Aug. 27, 1946. F. L. OWENS 2,406,507

VENTILATING AND DEODORIZING TOILET

Filed Feb. 5, 1945

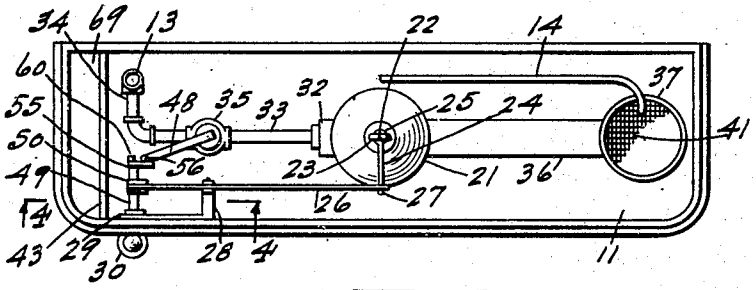


Fig. 1.

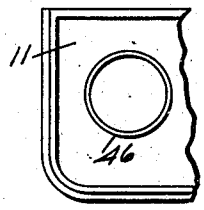


Fig. 7.

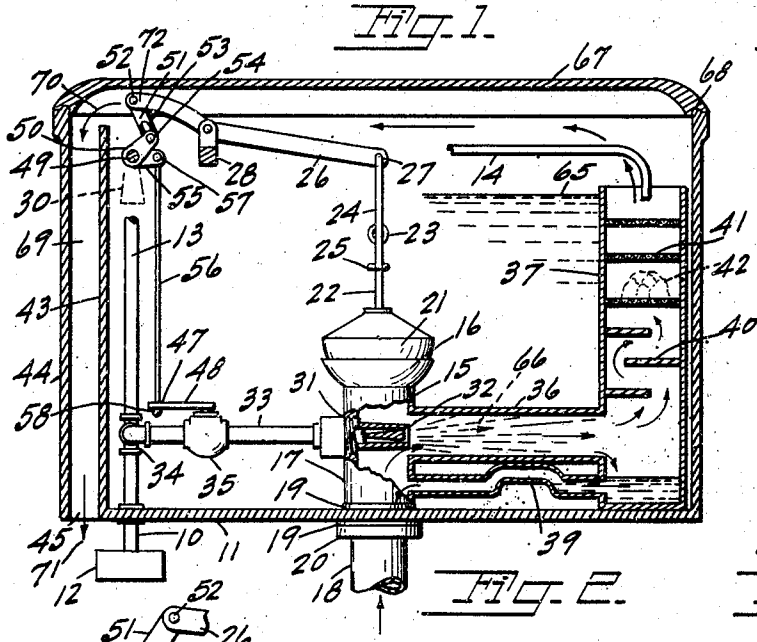


Fig. 2.

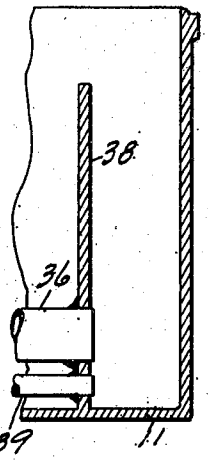


Fig. 3.

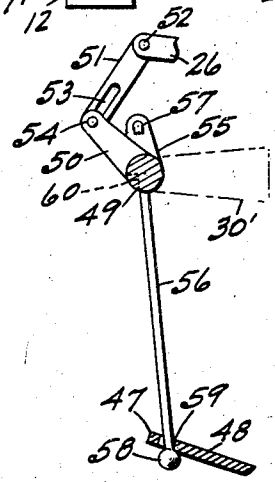


Fig. 4.

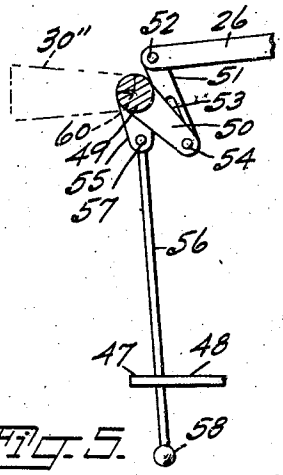


Fig. 5.

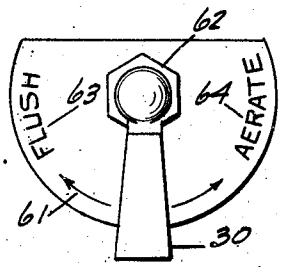


Fig. 6.

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VENTILATING AND DEODORIZING TOILET

Fred L. Owens, Richmond, Calif.

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8 Claims. (Cl. 4—215)

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This invention, air conditioning apparatus, is specifically designed for the aeration and removal of objectionable odors from water closets and the like, though it can be readily adapted to other air conditioning purposes. When installed in connection with a water closet, it can be used for conditioning the air in the room by setting the controls for continuous operation, leaving the seat of the water closet open. It can also be installed as a separate air conditioning unit without connection to anything other than a supply of water under pressure and a drain.

The objects and advantages of the invention are as follows:

First, to provide aerating and odor absorbing means for water closets and the like, and which will operate solely through a source of water under pressure.

Second, to provide apparatus which when installed in connection with a flush tank for a toilet bowl may be made to operate as air conditioning means for any desired length of time, at will.

Third, to provide apparatus of the type outlined, which when installed in connection with a flush tank, can be controlled by the same lever used for flushing the toilet.

Fourth, to provide apparatus as outlined which can be constructed as a unit for installation in a flush tank in place of the conventional flush pipe or flush chamber.

Fifth, to provide apparatus as outlined which when installed in a flush tank may be made operable selectively with the flushing operation through manual control of the conventional flushing handle.

Sixth, to provide apparatus as outlined which is simple in construction, easy to install, low in cost, and economical to operate.

Seventh, to provide an air conditioning unit which can be installed in a flush tank for operation in connection with a toilet bowl, and which can, at will, be installed for air conditioning in any location where a supply of water under pressure and drainage facilities are available, and which unit will be of the simplest possible construction.

Other objects and advantages of the invention will become apparent as the following description is read on the drawing forming a part of this specification, and in which:

Fig. 1 is a top plan view of a flush tank with the cover removed and showing the invention installed therein.

Fig. 2 is a sectional front elevation of the flush

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tank showing the invention installed therein and shown partly in section.

Fig. 3 illustrates one modification of the air-water separator column, formed as an integral part of the flush tank.

Fig. 4 shows the relative positions of the control means when set for operation of the air-conditioning apparatus and corresponds to a section taken on line 4—4 of Fig. 1.

Fig. 5 is a view similar to Fig. 4, but showing the control means set for flushing the toilet.

Fig. 6 illustrates the indicating means for the flush handle or control lever.

Fig. 7 shows a modification of the air-escape vent and which may be located at any desired position within the flush tank.

The invention is illustrated as being installed in a toilet flush tank, which may be constructed of any suitable material, such as porcelain, metal, plastic, or wood. A specially constructed tank is shown, though the invention is not limited to special tank constructions, but can be installed in any conventional or standard tank, or, even without a tank.

A water supply pipe 10 is conventionally secured and sealed through the bottom 11 of the tank and in communication with a supply of water under pressure 12, the pipe extending upwardly inside the tank as indicated at 13 and terminating at its upper end in a float-controlled tank filling valve (not shown) which also bleeds water through a tube 14 into the flush pipe through the conventional overflow pipe to fill the toilet bowl to a level with the top of the conventional trap following flushing of the toilet and while the tank is being refilled. The parts mentioned above do not form a part of the invention except insofar as they contribute to specific combinations and operations.

The invention consists essentially of a suction column and an air-water separator column interconnected by a spray chamber, and with a nozzle connected to a supply of water under pressure directing a spray of water under force through the spray chamber to the separator column to draw air through the suction column and wash and humidify the air as it passes through the spray chamber, then separate excess moisture from the washed air, permitting the washed air to escape and returning the separated water to the suction column which has communication with suitable drainage.

The invention can therefore be applied to the flush pipe below the tank, but is illustrated in its preferred form installed within the tank. In

some of the older types of tanks, the flush valve seat is located at the bottom of the tank, while in newer types and some of the older types, the flush pipe connects with a flushing chamber which extends upwardly into the tank and which terminates at its upper end in a flush valve seat and has an overflow pipe connected to one side, under which latter conditions the flushing chamber and overflow pipe is replaced by the flushing and suction chamber **15** and integral flush valve seat **16**; the flushing and suction chamber and associated parts being relatively exaggerated as to height for purposes of clarity.

The lower portion **17** of the flushing and suction chamber **15** is preferably interiorly threaded to receive the threaded end of the flush pipe **18**, or provided with other suitable attaching means, and suitable packing **19** is provided between the bottom of the suction chamber and the bottom **11** of the tank, and also between the draw-up nut **20** and the bottom **11**, to assure a perfect seal and easy installation of the unit.

The valve seat **16** is provided to suit the conventional tank float valve **21** which has a stem **22** terminating in a stop **23**. A finger **24** has a loop **25** on one end to slidably fit this stem and is connected at its other end to the trip lever **26** as indicated at **27**, this trip lever being shown as intermediately pivoted in a bracket **28** which is formed integral with the bearing **29** for the flush handle or lever **30**, and as usually arranged, this handle **30** will lift the valve **21** off its seat **16** with movement of the handle in either direction from the position shown in Fig. 1, and in Fig. 6.

The flushing and suction chamber **15** has formed integrally with or threadedly secured through one side as indicated at **31**, a jet-spray nozzle **32** which directs a spray of water under considerable force through the spray chamber. Though the nozzle is illustrated as actually extending through the flushing and suction chamber and mounted in one wall thereof, it is not limited to any specific position or mounting with the exception that its spray be directed axially through the spray chamber in a direction away from the flushing and suction chamber.

This nozzle is connected through a pipe **33** with the water supply pipe **13** as indicated at **34**, and a suitable valve **35** is provided for control of this communication **33**.

Extending from the other side of the flushing and suction chamber **15** in axial alignment with the spray nozzle **32** is a spray chamber **36** having a cross-sectional area to suit the specific nozzle for creation of maximum suction or displacement of air in the flushing and suction pipe, the other end of the spray chamber being integral with or secured to the air-water separating column, the one shown in Fig. 1 being a section of pipe **37** while the modification in Fig. 3 shows the column as formed integral with the tank by means of a partition **38** through which the pipe **36** is secured and sealed.

A combined drain pipe and trap **39** connects between the lower end of the separator column and the flushing and suction chamber to drain separated water from the column. Suitable moisture collecting and separating means is provided in the separating column, such as baffles **40**, or screens **41**; and if desired, deodorants or aromatics **42** can be placed on the baffles or screens, or in the bottom of the column. The column also functions as the overflow pipe for the tank, so that the conventional overflow pipe

can be dispensed with, the filler tube **14** being then extended to flow into the separator column as illustrated in Figs. 1 and 2.

Preferably, when used in connection with a toilet, the washed air is directed downwardly toward the floor, therefore a down-draft passage is shown as formed by a partition **43** formed integrally with the tank and with the bottom end of the passage open between the partition **43** and the side wall **44** of the tank as indicated at **45**. In lieu thereof, a pipe **46** can be mounted in any desired position in the tank, to extend through the bottom **11**, a suitable passage being provided in the bottom along with suitable sealing means.

As will be noted, the flushing and suction chamber **15**, valve seat **16**, spray chamber **36**, separator column **37**, and drain-back and trap **39**, can be cast as a unit, with the nozzle **32** suitably secured in position, and with the pipe **33** with the control valve **35** connected to the nozzle, to make a complete unit ready for installation.

Special unitary control means is desirable in connection with flush tank operation, one which will be selectively controllable for operation of the air-conditioning means and for flushing of the toilet, at will, and this is accomplished through a special crank and link mechanism in place of the single crank and link mechanism required only for flushing.

The control system is shown in its neutral or normal position in Figs. 1 and 6. The valve may be either the quarter-turn lever type, or as illustrated, the lift-lever type, in which the valve is normally closed by an internal spring, lifting of the end **47** of the lever **48** opening the valve, which closes upon release of the lever. This type of valve will open through either, lifting or depression of the lever. It is similar in construction and operation to the conventional toilet flush valve which opens with pressure on the handle in either direction.

The trip shaft **49** has a crank lever **50** intermediate its length and which crank lever is connected to the trip lever **26** through a link **51** which is pivoted to the trip lever at **52** and has an elongated slot **53** at the other end for cooperation with the pivot **54** in the end of lever **50**.

A second crank lever **55** is formed or mounted on the end of the trip shaft **49**, and a connection **56** is connected at one end to this crank lever as indicated at **57**, with the other end terminating in an engaging member **58** for cooperation with the underside of the valve-operating lever **48**, the connection being slidable in a passage **59** formed through the lever. A stop element or abutment **60** is formed on the crank lever **55** or projects from the end of the shaft **49** for cooperation with the connection **56** when the crank **55** has just passed over dead center to latch the lever **48** in open-valve position.

A suitable indicating dial **61** is mounted on the front of the flush tank, and can readily be secured in position by the bearing nut or head **62** of the bearing for the trip shaft **49**, and is provided with suitable indicators as shown at **63** and **64**.

The control arrangement shown and which is operated by the flush handle **30**, covers one conventional type of flush control, or flush tank. Obviously slight modifications in the arrangements of the levers **50** and **55** and the connections might be necessary with other types.

The operation of the invention in connection

with a flush tank, is as follows: Under normal conditions the control lever or flush handle **30** is in the neutral position shown in Figs. 2 and 6, the tank is filled with water as indicated at **65**, and the valves **21** and **35** are both closed, levers **50** and **55** being in the position shown in Fig. 2.

When the conditioning apparatus is to be set in operation, the control lever **30** is moved to the position **30'** in Fig. 4. Lever **50** through this movement swings over to the position shown in Fig. 4 from that shown in Fig. 2, but because of the slot **53** this movement has no effect on the trip lever **26**, the pivot **54** merely riding back and forth in the slot **53** while lever **55** swings to the position shown where it is stopped through cooperation of the side of the connection **56** with the projection **60** just after the pivot **57** has passed over dead center for retention of that position, the connection **56** pulling the valve lever **48** up as indicated to open the valve **35**. The normal urgence of the lever **48** will control lever **55** in its off-center position.

With valve **35** open, water under pressure is supplied through the pipe **10**, valve **35** and pipe **33** to the nozzle **32** from which it issues in the form of a power spray as indicated at **66**, drawing air from the toilet bowl through the combined flush and suction pipe **18** and suction chamber **15**, drawing and then forcing the air through the spray chamber **36** as indicated by the flow indicators, and thence into the air-water separating column **37** where the washed and humidified air is separated from free moisture as it passes up through the baffles or screens **40** or **41** and aromatized if desired, the air then passing out of the upper end and thence between the level **65** of the water in the tank and the cover **67** which is preferably sealed to the tank as indicated at **68**, and thence down through the passage **69** or **46** as indicated by the arrows **70** and **71**, the separated water flowing back to the flush pipe through the tube **39**.

When operation of the conditioning apparatus is to be discontinued, or the toilet flushed, the handle is pressed down from its position **30'** and it will drop of its own accord to the position **30**, Fig. 6, levers **55**, **50** and **48** returning to their normal position shown in Fig. 2 to release the valve **35** to close.

To flush the toilet, the lever **30** is moved to the position **30''** in Fig. 5 which moves levers **50** and **55** to the position shown while connection **56** merely slides down through the passage **59** in valve lever **48**, while lever **50** pulls down on the end **72** of lever **26** with lever **26** through the finger **27** in cooperation with the valve stem **22** lifting the valve **21** off its seat **16**; handle **30** returning to its normal position as soon as it is released.

If the apparatus is to be used for conventional air conditioning, the valve **35** should be replaced by any conventional adjustable valve, and the lower end of the chamber **15** connected to a suitable drain, while the upper end can be left open, the air then flowing in through the top, so that no changes are necessary to convert from flush tank installations to conventional air conditioning of rooms and the like.

I claim:

1. Air conditioning apparatus, in combination; a flush pipe having a valve seat at the upper end and a float valve therefor, a separating column, and a spray chamber communicating between said flush pipe below said valve seat and the lower portion of said separating column and having a nozzle for discharging and spraying water under

pressure into the lower portion of said separating column to draw air through and from said flush pipe and wash and humidify said air and discharge the same into said separating column for separation of the washed and humidified air from free moisture, a control valve for said nozzle, and control means for said control valve and said float valve, and drainage means for the lower end and an air outlet for the upper end of said separating column.

2. Air conditioning apparatus, in combination; a container; a flush pipe having a valve seat at its upper end and a float valve therefor; a separating chamber; a spray chamber having a spray nozzle therein connectable to a source of water under pressure said spray chamber having one end in communication with said suction chamber below said float valve seat and the other end in communication with the lower portion of said separating column with said spray nozzle directed through said spray chamber away from said suction chamber to draw air from said suction chamber and wash said air and discharge the washed air out of the other end of said spray chamber into said separating column, and air-moisture separating means in said separating column for the washed air and receiving the discharge from said nozzle; drainage means including a fluid trap for the lower end of said separating column; and manual control means having operative connections with said spray nozzle and with said float valve.

3. Air conditioning apparatus for flush tanks having a flush pipe and a flush valve therefor, and a supply of water under pressure; a spray nozzle connected to said supply of water under pressure and operating diametrically through said flush pipe below said flush valve; a separator column having an air outlet at the upper end; a spray chamber communicating between said flush pipe and the lower portion of said separator column and in axial alignment with said spray nozzle to receive the spray of water therefrom; a control valve for said nozzle, and manually operable means for controlling said control valve and said flush valve at will for operation of said air conditioning apparatus and discharging the contents of the tank at will; and drainage means for the lower end and an air outlet for the upper end of said separator column.

4. Air conditioning apparatus comprising; a flush pipe terminating at its upper end in a seat for a flush valve; a separating chamber having an air outlet at its upper end; a spray chamber communicating between said flush pipe below said seat and the lower portion of said separating chamber and having a nozzle connected to a source of water under pressure and directing water under pressure through said spray chamber toward said separating chamber to draw air from said flush pipe, wash the air within the spray chamber, and discharge the mixture of air and water into said separating chamber for separation of washed air and excess moisture, and a trapped drain for the bottom of said separating chamber, and control means for said flush valve and said nozzle.

5. An air conditioning unit for installation in a flush tank having a cover, a flush valve and operating means therefor, and a supply of water under pressure, in combination; a combined flushing and suction chamber connectable at its lower end to a flush pipe passing through the bottom of the flush tank, and having a valve seat for said flush valve at its upper end; a separating

column having an air outlet at its upper end and extending above the high-water level for said tank and having a fluid-trapped bypass from its lower end to said combined flushing and suction chamber; a spray chamber communicating between said combined flushing and suction chamber below said valve seat and the lower portion of said separator column, and a spray nozzle in communication with said supply of water under pressure and located in said suction chamber and directed to spray water under pressure through said spray chamber into said separator column to create suction to draw air from said flushing and suction chamber and wash the air and discharge the same into said separator column for separation of excess moisture from the washed air and escape of the washed air through said air outlet and of the water to said flushing and suction chamber; and manual control means for said water supply to said nozzle.

6. An aerating unit for installation in a flushing tank having a float valve and control means therefor and a flush pipe passage formed through the bottom of the tank, in combination a tubular member terminating at its upper end in a valve seat for the float valve; a spray chamber in communication with said tubular member, a nozzle axially aligned in said spray chamber and mounted through one side wall of said tubular member below said valve seat, a separator column having an air outlet at its upper end and having said spray chamber in communication with its lower end; an operative connection between said nozzle and the control means for the float valve; a drain for water separated and communicating between the lower portion of said separator column and said tubular member and including a fluid trap; said separator column simultaneously functioning as an overflow passage in connection with said drain for the tank.

7. An air conditioning unit for installation in a flush tank comprising; a flushing chamber arranged for connection at its lower end to a flush pipe and terminating at its upper end in a seat for a flush valve; a separator column extending upwardly and terminating at the tank high water level and having an air outlet at its upper end and a trapped drain to said flushing chamber at its lower end, and a combined suction and spray chamber communicating between said flushing chamber below said seat and the lower portion of said separator column; a nozzle mounted to direct a jet and spray of water through said combined suction and spray chamber from said flushing chamber to said separator column to create suction to draw air from said flushing chamber and force the same through said combined suction and spray chamber to wash the air and discharge the washed air into said separator column for separation of the washed air from excess moisture; a control valve for said nozzle and including a connection for a source of water under pressure; and manual control means for said control valve for operation of said unit at will.

8. A structure as defined in claim 7; supporting means for aromatics or deodorants in said separator column, a down-draft column in said tank and extending from the upper end thereof above the high-water line for the tank and down through the bottom of the tank to discharge the washed, humidified and deodorized air to atmosphere below the tank.

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