Oct. 6, 1942. H. BAITHER 2,297,935

VENTILATED TOILET

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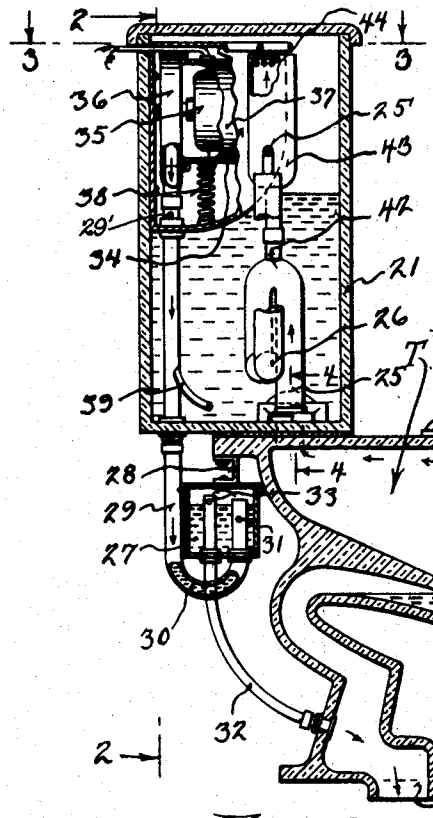


Fig. 1.

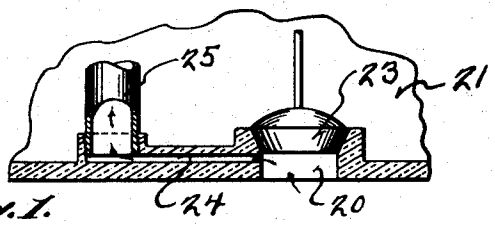


Fig. 4.

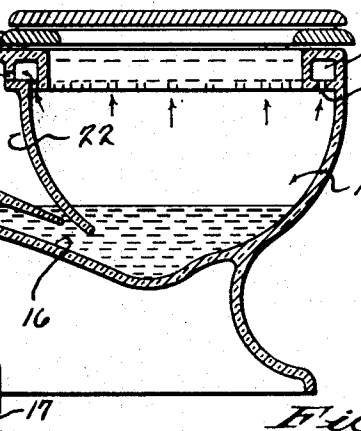


Fig. 5.

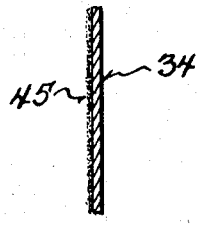


Fig. 3.

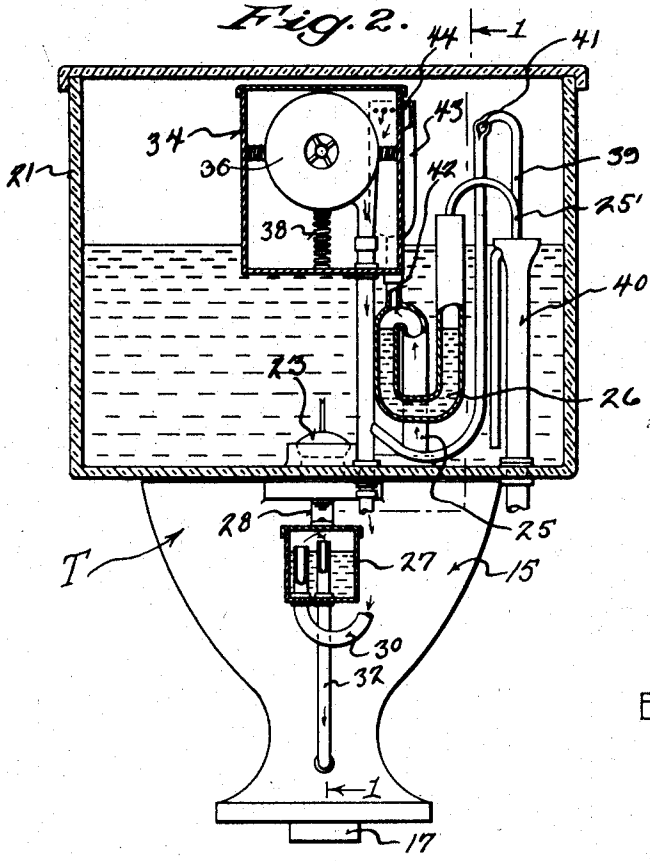
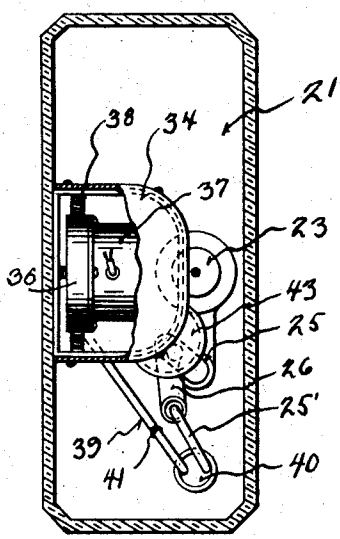


Fig. 2.



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Fig. 7.

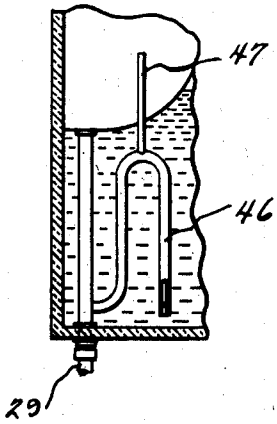


Fig. 9.

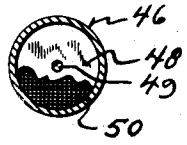


Fig. 8.

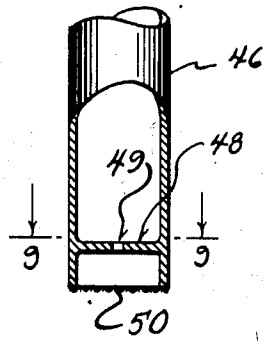


Fig. 10.

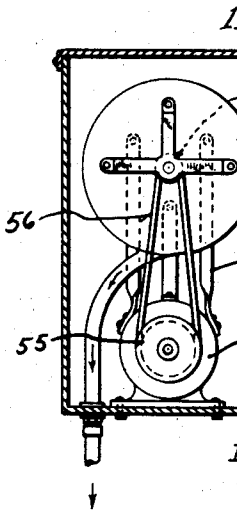


Fig. 11.

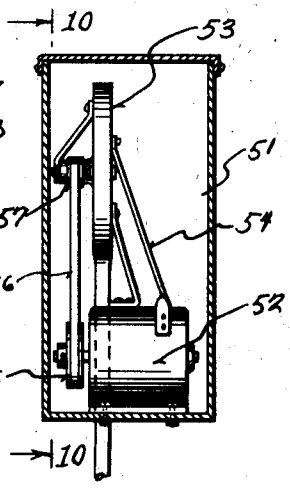


Fig. 12.

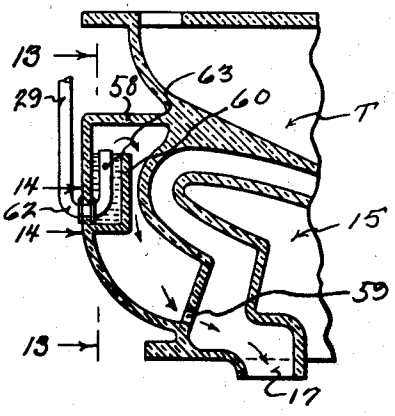


Fig. 13.

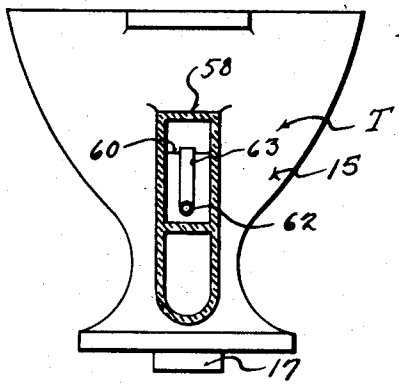
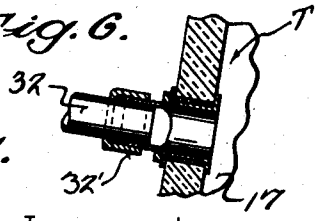


Fig. 14.



Fig. 6.



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UNITED STATES PATENT OFFICE

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VENTILATED TOILET

Harry Balther, Milwaukee, Wis.

Application February 3, 1941, Serial No. 377,180

9 Claims. (Cl. 4—213)

This invention appertains to ventilated toilets, and is an improvement on my prior Patent No. 2,227,920, issued to me January 7, 1941.

One of the primary objects of my present invention is to generally simplify and reduce the cost of construction of ventilated toilets and to facilitate the installation and incorporation of my ventilating system with toilets of the type now in common use.

Another salient object of my invention is to provide novel means for utilizing the protecting housing for the fan and motor as an entrance chamber for the foul odors from the toilet bowl, and to introduce the sucked-in air from the bowl into the housing in such a way that the noise of the inrushing air will be reduced to a minimum, and the noise of the motor and fan will be muffled.

Another important object of my invention is to provide positive means for preventing the drawing of flushing water into the protecting housing with the sucked-in foul air from the bowl.

A further object of my invention is the provision of novel means for leading and forcing the foul odors or gases from the fan into a water seal or trap chamber to prevent the escape of said gases in such a manner that the size of the water seal or trap chamber can be effectively reduced.

A further important object of my invention is to provide means for preventing the clogging up of the various pipes in my ventilating system by sand or other foreign matter which may be present in the flushing water.

A still further object of my invention is to provide means for reducing noise and vibration in the ventilating system by the employance of a low speed electric motor, with means for rapidly driving the fan therefrom.

With these and other objects in view the invention consists in the novel construction, arrangement, and formation of parts, as will be hereinafter more specifically described, claimed, and illustrated in the accompanying drawings, in which drawings:

Figure 1 is a vertical, sectional view through a toilet constructed in accordance with my invention, the section being taken substantially on the line 1—1 of Figure 2, looking in the direction of the arrows.

Figure 2 is a sectional view taken at right angles to Figure 1, and substantially on the line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a horizontal, sectional view through the flushing tank, taken on the line 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is an enlarged, fragmentary, detail, sectional view taken on the line 4—4 of Figure 1, looking in the direction of the arrows.

Figure 5 is an enlarged, fragmentary, detail, sectional view through the protecting housing for the motor and fan, illustrating one form of means for soundproofing the housing against noise.

Figure 6 is an enlarged, detail, fragmentary, vertical, sectional view illustrating one form of means for coupling the vent pipe for the foul odors with the drainpipe of the toilet.

Figure 7 is a fragmentary, detail, sectional view through the flushing tank, illustrating a modified form of means for introducing water into the water seal or trap chamber of my ventilating system.

Figure 8 is an enlarged, fragmentary, detail, sectional view through the inlet tube utilized for replenishing the water to the water seal or trap chamber, the view showing the means for screening the water.

Figure 9 is a detail, horizontal, sectional view through said tube, taken on the line 9—9 of Figure 8, looking in the direction of the arrows.

Figure 10 is vertical, sectional view through the protecting housing for the motor and fan, illustrating one form of means for utilizing a low speed motor, whereby to reduce noise incident to vibrations set up by high speed motors, the view being taken on the line 10—10 of Figure 11.

Figure 11 is a sectional view taken on the line 11—11 of Figure 10, looking in the direction of the arrows.

Figure 12 is a fragmentary, vertical, sectional view through a toilet bowl, illustrating one form of means for incorporating the water seal or trap chamber directly in the toilet.

Figure 13 is a detail, sectional view taken on the line 13—13 of Figure 12, looking in the direction of the arrows.

Figure 14 is a detail, sectional view taken on the line 14—14 of Figure 12, illustrating the formation of the toilet to facilitate the insertion of the vent pipe of the ventilating system therewith.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter T generally indicates my improved ventilated toilet, which comprises a toilet bowl 15 having communicating therewith through a water seal or trap 16 a drainpipe 17.

The upper end of the bowl 15 has formed therein a flush ring 18. This flush ring has communicating therewith a plurality of outlet apertures 19, and the flush ring communicates with

the main water outlet 20 of the flush tank 21. This outlet 20 also communicates with an enlarged passageway 22 with the body of the bowl 15. The flush tank 21 can be formed integral with or separate from the bowl 15. The outlet 20 can be controlled by any preferred type of valve 23. Communicating with the outlet opening 20 below the valve 23 is an overflow passageway 24, which has communicating therewith an overflow pipe 25, which normally extends above the level of the flushing water in the tank. In accordance with my invention, the overflow pipe 25 is bent or has incorporated therein a U-shaped trap portion 26 to form a water seal, for a purpose which will be later set forth.

My device also includes a water seal or trap chamber 27. In one form of my invention, this water seal or trap chamber 27 is made separate from the bowl and tank, and with my present construction (as will be later described), I am enabled to materially reduce the size of this chamber. As illustrated in Figures 1 and 2, the water seal or trap chamber 27 is arranged in back of the bowl and the outlet or drainpipe 17, and is secured in place by means of a bracket 28.

Communicating with the chamber 27 is a combined water supply and foul odor delivery pipe 29. The lower end of this pipe 29 is bent to form a water trap 30, and the pipe is extended into the trap chamber supply above the normal water level therein. The pipe below the water level has formed therein a small water inlet opening 31, whereby to insure the correct supply of water to the trap 30 to maintain the seal. Likewise, extending into the trap chamber 27 above the water level and above the upper end of the pipe 29 is a foul odor drawoff pipe 32. This pipe is extended into the drainpipe 17 in rear of the water seal 16 for the bowl. Any preferred type of coupling 32' can be employed for connecting the pipe 32 with the toilet. The drawoff pipe also has formed therein a small drain opening 33 adjacent the water level in the trap chamber, and, hence, this opening 33 acts to prevent the water from rising above a predetermined normal level in said trap chamber.

In the flush tank 21, I secure a protecting housing or casing 34 for the electric motor 35 and the fan 36. The rotor of the fan is driven from the armature shaft of the motor, and a housing 37 is employed for surrounding the motor. The motor and fan are suspended in the protecting housing or casing 34 by means of cushioning springs 38, which are placed at the desired advantageous points. The housing 37 for the motor is formed from copper or other material which will quickly transmit or dissipate heat, so that this housing 37 will not become unduly heated from the electric motor 35.

The pipe 29 is connected to the outlet of the fan by the use of a suitable flexible coupling, and the inlet of the fan is adapted to draw air in from the housing or casing 34 and to force the air through the pipe 29 into the trap chamber 27. This pipe 29 has communicating therewith adjacent the bottom of the flush tank 29 the water seal refill tube 39. This tube extends into the water refill pipe 40 for the flush tank. The tube 39 is provided with an air inlet opening 41 at a point above the normal water level in the flush tank, and this opening is provided for breaking any siphoning action which might take place in said tube. By this arrangement of parts, the pipe 29, as heretofore stated, is utilized both for supplying water to the trap chamber 27 and for conducting the foul odors to said trap chamber.

Communicating with the top of the trap 26 in the overflow pipe 25 of the flush tank is the foul odor suction pipe 42. This suction pipe 42 extends into the bottom of a supplementary foul odor chamber 43, and the upper end of the chamber communicates with the housing or casing 34 by means of a plurality of small openings 44.

When the fan is in operation, foul odors will be drawn through the flush ring 18, through the opening 20, the overflow passageway 24, pipe 25, suction tube 42, supplementary chamber 43, into the housing 34, and into the fan. As the suction tube is above the trap chamber, little or no water will be drawn into the supplementary chamber 43 with the air, and this chamber functions to collect such water and to allow the water to drain back into the overflow pipe. The plurality of openings 44 distributes the inrushing air and materially reduces the noise incident to the flow of air passing through the fan 36. The housing 34 and the chamber 43 also serve as a muffler for reducing noise produced by the fan and motor. If desired, the inner face of the housing or casing 34 can be provided with a lining or skin of soundproofing material 45, as shown in Figure 5 of the drawings. The pipe 29 at a desired point in the housing can be provided with a water drain opening 29' to prevent the collection of any water which might be present in the housing 34.

In use of my toilet, the circuit through the motor 35 is closed by the use of a suitable switch mechanism, which is operated preferably by the weight of a person using the toilet. As stated, upon the operation of the motor, the fan will suck in air and foul odors from the bowl, and this air is forced through the pipe 29, into the trap chamber 27, and the water in the trap 30 will be forced in advance of the air into the trap chamber. A small amount of the water will drain into the pipe 32, and all the air and foul odors will be forced through the pipe 32 into the drainpipe 17.

From the foregoing it can be seen that I have provided an effective means for sucking air and foul odors from the toilet, first, into the protecting housing for the motor and fan, and then forcing the same into the water seal or trap chamber prior to the forcing thereof down the drain. It can also be seen that means has been provided for resealing the trap 30 with water without the necessity of flushing the bowl 15, as water will enter the trap through the opening 31 from the water supply in the reservoir 27.

If preferred, water can be supplied to the pipe 29 by means of an inverted U-shaped tube 46 (see Figures 7, 8, and 9) in lieu of the tube 39. This tube 46 terminates adjacent the bottom of the flush tank, and any siphoning action in said tube 46 will be broken by an air inlet tube 47, which communicates with the upper bend in said tube, and which extends above the normal water level in the flushing tank. The water supply tube 46 is exceptionally useful in communities where sand or other foreign matter is present in the water, as an effective self-cleaning screen can be employed with said tube 46. As illustrated in Figures 8 and 9, the tube 46 adjacent its inlet end, can be provided with a partition 48 having a restricted water inlet 49. A fine screen 50 is placed over the inlet of the tube 46 in spaced relation to the partition 48. During the intake of water from the tube 46 by the pipe 29, the screen will prevent the entrance of sand and

the like into said tube, and when the bowl is flushed, the rushing of the water from the flushing tank and the drawing of any water in the tube 46 will clean and wash the screen 50.

While I prefer to utilize a high speed electric motor and to reduce noise and vibration by employing cushioning springs, as shown in Figures 1 and 2, noise can be reduced to a limited extent by employing a low speed electric motor, and connecting the motor with the fan through a speed increasing mechanism.

In Figures 10 and 11, I have shown a protecting housing 51 for a motor 52 and a fan 53, and this housing is adapted to be disposed in the flush tank in the same manner as the protecting housing 34. The motor 52 is of the low speed type and is secured directly to the housing 51. The fan 53 is held in spaced relation to the motor by brackets 54. The armature shaft of the motor has connected therewith a drive pulley 55 of a relatively large diameter, and this pulley has trained about the same a drive belt 56. The drive belt is, in turn, trained over a relatively small pulley wheel 57 secured to the drive shaft of the rotor of the fan.

In Figures 12 to 14, inclusive, I have illustrated a means for forming the trap or water seal chamber for the foul odors directly with the toilet. The rear of the toilet bowl has connected therewith a chamber 58, and this chamber communicates with the drainpipe 17 through the medium of an opening 59 in the lower end thereof. A water receiving compartment 60 open at its top is arranged in the chamber 58. The conduit pipe 29 from the fan is led into the compartment 60, and this conduit pipe, at its lower end, in this form of the invention, is provided with a U-belt 62. The upper end of the U-belt extends above the water compartment 60 and is provided with a small opening 63 below the normal water level in said compartment for insuring the maintenance of the water seal in said U-belt. The water compartment 60 acts as a reservoir for supplying water through the opening 63 to the water seal in the U-shaped portion 62 of the pipe 29. It can be seen that the foul odors and air will be forced through the pipe 29 directly into the compartment 58 and then in the drainpipe 17 through the opening 59. The opening 64 (see Figure 14) for the trap 62 can be of an elongated character, so as to facilitate the introduction of the trap into the water reservoir 60, and this opening 63 can be closed by the use of gaskets and the like.

Changes in details may be made without departing from the spirit or the scope of my invention, but what I claim as new is:

1. A ventilated toilet comprising, a bowl having a water basin therein and a drainpipe below the basin and communicating therewith, means for creating a suction in said bowl above the water basin including an electric motor and a fan, a protecting housing for the motor and fan entirely enclosing the same and constituting a foul odor receiving chamber, means connecting the interior of the housing with the bowl, the inlet of the fan communicating with the interior of said housing, a reservoir and trap chamber arranged above the drainpipe and the bottom of the bowl, means connecting the outlet of the fan with said reservoir and trap chamber above the normal water level therein, and means connecting the drain of the toilet with the water reservoir and trap chamber above the normal water level therein.

2. A ventilated toilet comprising, a bowl having a water basin therein and a drainpipe below the basin and communicating therewith, means for creating a suction in said bowl above the water basin including an electric motor and a fan, a protecting housing for the motor and fan entirely enclosing the same and constituting a foul odor receiving chamber, means connecting the interior of the housing with the bowl, the inlet of the fan communicating with the interior of said housing, a reservoir and trap chamber arranged above the drainpipe and the bottom of the bowl, means connecting the outlet of the fan with said reservoir and trap chamber above the normal water level therein, means connecting the drain of the toilet with the water reservoir and trap chamber above the normal water level therein, and means for supplying the reservoir and trap chamber with water from a source other than the bowl.

3. A ventilated toilet comprising, a bowl having a water basin therein and a drainpipe below the basin and communicating therewith, a flush tank for the bowl, a closed housing in the flush tank, a drive motor and fan in said housing, having its inlet communicating with the interior of the housing, a foul odor pipe communicating with the outlet of the fan and the drainpipe, a supplementary chamber located in the flush tank and exteriorly of the housing having a plurality of openings at its upper end communicating with the interior of the housing, and a suction pipe leading into the lower end of the supplementary chamber having communication with the bowl above the water basin.

4. A ventilated toilet comprising, a bowl having a water basin therein and a drainpipe below the basin and communicating therewith, means for creating a suction in said bowl above the water basin, including a suction pipe, a closed housing, an electric drive motor and fan in said housing, said suction pipe having communication with the interior of said housing and the inlet of said fan communicating with the interior of the housing, a reservoir and trap chamber located above the drainpipe and the bottom of the bowl having communication with the drainpipe, and a foul odor conducting pipe communicating with the outlet of the fan and provided with a water seal extending into the reservoir and trap chamber above the normal water level therein.

5. A ventilated toilet comprising, a bowl having a water basin therein and a drainpipe below the basin and communicating therewith, means for creating a suction in said bowl above the water basin, including a suction pipe, a closed housing, an electric drive motor and fan in said housing, said suction pipe having communication with the interior of said housing and the inlet of said fan communicating with the interior of the housing, a reservoir and trap chamber located above the drainpipe and the bottom of the bowl having communication with the drainpipe, a foul odor conducting pipe communicating with the outlet of the fan and provided with a water seal extending into the reservoir and trap chamber above the normal water level therein, and means for supplying water to the foul air conducting pipe including a water supply tube.

6. A ventilated toilet comprising, a bowl having a water basin therein and a drainpipe below the basin and communicating therewith, means for creating a suction in said bowl above the water basin, including a suction pipe, a closed housing, an electric drive motor and fan in said

housing, said suction pipe having communication with the interior of said housing and the inlet of said fan communicating with the interior of the housing, a reservoir and trap chamber located above the drainpipe and the bottom of the basin having communication with the drainpipe, a foul odor conducting pipe communicating with the outlet of the fan and provided with a water seal extending into the reservoir and trap chamber above the normal water level therein, and means for supplying water to the foul air conducting pipe including a water supply tube, said foul air conducting pipe having a water supply opening formed therein above the water seal and below the normal water level in the reservoir and trap chamber.

7. A ventilated toilet comprising, a bowl having a water basin therein and a drainpipe below the basin and communicating therewith, a flush tank for said bowl, means for creating a suction in said bowl above the water basin including a suction pipe communicating with the bowl, a closed housing in said tank, a drive motor and fan in said housing, the fan having its intake communicating with the interior of the housing, and said suction pipe communicating with the interior of the housing, a foul odor conducting pipe communicating with the outlet of the fan and the drainpipe, having a water trap therein arranged above the drainpipe and the lower wall of the basin, means for supplying the trap with water including a water reservoir and a water supply tube, said tube communicating with the conducting pipe and the flush tank, the inlet of said flush tank terminating adjacent the bottom of the flush tank and having a restricted water passageway therein and a screen below said restricted passageway.

8. In a ventilated toilet including a closed housing, an electric motor and suction fan for withdrawing foul odors from the bowl of the toilet arranged within the housing, said motor being connected directly with a wall of the housing and being of the low speed type, and speed reducing mechanism connecting the low speed motor with the fan.

9. A ventilated toilet comprising, a bowl having a water basin therein and a drainpipe below the basin and communicating therewith, a flush tank for the bowl, a closed housing in the flush tank, a drive motor and fan in said housing, having its inlet communicating with the interior of the housing, a foul odor pipe communicating with the outlet of the fan and the drainpipe, a supplementary chamber arranged in the tank and exteriorly of the housing and having a plurality of openings at its upper end communicating with the interior of the housing, and a suction pipe leading into the lower end of the supplementary chamber having communication with the bowl above the water basin, said housing and supplementary chamber cooperating to form a muffler for the incoming air and the noise incident to the operation of the fan and motor.

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