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AUTOMATIC VENTILATING SYSTEM FOR SANITARY TOILETS

Filed May 5, 1965

2 Sheets-Sheet 1

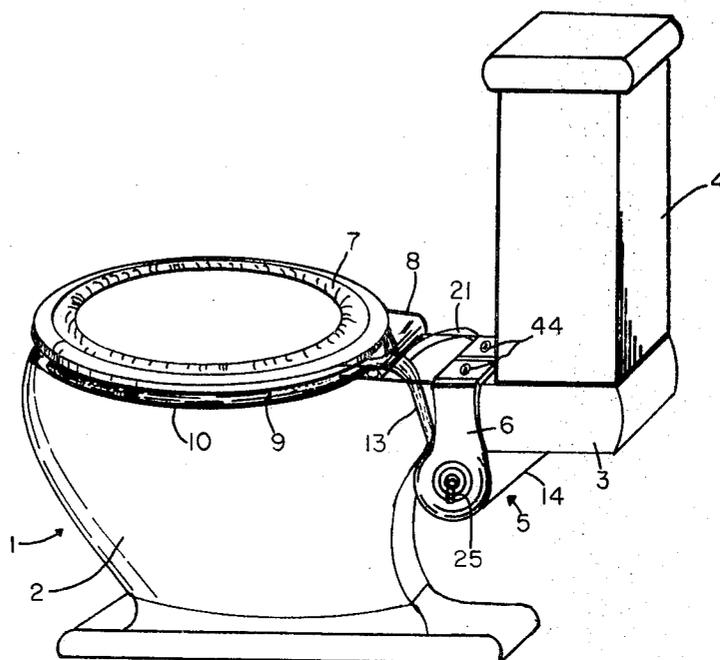


FIG. 1

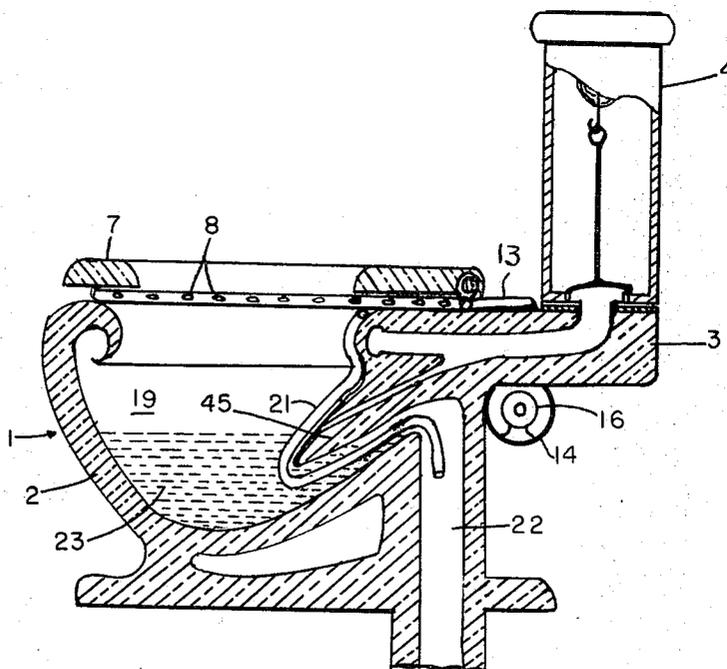


FIG. 2

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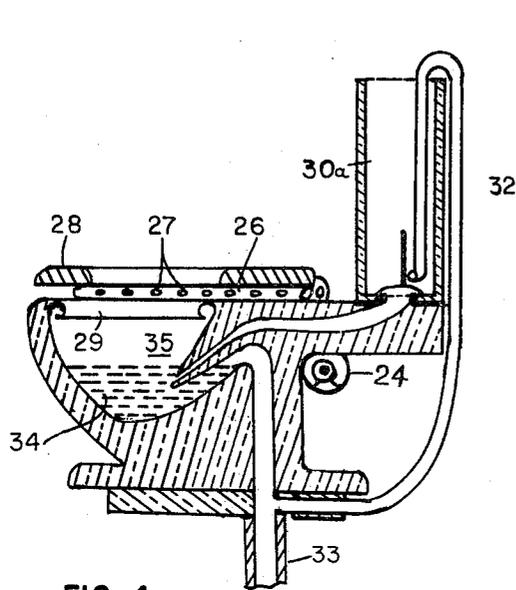


FIG. 4

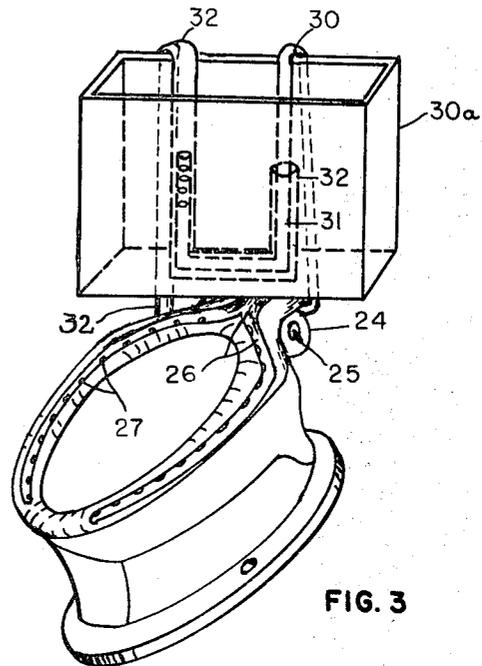


FIG. 3

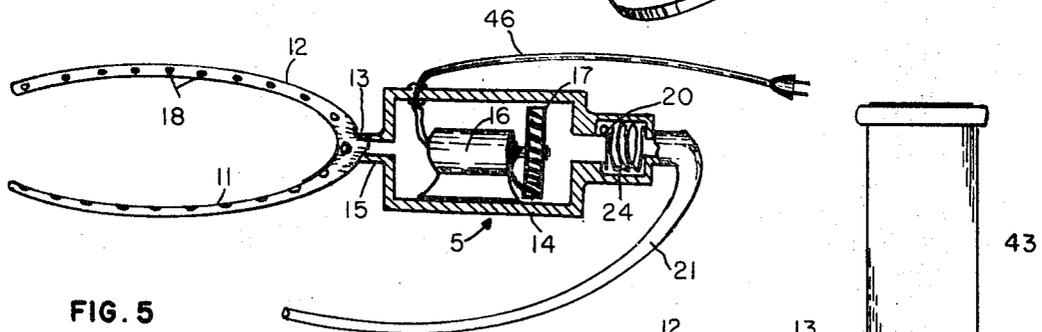


FIG. 5

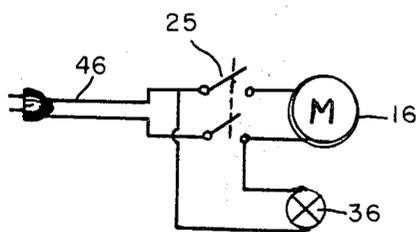


FIG. 7

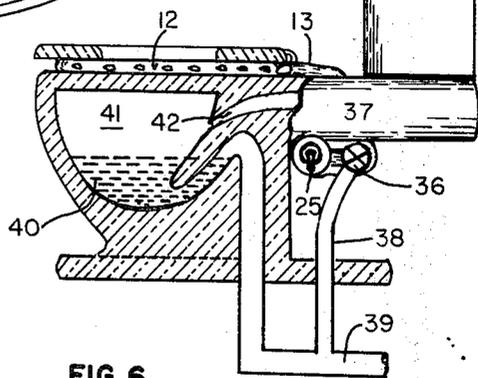


FIG. 6

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**AUTOMATIC VENTILATING SYSTEM FOR  
SANITARY TOILETS**

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5 Claims

The present invention relates to ventilating sanitary toilets and more particularly to an automatic ventilating system adapted to be easily installed on any existing toilet installation for effective removal of foul air therefrom.

It is the principal object of this invention to provide a practical and inexpensive ventilating means which can be attached to the toilet for drawing foul air therefrom and expelling it to the sewer line to which said toilet installation is connected.

A further object of the invention is to provide a flexible tubular means to be accommodated between the toilet seat and the rim of the toilet bowl and connected to the inlet section of a motor-operated exhaust pump for suction of foul air from said bowl.

Another object of the invention is the provision of a flexible conduit on the exhaust side of the motor-operated pump and extending beyond the water lock (trap) of the toilet system and into the sewer line.

A further object of the invention is to provide at the exhaust side of the motor-driven pump an automatic valve which is maintained shut at all times when the pump is not in operation and is open when the pump is in operation. This valve serves as a gas lock (trap) to prevent the re-entrance of any objectionable odors from the sewer into the toilet system when the pump is not in operation.

A still further object of the invention is to provide at the exhaust end of said pump a long flexible conduit which enters the water reservoir of said toilet and is inserted into a second flexible conduit therein to form a water lock utilizing the water in said reservoir. The terminal end of said second conduit is connected to the sewer line to expel the foul air drawn by said pump from said toilet bowl.

Other objects and advantages of the invention will become apparent from a consideration of the following specification taken in conjunction with the accompanying drawing forming part thereof, in which:

FIG. 1 is a perspective view of the automatic ventilating system installed in normal position between the toilet bowl and the flushing water reservoir.

FIG. 2 is a sectional view of the system shown in FIG. 1, illustrating principally the manner of extension of the flexible exhaust conduit from the motor-driven suction pump to the sewer line beyond the water trap of the toilet bowl.

FIG. 3 is a modified embodiment of my invention provided with a water lock which is located in the toilet flushing water reservoir, utilizing the water therein as a trap for excluding odoriferous gases from the sewer line.

FIG. 4 is a sectional view of the modified embodiment shown in FIG. 3, illustrating the manner of leading the exhaust conduit from the water lock to the sewer under the toilet hopper.

FIG. 5 is the perspective view of the principal invention shown installed on the toilet system in FIG. 1, with the motor-operated suction-pump housing sectioned to illustrate the manner of arrangement of the pump propeller (impeller), spring-actuated valve, exhaust conduit, and the associated parts.

FIG. 6 is the sectional view of another modified embodiment of my invention, showing a solenoid-actuated valve and its relation to the exhaust conduit leading to the sewer line.

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FIG. 7 is a schematic diagram showing the switch to turn on and off the motor and the solenoid valve simultaneously.

Referring now to the drawing, in which like numerals designate like parts throughout, the numeral 1 designates a sanitary toilet in which the present invention is incorporated. The sanitary toilet 1 comprises a hopper 2 with a rear extension section 3, on which rests a toilet water reservoir 4 and is attached thereto; the present automatic ventilating system is also attached to said extension section 3 by a U-shaped bracket or by any other suitable means 6. A toilet seat 7 is mounted on the bowl of hopper 2 and hinged at its rear portion 8 to said hopper 2. A hollow, circular member 9 of soft rubber, polyethylene, or any other yieldable plastic material is disposed between said seat 7 and the upper rim 10 of hopper 2. Said circular member 9 is formed of two arcuate tubings 11 and 12 (FIG. 5) joined at a common channeling section 13 which is attached to the motor-driven suction pump housing 14 at its intake section 15. The pump housing 14 contains the motor 16 and pump impeller 17. The internal peripheral wall of tubings 11 and 12 is provided with perforations 18 for suction of foul air from the toilet bowl 19 (FIG. 2) into the motor-driven pump housing 14 for expulsion therefrom through spring-actuated valve 20 (FIG. 5) and exhaust conduit 21 into the sewer line 22 (FIG. 2) after passing through water trap 23. The exhaust conduit 21 may be made of a flexible material such as rubber, polyethylene or a yieldable plastic. The valve 20 is provided with a spring member 24 which maintains the valve at closed position at all times except when the force of foul air driven by the impeller 17 opens it during operation, for discharge of effluents therethrough.

FIG. 3 illustrates a modified embodiment of the toilet ventilating system comprising a motor-driven exhaust system 24 (similar to the system of FIG. 5) which is provided with an on-and-off switch 25 and receives foul air from the arcuate branched tubular air intake 26 (similar to 11 and 12) having perforations 27 and being disposed between the toilet seat 28 and the hopper rim 29. The foul air is discharged from the system 24 through exhaust conduit 30 (similar to 21), passing through the water reservoir 30a and forming therein a water trap 31 together with a re-entrant exhaust conduit 32, into the sewer line 33 underneath the hopper. An existing water trap 34 prevents any odors from entering into the bowl 35 from the sewer line 33. The perforations in the re-entrant conduit 32 serve to form a water trap by maintaining a water level to the lowest hole in the conduit 32, thus preventing any backward effluence of odorous gases from the sewer. The toilet flushing mechanism and the water from the reservoir 30a are eliminated in FIGS. 3 and 4 in order to enhance clarification as to the arrangement of the present invention therein.

In another modified embodiment of the invention shown in FIG. 6, the toilet ventilating system is generally constructed and arranged using the same parts as shown in the system of FIG. 5, with the exception of the spring-actuated valve 20, which is replaced by an electric solenoid-actuated valve 36 attached to the exhaust side of the motor-driven impeller housing 37 (containing motor 16 and impeller 17). The exhaust conduit 38 from the valve 36 (replacing conduit 21 and being made of a similar material as conduit 38) is led into the sewer line 39. The solenoid-actuated valve 36 is maintained closed at all times except when the pump impeller 17 is in operation; thus the valve 36 prevents any odorous gases from passing through the pump into the toilet.

For a typical installation of the automatic ventilating system 5, the motor and impeller housing 14 (or 37 with solenoid 36) is secured by use of suitable means such as braces 6 to the normally installed household toilet system;

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the braces are bolted to the existing two bolts 44 to the rear section 3 as occurs in conventional toilet hoppers. The perforated tubular member consisting of the sections 11 and 12 is disposed over the rim of the hopper and under the toilet seat. This arrangement seals the toilet seat and the hopper airtight except a portion anteriorly to the seat that is open for fresh air intake into the bowl, as would be apparent from FIG. 3. In the embodiment shown in FIG. 2, the exhaust conduit 21 from the impeller housing 14 is inserted from the rear section of the toilet seat and the hopper into the bowl 19, and its terminal portion is pushed under the lip 45 into the sewer line 22. The electric cord 46 is plugged into a suitable household electric outlet of 115-volt power line, or when using low-voltage power a transformer can be interposed between the 115-volt line and the cord 46 plug.

For operation, the switch 25 is turned to "on" position. This action starts the motor 16 and the suction pump impeller 17 which draws the atmosphere from the bowl chamber above the water trap 23 (FIG. 2) or 34 or 40 of FIGS. 4 and 6, respectively, through the housing 14 and out through the exhaust conduit 21, or 32 or 38 of embodiments shown in FIG. 2 or 4 or 6, respectively, into the sewer line normally installed adjacent to the toilet installation. In this manner, the foul air is expelled from the toilet bowl into the sewer, without the danger of letting any odorous gases return to the toilet bowl.

While I have shown an effective system for eliminating odorous gases or foul air from toilet bowls, it is obvious that this invention is susceptible to constructional changes without departing from the spirit and scope of the invention and the appended claims and, therefore, the invention is not limited to the exact form disclosed herein.

I claim:

1. A ventilating system for use with an existing, conventional sanitary toilet communicating with a sewer line and having a toilet bowl including a toilet seat disposed thereon, said ventilating system comprising a motor-driven exhaust pump contained in a housing, bracket means for mounting said housing on said existing toilet, said housing having an inlet and an outlet section, said inlet section being provided with a tubular member extending therefrom and branching into two arcuate tubular sections having therein perforations for ingress of gaseous effluent therinto by suction of said exhaust pump, said outlet section having a normally-closed valve adapted to open when said pump is in operation and to close when said pump is nonoperative, and a flexible conduit secured to said outlet section and projecting therefrom downward through said toilet bowl adjacent the inside surface thereof and thence into the sewer line connected to said bowl through which the water and waste matter normally pass when being flushed from said bowl.

2. A toilet ventilating system comprising a motor-driven exhaust pump with a housing adapted to be secured to an existing toilet installation having a hopper, a toilet seat thereon, and a water reservoir connected to said hopper to furnish flushing water therinto, said exhaust pump having ingress and egress sections projecting in opposite relation to each other, said ingress section being provided with air intake extension member formed by two arcuate tubular sections having perforations therein and anchorable on said hopper in the inferior aspect of said toilet seat to draw foul air from said hopper into said motor-driven exhaust pump, said egress section having a water trap including a re-entrant exhaust conduit extending from within said water reservoir into the sewer line said re-entrant exhaust conduit having a plurality of holes therein to permit water from said reservoir to flow into said re-entrant exhaust conduit at least to the level of the lowest of said holes, and an exhaust conduit extending from said egress section into said water reser-

voir, said exhaust conduit having its end portion within said water reservoir coaxial with and terminating within said re-entrant exhaust conduit beyond said lowest hole, whereby the foul effluent drawn by said exhaust pump is expelled via said water trap into said sewer line.

3. A toilet ventilating system connectable to an existing toilet system consisting of a hopper attached to a sewer line, a toilet seat disposed on said hopper, and a flushing water reservoir; said toilet ventilating system comprising an electrically operated exhaust pump having non-detachably connected at one end a perforated flexible member extending therefrom and accommodated between said toilet seat and said hopper to draw foul air therefrom, and at the other end having an exhaust means provided with a one-way flexible, tubular passage means and extending from said exhaust pump to communicate with said sewer line attached to said toilet system, and further comprising substantially U-shaped bracket means capable of straddling a rear extension section of said hopper, said bracket means being capable of supporting said exhaust pump beneath said section, said U-shaped bracket means being mountable on said rear extension section, with the closed portion of said U-shaped bracket means uppermost, to the upper surface of said rear extension section by existing bolts, with the two straight arm portions of said U-shaped bracket means directed downwardly and serving as support means for a housing enclosing said electrically operated exhaust pump.

4. A toilet ventilating system adapted to be secured to a toilet installation connected to a sewer line and having a toilet bowl provided with a seat thereon, and a water reservoir for furnishing water to said bowl, said toilet ventilating system comprising a motor-driven pump, a switch to turn said motor on and off, and an air intake means at one end communicating with said bowl to draw foul air therefrom into said pump, and an exhaust conduit extending from the opposite end of said pump carrying said foul air into said water reservoir and having its end portion within said water reservoir coaxial with and terminating within a second conduit having perforations therein and forming a gas trap therewith utilizing the water in said reservoir, said second conduit extending from said reservoir into said sewer line to expel said foul air carried therinto by said exhaust conduit from said pump.

5. A ventilating toilet system as defined in claim 2 further comprising substantially U-shaped bracket means adapted to straddle the rearwardly extending section of said hopper, said bracket means being adapted to support said exhaust pump beneath said section.

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