

IMPROVED TOILET BOWL

TECHNICAL FIELD

The present invention relates to an improved toilet bowl, and in particular to a toilet bowl adapted to remove foul odours from the bowl.

5 BACKGROUND ART

Foul air produced in toilets causes both discomfort and embarrassment to users of a toilet. For many people it is unpleasant to enter a toilet in which a foul odour may be lingering and those responsible may not necessarily wish to be associated with the odour. Indeed, it has been known for people to light
10 cigarettes in toilets to try and disguise the odours being produced.

Attempts can be made to disguise the odour by introducing quantities of highly perfumed air fresheners to mask the odour but these attempts are not altogether successful and can lead to an unattractive mixture of odours.

Further attempts have been made to reduce the odour by using a fan in the
15 toilet to extract the odours. Typically, the fan would be placed in the ceiling and has to move circulate and exchange air from a large volume. This can be difficult and, which is worse, can spread the foul odours throughout a larger space. Because the odours are allowed to become diffused through the
20 space of the toilet a prolonged period of time may be required to extract all the odour. However, the fan devices, being high consumers of power are often linked to light switches so as to only operate when the light is on, ie., when the toilet is occupied, which may be an insufficient time to remove the odours leaving sufficient foul odour to cause some offence to the next occupant of the toilet. Thus such fan devices are not always successful.

25 Efficient removal of unwanted foul odours from a toilet is therefore desirable. It is also desirable to remove the odours without introducing large, complex or expensive structures into the toilet or washroom

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DISCLOSURE OF THE INVENTION

The present invention provides an improved toilet bowl, the bowl including an arrangement which allows any foul odours to be removed into the waste pipe thereby preventing odours escaping from the bowl and diffusing into the air space within the toilet or washroom.

Therefore according to one aspect of the present invention there is provided a toilet bowl comprising:

- a bowl and a waste pipe associated with the bowl, the waste pipe being in fluid communication with the bowl through a flushing outlet in the bowl;
 - 10 - an air duct allowing separated from the flushing outlet, the air duct providing a conduit for air flow between an interior of the bowl and the waste pipe; and
 - extraction means adapted to draw air from the interior of the bowl through the air duct into the waste pipe thereby substantially preventing escape of air from the interior of the bowl.
- 15 By locating the extraction means within the waste pipe and to act on the interior of the bowl, the toilet bowl of the present invention operates where the foul odours are in highest concentration, removing the odours into the waste pipe and eventually into the waste sewer. This technique effectively by passes the need for extraction of the whole space of the toilet or washroom
- 20 and also avoids the possibility of the extraction process diffusing the odours within the space.

Preferably, the extraction means is mounted within the waste pipe and comprises a fan having a propeller located in the vicinity of the air duct, the propeller blades being arranged such that when operated air is drawn by the fan from the interior of the bowl into the waste pipe.

Preferably, the propeller is driven by an associated motor, the motor being mounted within the waste pipe and isolated from the flow of water through the bowl.

The motor is conveniently mounted on mounting means in the waste pipe. Suitable mounting means include an annular shoulder extending into the pipe or a plurality of spaced mounting lugs on an inner surface of the pipe.

5 It is convenient for the motor to be mounted above the flushing outlet in the bowl to reduce any possibility of water passing through the bowl coming into contact with the motor. Once mounted the motor may be physically separated from the flow of water by any suitable means such as a seal extending across the waste pipe, the propeller extending through the seal and being operable by the motor. The possibility of water passing through the bowl coming into
10 contact with the motor is thus further reduced. The toilet bowl and motor arrangement is completed by arranging for the path of the air duct to be above the path of the flushing outlet.

Moreover, for the increased comfort of users of the toilet bowl of the present invention, it is possible to operate the extraction device independently of the
15 use of the toilet. Thus, for example, the fan may be operated before, during or following the flushing of the toilet.

The present invention, therefore, also provides a Method of extracting air from a toilet bowl including the steps of:

- 20 - locating an air duct in a toilet bowl, the air duct being separated from a flushing outlet of the bowl, the air duct providing a conduit for air flow between an interior of the bowl and a waste pipe associated with the bowl, the waste pipe being in fluid communication with the bowl through a flushing outlet in the bowl; and
- 25 - providing extraction means in the bowl, the extraction means being adapted to draw air from the interior of the bowl through the air duct into the waste pipe thereby substantially preventing escape of air from the interior of the bowl.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described, by way of example, with reference to the accompanying drawings in which:

5 FIG 1 illustrates in cross-sectional view a toilet bowl in accordance with one aspect of the present invention;

FIG 2 illustrates in detail, and in cross section, the extraction means of the toilet bowl of FIG 1; and

FIG 3 illustrates in expanded view the extraction means of the toilet bowl of FIG 1.

10 BEST MODE FOR CARRYING OUT THE INVENTION

The drawings illustrate a toilet bowl 10 in accordance with one aspect of the present invention. The toilet bowl 10 comprising:

- 15 - a bowl 12 and a waste pipe 14 associated with the bowl 12, the waste pipe 14 being in fluid communication with the bowl 12 through a flushing outlet 16 in the bowl 12;
- an air duct 18, the air duct 18 separated from the flushing outlet 16, the air duct 18 providing a conduit for air flow between an interior 20 of the bowl 12 and the waste pipe 14; and
- 20 - extraction means 22 adapted to draw air from the interior 20 of the bowl 12 through the air duct 18 into the waste pipe 14 thereby substantially preventing escape of air from the interior 20 of the bowl 12.

25 The bowl 12 is of generally conventional construction being formed to include a lowermost well 24 adapted to retain a volume of water therein. The well 24 extends into a U-bend path 25 through which the contents of the bowl 12 must pass in order to reach the flushing outlet 16 which is formed at one end of the U-bend 25. The upper surface of the U-bend is formed from a projection 26 of a rear portion of the bowl 12 into the interior of the bowl 12. The projection 26

initially extends upwardly and then falls downwardly to the well 24 thereby defining one limb of the U-bend 25. The water in the well 24 co-operates with an interior wall 26 of the bowl to form a water barrier between the waste pipe 14 and the interior of the bowl 20.

- 5 The bowl 12 further includes an upper rim 28 adapted to receive a seat (not shown) thereon and a water supply pipe 30 entering the bowl 12 through an inlet 32 located just below the rim 28 at a rear of the bowl 12. In a normal flushing the water enters through the inlet 32, cascades around the interior walls of the bowl, including the rear wall 26, passes into the well area 24 and
10 around the U-bend through the flushing outlet 16 into the waste pipe 14 and thence to the sewer.

In respect of the flushing mechanism, therefore, the toilet 10 acts in a conventional manner.

- However, associated with the bowl 12 is the air duct 18. The air duct 18 is
15 located above the rear flushing outlet 16. The air duct 18 terminates in outlet 34 which leads into the waste pipe 14. The air duct 18 is defined by an upper portion of the waste pipe 14 and the outer part of the projection 26 forms a path from the interior 20 of the bowl 12 and the waste pipe 14. As will be appreciated from FIG 1, the conduit 34 is relatively narrow, and moreover, is
20 located above the flushing outlet 16.

It can also be seen that the diameter of the waste pipe 14 at the point of entry of the air duct 18, that is at outlet 34, remains the same as at all other points of the pipe. Thus, the air flow through the waste pipe 14 in use will be smooth and constant.

- 25 Mounted into an upper portion of the waste pipe 14 is the extraction means 22. Detail of the extraction means 22 can be seen most clearly in FIGS 2 and 3 and reference will now be made to these drawings.

- The extraction means 22 comprise a propeller 36 attached to a drive shaft 38 which is in turn coupled to motor 40. As can be seen, the extraction means is
30 positioned such that the propeller 36 is lowermost and in the vicinity of the air duct 18. In the embodiment shown.

The propeller 36 is a 3 bladed propeller of approximately 90mm diameter and a 100mm pitch. The propeller 36 is arranged such that in use air flow is directed from the air duct 18 into the waste pipe 14.

- 5 The motor 40 is mounted in the waste pipe 14 so as to be sealed from contact with any water flowing through the pipe 14. The motor is mounted with the assistance of mounting means 42. The mounting means 42 comprises a circular mount plate 44 to which the motor 40 is connected, the connection being supplied by a pair of attaching screws 46 which extend through the mount plate 44 to the motor 40.
- 10 The mount plate 44 is of a similar diameter to the internal diameter of the waste pipe 14 and is adapted to rest on a circular mounting lug 48 is formed around an inner surface of the waste pipe 14. The mounting lug is integrally formed with the waste pipe 14. The mounting plate 44 has a centrally located aperture which allows the drive shaft to pass therethrough.
- 15 Located below the mounting plate 44 and also resting on the circular lug 48 is a sealing member 50. The sealing member 50, as shown in FIG 3 has a centrally located aperture through which the drive shaft 38 extends. The sealing member 50 is formed of resilient material and serves to seal the motor 40 against the drive shaft 38 thereby isolating the motor 40 from contact with
- 20 fluids travelling through the pipe 14. The resilient nature of the sealing member 50 allows the drive shaft 38 to rotate unhindered.
- The motor 40 is retained in position and secured against any unwanted movement by means of a mounting ring 52 placed above the mount plate 44. The mounting ring 52 comprises flat ring having a large central aperture 54.
- 25 As can be seen, the mounting ring 52 is dimensioned so as to just fit within the waste pipe 14 and for the motor to fit snugly into the central aperture 54. When it is considered necessary to remove the motor 40, all that is required is to pull on the motor 40 which in turn pulls the plastic retaining mounting ring 52 from its position.
- 30 The housing of the motor 40 in the waste pipe 14 is completed by a cap 56 resting on top of the waste pipe 14. The cap 56 is apertured to permit electrical connections to extend through the cap 56 from the motor 40 to a distant power supply.

Clearly, in any installation including the toilet 10 of the present invention a switch would be installed for activation of the motor 40. Such a switch could, for example be coupled to a light switch mechanism, or alternatively be totally independently controlled, or in a further still alternative, be triggered in
5 response to the flushing mechanism of the toilet. Further embodiments may be envisioned in which the motor is operated for pre-determined time periods.

In use, therefore, the motor 40 may be operated before, during or after the flushing of the toilet 10.

**CLAIMS**

1. A toilet bowl comprising:
 - a bowl and a waste pipe associated with the bowl, the waste pipe being in fluid communication with the bowl through a flushing outlet in the bowl;
- 5 - an air duct separated from the flushing outlet, the air duct providing a conduit for air flow between an interior of the bowl and the waste pipe; and
- extraction means adapted to draw air from the interior of the bowl through the air duct into the waste pipe thereby substantially preventing escape of air from the interior of the bowl.
- 10 2. A toilet bowl according to claim 1, wherein the extraction means are located within the waste pipe.
3. A toilet bowl according to claim 2, wherein the extraction means is mounted within the waste pipe in a position above a flushing outlet of the bowl and comprises a fan having a propeller located in the vicinity of the air
15 duct, the propeller blades being arranged such that when operated air is drawn by the fan from the interior of the bowl into the waste pipe.
4. A toilet bowl according to claim 3, wherein the propeller is driven by an associated motor, the motor being mounted within the waste pipe and isolated from the flow of water through the bowl.
- 20 5. A toilet bowl according to claim 4, wherein the motor is conveniently mounted on mounting means in the waste pipe.
6. A toilet bowl according to claim 5, in which the mounting means includes an annular mounting lug extending into the waste pipe.
- 25 7. A toilet bowl according to claim 5, in which the mounting means includes plurality of spaced mounting lugs on an inner surface of the pipe.



8. A toilet bowl according to claim 5, in which the motor may be physically separated from the flow of water by any suitable means such as a seal extending across the waste pipe, the propeller extending through the seal and being operable by the motor.
- 5 9. A toilet bowl according to claim 5, in which the motor may be retained in position by a circular mounting ring and secured in the waste pipe by a mounting plate resting on the mounting means, the motor being connected to the mounting plate.
- 10 10. A toilet bowl according to any one of the preceding claims, wherein a path of the air duct is arranged to be above the path of the flushing outlet.
11. A toilet bowl according to any one of the preceding claims, in which it is possible to operate the extraction means independently of the use of the toilet.
12. A method of extracting air from a toilet bowl including the steps of:
- 15 - locating an air duct in a toilet bowl, the air duct being separated from a flushing outlet of the bowl, the air duct providing a conduit for air flow between an interior of the bowl a waste pipe associated with the bowl, the waste pipe being in fluid communication with the bowl through a flushing outlet in the bowl; and
- 20 - providing extraction means in the bowl, the extraction means being adapted to draw air from the interior of the bowl through the air duct into the waste pipe thereby substantially preventing escape of air from the interior of the bowl.