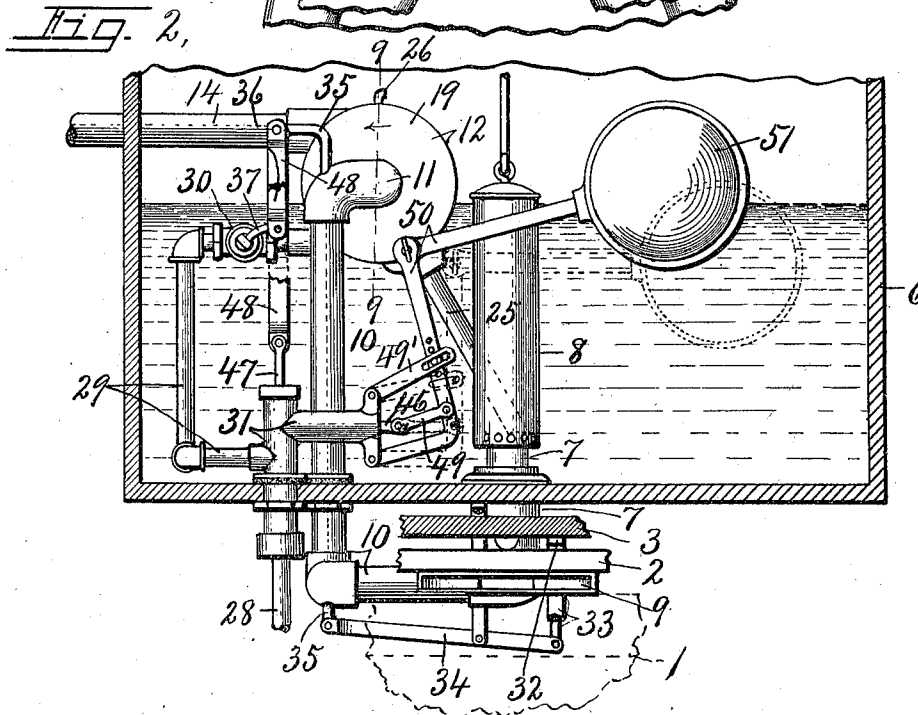
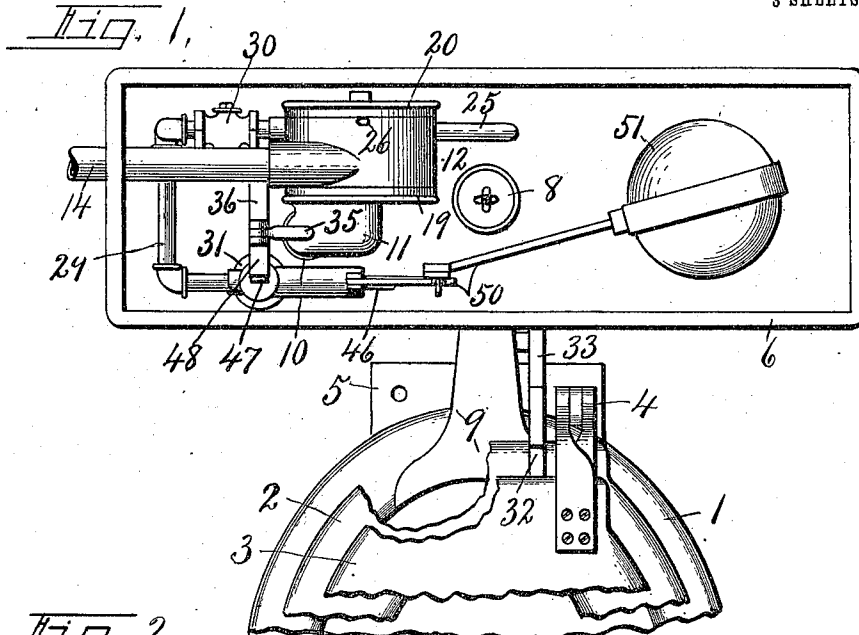


K. S. BLANCHARD.
VENTILATING SYSTEM FOR WATER CLOSETS.
APPLICATION FILED JUNE 18, 1910.

996,906.

Patented July 4, 1911.

3 SHEETS—SHEET 1.



WITNESSES
E. J. Staut.
H. E. Chase

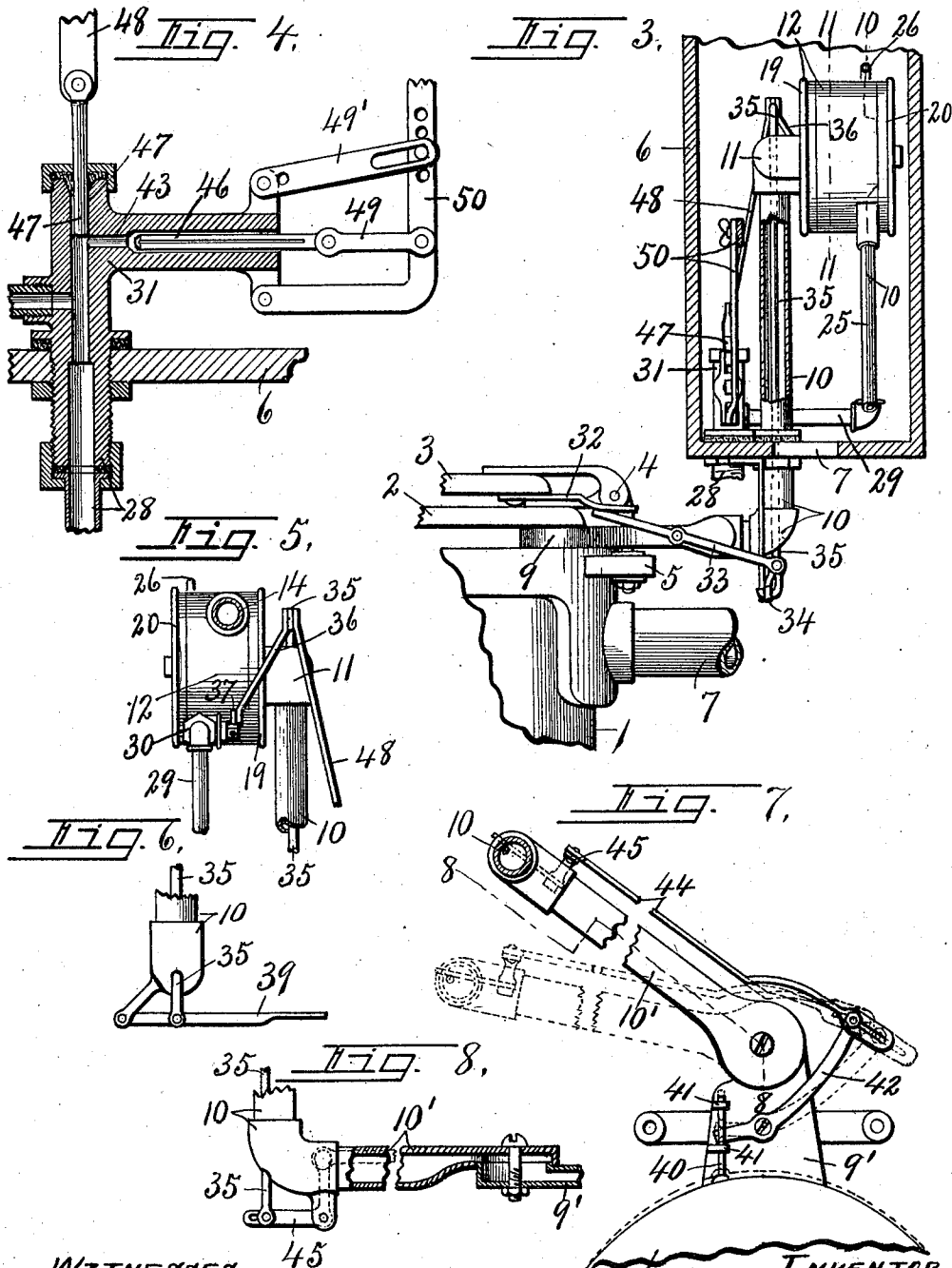
INVENTOR
K. S. Blanchard
By
Howard P. Driscoll
ATTORNEY.

K. S. BLANCHARD.
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3 SHEETS—SHEET 2.



WITNESSES
E. J. Staub.
H. E. Chase

INVENTOR
K. S. Blanchard
BY Edward P. Dennis
ATTORNEY.

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3 SHEETS—SHEET 3.

Fig. 9.

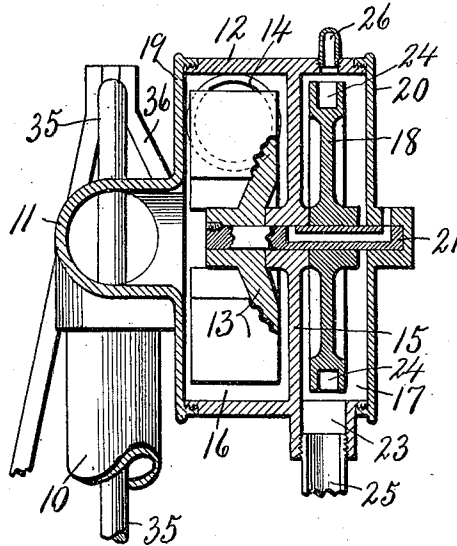


Fig. 10.

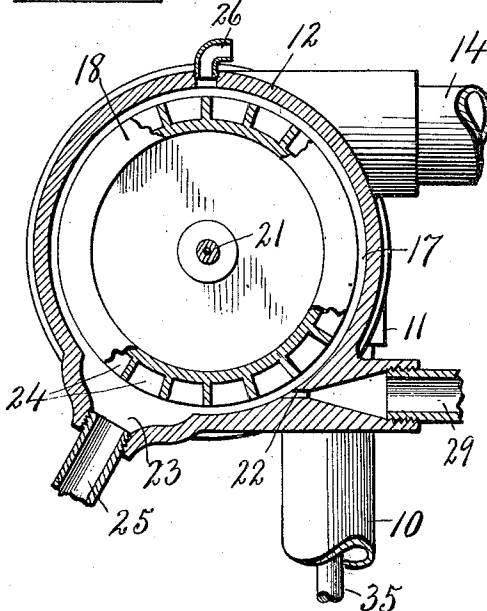
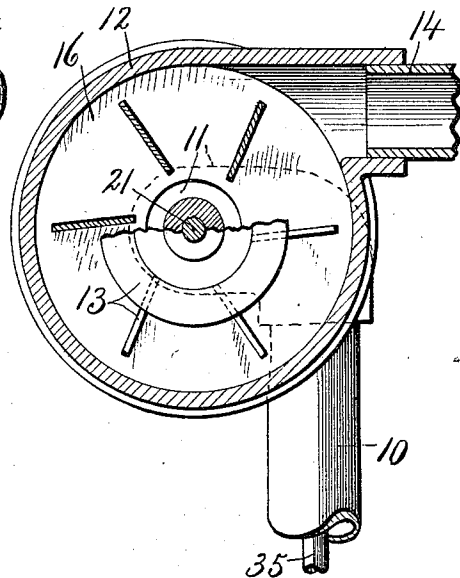


Fig. 11.



WITNESSES
E. J. Staut
H. E. Chace

INVENTOR
K. S. Blanchard
By
Howard P. Driscoll
ATTORNEY.

UNITED STATES PATENT OFFICE.

KIRK S. BLANCHARD, OF ROCHESTER, NEW YORK.

VENTILATING SYSTEM FOR WATER-CLOSETS.

996,906.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed June 18, 1910. Serial No. 567,634.

To all whom it may concern:

Be it known that I, KIRK S. BLANCHARD, of Rochester, in the county of Monroe, in the State of New York, have invented new and useful Improvements in Ventilating Systems for Water-Closets, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 This invention relates to certain improvements in ventilators for water-closets and similar fixtures and refers more particularly to that class in which a rotary suction fan is operated by a coaxial water-driven motor.

15 One of the objects is to arrange the entire ventilating system so that the motor and fan together with portions of the water supply and discharge pipes and ventilating flues will be concealed within the flush tank.

20 Another object is to produce a slight flushing of the bowl irrespective of the main body of water in the flush tank during the action of the water motor and fan.

25 A further object is to provide means adapted to be operated by hand or by one of the movable members of the seat for opening the valve in the supply pipe to the water motor.

30 A still further object is to provide means brought into action by pressure upon the seat for opening said valve automatically and for closing the valve when the pressure is released.

35 Other objects and uses relating to specific parts of the ventilating system will be brought out in the following description.

In the drawings: Figure 1 is a top plan of a flush tank and a portion of a closet seat and bowl showing my improved ventilating apparatus as applied thereto. Fig. 2 is a front elevation of the apparatus shown in Fig. 1, except that the flush tank is shown in section and a portion of the closet-bowl is indicated by dotted lines. Fig. 3 is a side elevation of the same apparatus showing a portion of the flush tank and a portion of the ventilating pipe in section. Fig. 4 is an enlarged sectional view of a portion of the water supply pipe and bottom of the flush tank through which it passes showing the controlling valves and a portion of the float lever in elevation, said valves being open. Fig. 5 is a side elevation of the motor and fan seen in Fig. 1, showing a portion of the main supply and ventilating pipes together with the main supply valve for the motor

and valve controlling rods. Fig. 6 is a detail view of the hand lever for controlling the operation of the main valve. Fig. 7 is a top plan of a modified construction of ventilator pipe connection to the bowl showing also a modified valve operating mechanism for the water supply valves. Fig. 8 is a sectional view taken on line 8-8, Fig. 7, showing the hinged connection between the ventilator pipe and mouth piece or bowl plate. Figs. 9, 10 and 11 are enlarged sectional views of the water motor and fan respectively taken on line 9-9, Fig. 2, and 10-10, and 11-11, Fig. 3.

In illustrating the operation of my invention, I have shown a portion of a closet bowl —1— having the usual seat sections —2— and —3— which are hinged in the usual manner at —4— to suitable supports on a rear plate —5— of the bowl, so as to hold the seat sections some distance above the upper face of said bowl.

Associated with the closet bowl is any well known form of flush tank —6— which may be located at any convenient height and connected in any well known manner by a flush pipe —7— to the bowl —1—, the terminal end of the flush pipe within the tank —6— being provided with any of the usual forms of flush valve —8—.

A hollow ventilator plate or mouth piece —9— is supported in a horizontal position in the space between the top of the bowl —1— and seat section —2—, as best seen in Figs. 1, 2 and 3 and is provided with a laterally flaring open inner end communicating with said bowl. The rear end of this plate is connected by a ventilating pipe —10— and coupling —11— to the center of a fan case —12— which is located within the flush tank —6— and contains a revoluble fan —13—, said fan case being provided with a tangentially extending outlet pipe —14— leading to the exterior of the flush tank and adapted to be connected to any available air flue, not shown.

The casing —12— is divided by a transverse partition —15— into separate compartments —16— and —17—, the compartment —16— being adapted to receive the fan —13—, while the compartment —17— is adapted to receive a coaxial water motor —18—. The outer ends of the compartments —16— and —17— are closed by screw caps —19— and —20— adapted to be removed when necessary to remove or replace

the fan or motor which are keyed or otherwise secured to the same shaft, as —21—.

The circumferential wall of the motor compartment —17— is provided with a restricted inlet port —22— and a relatively larger outlet port —23—, the inlet port —22— being disposed tangentially to the buckets, as —24—, of the motor —18—, while the outlet port —23— is disposed radially of the motor and discharges through a pipe —25— into the bottom of the tank —6—. These ports are preferably located in the underside of the motor case in proximity to each other while the upper side is provided with an air vent —26— to prevent the water from being drawn by suction away from the outlet and around the motor, thereby affording a free discharge of the inflowing jet of water directly after its impact against the buckets.

The water under pressure is supplied to the water motor through a main supply pipe —28— and branch pipe —29—, the latter having a normally closed valve —30— preferably in proximity to the motor. This valve is adapted to be opened by the operation of one of the movable sections, as —3—, of the seat, and for this purpose I provide said section —3— with a rearwardly extending arm —32— which when the cover is raised engages and operates a system of levers —33— and —34— and vertically movable rod —35—, the latter extending through the ventilator pipe —10— and connected by a link —36— to the operating member —37— of the valve —30—, the valve being opened by the downward movement of the rod —35—.

As soon as the valve —30— is opened, the water under pressure is admitted to operate the motor which in turn imparts its motion to the fan, thereby drawing the vitiated air from the bowl through the mouth piece —9— and conduit —10— to the fan case —9— and conduit —10— to the fan case from which it is discharged to any suitable flue or to the external atmosphere through the pipe —14—. When the cover —3— is lowered, the valve operating parts return by gravity to their normal position, thereby closing the valve —30—. This opening and closing the valve may however be effected by means of a hand lever —39— as clearly shown in Fig. 6 or it may be operated automatically by simple mechanism controlled by downward pressure upon the seat section —2—, as shown in Figs. 7 and 8, in which a ventilator pipe —10'— and mouth piece —9'— are hinged to each other to permit the ventilator pipe section —10'— to be adjusted horizontally to conform to different positions of the connection with the fan.

The seat section —2— shown in Fig. 7 is mounted in such manner that when depressed from its normal position, it will be shifted a slight distance rearwardly as in-

dicated by dotted lines and this movement is utilized to operate the valve controlling mechanism as follows: Secured to the rear edge of the seat section —2— is a slide rod —40— guided in suitable bearings —41— on the plate —9'— and engaged with the short arm of a horizontally disposed lever —42—, the latter being also fulcrumed upon the plate —9'— and extends around the hinged connection between said plate and conduit —10'—. The longer arm of the lever —42— is connected by a link —44— to one arm of a bell-crank lever —45— which is pivoted to the conduit —10'— and is connected to the valve operated rod —35—.

It is now apparent that when the seat section —2— is shifted from its normal position, shown by full lines, to the position shown by dotted lines, the valve —30— will be opened by the downward movement of the operating rod —35— and link —36—, thereby operating the motor and fan as the seat remains in this shifted position, said parts returning to their normal position as soon as the pressure or weight upon the seat is removed. During this operation of the ventilating device the flush tank is usually filled to a predetermined level with water as determined by the flush valve —8— so that any excess supplied by the operation of the motor to the tank is carried off by the flush pipe irrespective of the operation of the valve —8—. This valve is opened in the usual manner to allow the exit of the reservoir water to the bowl for flushing as usual.

In order that the tank may be refilled irrespective of the motor, a valve casing —31— is connected to the supply pipe —28— and provided with a valve port —43— communicating with the supply pipe and adapted to discharge horizontally into the interior of the flush tank. The passage of the water through this port to the interior of the tank is regulated by a float valve —46— and an auxiliary valve —47—, the float valve —46— coacting with the inner end of the port —43—, while the valve —47— is movable vertically across the opposite end of said port and is connected by a link —48— to the operating rod —35— for the valve —30—. The valve —47— is normally open or above the port —43— and is therefore moved to its closed position by the operation of the rod —35— when the valve —30— is opened. The valve —46— is connected by a link —49— to a sectional float lever —50— carrying a float —51—, the section of the lever —50— to which the float is secured being adjustable upon the other section to vary the time of complete closing and opening of the valve —46— by the entrance and recession of the water in the tank, and may also be utilized for regulating the quantity of water in the tank. When the water in the tank reaches a pre-

determined level, it operates the float —51— to close the valve —46— thus normally preventing the entrance of water to the interior of the tank through the port —43—.

5 In the operation of the ventilating system, the raising of the seat section or cover —3— for use of the bowl opens the water supply valve —30— and simultaneously closes the valve —46— across the adjacent end of the port —43— thereby admitting water to the motor for operating said motor and fan to withdraw any vitiated air from the bowl through the mouth piece —9— and pipe —10— to the fan case from which it is discharged through the pipe —14— to a suitable air flue, not shown, leading to the exterior of the building in which the apparatus is located. The operation of the fan continues until the seat section —3— is lowered to its normal position or until the valve —30— is again closed by the operation of the hand piece —39—, shown in Fig. 6. During this action of the motor, any excess of water in the tank beyond a predetermined quantity is allowed to overflow through the flush pipe into the bowl, but is insufficient to create any air currents within the bowl which might interfere with that produced by the fan.

30 The flush valve —8— may be opened in the usual manner to flush the bowl any time before or after the action of the motor and fan ceases, and during this flushing operation, the float —51— is of course lowered by its own gravity thereby opening the valve —46— independently of the operation of the valve —47—, but if the water supply valve —30— for the motor is still open the auxiliary valve —47— will be closed thus allowing the water to pass through the motor into the tank and preventing the passage of water through the port —43—. It is intended, however, to close the seat section or cover —3— before opening the flush valve by which operation the water supply valve —30— to the motor will be closed and the auxiliary valve —47— opened, so that when the flush valve is opened and the float —51— drops, the valve —46— will be opened to allow the water to flow from the supply pipe —28— through the port —43— and into the tank, thus refilling the tank and causing the elevation of the float to again close the valve —46— when a predetermined quantity of water has been admitted to the tank, the various parts of the apparatus being then in position for a repetition of the operation previously described.

In order that the flow of water through the port —43— into the tank may not be excessive, the movement of the lever —50—, and consequently the opening movement of the valve —46—, is limited by a link —49— which is pivoted at one end to the valve casing —31— and its other end provided

with a slot and adjustably connected to the lever —50— by means of a removable pin which may be placed in one of a series of holes in said lever, said link serving to hold the valve closer to its seat when thrown open.

One of the important advantages in making the suction pipe leading from the bowl in sections, hinged to each other, is that it permits said pipe to be more readily adapted for connection with different tanks, the positions of which varies with reference to the bowl under different conditions.

What I claim is:

1. In a ventilating system for water closets in combination with a bowl and a flush tank, a fan, a water motor for the fan discharging into the tank, a water supply pipe having a passage leading to the motor and another passage leading directly into the tank and separate valves for said passages.

2. In a ventilating system for water closets, the combination with a bowl, a flush tank, a flush pipe and valve therefor, of a fan, a water motor for the fan, a water supply pipe having one passage leading to the motor and a separate passage leading directly into the tank, a valve in the passage leading to the motor and a float operated valve in the passage leading directly into the tank.

3. In a ventilating system for water closets, the combination with a bowl, a flush tank, a flush pipe and valve therefor, of a fan, a water motor for the fan discharging into the tank, a water supply pipe having a branch passage leading to the motor and another branch passage leading directly into the tank and a float operated valve for the last named passage.

4. In a ventilating system for water closets, in combination with a bowl and flush tank, a rotary suction fan and water-motor therefor both located within the flush tank, the fan communicating with the interior of the bowl and provided with an outlet, said motor having an inlet and an outlet, the latter discharging into the tank, a water supply pipe connected to the inlet of the motor, a normally closed valve in the supply pipe, a separate port leading from the supply pipe directly into the tank, a normally open valve for said port, means for simultaneously opening the first named valve and closing the second named valve, a float and float operated means for cutting off communication between the port and interior of the tank.

5. In a ventilating system for water closets, in combination with a bowl and flush tank, a rotary suction fan and water motor therefor both located within the flush tank, the fan communicating with the interior of the bowl and provided with an out-

- let, said motor having an inlet and an outlet, the latter discharging into the tank, a water supply pipe connected to the inlet of the motor, a normally closed valve in the supply pipe, a separate port leading from the supply pipe directly into the tank, a normally open valve for said port, means for simultaneously opening the first named valve and closing the second named valve, an additional valve for said port, a float operated by the rise of water in the tank for closing the additional valve and for opening said valve when the water in the tank recedes from a predetermined level.
6. In a ventilating system for water closets, the combination with a bowl, a flush tank, a flush pipe and valve therefor, of a fan, a water motor for the fan discharging into the tank, a water supply pipe having a branch passage leading to the motor and another branch passage leading directly into the tank, a valve in the passage leading to the motor, an additional valve for the branch leading directly into the tank, connections between the last named valves for closing one of the branch passages when the other is opened and vice versa and an additional float operated valve for the passage leading directly into the tank.
7. In a ventilating system for water closets, a bowl, a flush tank, a flush pipe and a flush valve, in combination with a rotary fan and a water motor coaxial therewith and both located within the flush tank, a suction pipe leading from the interior of the

bowl to the fan, a discharge pipe for the fan, a water supply pipe for the motor, an outlet pipe for said motor discharging into the tank, a normally closed valve in the supply pipe, a valve casing connected to the supply pipe and provided with a port opening directly into the tank, a float operated valve for said port and an operating float therefor normally closing such valve when the water in the tank assumes a predetermined level, an additional normally open valve for said port, and means for simultaneously opening the valve in the supply pipe and closing said additional valve.

8. In a ventilating system for water closets, in combination with a bowl, a flush tank, a flush valve, a fan, a water motor for operating the fan discharging into the tank, a water supply pipe having a branch passage leading to the motor and another branch passage leading directly into the tank, a valve in the passage leading to the motor, operating means for the last named valve and additional means brought into action by the operation of the last named valve for closing the branch passage leading directly into the tank when the valve leading to the motor is opened.

In witness whereof I have hereunto set my hand on this 13th day of June 1910.

KIRK S. BLANCHARD.

Witnesses:

G. C. WATSON,
F. T. SAGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."