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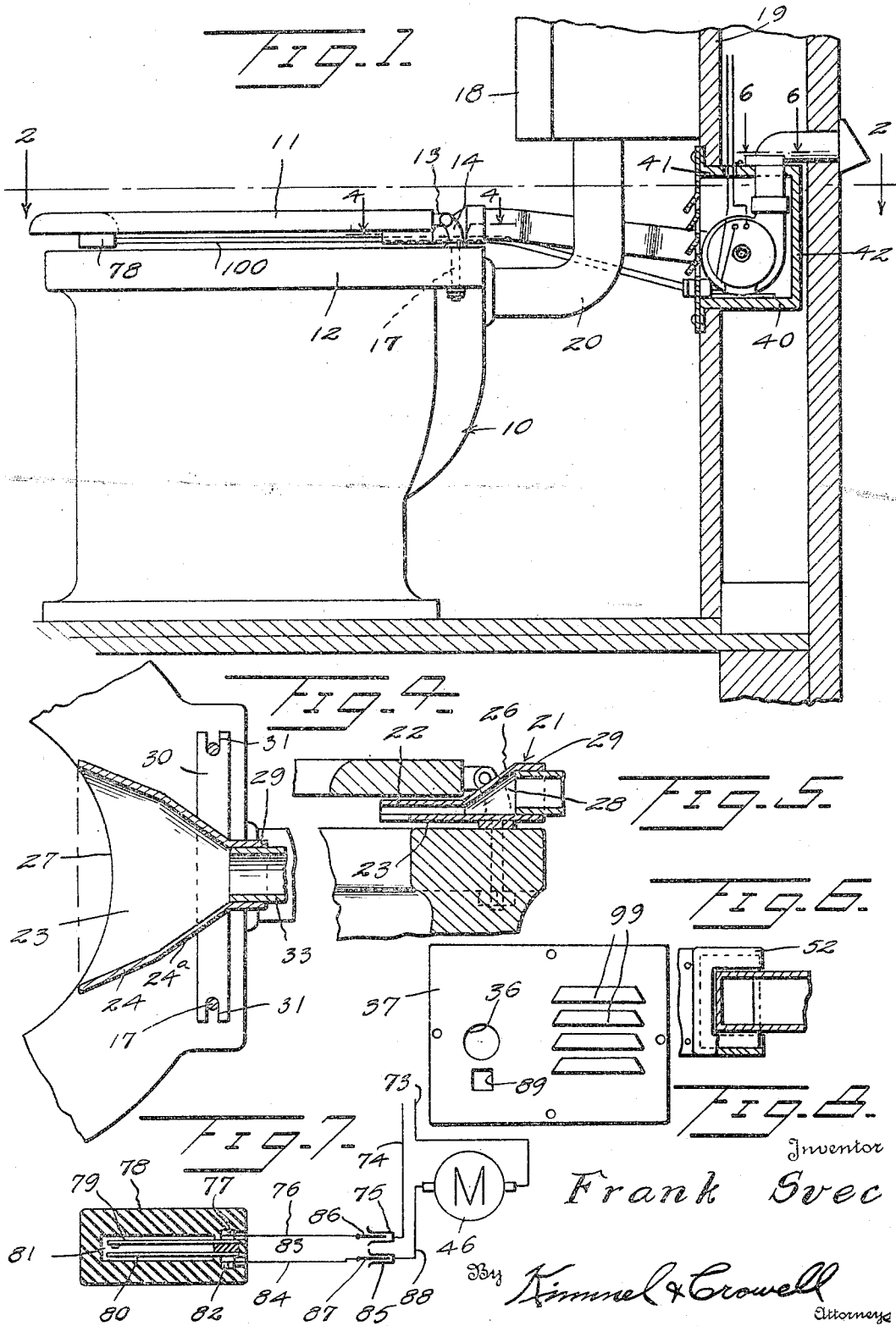
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AUTOMATIC TOILET BOWL VENTILATING SYSTEM

Filed March 21, 1941

2 Sheets-Sheet 1



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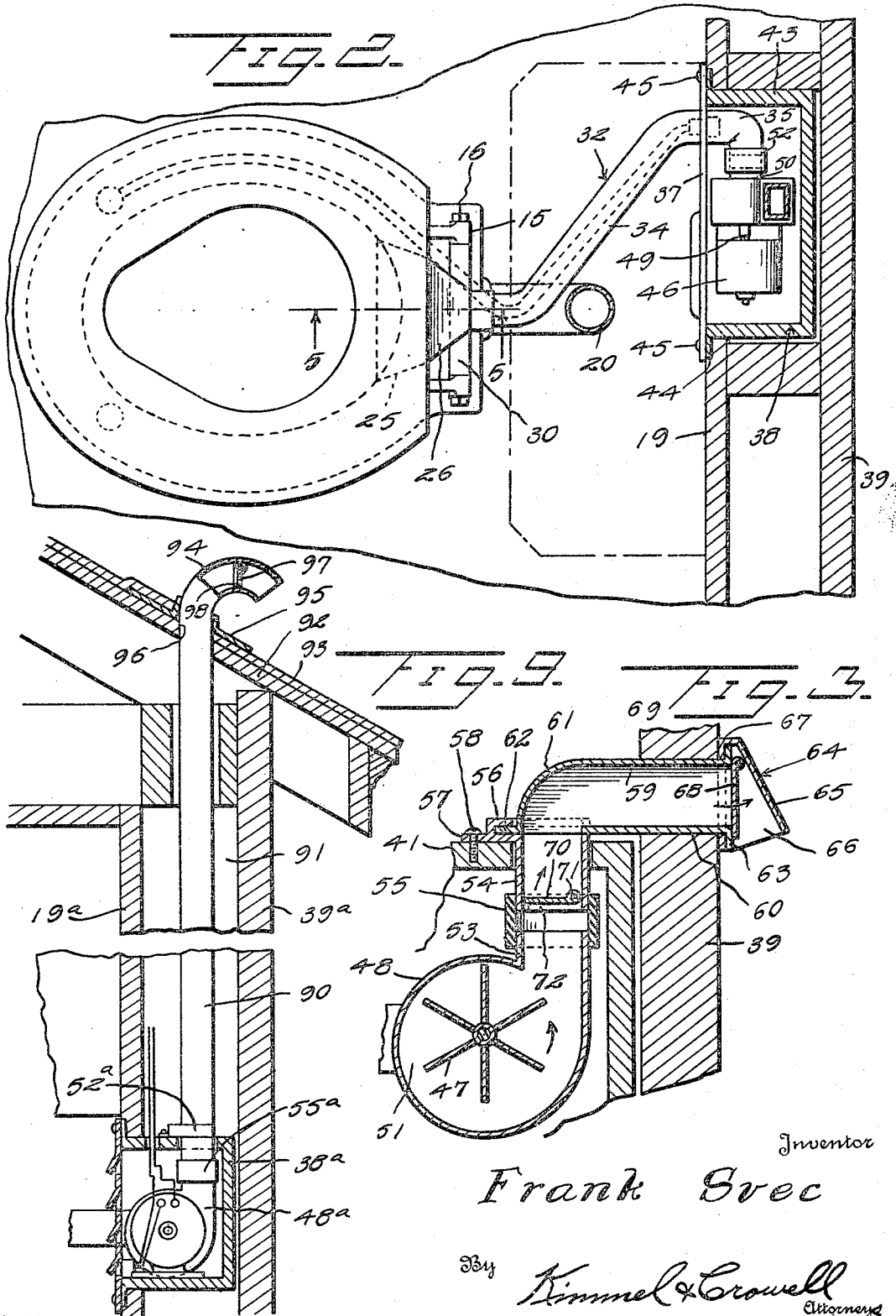
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UNITED STATES PATENT OFFICE

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AUTOMATIC TOILET BOWL VENTILATING
SYSTEM

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4 Claims. (Cl. 4-213)

This invention relates to ventilating devices and more particularly to a ventilating means for a toilet bowl which is actuated by weight on the seat.

An object of this invention is to provide a ventilating means of this type which can be used as an attachment for a conventional toilet bowl and seat, and which may be embedded in an adjacent wall of the room so as to withdraw the air from the toilet bowl and discharge the same exteriorly of the building.

Another object of this invention is to provide an automatically operable ventilating means of this type and a soundproof operating means for the suction fan which is adapted to be positioned within a wall.

A further object of this invention is to provide in combination with a ventilating means of this type, means whereby the cold air from the exterior of the building is prevented from entering the room when the device is not in operation.

A further object of this invention is to provide an improved means for coupling the fan structure with the outlet air duct.

A still further object of this invention is to provide a device of this type which is so constructed that if desired, the outlet from the fan may be extended directly to the exterior of the building or may be extended upwardly within the wall and in a position to discharge at a point above the roof.

To the foregoing objects and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawings wherein are shown embodiments of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a detail side elevation of a device constructed according to an embodiment of this invention connected with a toilet bowl and seat, the wall of the building being shown in vertical section.

Figure 2 is a sectional view taken on the line 2-2 of Figure 1.

Figure 3 is a vertical section taken through the suction fan and the outlet shown in Figure 1.

Figure 4 is a fragmentary sectional view taken on the line 4-4 of Figure 1.

Figure 5 is a fragmentary sectional view taken on the line 5-5 of Figure 2.

Figure 6 is a fragmentary sectional view taken on the line 6-6 of Figure 1.

Figure 7 is a diagrammatic view partly in section of the electric circuit embodied in this invention.

Figure 8 is a detail front elevation of the escutcheon plate used with this device.

Figure 9 is a fragmentary vertical section showing the extension of the outlet to the roof of the building.

Referring to the drawings, the numeral 10 designates generally a toilet bowl which is provided at the upper edge thereof with a rim 12. A seat 11 is hingedly secured to the rear portion of the rim 12 by means of hinge members 13 and 14. The hinge members 13 are constructed in the form of a pair of rearwardly projecting arms formed with eyes 15 which engage hinge bolts 16 carried by the upwardly projecting hinge arms 14. A bolt 17 is fixed relative to the hinge arms 14 and is extended downwardly through the rear portion of the rim 12. A flushing tank 18 is in the present instance positioned adjacent the rear of the bowl 10 being secured to the inner side 19 of the adjacent wall and the tank 18 is connected to the bowl 10 by means of a pipe 20. The structure hereinbefore described is a conventional structure and it will be understood that the invention hereinafter described may be combined with any suitable type of toilet bowl and flushing means, the particular type of toilet bowl and seat here shown being merely illustrative of one form of toilet bowl and seat with which this invention may be used.

A forwardly directed horizontally disposed, suction nozzle generally designated as 21 has the forward portion thereof interposed between the seat 11 and the rim 12 and is adapted to be connected to a suction means as will be hereinafter described. The said forward portion of nozzle 21 extends beyond the rear inner edge of the rim 12. The nozzle 21 is of flared contour and so disposed relative to the bowl whereby its forward or intake end will be of greater length than its rear or outlet end. The forward or intake end of the nozzle is open throughout and this statement applies to the said rear or outlet end. The nozzle 21 is formed with an upper wall 22, a lower wall 23 and side walls 24. The upper wall 22 is formed of a pair of frustro-triangular portions 25 and 26, which are integral with each other, the frustro-triangular portion 26 being smaller in size at the base thereof than

the base of the forward frustro-triangular portion 25.

The side walls 24 are formed with a pair of obtusely related portions as shown in Figure 4, and the lower wall 23 is of similar construction to the upper wall 22 with the exception that the forward or inner edge of the lower wall 23 is formed with a concave or cut-out portion 27, which is adapted to substantially follow the curvature of the inner edge of the rim 12, at the rear of the latter as shown in Figure 4. The frustro-triangular portion 25 is parallel with the bottom wall 23 and as shown in Figure 5, the frustro-triangular portion 26 is inclined upwardly and rearwardly relative to the bottom wall 23 so as to form the top wall of an enlarged suction chamber 23 in proximity to the rear end of the nozzle.

Obtusely related side wall portions 24^a of the side walls 24 in side elevation are of substantially triangular configuration and provide the side walls of the chamber 23. The said portions 24^a merge into a nipple or coupling member 29 which also merges with the bottom wall 23 and the upwardly and rearwardly inclined top wall portion 26. The rear part of the wall 23 forms the bottom of chamber 23. The nozzle 21 is adapted to be fixedly secured relative to the bowl 10 by means of a pair of laterally extending arms 30 which as shown in Figure 4 are formed at their outer ends with slots 31 through which the fastening bolts 17 are adapted to engage.

A suction pipe 32 is adapted to be connected as at 33 to the coupling member or nipple 29 and in the present instance the forward portion 33 of the pipe 32 is disposed at an obtuse angle to the longitudinal axis of the intermediate portion 34 so that the intermediate portion 34 of the pipe 32 may extend at one side of the connecting pipe 20. The pipe 32 is also formed at the opposite or rear end thereof with an L-shaped part 35 which is adapted to extend through an opening 36 formed in a closure plate or escutcheon 37. The plate 37 engages against the outer edge of a housing generally designated as 38 which is adapted to be positioned in the space between the inner wall 19 and the outer wall 39 of the dwelling.

The housing 38 is formed of a bottom wall 40, a top wall 41, a rear wall 42 and opposite side walls 43. The walls of the housing 38 are adapted to be constructed of sound insulating or absorbing material so that the sounds or vibrations generated within the housing 38 will be absorbed or deadened. The housing 38 at its forward or inner side may be formed with a marginal flange 44 to which the plate 37 may be secured by fastening devices 45. An electric motor 46 is mounted within the housing 38, being secured to the bottom wall 40 and a fan blade structure 47 which is mounted in a fan housing 48 is adapted to be directly connected to the drive shaft 49 of the motor 46. The housing 48 of the fan structure has its intake axially of the blade structure 47, and an intake nipple 50 is carried by the end wall 51 of the housing 48.

One leg of the L 35 of the pipe 32 is adapted to be connected to the intake nipple 50 by means of a flexible sleeve or coupling member 52. In this manner, the vibrations of the fan structure and the motor 46 will not be communicated to the pipe 32. The fan housing 48 is provided with an outlet nipple 53 and this outlet nipple 53 is adapted to be connected to a short pipe section 54 by means of a second yieldable or rubber

coupling sleeve 55. The pipe section 54 at its upper end is formed with a U-shaped channelled coupling means 56 which is also provided with a flange 57. The flange 57 is adapted to be secured by fastening means 58 to the top wall 41 of the housing 48. A horizontally disposed outlet pipe 59 is adapted to be extended through an opening 60 in the outer wall 39, and the inner end of the outlet pipe 59 is formed with an arcuate portion 61. The arcuate portion 61 is provided with a U-shaped flange 62 which is adapted to engage in the U-shaped member 56 so that the outlet pipe 59 may be coupled with the vertical pipe section 54 by inserting the outlet pipe 59 inwardly through the outer wall 39.

The outer end of the outlet pipe 59 is provided with a flange 63 and a downwardly directed hood generally designated as 64 is secured to the flange 62. The hood 64 includes an outer downwardly and outwardly inclined wall 65, a pair of triangularly-shaped side walls 66 and a flange 67 which is adapted to engage behind the flange 63 and may be secured thereto in any suitable manner. The hood structure 64 provides a means whereby the air being discharged outwardly through the outlet pipe 59 will be directed downwardly and any moisture from the outside will be prevented from entering the outer end of the pipe 59. A gravity closing check valve 68 is hingedly secured as at 69 to the outer end of the outlet pipe 59 and is adapted when in closed position to prevent any air from the exterior of the building from entering the outlet pipe 59. A second check valve 70 is hingedly mounted as at 71 in the pipe section 54 at a point closely adjacent the inner or lower end of the pipe section 54 and the check valve 70 is adapted to engage on a seat 72 carried interiorly of the pipe section 54.

The check valve 70 is a downwardly and inwardly closing check valve which closes by gravity and is adapted to be opened when the fan plate structure 47 is in operation.

The motor 46 is adapted to be connected to a suitable source of electric supply, being connected at one side by means of a conductor 73 to the current supply source. A second conductor 74 is adapted to be connected at one end to the supply source and the other end of the conductor 74 is connected to one part 75 of an electric connector. A conductor 76 is adapted to be detachably connected at one end to the connector 75 and the opposite end of the conductor 76 is connected to a terminal 77. The terminal 77 is mounted within a resilient button or housing 78 which is adapted to be fixedly secured beneath the seat 11 and is adapted to normally engage the upper side of the rim 12. A resilient contact member 79 is secured at one end to the terminal 77 and the opposite end of the contact member 79 is free and confronts the free end of a second resilient contact member 80 which is also mounted within the chamber 81 formed within the yieldable housing 78. The second contact member 80 is connected to a second terminal 82, which is insulated by an insulating member 83 from the terminal 77. A conductor 84 is connected at one end to the terminal 82 and the opposite end of the conductor 84 is formed with a connector means, which is adapted to engage a second connector member 85.

The two connector members 75 and 85 are conventional connector members of the resilient type and the conductors 76 and 84 have secured thereto a plug structure including a pair of connector members 86 and 87 which are detachably engage-

able with the connector members 75 and 85. The connector member 85 is connected by means of a conductor 88 to the opposite side of the motor 46. By providing the detachable connector structure 86 and 87 which is engageable with the connector members 75 and 85, the switch structure mounted within the yieldable housing 76 may be quickly and easily disconnected from the motor 46. In practice the two connector members 75 and 85 are mounted in an opening 89 formed in the plate 10 below the pipe opening 36 as shown in Figure 8.

In Figure 9 there is disclosed a slightly modified form of this invention wherein the housing 38^a is mounted within the wall structure in the same manner as shown in Figures 1 and 2, but in this instance, the fan housing 48 is connected to a vertically disposed outlet pipe 90 which extends vertically in the space 91 between the inner and outer walls 18^a and 28^a of the building. The lower end of the outlet pipe 90 is formed with a coupling means similar to that shown in Figures 3 and 6 which is adapted to engage a U-shaped coupling member 92^a similar in every detail to the structure shown in Figures 3 and 6. The outlet pipe 90 is adapted to be extended upwardly through the sheathing 92 and through the roof 93.

The upper end of the outlet pipe 90 terminates in an arcuate discharge member 94 which is adapted to direct the discharging air outwardly and downwardly relative to the roof 93. A flashing member 95 is disposed about the upper end of the outlet pipe 90 and engages the roof 93 so as to prevent any water from leaking downwardly through the opening 96 which is formed in the roof 93 and in the sheathing 92. A gravity closing check valve 97 is carried by the arcuate discharge member 94 and is adapted to normally engage a valve seat 98 which is fixed within the discharge member 94. It will be understood that the fan housing 48^a is also provided with a check valve similar to the valve 70 shown in Figure 3 and the lower end of the outlet pipe 90 is connected by means of a flexible sleeve 99 to the housing 48^a.

In order to provide a means whereby the interior of the housing 38 may be maintained in a relatively cool condition, the plate 37 has formed therein a plurality of louvers 99 so that air may freely enter the interior of the housing 38.

In the use and operation of this device, the housing 38 is adapted to be mounted within a wall of the dwelling or if desired may be positioned at any other suitable point as for instance the housing 38 may be positioned beneath the floor supporting the bowl 10. The fan housing 48 is connected to the bowl 10 by the pipe 32 which is connected to the suction nozzle 21. This nozzle 21 is secured to the bowl 10 by disconnecting the bolts 37 and inserting these bolts 37 through the slots 31 of the supporting arms 30 for the nozzle 21.

The switch housing 76 may be positioned at the forward portion of the switch 11 being secured to the underside of the seat and may serve as one of a pair of rubber buttons beneath the seat 11. The two conductors 76 and 84 may be mounted in a single casing 100 which may be secured by clips or other suitable fastening means to the underside of the seat 11.

The conductors 76 and 84 may normally be connected with the connectors 75 and 85. When a weight is placed on the seat 11, the housing 76 will be compressed sufficiently to bring the con-

tacts 79 and 80 into engagement with each other and thus close the electric circuit from the conductors 74, 76, contacts 79 and 80 and conductors 84 and 88 to one side of the motor 46. The other side of the motor 46 being connected directly to the source of current supply by the conductor 73 when the contacts 79 and 80 are in contacting relation, the motor 46 will be operated so as to operate the fan blade structure 47.

As the air is being drawn out from the interior of the bowl 10 by the fan structure, the two check valves 70 and 88 will be swung to an open position so as to permit the discharge of the air through the hood 64. By mounting the motor and fan structure in a sound absorbing housing 38, the vibrations of the motor and fan will be deadened and by connecting the fan structure on the intake and outlet sides thereof with the intake and outlet pipes by means of rubber sleeves or connectors, the vibrations of the fan will not be communicated to a point outside of the housing 48.

A relatively small power motor may be used with the fan structure so that when the motor 46 is in operation, it will run very quietly.

Furthermore, while I have shown a pressure operated switch between the seat and the top of the bowl, it will be understood that under certain circumstances a manually operated switch, such as a toggle switch, may be substituted for the pressure operated switch, the manual switch being positioned at any convenient location with respect to the bowl.

What I claim is:

1. In a toilet bowl of the type embodying a bowl and a seat, a bowl ventilating means comprising a soundproof housing disposed adjacent to the rear of said bowl, a suction fan in said housing, an electric motor connected to said fan and disposed in said housing, a forwardly directed horizontally disposed tapered suction nozzle having a suction chamber at its rear formed with a rearwardly directed outlet nipple, means mounting said nozzle between the toilet seat and the upper portion of the bowl, a pipe connecting said nipple with the suction side of said fan, a yieldable coupling interposed between said pipe and said fan for absorbing the vibrations of said fan, an outlet pipe extending from said housing, a second yieldable coupling connecting said outlet pipe with the outlet side of said fan for absorbing the vibrations of said fan, said outlet pipe comprising a vertical pipe section, a flange carried by the upper end of said vertical pipe section, engageable with the upper side of said housing, a channelled coupling means carried by said flange, an upper horizontal pipe section including a downwardly directed rear part, a horizontal flange carried by said rear part engageable in said channelled coupling means, a downwardly directed outlet hood carried by the outer end of said upper pipe section, a pair of spaced gravity closing check valves correlated with said outlet pipe, and a normally open switch fixed to the seat and connected to said motor for closing the electric circuit to said motor when a weight is disposed on said seat.

2. In a toilet bowl and seat ventilating device, a sound-proof housing, a suction fan in said housing, an intake pipe extending into the housing, a rubber coupling means for connecting said intake pipe to said fan, an outlet pipe, an outlet nipple within and extended from the housing, a rubber coupling means between said outlet nipple and the outlet side of said fan, a forwardly

opening U-shaped channelled coupling member carried by said nipple, and a flanged coupling member carried by said outlet pipe engageable with said channelled coupling member.

3. In a toilet bowl and seat ventilating device, a housing, a suction fan in said housing, an intake pipe extending into the housing, a rubber coupling means for connecting said intake pipe to said fan, an outlet pipe, an outlet nipple within and extended from the housing, a rubber coupling means between said outlet nipple and the outlet side of said fan, a forwardly opening U-shaped channelled coupling member carried by said nipple, a flanged coupling member carried by said outlet pipe engageable with said channelled coupling member, a downwardly directed discharge hood carried by the outer end of said outlet pipe, and a gravity closing check valve between said hood and the outer end of said outlet pipe.

4. In a toilet bowl and seat ventilating device, a housing, a suction fan in said housing, an intake pipe extending into the housing, a rubber coupling means for connecting said intake pipe to said fan, an outlet pipe, an outlet nipple within and extended from the housing, a rubber coupling means between said outlet nipple and the outlet side of said fan, a forwardly opening U-shaped channelled coupling member carried by said nipple, a flanged coupling member carried by said outlet pipe engageable with said channelled coupling member, a downwardly directed discharge hood carried by the outer end of said outlet pipe, a gravity closing check valve between said hood and the outer end of said outlet pipe, and a downward closing check valve carried by said outlet nipple.

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