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Stump

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[54] **WATER CLOSET EVACUATION MEANS**

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[51] **Int. Cl.**[2].... **A47K 3/22;** E03D 9/04; E03D 9/05

[58] **Field of Search** 4/209, 218, 72, 213

[56] **References Cited**

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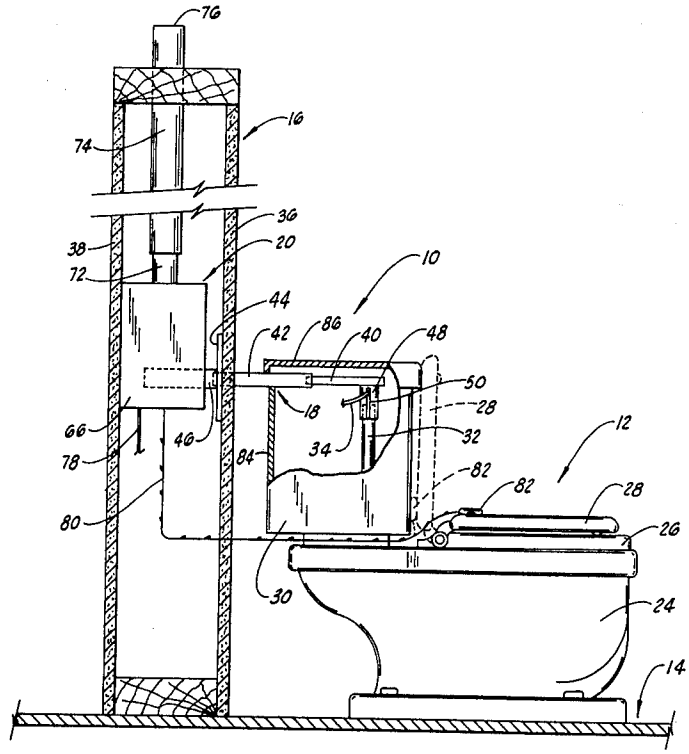
Primary Examiner—Henry K. Artis

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[57] **ABSTRACT**

In a conventional water closet mounted in a building and having a bowl, a lid, a flush tank, and water overflow conduit mounted in the flush tank; an improvement of a ventilator therefor includes a conduit mountable over the overflow conduit and extending from the flush tank through a wall of the building, an air moving apparatus mounted in operative relation to the conduit and discharging through the wall of the building, and a control for the air moving apparatus operably mounted on the lid. In use the ventilator operates when the lid is raised, and removes gas from the bowl, passes same through the water overflow conduit, the conduit therefrom, the air moving apparatus and discharges same through the wall of the building.

1 Claim, 4 Drawing Figures



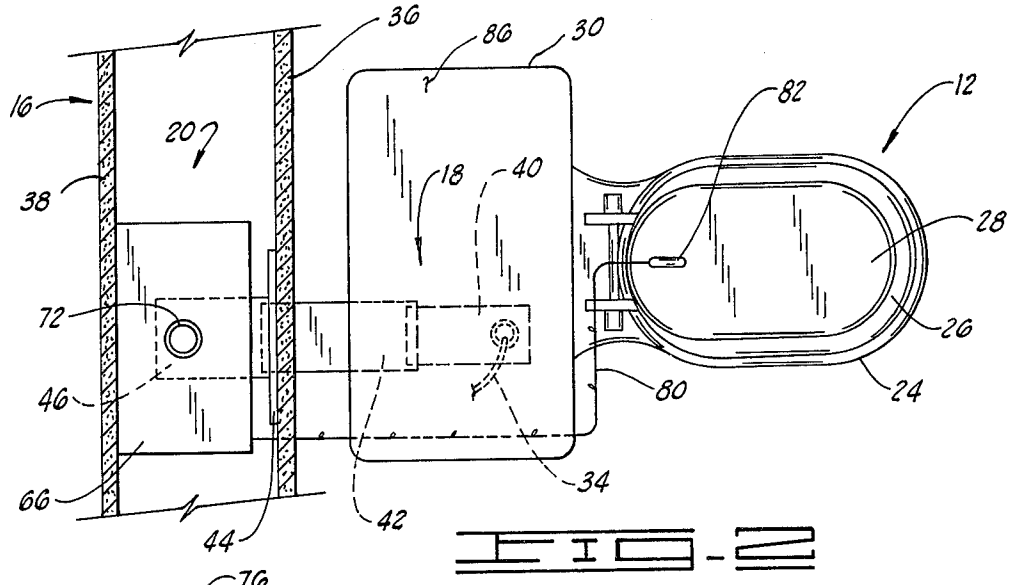

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FIG-2

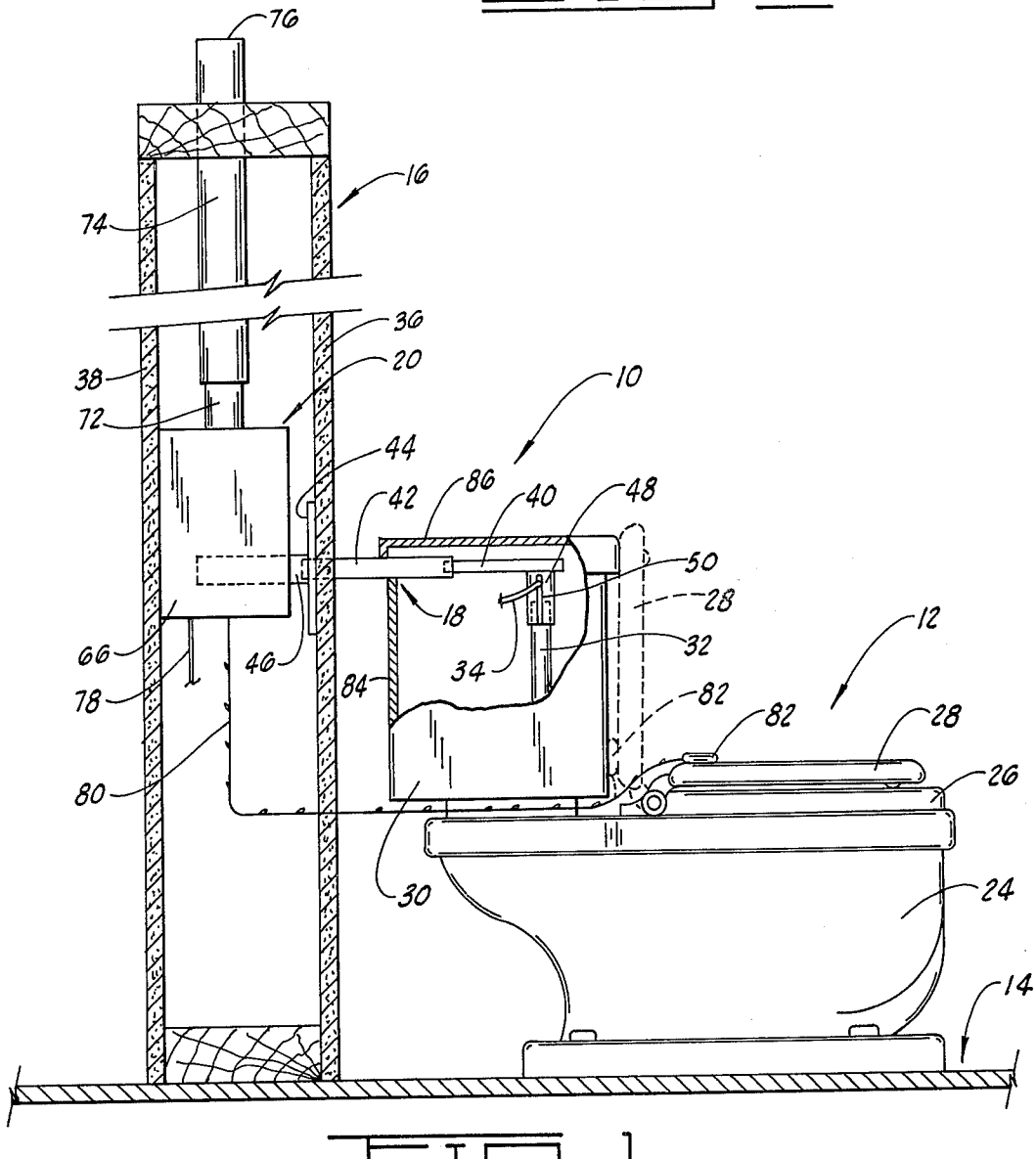

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FIG-1

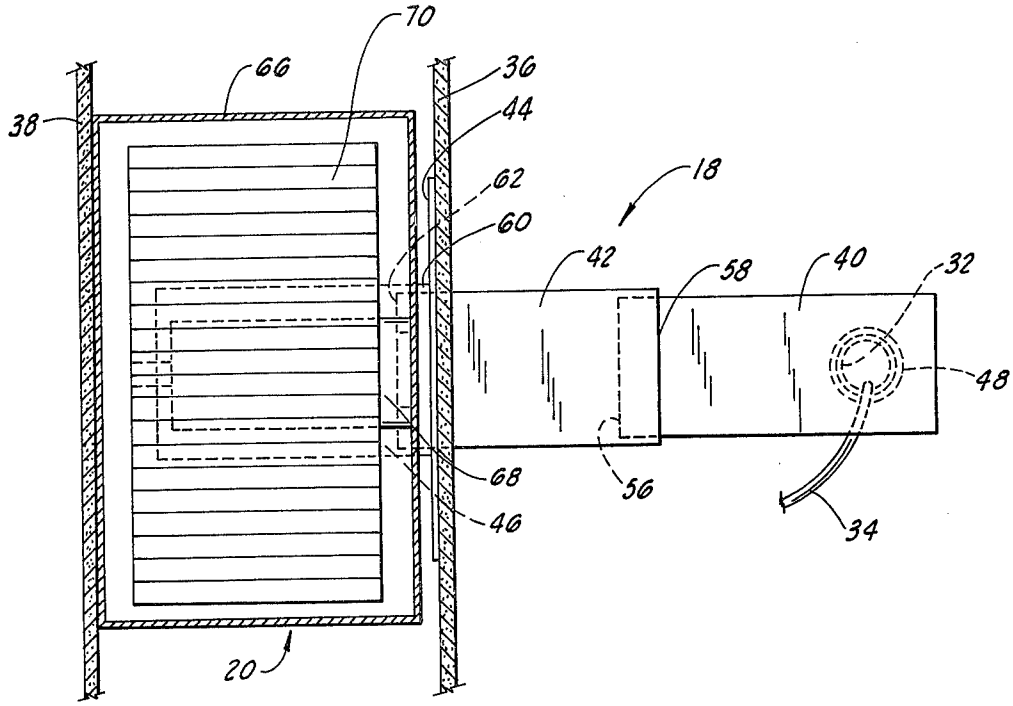

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FIG. 4

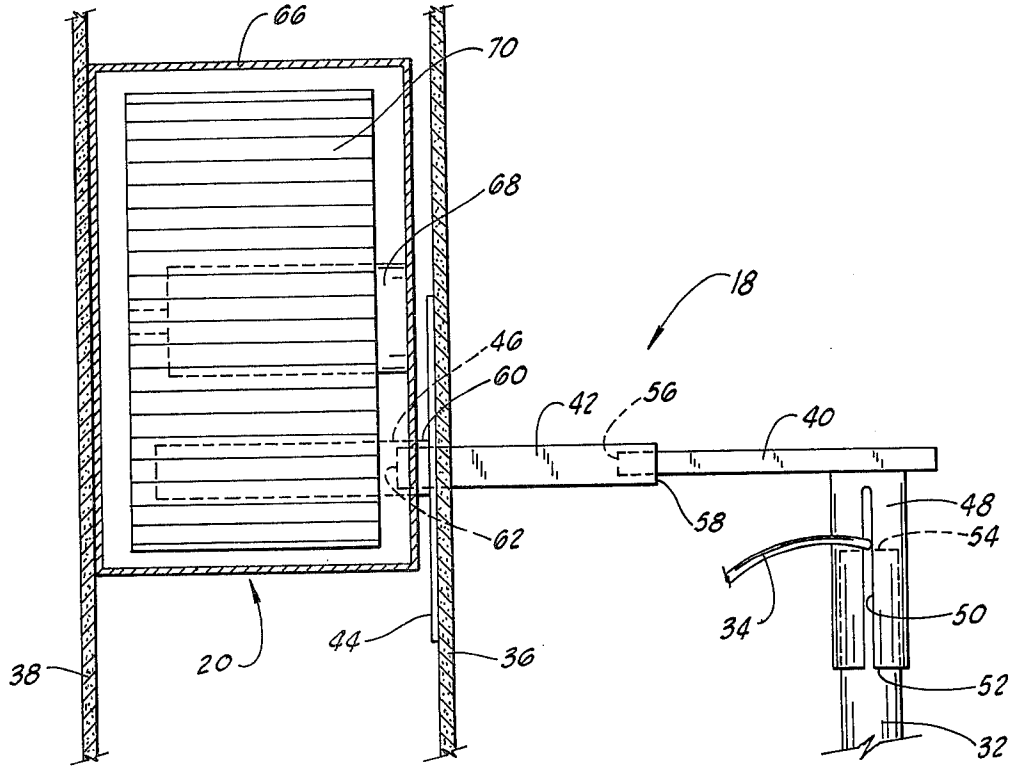

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FIG. 3

WATER CLOSET EVACUATION MEANS

BACKGROUND OF THE INVENTION

The invention is related to ventilators for water closets. More particularly, the invention is related to ventilators for water closets which remove fumes from the bowl portion of the water closet via the water overflow and bowl filler pipe and discharge the fumes at a remote location.

Many prior art toilets and bathroom ventilators are known which are operable to remove air and fumes from the bowl portion of a water closet or toilet stool. Many of the prior art devices require specially constructed water closets; however, some may be easily installed in existing structures and in existing bathrooms. Some of the prior art devices are connected with the water overflow and bowl filler pipe portion of the toilet apparatus and are sealed with that pipe by using a water seal or other seal so that a relatively low suction blower or air mover can be connected therewith for removal of the air from the bowl of the water closet. These prior art devices use a blower mounted usually in the floor or behind the water closet on the floor and they are controlled by a hand-operated switch mounted on the wall adjacent to the water closet. These devices have a significant disadvantage in that it is necessary for a person to manually turn on and off the blower so that the system will operate properly. With these devices, obviously, unless the person remembers to turn the device on, the system is useless and if he forgets to turn it off it operates needlessly. The prior art devices generally use a relatively low horsepower motor driven blower to create a suction for moving air through the bowl, overflow and bowl filler pipe and other conduits of the apparatus thus necessitating a leakproof seal with the water overflow and bowl filler pipe so that only air from the bowl is drawn into the system. A relatively low powered motor is used with the blower because the prior art systems lack a convenient manner for turning the blower motor off when the system is not in use, thus if the person forgets to turn the blower motor off a minimum amount of power is wasted by continued needless operation of the blower's motor.

SUMMARY OF THE INVENTION

In one preferred specific embodiment, a water closet evacuation apparatus mountable with a conventional water closet in a building includes conduit assembly with a first conduit portion mounted on the water overflow and bowl filler conduit, a second conduit portion communicably with the first conduit portion and extending from the first conduit portion and the water tank into a wall of the building, and further including an air moving apparatus mounted in the wall of the building having the inlet thereof communicably connected with the second conduit outlet wherein the air moving apparatus discharges into the attic portion of the building. A control for the air moving apparatus is mounted on the seat lid of the water closet and in use activates the air moving apparatus when the lid is raised and terminates operation of the air moving apparatus when the lid is lowered. In use the water closet evacuation apparatus of this invention serves as a ventilator for a water closet by moving air from the bowl portion of the water closet through the water overflow and bowl filler conduit, through the conduit assembly and through the air moving apparatus with the air moving apparatus discharging through a wall and preferably into the attic or a similar portion of the building in which the water closet is installed.

One object of this invention is to provide a water closet evacuation apparatus overcoming the aforementioned disadvantages of the prior art devices.

Another object of this invention is to provide a water closet evacuation apparatus having a conduit mountable with the water overflow and bowl filler conduit of a conventional water closet and further including an air moving apparatus mountable in the wall of a room wherein the water closet is installed with the air moving apparatus discharging into the attic of the building containing the water closet and having a control for the air moving apparatus mounted with the seat lid so that in use, when the seat lid is raised, the air moving apparatus is operated to remove air from the bowl of the conduit passing the air through the conduit and discharging same into the attic of the building with the air moving apparatus turned off as the seat lid is placed in a lowered position.

Still, another object of this invention is to provide a water closet evacuation apparatus which has an air moving apparatus that can be mounted and concealed in the wall of a room where the water closet is mounted the evacuation apparatus having a conduit connectable with the water overflow and bowl filler conduit for removing air and fumes from the bowl portion of the water closet for discharge to a remote location such as in the attic of the building where the water closet is installed.

Still, one other object of this invention is to provide a water closet evacuation apparatus having an electrically powered air moving apparatus connected with the water overflow and bowl filler conduit of the water closet wherein the control for the air moving apparatus has a mercury element switch mounted on the seat lid which in use activates the air moving apparatus when the lid is raised and terminates operation thereof when the lid is lowered.

Yet, another object of this invention is to provide a water closet evacuation apparatus having an air moving apparatus mountable in concealed condition in the wall of a room where the water closet is installed with the air moving apparatus connected by a telescopic conduit with the water overflow and bowl filler conduit in the water tank of the toilet.

Various other objects, advantages, and features of the invention will become apparent to those skilled in the art from the following discussion, taken in conjunction with the accompanying drawings, in which:

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view of a water closet mounted on a supporting surface and adjacent to a wall with portions of the wall and the water closet cut away for clarity;

FIG. 2 is a top plan view of the water closet wall shown in FIG. 1 with the upper portion of the wall removed for clarity and portions of the apparatus shown in dashed lines;

FIG. 3 is an enlarged side elevation view of a portion of the water closet's water overflow and bowl filler pipe, and the evacuation apparatus including the air moving apparatus mounted in a segment of a wall and having the air moving apparatus housing partially removed for clarity; and

FIG. 4 is a top plan view of the apparatus shown in FIG. 3 with the air moving apparatus partially removed for clarity.

The following is a discussion and description of preferred specific embodiments of the water closet evacuation apparatus of this invention, such being made with reference to the drawings, whereupon the same reference numerals are used to indicate the same or similar parts and/or structures. It is to be understood that such discussion and description is not to unduly limit the scope of the invention.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to the drawings in detail and in particular to FIG. **1**, the water closet evacuation apparatus of this invention, indicated generally at **10**, is shown with a water closet **12** mounted on a supporting surface **14** and positioned adjacent to a wall **16**. The water closet evacuation apparatus **10** includes a conduit apparatus, indicated generally at **18**, connected with the water overflow and bowl filler conduit of the water closet **12** and on its opposite end discharging into an air moving apparatus, indicated generally at **20**, mounted in the wall **16**.

The water closet **12** is preferably of the conventional type having a bowl portion **24** mounted on the supporting surface **14** with a seat **26** above the bowl and a lid **28** hingedly attached to the structure above the seat **26** and further including a water tank or flush tank **30** mounted on the rear of the bowl poriton **24**. The flushing apparatus is enclosed within the flush tank **30** and includes a water overflow and bowl filler conduit **32** extending upward through the flush tank **30** terminating at the full level water line of the water tank and having its outlet communicably connected with the water cavity of the bowl **24**. The water overflow and bowl filler conduit **32** has the inlet end thereof terminating in what is normally the upper limit of the water capacity of the flush tank **30** to provide for overflow from this level into the water cavity of the bowl **24**. This conduit **32** receives water from a bowl filler conduit **34** from the flushing apparatus to insure filling of the water cavity of the bowl after a flush while the water tank or flush tank **30** is filling for the next flush. Adjacent to and preferably behind the water closet **12** is a wall **16** with the air moving apparatus **20** mounted between the wall sides **36** and **38** and between vertically disposed studs of the wall.

The conduit portion **18** of the evacuation apparatus **10** includes a first conduit portion **40** mounted on and communicably connected with the water overflow and bowl filler conduit **32** in the upper portion of the water tank **30** and a second conduit portion including a telescopic conduit portion **42** and an outlet conduit portion **46** supported by a mount **44** on the wall side **36**. Preferably, the first conduit portion **40** is contained within the water tank **30** and includes a cylindrical sleeve-like portion **48** with a longitudinally elongated aperture or slot **50** therein extending generally upward from the conduit's lower end **52**. The sleeve-like portion **48** can, if desired, be constructed to fit snugly over the overflow conduit **32**. A cross-sectionally rectangular conduit portion is secured to the sleeve-like conduit portion **48** as shown. Preferably, the conduit segments indicated at **40, 42** and **46** have an essentially flat and rectangularly shaped cross-section. When the first conduit portion **40** is mounted on the water overflow and bowl filler pipe **32**, the upper end of that pipe indicated at **54** is slightly below the upper end of the elongated slot or aperture **50** to provide for receipt of the bowl filler conduit **34** as shown in FIG. **3**. The first conduit outlet end **56** is disposed inside the telescopic conduit portion **42** with the telescopic conduit end **58** overlapping the first conduit's outlet end portion as shown. The mounted conduit segment **46** of the second conduit portion has its inlet end **60** secured to the mounting plate **44** with the telescopic conduit's outlet end **62** disposed inside the inlet end portion of the mounted conduit segment **46**. Preferably, the mounted conduit segment **46** is sized such that the telescopic conduit portion **42** can be easily slid into the mounted conduit segment **46** and slid over the outlet end portion of the first conduit portion **40** for adjustment needed when installing the water closet evacuation apparatus **10** of this invention.

The air moving apparatus includes a housing **66** mounted with the wall structure **16** concealed between the wall's sides **36** and **38** substantially as shown in the drawings. A motor **68** is mounted in the housing **66** with a squirrel cage type fan **70** mounted on the motor's shaft. The housing **66** has an inlet with the mounted conduit segment **46** extending therein and it has an outlet **72** for mounting a discharge conduit **74**. The air moving apparatus discharge conduit **74** preferably has the outlet end **76** thereof positioned to discharge air into the attic or an attic-like portion of the building containing the water closet **12** or in the alternative discharging same at another suitable point. It is to be noted here that the air moving apparatus portion of this invention provides for containment of heated or cooled air in a building because such does not discharge air to the atmosphere. This air containment feature of the evacuation apparatus **10** provides for more efficient operation of a toilet or bathroom ventilation apparatus than those devices which discharge the evacuated air into the atmosphere. Additionally, it is to be noted that the air moving apparatus can be mounted adjacent to the water closet **12**, such as behind the flush tank **30**, with same discharging through the wall into the atmosphere or to any other suitable point, if desired, without departing from the scope of the invention. Electrical power for the air moving apparatus motor **68** is preferably supplied by a power line **78** connected with the electrical circuit of the building, normally **110** volts alternating current. An electrical connector line **80** is connected with the power line **78**, the motor **68** and a switch **82** on the seat lid **28**, with the switch **82** being used to control on and off operation of the motor **68**. The switch **82** is a position sensitive type of switch. Preferably, the switch **82** has a mercury switching element with the mercury element moving to a position to close the electrical circuit when the seat lid **28** is in the raised position as shown in dashed lines in FIG. **1** and the mercury element moving to a position to open the electrical circuit when the seat lid **28** is moved to the lowered position as shown in the solid lines in FIG. **1**. It is to be noted that the air moving apparatus **20** can be a blower of a common type used for ventilation of bathrooms and structurally constructed to be mounted in a wall or ceiling. In mounting the housing **66** of the air moving apparatus in a wall the mounting plate **44** is attached to the inner surface of the wall side **36** to provide strengthening of that mem-

ber in the area adjacent to the aperture necessary for the conduits.

In the installation of the water closet evacuation apparatus **10** of this invention, it is to be noted that such can be easily installed on conventional water closets **12** and it can be installed in existing bathrooms relatively easily. The air moving apparatus **20** is mounted in the wall **16** preferably behind the toilet since a great many water closets are adjacent to a wall on their rear. Once the housing has been installed the mounted conduit segment **46** and mounting plate **44** are attached to the wall side **36** with an aperture provided in the wall side **36** for the telescopic conduit portion **42.** The first conduit portion **40** is mounted over the water overflow and bowl filler conduit **32** with the walls of the sleeve portion **48** of that conduit being fitted over the exterior of the conduit **32** and positioned to receive the bowl filler conduit **34** as shown in detail in FIG. **3.** The telescopic conduit portion **42** connects the first conduit portion **40** and the mounted conduit segment **46.** The telescopic structure of these conduit portions provides for communicably connecting the overflow conduit **32** and air moving apparatus **20** without regard to spacing of the water closet **12** and the wall **16.** It is to be noted that the telescopic conduit portion **42** passes over the top of the rear water tank wall **84** with the water tank lid **86** resting on the upper portion of the telescopic conduit portion **42.** In some flush tank structures the upper surface of the tank is essentially planar with the lid resting on this planar surface. In situations where the water closet evacuation apparatus **10** is installed with this type of tank, the lid of the flush tank will be inclined slightly because it will rest on the relatively thin, flat structure of the conduit **18.** In some flush tank structures for water closets the rear center portion of the tank has a notch and in the situation where the water closet evacuation apparatus **10** is installed with these structures, the lid of the water tank will assume its normal or nearly normal position.

In the use and operation of the water closet evacuation apparatus of this invention, once it is installed it requires only raising and lowering of the seat lid **28** to effect operation thereof. As described hereinbefore the control switch **82** for the motor **68** of the air moving apparatus **20** is mounted on the seat lid and closes the circuit to operate the motor once the seat lid **28** is raised. In the normal use of a water closet having the air evacuation apparatus **10** of this invention, the seat **28** should be raised prior to use of the water closet in order to start the motor of the blower or air moving apparatus and it should be replaced in the lowered position, as shown in solid lines in FIG. **1,** when not in use to terminate operation of the motor **68.** When the motor **68** is in operation the fan **70** creates a suction or reduced pressure zone in the conduit portion **18** of the apparatus which causes air to be drawn through the bowl **24** and through the conduit **18** therein connected with the water overflow pipe **32.** Air moving through the water overflow conduit **32** passes through the conduit **18** into the air moving apparatus **20** and it is forced through discharge conduit **74** into the attic of the building. It is to be noted that air will also enter the conduit **18** through the space between the slotted aperture **50** in the bowl filler conduit **34;** however, in practice it has been found that this is a rather insignificant quantity of air in comparison to that drawn into the conduit **18** through the water overflow pipe **32** and such does not effect efficient operation of the water closet evacuation apparatus **10** in removing undesirable odors and fumes from the toilet bowl portion **24.** Also, it has been found that since the air moving apparatus **20** begins operation as soon as the lid **28** is raised, this starts the described airflow which provides for the immediate removal of odors from the bowl once they are introduced. In practice it has been found that air is removed or evacuated from the air cavity of the flush tank by passing into the conduit through the slot **50** adjacent to the bowl filler conduit **34** so no odors enter the flush tank **30.** Additionally, in practice it has been found that a squirrel cage type fan in the air moving apparatus **20** provides for an efficient and quiet operation of the apparatus as compared to blowers having radially bladed fans or other types of fan structures. In FIGS. **2** and **3** the switch **82** is shown mounted on the top of the seat lid **28** for clarity; however, it is to be understood that this mercury element switch can be mounted on the hinge mount of the seat lid in order to be inconspicuously placed and not detractive from the appearance while serving the same function.

In the manufacture of the water closet evacuation apparatus structure of this invention, it is obvious that such can be easily constructed to achieve the end product. The air moving apparatus in particular can be adapted from conventional blowers of the type currently and popularly used for ventilation of bathrooms. The conduit portion **18** of the structure can be easily constructed by forming the conduit segments by methods currently used in conduit manufacture and fabrication. The mercury element switch **82** is of a simple design and can be easily fabricated to be attachable with the seat lid or attached otherwise as described.

In the use and operation of the water closet evacuation apparatus of this invention, it is seen that same provides an efficient and structurally simple apparatus for the removal of odors or fumes from the bowl portion of a water closet. In use, the evacuation apparatus is turned on and off by a switch mounted on the seat lid and it functions during periods when the seat lid is raised to move air through the bowl of the water closet and remove the air from the water closet. When the evacuation apparatus is mounted with a water closet it can be mounted so as to be inconspicuous and substantially unnoticeable. In practice it has been found that the evacuation apparatus of this invention functions efficiently as described to remove undesirable odors from the bowl portion of a water closet.

As will become apparent from the foregoing description of the applicant's water closet evacuation apparatus, relatively inexpensive and simple means have been provided to ventilate a water closet and remove undesirable odors from the bowl portion thereof. The structure is economical to manufacture, it is simple to use when installed with a water closet in a building and it can be easily installed with a water closet in a building or the like. The evacuation apparatus structure is substantially contained in the enclosure of the water tank or flush tank and wall adjacent to the toilet so that it will not distract from the appearance of the surroundings when in use or when not in use.

While the invention has been described in conjunction with preferred specific embodiments thereof, it will be understood that this description is intended to illustrate and not to limit the scope of the invention, which is defined by the following claims.

I claim:

1. In a conventional water closet mounted in a wall of a building and having a bowl with a lid hingedly mounted thereon, a flush tank, and a water overflow and bowl filler conduit uprightly mounted in said flush tank, said overflow and filler conduit having an inlet and an outlet communicably connected with said bowl of said water closet, that improvement of a ventilator in combination therewith, comprising:

a. mounting plate means on the inside of said wall, a conduit means extending through said mounting means and said wall and having an inlet and an outlet, said conduit means having an inlet portion mountable over the upper end portion of said overflow and bowl filler conduit, an air moving means having an inlet and an outlet and mounted in said wall and in operative relation to said conduit means, said inlet of said air moving means connected in gaseous fluid communication to said conduit means outlet and said air moving means outlet discharging through said wall of said building, a control means for said air moving means operatably mountable on said lid, said conventional water closet has a bowl filler conduit from a water source entering said overflow conduit at said inlet thereof, said conduit means inlet end portion has an aperture therethrough to receive said bowl filler conduit, said conduit means has a telescopic portion therein between said inlet end portion and said air moving means, said building has an attic portion, said air moving means outlet is connected in gaseous fluid communication with said attic, said conduit means has a first conduit portion including said inlet end portion, and a second conduit portion including said telescopic portion, said first conduit portion has an inlet portion and an outlet portion, said first conduit inlet portion mounted on said water overflow and bowl filler conduit inlet in overlying relation, said second conduit portion has an inlet portion and an outlet portion, said second conduit inlet portion communicably connected with said first conduit outlet portion and said second conduit outlet portion communicably connected with said air moving means inlet, said air moving means has a blower means having an inlet and an outlet, said blower means being mounted in said wall and having a discharge conduit communicably connected to said blower means outlet and said discharge conduit having an outlet discharging into said attic, said control means has a switch means mounted on said lid, said switch means being electrically connected to a source of electrical power and to said blower means, said switch means in use being closable to activate said blower means when said lid is in said raised position, said switch has a mercury circuit connecting element therein movable to a closed condition when said lid is in said raised position and movable to an opened condition when said lid is in a lowered position, said first conduit inlet end portion has a generally cylindircal sleeve-like portion engagable over said water overflow conduit upper end portion, said aperture is an elongated slot lengthwise in said sleeve-like portion open at one end of said sleeve-like portion, said blower means has a squirrel cage fan means powered by an electric motor, said first conduit portion outlet end portion has a generally rectangularly shaped cross-section, said second conduit portion has a generally rectangularly shaped cross-section, said second conduit has a mounted conduit member on its said outlet end portion mountable on said wall and a telescopic member on its said inlet end portion, said telescopic member slidably connected between said mounted conduit member and said first conduit portion outlet portion, said ventilator being constructed and adapted when mounted on said water closet to operate when said lid is raised, thereby actuating said air moving means, and thereby removing gas from said toilet bowl, passing same through said overflow and filler conduit, said conduit means, said air moving means, and discharging same through said wall of said building.

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