April 30, 1963 M. A. HUSO 3,087,168

TOILET FILTERING VENTILATOR

Filed May 10, 1960

FIG. 1.

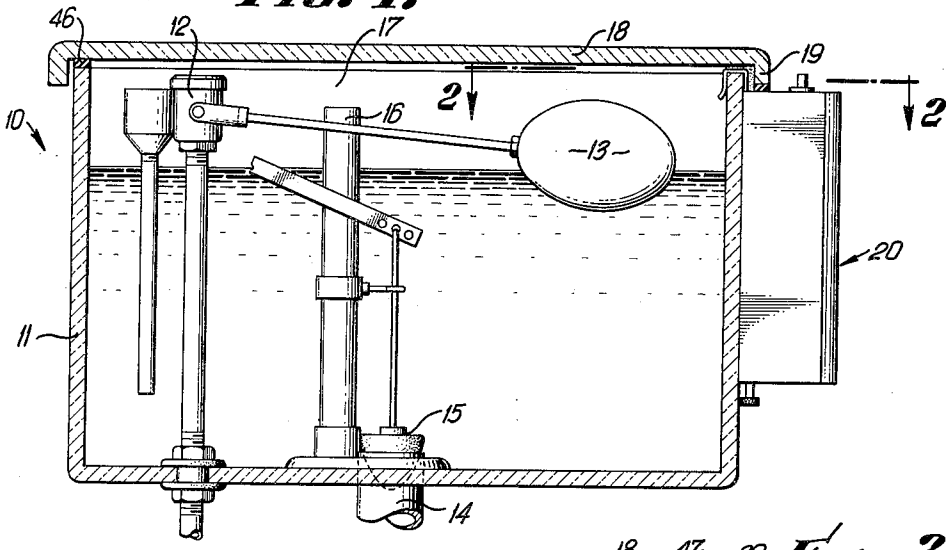


FIG. 2.

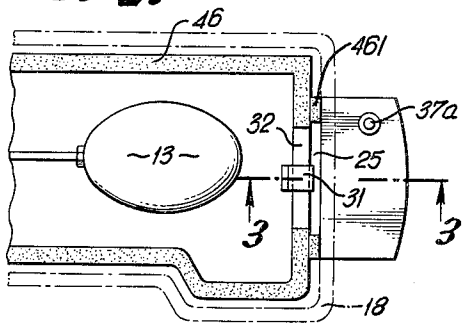


FIG. 3.

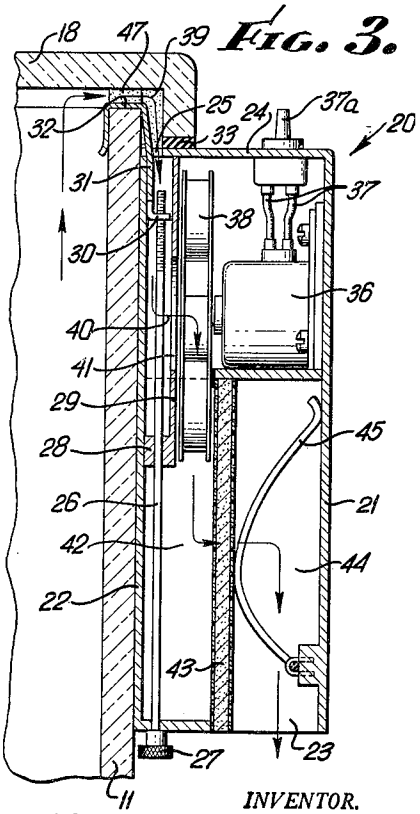
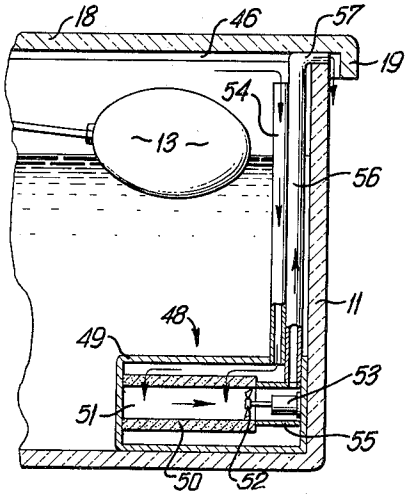


FIG. 4.



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TOILET FILTERING VENTILATOR

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This invention relates generally to toilet bowl ventilation, and is directed particularly to improved toilet bowl ventilating means characterized by the simplicity, economy and practicability with which effective bowl ventilation may be achieved by virtue of certain novel concepts upon which the invention is predicated.

Heretofore, various devices and expedients have been proposed for toilet bowl ventilation, the bulk of which have found little acceptance for such reasons as cost and inconvenience of installation, such as would arise where alterations in plumbing or the standard toilet structures are necessitated. Otherwise, prior proposals have proven unacceptable because of inefficiency over extended periods, or objectionable features of appearances or encumberances of the standard equipment.

My general object is to provide a new and improved ventilator which can be applied in a few minutes' time to the usual toilet with minimum alteration of its normal condition, and which thereafter will perform efficiently and to the elimination of all bowl odors, over long periods of service.

In one of its major aspects, the invention is predicated upon achieving bowl ventilation through the usual overflow pipe and water tank by a simple expedient of providing for localized spacing between the tank rim and its cover, all in a manner that will permit use of an associated air filtering unit either inside or outside the tank. More particularly, the invention contemplates applying to the tank rim a gasket interrupted at one location to provide sufficient spacing between the cover and rim to permit air displacement through the space so formed, from or to a filter unit placed inside or outside the tank, as the case may be. Thus, assuming the provision of a suitable filtering unit comprising a housing, contained adsorbent and powered means acting to displace the ventilated air through the adsorbent, practice of the invention requires merely the application of a gasket as described, to the tank rim, and the quick association or mounting of the filter unit, all of which may be accomplished very quickly and easily.

The invention has various additional features and objects, particularly in relation to a preferred embodiment of the invention according to which the filter unit is mounted at the outside of the water tank. Here the invention contemplates a simple mode of attachment of the unit housing to the tank within the ventilation space, in a manner such that the latter is brought into communication with an opening in the filter unit housing through which air flow is induced from the tank via the rim-cover spacing and into the housing, thence to be displaced through an adsorbent such as activated carbon. The invention contemplates the further feature of utilizing the underside of the tank cover as a closure above the housing opening, and for this purpose the invention provides for vertical adjustment of the filter unit in its application to differently dimensioned tanks and covers, to assure contact between the housing and the underside of the cover.

All the features and objects of the invention as well as the details of certain illustrative embodiments, will be more fully understood from the following detailed description of the accompanying drawing, in which:

FIG. 1 is a view partly in vertical section, showing a preferred embodiment of the invention in operative association with a conventional toilet water tank;

FIG. 2 is a fragmentary section taken on line 2—2 of FIG. 1;

FIG. 3 is an enlarged cross sectional view of the filter unit, taken on line 3—3 of FIG. 2; and

FIG. 4 is a fragmentary view similar to FIG. 1 illustrating a variational form of the invention.

Referring first to FIG. 1, the water tank assembly generally indicated at **10**, is to be regarded as illustrative of any of the conventional forms of tanks from which water is admitted to the tank proper, **11**, under control of a valve **12** which in turn is controlled by the float **13**. Water discharged through pipe **14** to the conventional bowl, not shown, is controlled by the manually operated valve or stopper **15**. For the purposes of the invention, we need be concerned only with reference to the usual water overflow pipe **16** which communicates with the atmosphere of the bowl and therefore is capable of venting the latter into the tank space **17** above the water. The tank is shown to be closed by a cover **18** which usually has a peripheral down-turned flange **19**.

The filter unit, generally indicated at **20**, is shown to comprise a housing **21** the inner wall **22** of which is adapted to bear against the side of the tank **11**, the bottom of the housing having an air discharge opening at **23** and the top wall **24** a slot-like opening **25**, see FIG. 2, through which air flow is induced from the tank space **17** as will later appear. The unit **20** is shown to be adjustably supported by the tank and in relation to the overhanging cover flange **19**, by a rod **26** extending from the externally knurled head **27** upwardly within the housing **21** through a bearing or guide **28** carried by a partition **29** in the housing. The upper end of rod **26** is threaded at **30** into a supporting bracket **31** extending upwardly through the slot **25**, and which hooks over the surface of the tank rim. As will be apparent, rod **26** may be turned to vertically adjust the housing **26** relative to the tank and flange **18**, so that the top **24** of the housing may be brought upwardly against the underside of the rim or an interposed gasket **33** to effect a closure against escape of the air flow induced into the housing.

It will be understood that in the broad contemplation of the invention, the unit **20** may comprise any suitable power actuated means for inducing air flow from the tank space **17** into the housing, and for displacing the air through a filtering medium acting to effectively absorb or adsorb all odors vented from the toilet bowl. Merely as illustrative, the housing **21** is shown to contain a motor **36** to which current supply through leads **37** is controlled by switch **37a**. The motor operates a rotary induction blower **38** positioned at the inside of partition **29** and acting to induce air flow as indicated by the arrows **39** and **40** through opening **41** in the partition, downwardly into chamber **42**. The air is thence displaced through a plate cartridge **43** containing activated carbon or other efficient adsorbent, so that the air thence discharged into chamber **44** to the outlet **23** is odorless. The cartridge **43** is removably held in place by bowed spring **45**.

The invention is more primarily concerned with the manner in which an air displacing filter unit, either outside or inside the tank, may be applied to or associated with the conventional tank, without alterations beyond providing for localized spacing between the tank **11** and its cover **18**. In accordance with the invention, I apply and adhere to the top or rim surface of the tank a gasket **46** which, as shown in FIG. 2, extends continuously on the rim surface except for the interruption at **32** opposite the filter unit slot **25**, so that the gasket affords a seal between the cover and tank except for the stated interruption which provides for spacing at **47** through which the induced air flow is taken into the filter unit. As will be recognized, any conventional tank may be so provided with the interrupted gasket, very simply and in a few minutes' time, so

that installation of the filter unit 20 may be effected most quickly and economically. Any suitable plugging means 461 may be used or inserted to prevent outside air induction at the ends of slot 32.

FIG. 4 illustrates diagrammatically a variational form of the invention in which the filter unit, generally indicated at 48, is contained within the tank 11, the uint comprising a housing 49 containing a tubular activated carbon filter 50 into the interior 51 of which air flow is induced by a small fan 52 driven by motor 53. Air induction into the housing 49 occurs through a conduit 54 extending upwardly above the water level in the tank. The filtered air stream is discharged from an internal housing 55 upwardly through duct 56, the upper turned end 57 of which extends into the clearance corresponding to space 47 in FIG. 3 provided by interrupting the gasket 46 in the manner previously explained.

I claim:

1. The combination with a toilet including a bowl, a water tank having an overflow pipe communication with the bowl and a removable cover carried by the top rim of the tank; a cover supporting gasket applied to the top surface of said rim and interrupted at a location to provide an air space between the cover and rim, said cover having a down-turned flange spaced from the side of the tank at the outside of and depending below said opening, a filter unit containing a blower and comprising a housing containing in its top wall an air inlet directly underlying the space between said flange and the tank, and means mounting said housing to the tank so that the top of the housing is brought close to the underside of said flange and said inlet is positioned oppositely below said air space to communicate therewith through clearance between said flange and the tank, whereby the filter unit is operable to induce air flow from the bowl through the overflow pipe into the tank and thence through said air space and clearance between said tank and flange into the filter unit.

2. The combination of claim 1, in which said mounting means comprises means for vertically adjusting said unit relative to said flange.

3. The combination of claim 1, in which said mounting means extends upwardly through said clearance to overlie the tank rim within said air space.

4. The combination of claim 3, in which said mounting means is operable to vertically adjust said unit to engage it against the underside of said flange.

5. For use in combination with a toilet water tank having a top rim to which is applied a gasket interrupted to provide an air passage, a cover on said gasket and having a downturned flange spaced from the outside of the tank and depending opposite and below said passage; a filter unit comprising a housing containing a filter medium and a blower and having an air inlet in its top wall and positioned to directly underlie the space between the tank and flange, supporting means associated with said housing and extending upwardly therefrom to be receivable within said passage to support the housing on the tank rim therein, said supporting means including means for engaging the housing against the underside of said flange whereby said inlet is directly communicable with said air passage through the space between said flange and the tank.

6. A filter unit as defined by claim 5, in which said supporting means is manually adjustable to vertically position the housing relative to said flange.

7. A filter unit as defined by claim 5, in which said supporting means includes means manually adjustable at the bottom of the housing to vertically position the housing relative to said flange.

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