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VENTILATING AND FLUSHING APPARATUS FOR WATER CLOSETS

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Fig. 1

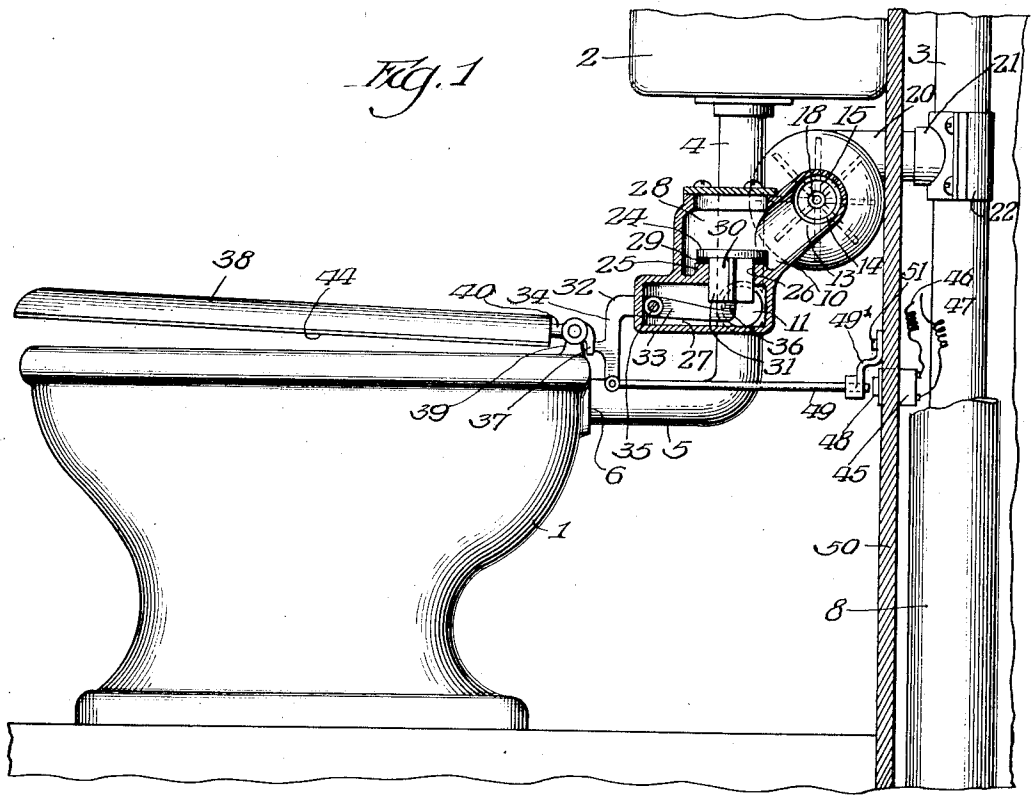
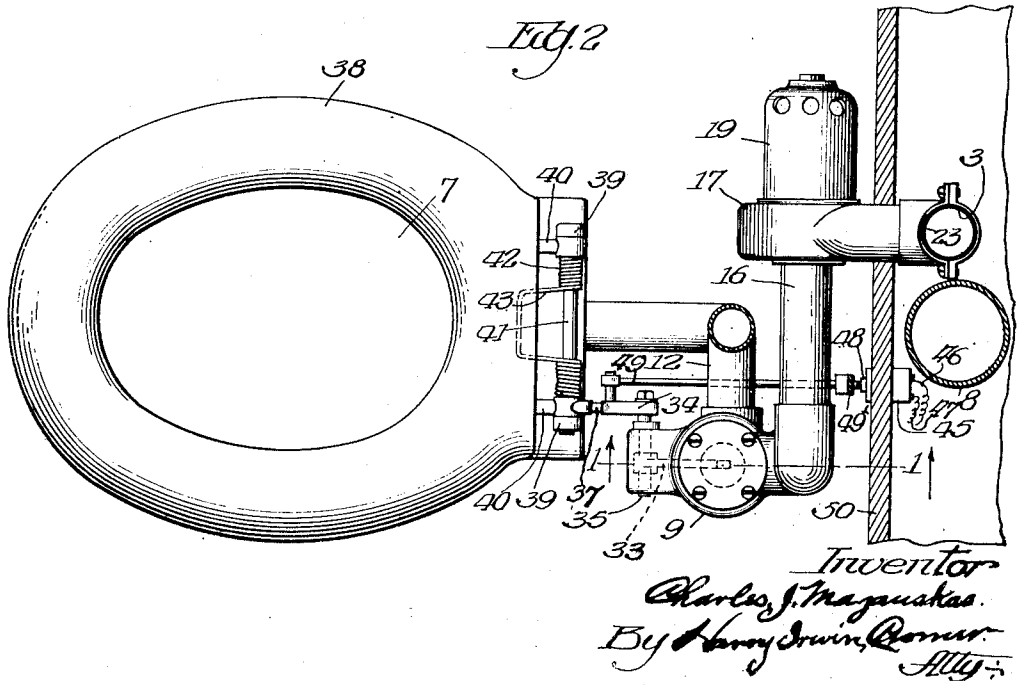


Fig. 2



Inventor
Charles J. Majauskas.
By Harry Irwin, Romer
Atty.

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CHARLES J. MAJAUSKAS, OF CHICAGO, ILLINOIS

VENTILATING AND FLUSHING APPARATUS FOR WATER-CLOSETS

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This invention relates to ventilating and flushing apparatus for water closets, and has for its object to provide simple and efficient means for ventilating and flushing and cleansing a water closet bowl.

A further object of the invention is to provide a simple, economical and efficient ventilating and flushing apparatus adapted to be connected with the bowl through a single opening with which the flush pipe is connected, including means for introducing water for flushing and cleansing the interior of the bowl, and means for ventilating the bowl by causing a ventilating current of air to pass from the interior of the bowl through the flush pipe and through the same opening in the bowl by means of which water for flushing the bowl is admitted, and to dispense with the making of a separate opening in the bowl in order to attach the ventilating means.

A further object of the invention is to provide an improved ventilating and flushing apparatus including a valve-controlled ventilating air passage adapted to be connected with the flush pipe, and provided with power-driven means for causing a current of air to pass from the interior of the bowl through the opening with which the flush pipe is connected with the bowl and through the valve-controlled air passage, and means for operating the valve and for starting and stopping the power-driven means.

Other and further objects of the invention will appear from the following description and claims, and from an inspection of the accompanying drawings which are made a part hereof.

The invention consists in the features, combinations, details of construction, and arrangement of parts herein described and claimed.

In the accompanying drawings—

Figure 1 is a view in side elevation of a closet bowl provided with my improved ventilating and flushing apparatus, the latter being shown in vertical section as taken on line 1—1 of Fig. 2, looking in the direction indicated by the arrows; and

Fig. 2 is a plan view of the apparatus shown in Fig. 1, with the flush tank omitted, and with the flush pipe and the usual upright ventilating pipe or flue shown in section.

In constructing an improved ventilating and flushing apparatus for closets in accordance with my invention, I provide for use in connection with any ordinary well known or suitable form of closet bowl 1, flush tank 2, or source of water supply, upright vent pipe or flue 3, a flush pipe 4 which is adapted for connection with the float chamber of the tank 2 or source of water supply and with the interior of the closet bowl.

The flush pipe 4, which may be of any ordinary or suitable form, is, by preference, provided with an upright depending portion adapted to communicate with the interior of the flush tank or source of supply 2, the pipe being bent to form an elbow, and having a lower angular portion 5 which is adapted to be connected with and to extend into an opening 6 in the bowl.

The flush pipe 4 thus forms a passage which leads from the flush tank or source of water supply 2 and communicates with the interior of the bowl through the opening 6. And the bowl has the usual outlet 7 which leads to the waste pipe 8, the outlet and bowl being provided with the usual water trap—not shown.

A hollow casing 9 is provided, which is adapted to form a ventilating air passage 10 the lower extremity 11 of which is connected with the flush pipe 4 through a tubular extension or pipe 12, one end of which is connected with the flush pipe 4, and the other end of which is connected with or may be formed in one integral piece with the casing 9. The lower extremity of the ventilating air passage thus formed through the casing 9 is, by preference, connected with the flush pipe 4 at a point above the level of the lower extremity of the water passage formed by the flush pipe, for example, with the upright portion of the flush pipe 4, so that water will flow downward through the pipe 4 from the flush tank 2 and into the interior of the bowl 1 without flooding the air passage through the casing 9.

The upper discharge opening or outlet 13

of the ventilating air passage 10 is connected with the air chamber or fan chamber 14 of a power-driven fan 15 by means of a tubular extension or pipe 16 which is connected with and leads into the central inlet opening of the fan casing 17. And the radial blades of the fan 15 are rotatively mounted within the fan chamber 14 on a rotative shaft 18 which is journaled in suitable bearings in the fan casing and connected with and adapted to be driven by a suitable source of power, such, for example, as an electric motor 19, the frame of which is attached to or may be formed integrally with the fan casing.

The fan casing 17 has a peripheral discharge passage or outlet 20, the discharge end of which is connected and adapted to communicate with the usual upright vent pipe or flue 3 above referred to. The connection may be conveniently made by means of an elbow or fitting 21 connected with the outlet passage or pipe 20, and having a split sleeve portion 22 which is adapted to encircle and to be clamped in snugly fittting engagement with the upright vent pipe or flue 3. A rubber gasket 23 may be inserted between the tubular split sleeve portion 22 of the pipe fitting 21 and the vent pipe 3 in position to surround the mouth of the passage 20 and form an air-tight connection between the latter and the upright vent pipe 3.

A valve 24 is interposed between the lower portion 11 and the upper portion of the inclined ventilating air passage 10 formed by the valve casing 9. The valve 24 is, by preference, in the form of a disk valve which is seated in a valve seat 25 located between the lower porton 11 and the upper portion of the air passage 10, said valve seat having an opening 26 therethrough which leads from the lower chamber 27 and connected lower passage portion 11 formed by the valve casing, into the upper valve chamber 28 and upper portion of the passage 10. An annular packing ring or gasket 29, of rubber or similar compressible material surrounds the opening 26 in the valve seat between the upper face of the valve seat and the lower face of the valve; and the valve 24 has a depending valve stem 30 which extends downward through the opening 26 and comprises a plurality of upright radial guiding arms or webs 31 having vertically elongated peripheral margins or guiding flanges which are adapted to slidably engage the margin of the opening 26 and serve to guide the valve as it is raised and lowered. The valve stem thus formed, is adapted to guide the valve accurately to its proper close-fitting engagement with the valve seat; and there are spaces between the upright radial web portions or guiding flanges 31 of the valve stem to provide the desired open passages through the valve seat when the valve is raised to passage-opening position.

Suitable valve-operating means is provided for opening and closing the valve, by preference, automatically, as follows: A valve-operating lever 32 having an inner lever arm 33 and an outer lever arm 34, is pivotally mounted upon a rock-shaft 35 which is rockingly supported in suitable bearings in the valve casing 9, the inner lever arm being located in the lower chamber 27 below the valve and valve seat, and having the upwardly and downwardly movable inner end 36 of said lever in engagement with and adapted to raise and permit the lowering of the valve 24 by the upward and downward movements of said inner lever arm. The outer lever arm 34 which extends downward at an angle with respect to the inner lever arm, is, by preference, located adjacent to and in position to operatively engage and be operated by means of a depending lever arm 37 which is, by preference, operatively connected with and adapted to be operated by the seat which is hinged to the bowl 1. In the device shown in the accompanying drawings, two upright hinge members or eyes 39 are fixed to and project upward from the top of the rim of the bowl; two similar hinge members or eye-members, which may consist of eye-bolts, are fixed to the rear margin of the seat adjacent to and, by preference, in position to extend between the upright eye-bolts or hinge members 39, 39, and a transverse horizontal hinge pin 41 extends loosely through the openings in the fixed hinge members 39 and through and in fixed engagement with the rocking hinge members 40 which are fixed to and adapted to swing with the seat. A spring 42 engages the seat and tends to raise the same to inclined position above and out of engagement with the top of the bowl, and acts to hold the seat in raised position and the depending valve-operating lever arm 37 in forward position when the seat is not occupied or pressed down. The depending lever 37 is, by preference, connected with the seat by being fixed to one of the hinge-members or eye-bolts 40. And the spring 42 is, by preference, wound around the transverse hinge pin 41 and bent to form a spring arm or loop 43 which projects forward beneath and in engagement with the seat, and is adapted to yieldingly support or tend to press the seat upward to its raised inclined position, and to yieldingly resist but permit the downward movement of the seat when the latter is occupied or pressed downward. The forward movement of the depending lever arm 37 which is caused by the raising of the seat, thus permts the valve-operating lever 32 to move with the valve 24 to passage-closing position; and the movement of the depending lever 37 rearward, which is caused by the lowering of the seat to horizontal position by subjecting the same to the weight of an occupant, or otherwise, will actuate the valve-

operating lever 32 and raise the valve 24 from its seat to passage-opening position. A rubber gasket 44 is interposed between the bottom face of the seat and the top rim of the bowl, to afford a tight connection between the seat and bowl when the seat is lowered.

An electric switch 45, which may be of any ordinary and well known or suitable form, is connected with the motor and with a dynamo or source of electric supply by the usual connections, including electric wires 46 and 47 which are connected with the switch contacts and adapted to be embraced within the same electric circuit with the motor and source of power in the usual manner familiar to those skilled in the art; and the movable switch member or switch button 48, which is normally in open circuit-breaking position, as shown in Fig. 1, is mounted, by preference, adjacent to and in position to be engaged and pressed into circuit-closing position by suitable switch-actuating means, such for example, as a plunger 49, one end of which is connected with and adapted to be operated by the lever arm 34 which is adapted to operate the valve 24, and the other end of which is slidably supported and guided into and out of switch-closing position or engagement with the switch button 48 by means of a suitable support 49. The support 49 may be a supporting bracket having an opening in one end through which the plunger extends, the other end of support 49 being secured to a stationary support 50 by means of a securing bolt 51, or other suitable securing means.

From the foregoing it will be readily understood by those skilled in the art that my improved ventilating and flushing apparatus constructed as herein described and claimed, is adapted to be attached to and to operate in an efficient manner in connection with a water closet bowl having the usual opening leading into the interior of the bowl and to which the flush-pipe is attached or to be attached, without the necessity of providing any other or separate opening in the bowl for receiving a ventilating pipe or for forming a ventilating air passage, other than the original opening to which the usual flush-pipe is attached. Making a plurality of openings, one for receiving the current of water for flushing the bowl, and one for permitting the escape of air for ventilating the bowl, is, of course undesirable if one of such openings can be dispensed with, even in a new bowl. And the making of an additional opening in the bowl for receiving the ventilating pipe is impracticable in cases in which it is desirable to attach or provide a ventilating apparatus to be used in connection with a closet bowl which has already been installed having the usual single opening for receiving the flush-pipe but having no other opening for receiving a ventilating pipe or apparatus.

My improved ventilating and flushing apparatus is adapted to overcome the difficulties above suggested, and to enable a bowl which has already been installed having a single opening for receiving a flush-pipe, and no opening for receiving a ventilating pipe, to be fitted with my improved apparatus which includes a casing or passage-forming element attached to the flush-pipe and forming an air passage which is connected with the water passage in the flush-pipe and adapted to communicate with the interior of the bowl through the same single opening with which the flush-pipe is connected.

Applicant's improved ventilating and flushing apparatus thus includes and comprises means for introducing a current of water into the bowl through the flush-pipe and the opening in the bowl with which the flush pipe is connected, for flushing and cleansing the bowl, and means for withdrawing air from the bowl through the same opening and through a portion of the flush pipe and through the valve-controlled air passage, for ventilating the bowl. And the valve-actuating mechanism and the switch-actuating mechanism by means of which the motor-driven fan is stopped and started, are operatively connected and adapted to operate the valve and switch, or valve and motor-driven fan concurrently. And the valve-actuating mechanism and switch-actuating mechanism are, by preference, not only connected with each other as above described, but are adapted to be engaged and operated by the hinged seat of the bowl which is provided with the depending lever or arm 37 fixed to the hinged seat by means of one of the hinge members or eye-bolts 40, and adapted to operatively engage the valve-actuating lever arm 34 which operates or raises the valve 24, and also operates the switch-actuating plunger 49, and thereby the electric switch 48, as already described.

I claim:

1. In an apparatus of the class described, the combination of a flush-pipe forming a passage adapted to be connected with an opening in and leading to the interior of a closet bowl, a valve for controlling said fluid passage, a casing attached to said pipe and forming an air passage which is connected with said passage in the flush pipe, a fan connected with said air passage and adapted to cause a current of air to pass from the interior of said bowl through said opening in the bowl and through said flush-pipe passage and connected air passage, for ventilating the bowl, a valve in said bowl-ventilating air passage, and automatic valve-operating means located outside of said flush pipe, for controlling said air passage independently of said flush-pipe passage-controlling valve.

2. In an apparatus of the class described, the combination of a flush pipe forming a passage adapted to be connected with an opening in and leading to the interior of a closet bowl for flushing the bowl, a valve for controlling said flush pipe passage, a casing attached to said pipe and forming an air passage which is connected with said passage in the flush pipe, a fan connected with said air passage, means for operating said fan, means for automatically starting and stopping said fan-operating means for causing a current of air to pass from the interior of said bowl through said opening in the bowl and through said passage formed by the flush pipe and said air passage, for flushing and ventilating the bowl, a valve in said bowl-ventilating air passage, and automatic valve-operating means located outside of said flush pipe, for controlling said air passage independently of the flush-pipe passage-controlling valve.

3. In an apparatus of the class described, the combination of a flush-pipe forming a passage adapted to be connected with an opening in and leading into the interior of a closet bowl, valve-mechanism for controlling said flush-pipe passage, a casing attached to said pipe and forming an air passage which is connected with said passage in the flush-pipe, a valve in said air passage, and valve-actuating mechanism on said casing and in operative engagement with said last-mentioned valve for operating the same independently of the flush-pipe controlling valve mechanism, said elements including means for introducing a current of water into the bowl and means for withdrawing air from the bowl through said opening in the latter and through said flush-pipe passage and connected air passage, for flushing and ventilating the bowl.

4. In an apparatus of the class described, the combination of a flush pipe forming a passage adapted to be connected with an opening in and leading into the interior of a closet bowl for flushing the bowl, a valve for controlling said flush-pipe passage, a casing attached to said pipe and provided with an air passage which is connected with the passage in the flush-pipe, a valve in said air passage, a fan having an inlet opening connected with said air passage and provided with an outlet opening adapted for connection with a flue, an electric motor supported by said casing and connected with said fan, for driving the same, means for connecting said motor with a source of electric supply, said means including an electric switch, and connected valve and switch actuating mechanism operatively connected with and adapted to operate said last mentioned valve and switch concurrently independently of the flush-pipe controlling valve, for ventilating the bowl.

5. In an apparatus of the class described having a closet bowl provided with a hinged seat, the combination of a flush-pipe connected with an opening in and leading to the interior of the bowl and forming a water passage which is adapted for connection with a source of water supply for flushing the bowl, a valve for controlling said flush-pipe passage, a casing attached to said pipe and forming an air passage which is connected with said passage in the flush-pipe, a valve in said air passage, for opening and closing the same independently of said flush-pipe passage-controlling valve, and automatic valve-actuating means operatively connected with said valve and adapted to be operatively engaged and operated by the movement of the hinged seat.

6. In an apparatus of the class described having a closet bowl provided with a hinged seat, the combination of a flush-pipe connected with an opening in and leading to the interior of the bowl and forming a water-passage which is adapted for connection with a source of water supply for flushing the bowl, a valve for controlling said flush-pipe passage, means for operating said valve, a casing attached to said pipe and forming an air passage which is connected with said water-passage in the flush-pipe, a valve in said air passage, for opening and closing the same, a rotative fan having an inlet opening connected with said air passage, and having an outlet, an electric motor connected with said fan, for driving the same, means for connecting the motor with a source of electric supply, said means including an electric switch, and valve and switch actuating means adapted to be engaged and operated by the hinged seat and operatively connected with and adapted to operate said last-mentioned valve and switch concurrently.

Signed at Chicago, in the county of Cook and State of Illinois, this 30th day of April, 1928.

CHARLES J. MAJAUSKAS.