**

An apparatus for ventilating the toilet bowl of noxious odors which includes a conduit formed within the toilet seat interconnecting the toilet bowl chamber and an opening in the toilet seat axle. The noxious odors are to be sucked through the opening in the toilet seat and into and interiorly of the toilet seat axle whereupon the odors are moved by a blower into a separate chamber formed interiorly of the lavatory conduit. The odors are then transmitted through the lavatory conduit and into the sewage plumbing system.

8 Claims, 10 Drawing Figures



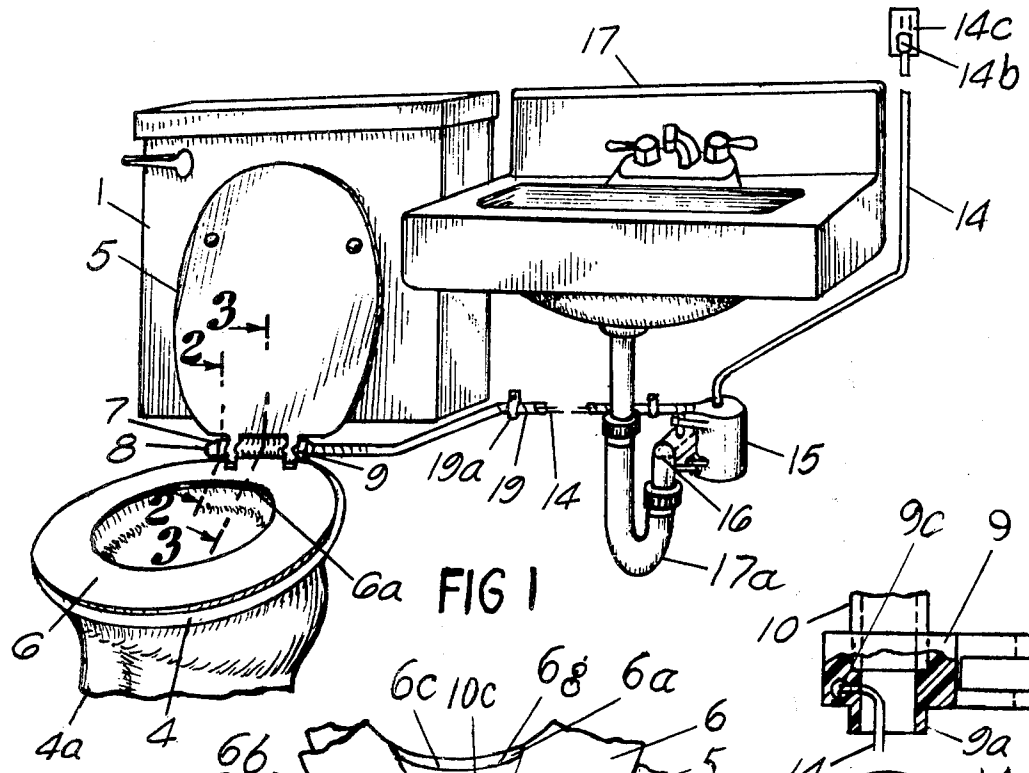


FIG 1

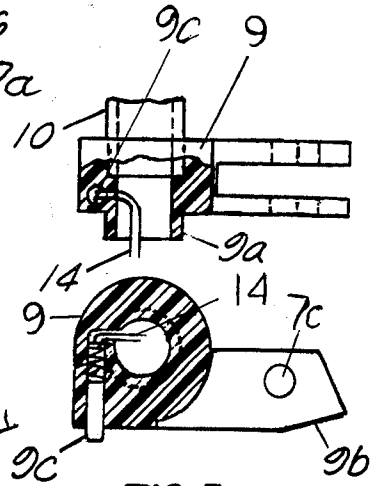


FIG 5

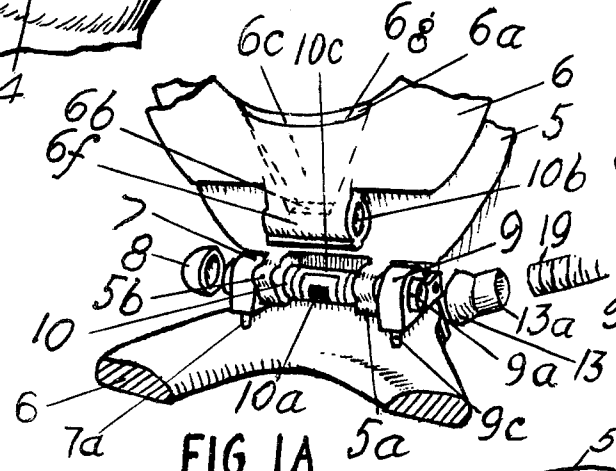


FIG 1A

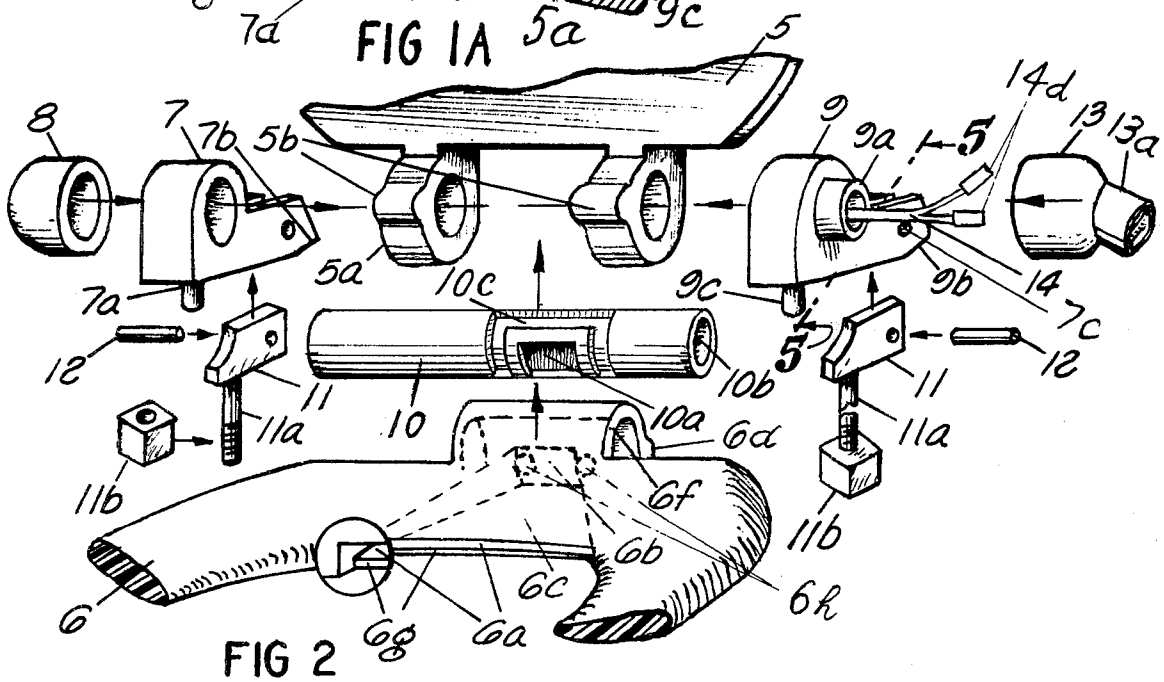


FIG 2

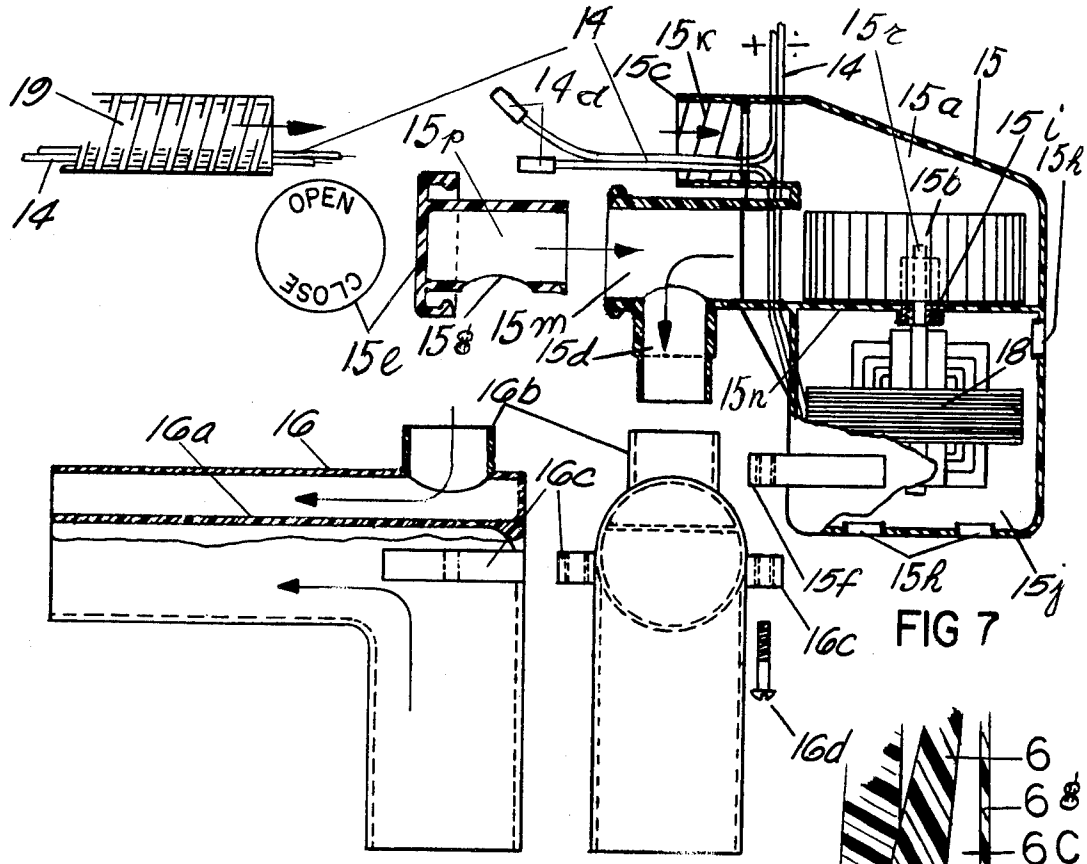


FIG 7

FIG 8

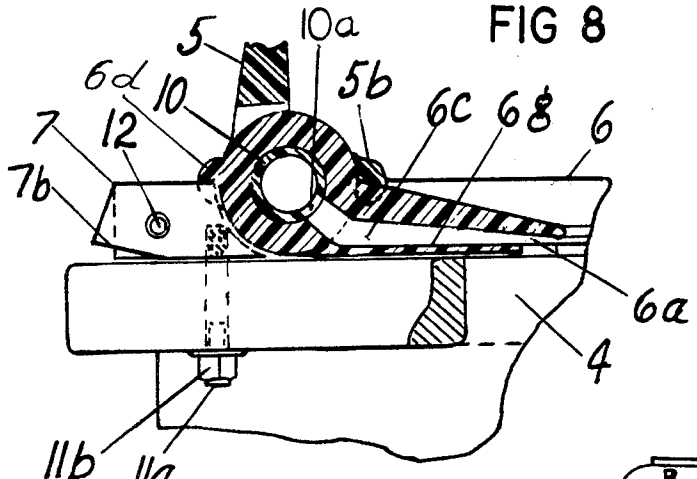


FIG 3

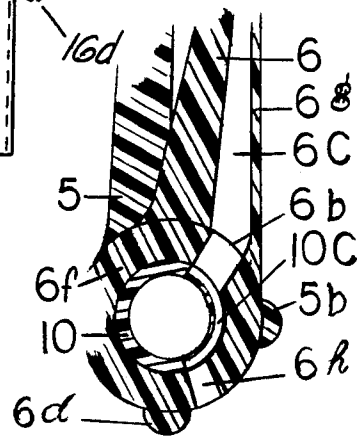


FIG 6

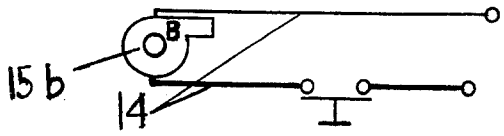


FIG 9

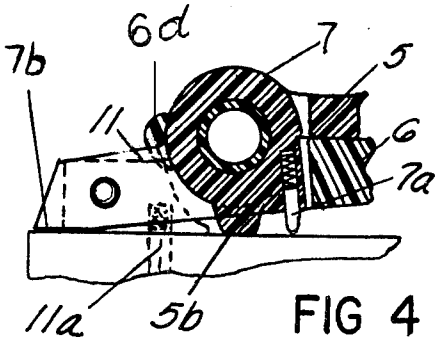


FIG 4

TOILET VENTILATING APPARATUS IN KIT FORM

BACKGROUND OF THE INVENTION

The field of this invention relates to a ventilation apparatus for a conventional, human sit down type of toilet facility.

The conventional toilet bowl construction has no provision for the elimination of any noxious odors with the exception of permitting such to be expelled into the atmosphere. The expelling of such into a confined area, such as in the conventional small bathroom area, it is an unpleasant situation. Prior to the subject matter of this invention, there has been no known structure which specifically provided for the elimination of odors from within a toilet bowl in the form of a kit.

SUMMARY OF THE INVENTION

The apparatus of this invention employs a flat shaped conduit in the back end of the toilet seat. This conduit opens up into the toilet bowl chamber when the seat is placed in its lower most position against the toilet and against the upper surface of the toilet bowl. The seat is pivotable with respect to the toilet bowl by means of a pivot axle. This pivot axle includes an opening formed therein which connects with the opening in the toilet seat. The pivot axle is hollow and connects with a conduit. This conduit in turn connects with a blower. The blower is to remove by suction any noxious odors within the toilet bowl through the conduit in the seat, through the opening in the axle, through the axle and into the conduit and through the outlet of the blower. The outlet of the blower is connected to the lavatory discharge plumbing elbow. This lavatory plumbing elbow has been divided into an upper section and a lower section. The lower section of the plumbing elbow provides for discharge of the water from the lavatory. The upper portion of the lavatory elbow provides for discharge of the noxious odors so that such are not permitted to be expelled out into the lavatory bowl. The lavatory elbow then discharges into the sewage plumbing system to which it is connected. At this point, both the odorfrous gas and the liquid are discharged together. An electrical switch means is employed in combination with the toilet seat and upon the seat being pressed downwardly by the weight of the person, the switch means is activated resulting in operation of the blower.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an isometric view of a toilet and an adjoining lavatory with the apparatus of this invention mounted therebetween;

FIG. **1***a* is an enlarged partial exploded view showing in greater detail the interconnection between the toilet seat and the toilet bowl;

FIG. **2** is an exploded isometric view of the apparatus of this invention showing the structural arrangement of parts at the interconnection of the toilet seat to the toilet bowl and functional characteristics of components;

FIG. **3** is a cross-sectional view through a suction portion of the apparatus of this invention taken along line **3—3** of FIG. **1**;

FIG. **4** is a cross-sectional view similar to FIG. **3**, but showing the toilet seat in its normal at rest position with cover down;

FIG. **5** is a top and side view of the axle bearing taken along line **5—5** of FIG. **2**;

FIG. **6** is a cross-sectional view through the connection of the toilet seat to the axle with the toilet seat in the upper vertical position, showing the way of drainage of accidentally poured water;

FIG. **7** is a partially exploded, cross-sectional view, showing the details of the blower of this invention and the interconnection of such to the lavatory plumbing elbow;

FIG. **8** is a partly cross-sectional side and front view of the lavatory plumbing elbow; and

FIG. **9** is a diagram showing the interconnection of the electrical components.

DETAILED DESCRIPTION OF THE SHOWN EMBODIMENT

One of the objectives of this invention is to provide a simple, efficient and durable toilet bowl ventilating apparatus. The apparatus is designed into the form of a kit which can be easily installed on conventional toilet bowl structures requiring no professional skill or special tools for installation. The apparatus of this invention is fully automatic and is operated only when a person is located upon the toilet seat with cover up. The apparatus of this invention is designed to be employed in conjunction with the lavatory plumbing, since most water closets are equipped with a lavatory as well as a toilet bowl. The apparatus of this invention eliminates costly installation of vents or blowers in walls or flooring. A further advantage of the apparatus of this invention is when the toilet seat cover is in the lower position down against the toilet seat, the apparatus cannot be operated and the toilet bowl can function as a conventional chair. A further advantage of the apparatus of this invention is that it is protected from accidental water penetration even when the seat is in the upper vertical position with its intake duct exposed. The apparatus of this invention is designed to be easily dismantled and relocated, if necessary.

Referring particularly to the drawings, there is shown in FIG. **1** a toilet which is composed generally of a tank **1**, a toilet bowl **4a** having a toilet bowl rim **4**, a seat **6** and a cover **5**. Also shown in FIG. **1** is a lavatory **17**. The lavatory is normally mounted upon the wall within a water closet or other similar structure with the toilet bowl **4***a* being mounted upon the floor. A water trap **17***a* connects with lavatory **17** and functions to discharge the water from the lavatory bowl. The apparatus of this invention is designed to take advantage of the proximity of a lavatory to the toilet in most installations, facilitating the construction of this invention in kit form.

Formed in the rear portion of the seat **6** is a seat duct **6***c* (FIG. **2**). The seat duct **6***c* includes a forward opening **6***a* and an aft opening **6***b*. The opening **6***a* is basically long and narrow wherein opening **6***b* is of a shorter length, but of a greater height. However, both openings are of approximately the same area.

Located at the back end of the seat **6** is a seat bearing **6***f* through which the duct **6***c* communicates with the interior of the axle hole **10***a*.

Slidingly mounted within the opening in the bearing **6***f* is an axle **10**. The axle **10** includes an opening **10***a* which is of the same size as opening **6***b* and is to connect therewith when the seat **6** is in the down position against the rim **4**. The edges of the axle **10** are to extend

within a pair of spaced apart cover bearings **5***a* which are attached to the cover **5.** Each bearing **5***a* includes a bump **5***b*. The function of the bumps **5***b* will be explained further on in the specification.

Also, each end of the axle **10** cooperates within an opening formed in anchor bearings **7** and **9.** Anchor bearing **7** includes a small opening therein adapted to receive a pin **12.** Pin **12** cooperates within an opening formed in an anchor **11.** The anchor **11** is connected to an anchor bolt **11***a*. The free end of the anchor bolt **11***a* is connectable to a nut **11***b*. By inserting the pin **12** through the opening in the anchor **11** and into the opening in the anchor bearing **7,** and then placing the anchor bolt **11***a* through an appropriate opening in the toilet bowl **4***a* and locking such by means of nut **11***b*, the axle **10** is thereupon fixed to the toilet bowl **4***a*. A tight fit is to be established between the axle **10** and the anchor bearing **7.**

In a similar manner, the anchor bearing **9** at the opposite end of the axle **10** is to be attachable to the toilet bowl **4***a* by means of a pin **12,** an anchor bolt **11***a* and a nut **11***b*. The use of anchors and anchor bolts and nuts are used in conventional toilet manufacture.

The aft ends of each anchor bearing **7** and **9** includes a slightly, upward bevel **7***b* and **9***b*, respectively. The anchor bearings **7** and **9** are permitted a slight amount of pivotal movement within the uppermost position governed by the bevels **7***b* and **9***b* about the surface of the rim **4***c*. In this position, the seat **6** is canted slightly with respect to the rim **4** determined by the angle of inclination of bevels **7***b* and **9***b*. This can be best seen in FIG. **4.**

Mounted within the under surface of the anchor being **7** is a push button **7***a* which is spring loaded. In a similar manner, a push button switch **9***c* is mounted within the anchor bearing **9** and is also spring loaded. When no person is sitting on the seat **6,** the biasing action of the springs **7***c* and **9***d* is sufficient to locate the seat **6** in the raised position shown in FIG. **4.** When the cover **5** is placed upon the seat **6,** the bumpers **5***b* come into contact against the bowl rim **4** preventing depression of switch **9***c*. As it will be explained further on in the specification with the cover in the downward position, or if the cover **5** is up and no one is sitting on the seat **6,** the rear part of the seat will be raised by the spring action of the push buttons with respect to the toilet bowl rim **4** and there will be no activation of the device. Also, to prevent activation when both seat and cover are up, the rear side of the seat bearing is provided with a bump **6***d*.

The anchor bearing **9** includes an extension **9***a*. The top view in FIG. **5** clearly shows the relationship between the extension **9***a* and the placement of the axle **10.** Also, it is to be noted that the aft end of each of the anchor bearings **7** and **9** are bifuracted to form a pair of spaced apart legs. It is between these legs that the anchors are situated and cooperates with their respective pins **12.**

A cap **13** with duct receptacle **13***a* is connected to either side of the axle **10,** depending on which side the lavatory is located. Cap **8** closes the other end of the axle **10.**

When the seat **6** is in the upper, vertical position as shown in FIG. **6,** any water which enters duct **6***c* is drained through the channels **10***c*. Carved in the outside wall of the axle **10,** these channels cooperate with the inside surface of the seat bearing **6***f*. (FIG. **2** and FIG. **6**). Thus, forming ducting for water which is expelled through the holes in the rear side of the seat bearing **6***h* (FIG. **6** and FIG. **2**). This is due to the fact that axle **10** is fixed to the bearing **9** and thus does not move while seat bearing **6***f* rotates and opening **6***b* locates itself out of alignment with opening **10***a*, adopting alignment with upper side of channel **10***c*.

The electric push button switch **9***c* is normally open and closes when compressed. The switch **9***c* is connected to wires **14.** These wires extend through the conduit **19.** The conduit **19** is threadably attached into the receptacle **13***a*. Conduit **19** is to be appropriately bent and mounted by brackets **19***a* (FIG. **1**) to the wall to which the lavatory **17** has been mounted. The wires **14** extend within the blower housing **15.** The blower housing **15** is attached to the lavatory elbow **16.** The lavatory elbow **16** is specifically designed and replaces the conventional elbow of the lavatory. The interior of the lavatory elbow **16** includes a partition **16***a* which in essence divides the lavatory elbow into a lower water duct and a upper gaseous duct. The water trap **17***a* discharges into the lower water duct. A nipple **16***b* is provided for access into the upper gaseous duct and for fixing the blower to it.

Attached exteriorly to the elbow **16** (FIG. **8**) are a pair of brackets **16***c* located on opposite sides of the elbow **16.** Attached to the blower housing **15** is an attaching bracket **15***f*. To mount the blower housing **15** upon the elbow **16,** the blower outlet **15***d* is inserted into the elbow nipple **16***b*. The holes in elbow and blower brackets are aligned and tightened securely by means of bolt **16***d*. The blower housing **15** can be attached by either one of the brackets **16***c*, depending upon which side of the elbow **16** it is desirable to mount the blower housing **15.**

Nipple **15***d* (FIG. **7**) is integrally formed as a right angle extension of conduit **15***m*. Located within conduit **15***m* is a valve formed of an inner conduit **15***p* and a cap **15***e*. The cap **15***e* is to facilitate rotation of the inner conduit **15***p* from the open position shown in FIG. **7** and the closed position. The cap **15***e* is provided with appropriate indicia denoting whether the valve is in the open or closed position. The cap and conduit **15***p* are to be longitudinally fixed upon the conduit **15***m* by means of conventional fastening means, such as a bayonet slot arrangement. A hole **15***g* is formed within the inner conduit **15***p* and when the valve is in the open position is to match identically the size of the opening within nipple **15***d*. This valve is to be employed in case of pressure cleaning of the lavatory to prevent water from being forced into the blower housing **15.** Therefore, during normal use, the valve will be in the open position.

The free end of flexible ducting **19** is threadably connected with threads **15***k* of a nipple **15***c* (FIG. **7**). Nipple **15***c* is formed as a integral part of the blower housing **15.** The electrical wires **14** are conducted through the nipple **15***c* and into the blower chamber **15***a* of the blower housing **15.** Mounted within the chamber **15***a* is an air blower **15***b* which is rotatably driven by means of a motor **18.** In case of clogging of the water discharge by which would cause water to enter into the gaseous chamber and up into the blower chamber **15***a*, penetration of such into the motor chamber **15***j* is prevented by means of wall **15***n* and conventional sealer bearing **15***i* which surrounds the blower shaft **15***r* and is mounted within the partition **15***n*. Air holes **15***h* are

provided within the motor housing **15** in order to cool the motor **18** during use.

The motor **18** is driven by being connected to a conventional source of electricity. The source will normally comprise conventional house current outlet such as a socket **14***c* (FIG. **1**) or any other available outlet.

The operation of the apparatus of this invention is as follows: when a person sits upon seat **6**, the buttons **7***a* and **9***c* are depressed. Upon the depressing of **9***c*, the switch is closed thereby completing the electric circuit to the blower motor **18**. The blower **15***b* is then rotated causing a suction. Any noxious gases produced within the toilet bowl **4***a* are sucked through the opening **6***a* and into the duct **6***c*, through the conduit **19** into the blower chamber **15***a*, out through conduit **15***m* and nipple **15***d*, throgh nipple **16***b* and into the air chamber of the elbow **16**. The gases are then conducted to the sewage plumbing system in order to be transmitted along with the sewage water to an appropriate sewage disposal system.

What is claimed is:

1. In combination with a toilet and a lavatory, said toilet having a toilet bowl and a toilet seat, said toilet seat being pivotally connected by pivot means to said toilet bowl, said lavatory having a liquid drain pipe, a toilet ventilating apparatus comprising:

air duct means connected to said toilet seat;

air conduit means connected to said air duct means;

air blower means having an air inlet and a air outlet, said air inlet connected to said air duct means, said air outlet connected to said lavatory liquid drain pipe, whereby said air blower means is to draw air by suction from within said toilet bowl through air duct means and through said air conduit means and into said lavatory liquid drain pipe;

means connected to said toilet seat for causing said toilet seat to assume a canted position with respect to the rim of the said toilet bowl when said seat is in the at rest position;

said means includes an axle, said seat being pivotally mounted upon said axle, said axle being fixed to connected anchor means, said anchor means including an anchor bearing, said anchor bearing being movable between an and upper position and a lower position, said anchor bearing being under a constant bias to said upper position, whereby when said anchor bearing is in said upper position said toilet seat is canted at an angle with respect to the rim of said toilet bowl.

2. The combination as defined in claim **1** wherein:

said axle being hollow, an aperture extending through said axle into the hollow chamber formed therein, said aperture to connect with said duct means when said seat is located against the rim of said toilet bowl.

3. The combination as defined in claim **1** wherein:

an electrical switch means connected with said anchor bearing, with said anchor bearing in said lower position said switch means being closed, with said anchor bearing in said upper position said switch means being open, said air blower connected to said switch means, with said toilet seat in said lower position said air blower capable of being activated.

4. The combination as defined in claim **3** including:

a toilet seat cover pivotally attached by a bearing assembly to said axle, said toilet seat cover capable of assuming an upper substantially vertical position and a lower position in contact with said toilet seat, said bearing assembly including enlarged cam means, with said cover in the lower position against said toilet seat said cam means causes said anchor bearing to be located in said upper position.

5. The combination as defined in claim **1** wherein:

said duct means being formed within said toilet seat and located at the back end of said toilet seat adjacent said pivot means.

6. The combination as defined in claim **5** wherein:

said air duct means including an inner opening and an outer opening, said outer opening connecting with the interior portion of said toilet bowl, said inner opening connecting with said air conduit means, the area of said inner opening and said outer opening being approximately equal.

7. The apparatus as defined in claim **6** wherein:

with said toilet seat being manually moved to an upper substantially vertical position therebeing water conducting channels formed between said duct means and said axle, whereby if any liquid is caused to enter said duct means when said seat is in the upper vertical position said water is not conducted into said air conduit means and is passed through said gap and within said toilet bowl.

8. The combination as defined in claim **1** wherein:

said lavatory liquid drain elbow including an inner partition, said inner partition dividing said liquid drain pipe into a gaseous chamber and a water chamber, the water from said lavatory being expelled through said water chamber, the gases expelled by said air blower means being conducted into said gaseous chamber.

* * * * *