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[54] **VENTILATING ATTACHMENT FOR WATER CLOSET**

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[51] **Int. Cl.** **A47k 3/22**, E03d 9/04, E03d 13/00

[58] **Field of Search** 4/209, 217, 213, 72

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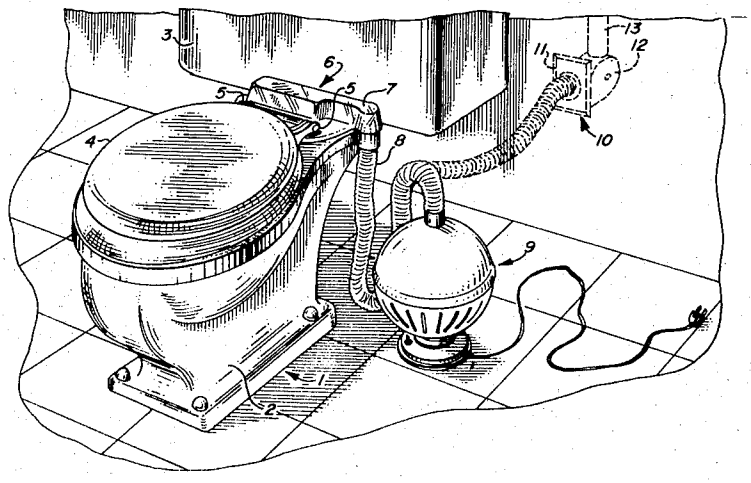
Primary Examiner—Henry K. Artis

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[57] **ABSTRACT**

In order to provide very efficient and effective ventilation of a water closet, a collector having an exhaust coupled to suction means is disposed directly beneath the seat at the rear thereof. The collector is held in place by and between the hinge bolts of the seat, and has a downwardly directed inlet opening which extends over the center rear portion of the bowl. A passageway, which is taller than its narrowest portion, extends laterally between the seat and the water reservoir of the water closet to effect a conduit between the inlet and exhaust openings. The exhaust opening is coupled, by means of a flexible hose, to the suction means comprising a motor driven centrifugal air pump. The air pump may discharge to a conduit leading outdoors or to another convenient discharge space, or the air from the bowl may be pulled by the suction pump through filtering means, such as activated charcoal, after which it is discharged into the local environment. With the latter configuration, a self-contained pump/filter unit is provided, and the activated charcoal is disposed within a chamber having a baffle which prevents "tunneling" of the flowing air through the charcoal after a period of use. The collector is provided with upwardly directed lips about both the inlet and exhaust openings to achieve a double trap against any water which might inadvertently enter the collector, thereby preventing any water from entering the flexible tubing to prevent electrical malfunctions of the motor driving the air pump.

4 Claims, 7 Drawing Figures



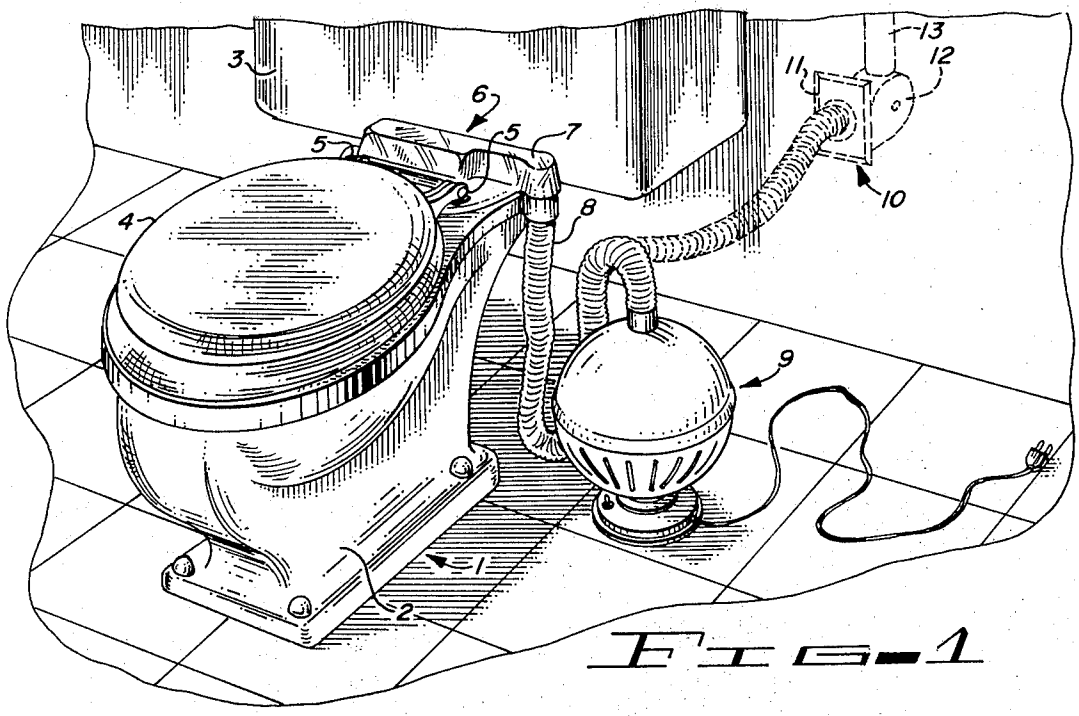


Fig-1

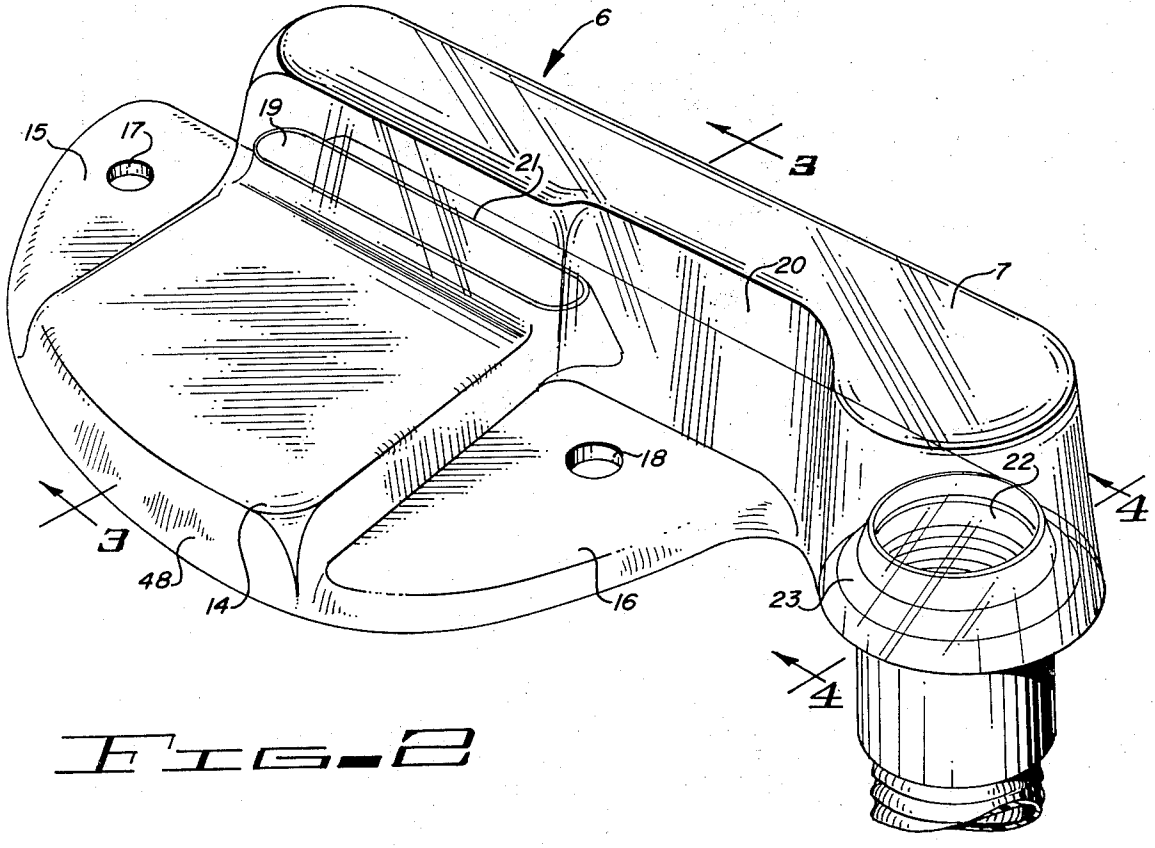


Fig-2

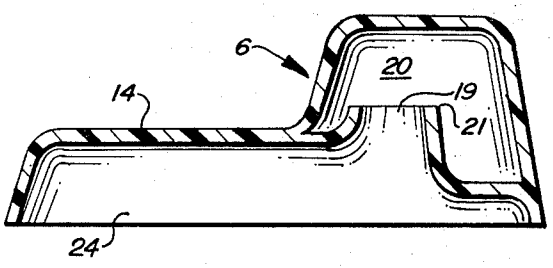


Fig-3

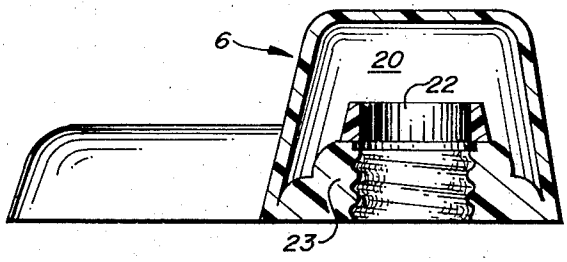


Fig-4

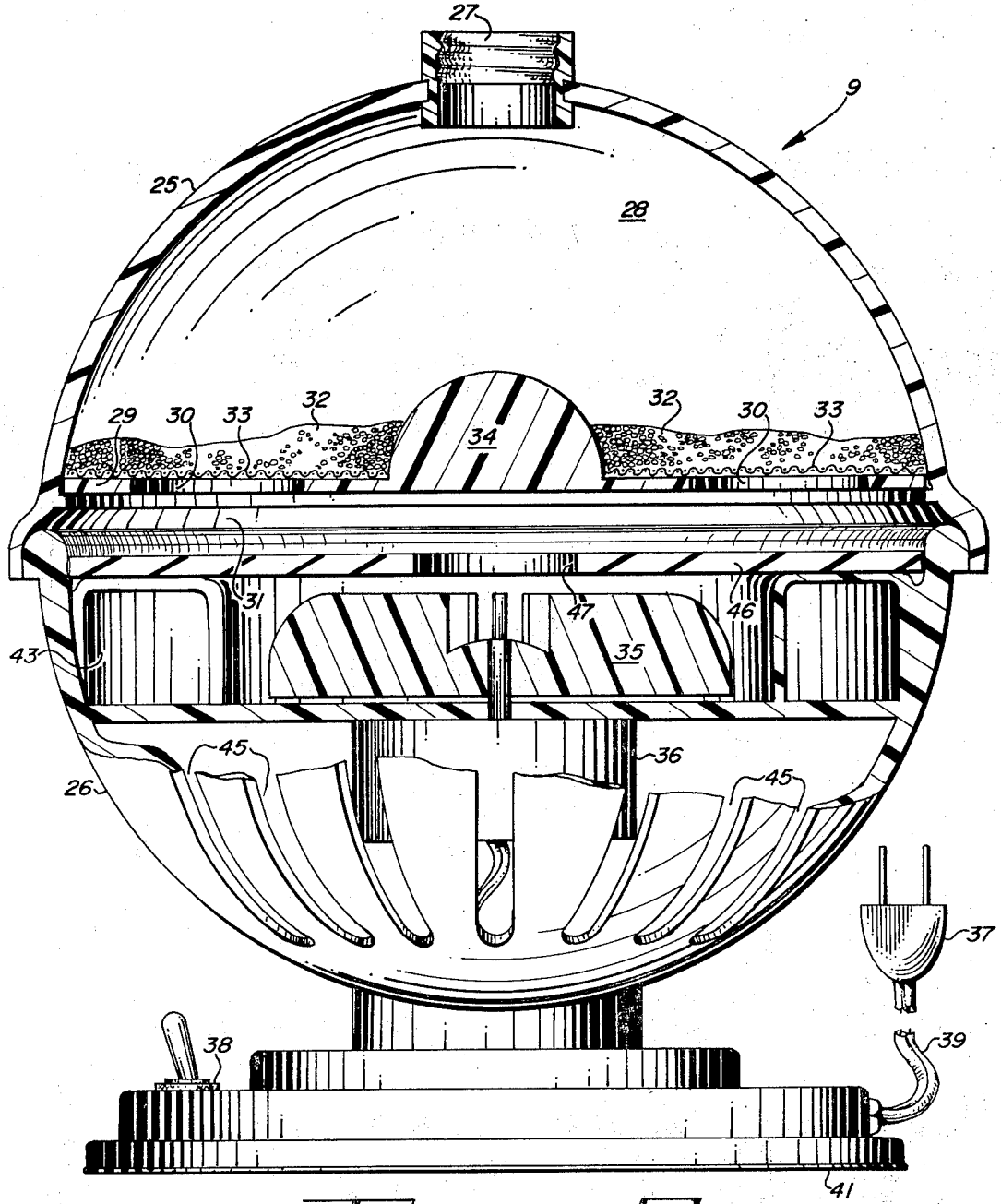


Fig-5

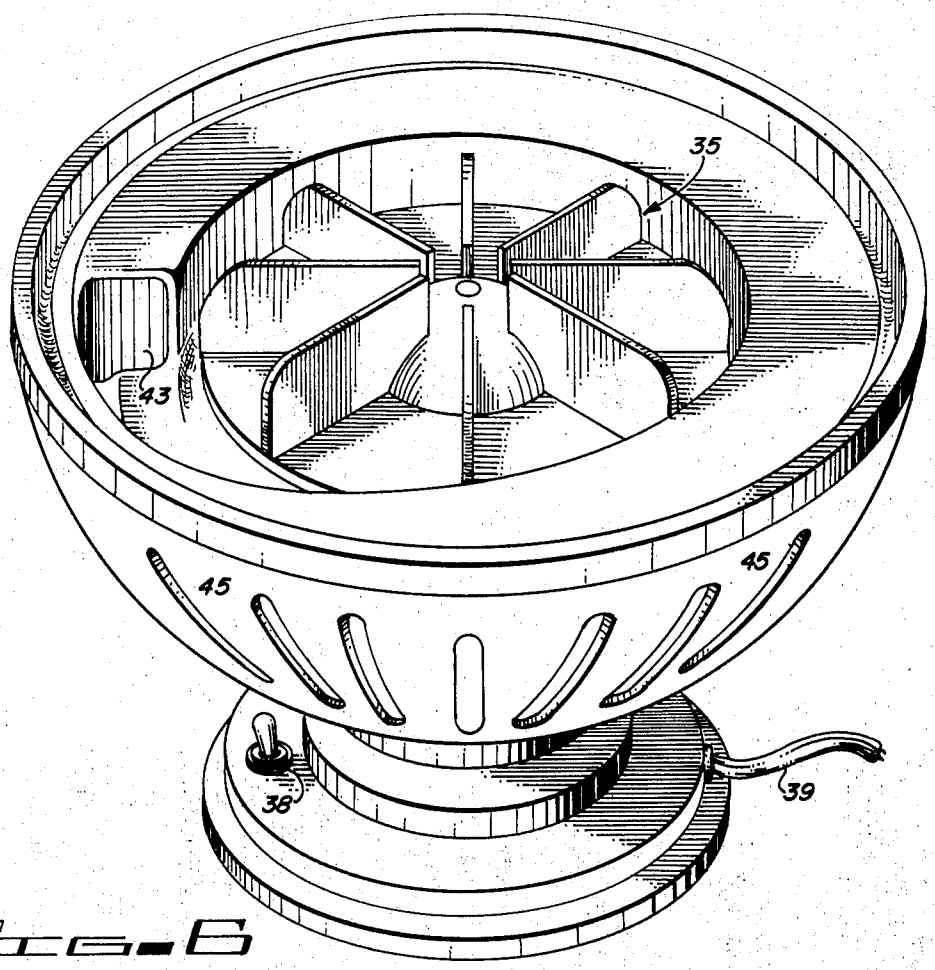


Fig-6

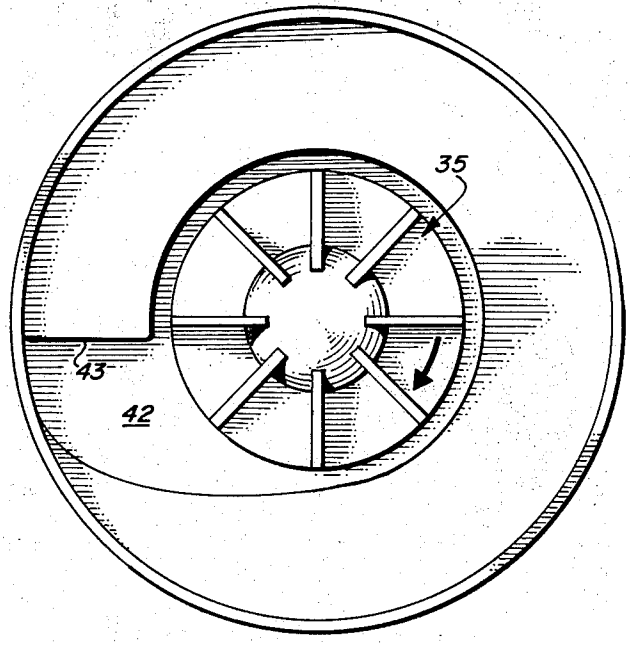


Fig-7

VENTILATING ATTACHMENT FOR WATER CLOSET

This invention relates to ventilated water closets and, more particularly, to an attachment system for forcibly ventilating water closets.

Various attachment and integral systems have been proposed in the past for ventilating water closets. The prior art in this field is characterized by impractical and incompletely thought-out systems which require considerable alteration of an existing water closet and which are still ineffective because the aerodynamics of the system were casually treated.

Thus, it is a broad object of my invention to provide an improved ventilating system for water closets.

It is another object of my invention to provide such a system which may readily be incorporated into an existing water closet.

It is still another object of my invention to provide a collector for such a system which is scientifically placed and configured for maximum efficiency and sanitation.

It is a further object of my invention to provide such a system which is very durable and yet is relatively simple and economical to manufacture.

In yet another aspect, it is an object of my invention to provide such a system in which variant embodiments may either exhaust to another environment or within the same environment after treatment.

The subject matter of the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention, however, both as to organization and method of operation, may best be understood with reference to the following description taken in connection with the accompanying drawings of which;

FIG. 1 is a pictorial illustrating the broad means by which the apparatus constituting the present invention may be integrated with a conventional water closet;

FIG. 2 is a detail of a collector unit element of the system shown in FIG. 1, FIG. 2 being drawn as if the material used in the upper portion of the collector unit were clear to better illustrate the internal construction thereof;

FIG. 3 is a cross-sectional view taken along lines 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view taken along lines 4—4 of FIG. 2;

FIG. 5 is a partially cutaway and partially cross-sectional view of an air recirculating and treating unit which is a principle component in one embodiment of the invention;

FIG. 6 is a perspective view of the lower section of the unit illustrated in FIG. 5 showing the impeller means therefor; and

FIG. 7 is a planned view of the lower portion of the unit illustrated in FIG. 5 particularly showing the general shape of the chamber containing the impellers and the exhaust area.

Referring now to FIG. 1, a conventional water closet 1 including a base portion 2, reservoir portion 3, and seat means 4 secured to the base portion 2 by hinge means 5. The hinge means 5 includes downwardly directed bolts (not shown) for securing the seat means 4 to the base portion 2 in the usual manner. However, as will be more fully explained below, a collector unit 6 is

interposed generally between the hinge means 5 and is held in position by the aforementioned bolts.

The collector unit 6 is provided with a laterally offset portion 7 having an exhaust aperture on the underneath side thereof, which exhaust aperture couples to a flexible hose 8 which leads to the inlet of air recirculating and treating apparatus 9 or, alternatively, to power operated exhaust means 10. The power operated exhaust means 10 includes a wall plate 11 for receiving the remote end of the flexible hose 8, a motor driven suction fan 12, and a conduit 13 coupling the exhaust outlet of the suction fan 12 to an exhaust area such as the outside environment or an attic.

FIG. 2 illustrates the collector unit 6 drawn as if the upper portion thereof were fabricated from clear material to afford an understanding of the internal construction thereof. A central portion 14 is raised from wing portions 15 and 16 on either side thereof. The wing portions 15 and 16 are provided, respectively, with apertures 17 and 18 which are spaced apart from one another a standard distance for receiving the downwardly directed hinge bolts (not shown) such that the collector unit 6 can be secured in place in the obvious manner. The underside of the central portion 14 is provided with an inlet opening which, it will be observed, is directly centrally disposed between the hinges 5 (FIG. 1). The inlet area beneath the central portion 14 provides direct air communication between the bowl portion of a water closet to which the collector unit 6 is affixed and an elongated aperture 19 which discharges into laterally extending chamber 20. The elongated aperture 19 includes an upwardly extending lip portion 21 about the entire periphery thereof for reasons which will be set forth below. The laterally extending chamber 20 provides a relatively tall and narrow conduit to an outlet 22 to which the flexible hose 8 is attached. The outlet 22 is also provided with a lip portion 23 about the complete periphery thereof.

With simultaneous reference to FIGS. 2, 3, and 4, it will be observed that air can pass from a water closet bowl through the inlet 24 of the collector unit 6, through the elongated aperture 19, through the laterally extending chamber 20, and out the collector unit outlet 22. The lips 21 and 23 encompassing respectively the apertures 19 and the outlet 22, serve to trap any water which might escape into the collector unit 6 from a water closet bowl (as in the case of inadvertent water overflow) in the chamber 20, thereby preventing such water from entering the flexible hose 8, which water could conceivably reach electrically driven suction means.

For installations made in conjunction with fabrication or extensive remodeling of the environment, the wall mounted power operated exhaust means 10 (illustrated in FIG. 1) may be preferred, in which case activation of the motor driven suction fan 12 will draw air from the immediate environment, beneath the seat 4, into the collector unit 6, through the flexible hose 8 and through the exhaust means 10 for discharge to a remote point. However, for installation with water closets in which no other alteration of the environment is contemplated and for portable use, the utilization of the air recirculating and treating apparatus 9 (FIG. 1) is provided. In both variants, the specific configuration of the collector unit 6 permits incorporation of the system into an existing water closed by virtue of the standardized spacing between the apertures 17 and 18 (FIG. 2)

and the relatively narrow laterally extending chamber **20**, the configuration of which achieves adequate volumetric capacity without physical interference with the reservoir **3** of the water closet **1**. The internal construction of the air recirculating and treating apparatus **9** is best understood from a consideration of FIGS. **5**, **6**, and **7**. Referring specifically to FIG. **5**, it will be observed that the recirculating and treating apparatus **9** includes an upper portion **25** which fits over a lower portion **26**. The upper portion **25** has an inlet aperture **27** centrally disposed at the top thereof and leading to an inner chamber **28**. The bottom **29** of the inner chamber **28** is provided with a plurality of apertures **30** discharging into a space **31** intermediate the upper and lower portions **25** and **26** of the recirculating and treating apparatus **9**. The chamber **28** is partially filled with activated charcoal **32** which is prevented from falling through the apertures **30** by screen means **33**.

A deflector **34** extends upwardly from the bottom **29** of the inner chamber **28** directly below the inlet aperture **27**. The function of the deflector **34** is quite important in that it prevents "tunneling" through the activated charcoal **32** as a result of air flow into the inner chamber **28**. Such tunneling is very undesirable because, if permitted, it establishes an air flow path which shunts the activated charcoal whereby the air passing through the apparatus **9** would be partially treated or not treated at all.

Referring now to FIGS. **5**, **6**, and **7**, an impeller **35** centrally disposed in a chamber **40** positioned in the upper section of the lower portion **26** of the apparatus **9** is driven by an electrical motor **36** which may be energized through conductor **39** from conventional wall plug **37** in accordance with the position of switch **38**. A base member **41** provides support for the entire recirculating and treating apparatus **9** such that it may be freestanding in any convenient position proximate the water closet to which it is coupled.

Upon energization of the motor **36**, clockwise rotation (FIG. **7**) of the impeller **35** commences with an exhaust chamber **42** receiving air pulled through the upper portion **25**, including the activated charcoal **32**. The pumped air passes through an outlet **43** which is in direct communication with a lower chamber **44** in the lower portion **26** of the apparatus **9**. The treated air is then discharged through a series of circumferentially distributed slots **45** back into the immediate environment.

With specific reference to FIG. **7**, it will be noted that the exhaust chamber **42** extends only a relatively short angular distance about the circumference of the impeller **35**. Quieter and more efficient operation result from keeping this angular distance on the order of 90° or less. Additionally, quiet operation and volumetric efficiency are further enhanced by the provision of a baffle **46** having a centrally disposed aperture **47** placed over the impeller **35** such that the air flowing through the activated charcoal **32** and the apertures **30** is pulled inwardly to pass through the aperture **47** into the impeller chamber **40**.

Attention is redirected to the collector unit **6** which was depicted in FIG. **2** as if the upper portion were made of clear material. In practice, a plastic material is utilized which may be matched in color to the specific water closet to which it is affixed. It may further be noted that the forward end **48** of the central portion **14** has a "waterfall" shape for sanitary purposes. It will further be noted that the inlet **24** (FIG. **3**) is symmetrically disposed about the fore and aft centerline of the water closet because of the position of the apertures **17** and **18** (FIG. **2**) which are utilized to secure the collector unit **6** in position. This specific position has been found critical in achieving flow characteristics whereby essentially all air from the bowl is drawn into the flexible hose **8** for exhaust or treatment. Therefore, it will be understood that the placement of the inlet to the collector unit **6** at the rear central area of the bowl results in greatly enhanced volumetric efficiency such that relatively low speed and quiet motors can be utilized in the suction means and the necessity for very high flow rate across the bowl is obviated.

While the principles of the invention have now been made clear in an illustrative embodiment, there will be immediately obvious to those skilled in the art many modifications of structure, arrangement, proportions, the elements, materials, and components, used in the practice of the invention which are particularly adapted for specific environments and operating requirements without departing from those principles.

I claim:

1. A system for ventilating a water closet bowl comprising:

a. a collector unit having an inlet opening symmetrically disposed about the bowl fore and aft centerline and positioned at the rear thereof, said collector unit also having an outlet aperture in direct communication with said inlet opening, said inlet opening and said outlet aperture of said collector unit being in direct communication by a laterally extending chamber, a first passage coupling said inlet opening to said laterally extending chamber and terminating therein in an upwardly lipped aperture, said outlet aperture being defined by an upwardly extending circumferential lip;

b. an air pump means having an intake and an exhaust;

c. conduit means coupling said outlet aperture of said collector unit to said air pump intake;

d. an air recirculating and treatment housing having an inlet coupled to said conduit means, said housing including an inner chamber and a quantity of activated charcoal at least partially filling said inner chamber, said housing further including said air pump means for drawing air from said collector unit, through said inner chamber and discharging the air through said air pump exhaust into the water closet environment; and

e. air deflector means disposed in said inner chamber directly in the path of the gaseous mixture to prevent tunneling through the activated charcoal.

2. The system of claim **1** in which said air pump means comprises an impeller, an electrical motor driving said impeller, an air exhaust chamber radially outboard of said impeller for receiving air moved by said impeller, an exhaust outlet coupling said exhaust chamber to a lower chamber, and at least one discharge aperture in said lower chamber communicating with the water closet environment.

3. The system of claim **2** including a plurality of discharge apertures circumferentially distributed about said housing.

4. The system of claim **3** in which said collector unit further includes first and second wing portions extending laterally on opposite sides of said inlet opening, first and second fixing apertures through, respectively, said first and second wing portions, said first and second fixing apertures spaced from one another to align with conventially spaced seat securing bolts whereby said collector may be secured in place by passing the bolts through said fixing apertures.

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