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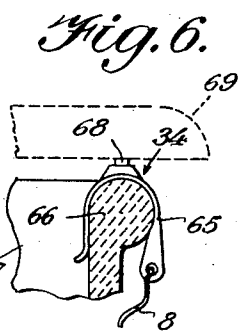
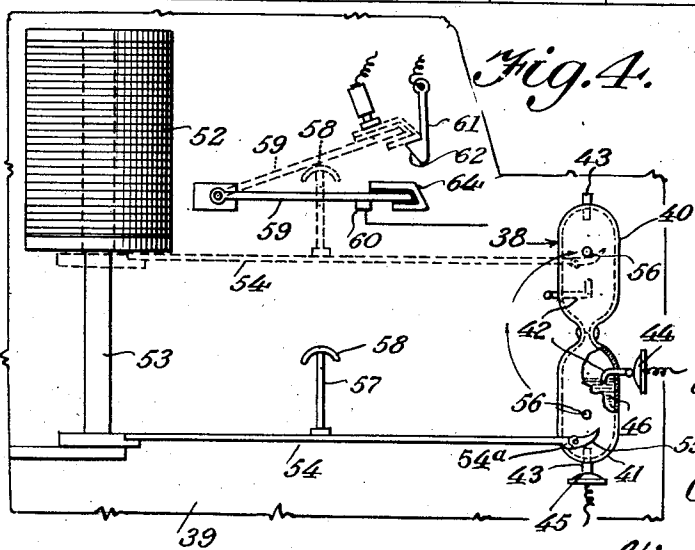
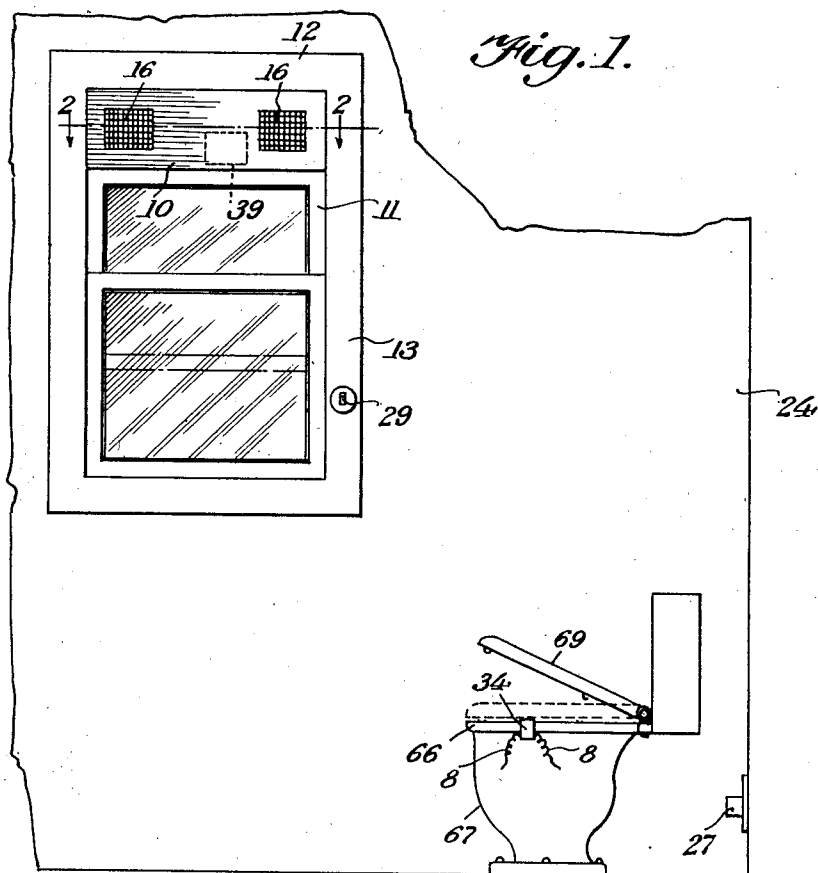
**C. F. MAGUIRE**

**2,326,957**

BATHROOM VENTILATOR

Filed Jan. 3, 1941

2. Sheets-Sheet 1



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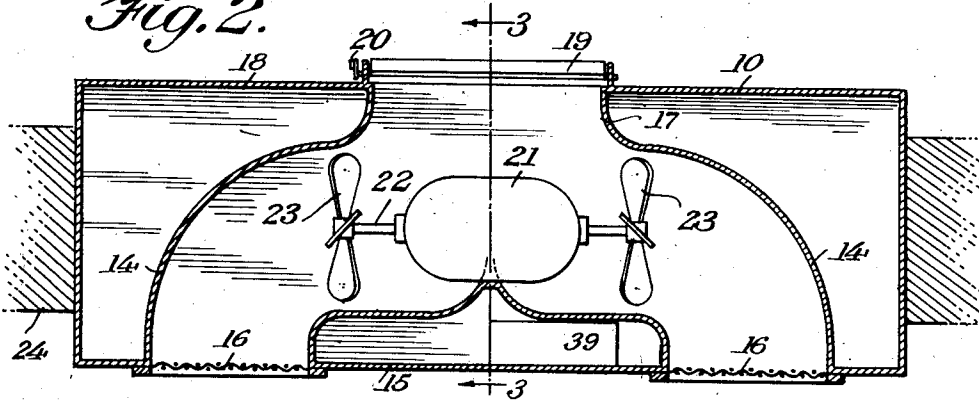
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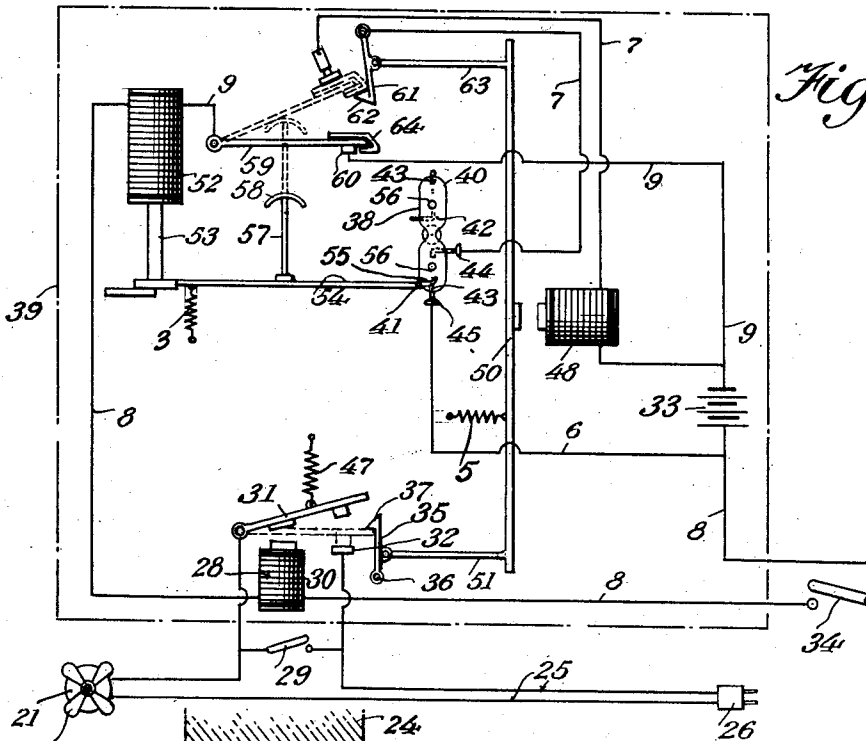
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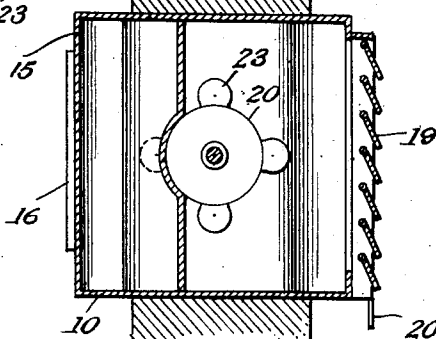
*Fig. 2.*



*Fig. 5.*



*Fig. 3.*



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## UNITED STATES PATENT OFFICE

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## BATHROOM VENTILATOR

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Application January 3, 1941, Serial No. 373,049

2 Claims. (Cl. 98—29)

This invention relates to bathroom ventilators and has for an object to provide a device of this character which will be energized when the toilet seat is used and will be deenergized automatically after a fixed period of operation, approximately ten minutes, during which time all odors will have been completely dispelled from the bathroom.

A further object is to provide a simplified device of this character including essentially a toilet seat, a normally open switch mounted on the seat and adapted to close when weight is applied to the seat, a ventilating fan adapted to be started by the closing of the switch, and a time switch adapted to open the fan circuit after a predetermined time interval.

A further object is to provide a device of this character which will be formed of a few strong, simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming a part of this specification:

Figure 1 is a side elevation showing a conventional toilet seat, bathroom window, and housing of the ventilating fan mechanism disposed at the top of the window between the upper sash and the window casing.

Figure 2 is a longitudinal sectional view of the ventilating fan mechanism and housing taken on the line 2—2 of Figure 1.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a diagrammatic view showing the rotatable mercury time switch and electrical means for rotating the switch.

Figure 5 is a diagrammatic view showing the electrical connections and controlling devices for initially starting the ventilating fan and subsequently after a predetermined time interval opening the fan circuit.

Figure 6 is a detailed cross sectional view showing the toilet seat switch.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, 10 designates a fan housing adapted to be disposed at the top of a bathroom

window between the upper sash 11 and the head 12 of the window casing 13.

Preferably the housing is provided interiorly with two air ducts 14 which open through the inner wall 15 of the housing and are provided with grids 16. The air ducts merge into a common air duct 17 which opens through the front wall 18 of the housing and is provided with movable louvers 19, best shown in Figure 3, which are adjustable in the usual manner through the medium of a rod 20.

Within the air ducts an electric motor 21 is secured in any preferred manner and is provided with a shaft 22 which projects from both ends of the motor and is equipped at the ends with fans 23. The fans draw air from the bathroom 24 and expel it into the atmosphere through the space between the louvers 19.

The motor is energized from the conventional house service lines to which the motor circuit wires 25 are connected by a plug and outlet connection 26—27.

A solenoid switch 28 and a manually operable switch 29 control the motor circuit, the hand switch being utilized should the solenoid switch become defective. The solenoid switch includes a coil 30 and an armature switch arm 31 which engages a stationary switch contact 32 when the coil is energized through the medium of a low voltage circuit 8—9 energized by a battery 33 and controlled by a normally open switch 34 which is mounted on the rim of the toilet bowl and is adapted to close when weight is applied to the seat. When the solenoid coil is energized to close the solenoid switch, the armature switch arm 31 is latched in circuit closing position by a hook 35 which is pivotally mounted, as shown at 36, at the lower end and is provided with an inclined cam edge 37 upon which the attracted switch arm rides to catch beneath the hook and be latched thereby in circuit closing position.

The fan motor circuit is maintained closed through a predetermined period of time, about ten minutes more or less, even though the seat switch is sooner opened, and for this purpose a mercury time switch 38 is employed, the time switch and mechanism connected therewith, also the solenoid switch 28, being concealed within a casing 39, which preferably is mounted in the ventilating fan housing 10 as indicated in Figure 1.

The mercury time switch 38 is hourglass in contour so that the mercury must flow through a constricted neck from one chamber 40 of the switch to the other chamber 41 of the switch

when the switch is inverted to submerge spaced switch contacts 42 and 43 in the chamber which is lowermost. A pair of stationary switch contacts 44 and 45 are mounted laterally of the mercury switch out of the path of rotation thereof, although not shown diagrammatically, and are disposed to be engaged by the switch contacts 42 and 43 of the lowermost chamber of the mercury switch. The body of mercury 46 rising in the lowermost chamber electrically connects the contacts 42 and 43 thereof, at the end of approximately a ten minute time period during which the mercury has been gravitating from the upper chamber to the lower chamber to close a circuit at this point for releasing the above described latch 35 to permit the solenoid switch arm 31 to be retracted by its controlling spring 47 to open the ventilating fan motor circuit.

The stationary switch contacts 44 and 45 are disposed in a second low voltage circuit 6-7 also connected to the battery 33 and in which is connected an electromagnet 48 which is energized when the circuit is closed by the rising mercury body. An armature 50, in the nature of a bar, is associated with the electro-magnet and is connected to the latch 35 by a link 51 so that when the electro-magnet is energized the latch 35 will be disengaged from the switch arm 31 to permit the ventilating fan motor circuit to be opened as previously described. A spring 5 returns the armature to normal position.

For inverting the hourglass mercury switch each time the toilet seat switch 34 is closed a solenoid 52 is connected in the first mentioned low voltage circuit 8-9 and is energized when the seat switch is closed. The solenoid is provided with a sliding core 53 to which is fixed a rod 54 which is terminally equipped with a pivoted curved dog 55, best shown in Figure 4. The dog is adapted to alternately engage lugs 56 which project laterally from the chambers 40 of the mercury switch. When the solenoid 52 is energized, the rod 54 is raised vertically and the dog 55 by its engagement of the lug 56 of the lowermost chamber 40 of the mercury switch, inverts the mercury switch by carrying the lowermost mercury filled chamber through an arc of 180° so that its contents may gravitate into the empty chamber which at this time has assumed lowermost position and forms a circuit closer as above explained. When the mercury switch has been inverted, the low voltage circuit 8-9 is immediately opened and for this purpose a pin 57, which rises from the rod 54, and which is equipped with a rounded head 58, impinges against a pivoted switch arm 59 and lifts the switch arm from circuit closing contact with a stationary switch contact 60 which, together with the switch arm, is connected in the low voltage circuit 8-9. The rod 54 is then retracted by a spring 3 and the dog 55 moves from a point above the lug 56 on the lowermost chamber to a point below it ready for the next operation.

During the downward movement of the rod 54, which takes place when the solenoid 52 is deenergized, the dog 55 moves to a position below the lowermost lug 56 of the mercury switch. The movement of the dog 55 into this position is permitted by its pivotal connection with the rod 54, the dog pivoting upwardly as it contacts with the lowermost lug 56 and moving into its normal position after passing the lug. That end of the rod 54 to which the dog 55 is pivoted, is provided with a shoulder 54a which supports the dog in its normal position with respect to the rod.

When the switch arm 59 is rocked to open circuit position as just described, it is yieldably latched in this position by a hook 61 which is pivoted at its upper end in any suitable manner and is provided with an inclined cam edge 62 over which the free end of the switch arm 59 rides upwardly to be lodged above the hook as shown in Figure 5. A link 63 connects the hook 61 with the bar armature 50 so that when the armature is attracted by the energized electromagnet 48 in the low voltage circuit 6-7, the hook will be dislodged to permit the switch arm 59 to gravitate to circuit closing position and close the low voltage circuit 8-9 through the solenoid 52 to again invert the mercury switch. In order that the battery 33 will not be depleted when the mercury is submerging the contacts 42 and 43 during long periods the toilet seat is not in use, the low voltage circuit 6-7 is automatically opened when the switch arm 59 gravitates to circuit closing position after the solenoid 52 has been deenergized, and for this purpose a contact 64 is fixed to and insulated from the switch arm, as best shown in Figure 4, and is connected in the low voltage circuit 6-7 as is also the hook 61. When the contact 64 is in electrical engagement with the hook 61, the low voltage circuit 6-7 will be closed at this point, but when the switch arm 59 drops to circuit closing position the contact 64 will be out of engagement with the hook 62 so that the low voltage circuit 6-7 will be opened.

The seat switch 34 is of the push button type and is secured to a spring clip 65 which is adapted to straddle the rim 66 of the bowl 67, as best shown in Figure 6, the button 68 of the switch being adapted to be depressed to close the switch as the seat 69 is depressed by a weight thereupon.

In operation, the parts are normally in the position shown diagrammatically in Figure 5. When the seat switch 34 is closed the low voltage circuit 8-9 is closed and the coil 30 of the solenoid switch is energized and moves the switch arm 31 to circuit closing position to close the ventilating fan motor circuit 25 at the fixed contact 32. Thus the motor is started. Simultaneously with starting of the motor the low voltage circuit 8-9 energizes the solenoid 52 to lift the rod 54 and invert the mercury switch so that the mercury will start rising in the lowermost chamber. At the same time the mercury switch is inverted, the low voltage circuit 8-9 is opened through the medium of the head 58 of the pin 57 dislodging the pivoted switch arm 59 from the fixed contact 60, the switch arm being immediately latched in open circuit position by the hook 61. During a predetermined time interval, say ten minutes, the mercury will have risen sufficiently in the lower chamber to close the low voltage circuit 6-7 at the contacts 42 and 43 whereupon the electro-magnet 48 is energized to attract the bar armature 50 and, through the medium of the links 51 and 63, disengage the latch hook 35 to open the ventilating fan motor circuit 25-25, and dislodge the hook 61 from the switch arm 59 to permit the arm to gravitate to circuit closing position to close the low voltage circuit 8-9 at this point ready for the next closing of the seat switch. When the switch arm 59 moves to circuit closing position it opens the low voltage circuit 6-7 so that no battery current is wasted during the interim the toilet seat is not in use.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

1. A room ventilator comprising an electric fan, a circuit for the fan including conductors adapted to be connected to a source of current, a normally opened switch in the fan circuit, an electro-magnet adapted when energized to close the switch, a normally opened circuit for the magnet, a source of current for the magnet circuit, a normally closed switch and a solenoid in the magnet circuit, means adapted for operation by the solenoid when energized to open the normally closed switch, means adapted to latch the first switch in closed position and the second switch in opened position when moved to such positions by the energization of the magnet and solenoid, a normally open switch in the magnet circuit adapted to be closed to effect the ener-

gization of the magnet and solenoid, and means automatically actuated after the lapse of a predetermined period of time from the closing of the last named switch to effect the retraction of the latches so as to release the first named switch and the second named switch for movement to their opened and closed positions, respectively.

2. A room ventilator as described in claim 1, wherein the last named means comprises an electro-magnet adapted when energized to retract the latches, a normally open circuit for the magnet including the source of current for the first named magnet circuit, a pivoted time controlled mercury switch in the last named circuit, means operated by the solenoid on the energization of the latter to operate the mercury switch, the last named circuit including spaced contacts, and a contact bridging element associated with the normally closed switch for engagement with the contacts on the opening of the switch.

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