

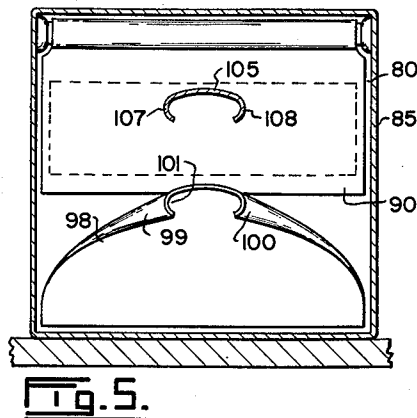
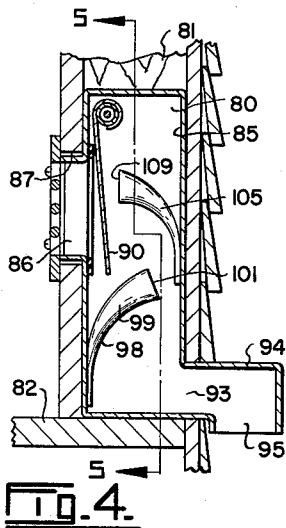
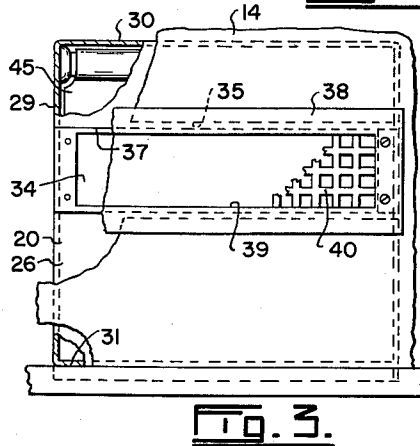
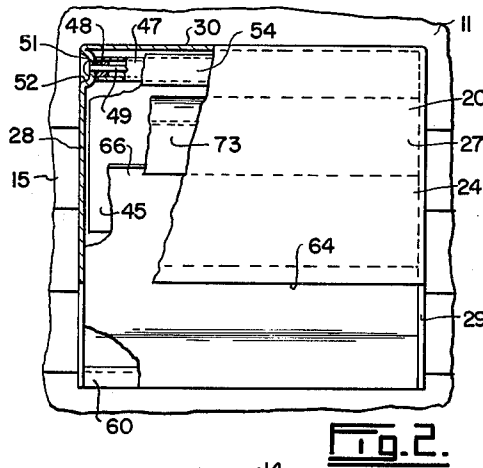
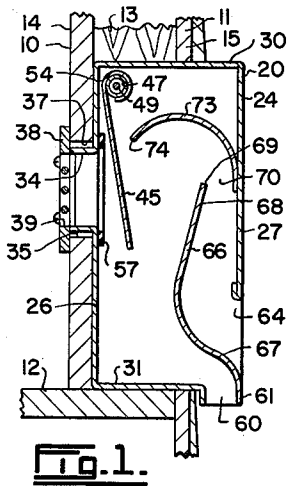
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ROOM VENTILATING APPARATUS

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ROOM VENTILATING APPARATUS

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This invention relates to apparatus for ventilating rooms preferably to the outside atmosphere.

An object of the present invention is the provision of room ventilating apparatus which is always ready to remove stale air and/or dangerous gases from the room.

Another object is the provision of ventilating apparatus which automatically operates to suck air out of the room and yet does not require any power.

A further object is the provision of room ventilating apparatus which greatly lessens the possibility of anyone in a room, whether awake or asleep, being asphyxiated by poisonous gases such as are used for heating and cooking purposes.

Yet another object is the provision of room ventilating apparatus which may form part of a heating system in which hot air is directed into room near the top thereof, said air forcing the cooler air downwardly and out through the ventilator so that people in the room are always breathing fresh air.

Air made stale by the addition of impurities as well as carbon dioxide, exhaled by all humans and household pets, settles to floor level because of the additional weight acquired, thus making the area adjacent the floor the most unhealthy part of any room. More often than not, this air is recycled through a home by the action of standard hot air furnace systems which more or less continuously circulate air throughout a home. Very young children spend much of their time playing on the floor, and, therefore, breathe in the stale air.

Where gas is used as a heating medium, any leakage from a pipe or a faulty fixture immediately becomes a menace to life. This gas, which is heavier than air, sinks to the floor level and builds up towards the ceiling.

The present ventilating apparatus provides an opening at or near the floor of a room. This opening preferably communicates with the air outside the building. The apparatus is designed normally to leave the room opening uncovered, but it closes said opening if there is a back draft from the outside. Thus, the foul air and heavy gases continually pour out of the room opening and the ventilating apparatus. The stale air and gases being heavier than air, naturally flow outwardly from the floor level area of the room.

The ventilating apparatus includes a swingable flap mounted so that it will close the room opening if there is a back draft through the apparatus, but it normally leaves said opening clear. The opening of a door, room door, or cupboard door inside the room displaces air which causes the flap to swing to and fro relative to the ventilating opening, thus sucking out stale air with each outward swing. This same action is caused each time a breeze strikes the outside face of the wall in which the ventilating apparatus is installed. The apparatus includes means for directing the outside air against the flap in such a way as to close the ventilating opening. Thus, gusty weather will also cause the flap to swing back and forth, while said flap prevents the outside air from entering the room through the ventilating opening.

Referring to the drawings,

FIGURE 1 is a vertical section through a wall and a preferred form of room ventilating apparatus,

FIGURE 2 is an outside elevation of the wall and the ventilating apparatus, part of the latter being broken away to show the interior thereof,

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FIGURE 3 is an elevation of the inside of the wall with part of the wall and of the apparatus broken away,

FIGURE 4 is a vertical section similar to FIGURE 1 through an alternative form of room ventilating apparatus, and

FIGURE 5 is a vertical section taken substantially on the line 5-5 of FIGURE 4.

Referring to the drawings, 10 is a room having an outside wall 11 and a floor 12. Wall 11 is of standard construction and is made up of studs 13, and inner covering 14, and an outer covering 15.

A preferred form of ventilating apparatus 20 is mounted in wall 11 near the bottom thereof, as shown, or it may be mounted at the outer surface of said wall. Ventilator 20 includes a casing 24 which is located outside covering 14 which forms the actual wall of room 10. This casing has inner and outer walls 26 and 27, end walls 28 and 29, a top 30, and a bottom 31. An inlet 34 is formed in inner wall 26 and is adapted to register with a ventilating opening 35 in the inner covering 14 of wall 11. The casing inlet 34 and the room opening 35 may be near but spaced a little above floor 12, as shown, or they may be right at said floor level. The main thing is that they must be nearer the floor. Furthermore, casing 24 may be located against the outer surface of wall covering 14, in which case, inlet 34 is right at the wall opening 35, but the casing may be spaced outwardly from covering 14 so that a duct would be provided from the inlet to the wall opening. The inlet and opening are relatively wide in a horizontal direction, and casing 24 may be provided with an outwardly-projecting flange 37 around inlet 34 and extending into wall opening 35, as clearly shown in FIGURE 1. A suitable ornamental plate 38 may be mounted on the inner surface of wall covering 14, said plate having a large opening 39 therein which is as large as or larger than wall opening 35. Plate 38 may have an ornamental grid 40 over its opening 39. Furthermore, a screen, not shown, may extend across the casing inlet 34, wall opening 35 or plate opening 39.

A substantially vertical flap 45 is swingably mounted in casing 24 in such a position as to overlap inlet 34 thereof, said flap being swingable to close the inlet and being balanced normally to leave said inlet open, as shown in FIGURE 1. A preferred form of mounting for flap 45 is shown in FIGURES 1 to 3. This consists of a horizontal supporting tube 47 having internal bearings 48 at the ends thereof by means of which it is mounted on a shaft 49 which extends along the longitudinal axis of the tube. This shaft is supported in casing 24 in any suitable manner. This may be accomplished by extending the shaft through holes 51 formed in the casing end walls 28 and 29, said walls preferably being pressed inwardly at 52 around said holes. With this construction, the ends of shaft 49 may be peened to keep the shaft in position.

The upper edge of flap 45 is connected to the supporting tube 47 spaced outwardly from the longitudinal axis thereof. In this example, the material forming flap 45 is extended beyond the upper edge of said flap and rolled around tube 47, as indicated at 54. As the flap is actually connected to tube 47 at 55 spaced horizontally from the longitudinal axis of said tube, the flap hangs downwardly in an incline and extends across but is normally spaced outwardly from the casing inlet 34. As the flap is actually supported by bearings 48 on shaft 49, said flap is free to swing toward and away from opening 34. The flap is so positioned that it closes opening 34 when it is in a substantially vertical position. If desired, a gasket 57 formed of suitable resilient material, such as soft rubber, may be mounted on the inner surface of

casing wall 26 around inlet 34 so that flap 45 engages said gasket when it closes the casing inlet.

Casing 24 is provided with an outlet below its inlet 34. In this form of the invention, an outlet 60 is formed in the casing bottom 31 near the lower edge of the outer wall 27. It will be noted that the casing is large enough to project a little outwardly from the outer covering 15 of wall 13 so that outlet 60 is located outside said outer covering. It is preferable to provide a downwardly-extending sleeve 61 around outlet 60. This outlet is preferably as long as inlet 34.

Although the ventilator 20 described so far will function reasonably well, it is preferable to provide an air entrance 64 in the outer casing wall 27 preferably below the level of inlet 34. A first baffle plate 66 is mounted in casing 24 between entrance 64 and flap 45 as well as between said entrance and outlet 60. The lower portion 67 of plate 66 curves inwardly and upwardly from the bottom of entrance 64 and over outlet 61. The upper section 68 of said baffle plate is inclined towards outer wall 27 and has an upper edge 69 spaced from said wall to form therebetween a passage 70. It will be noted that the upper edge 69 of plate 66 is above the lower edge of flap 45. A second baffle plate 73 is spaced above the first baffle plate 66 and extends from the outer wall 27 over said first plate towards flap 45. Plate 73 is actually mounted on the inner surface of wall 27 and curves upwardly and then downwardly to terminate in a free edge 74 which is spaced a little from flap 45 when the latter is in its normal hanging position.

Assuming that there is no movement of air in room 10, or outside the wall 11, flap 45 normally hangs in an inclined position leaving the ventilating opening 35 uncovered. At this time, stale air and/or poisonous gases near the room floor 12 will flow through opening 35 and inlet 34, and will drop downwardly through casing 24 and out through outlet 60 thereof. Baffle 66 helps to direct said stale air and/or gases towards the outlet. If any door in room 10 is opened or closed, this causes movement of air in the room which, in turn, causes flap 45 to swing back and forth alternately to close and open the ventilating opening 35. This action of the flap tends to suck stale air and gases out through the ventilating opening. Any breezes hitting the outer surface of wall 11 will cause a movement of air inwardly through entrance 64, and this air is directed by baffle 66 against the undersurface of baffle 73 which, in turn, directs it against the outer surface of flap 45, causing said flap to swing to close the ventilating opening. Thus, the outside air cannot get into room 10. As the pressure of the breezes varies, flap 45 will be caused to swing back and forth to create the suction action mentioned above.

FIGURES 4 and 5 illustrate an alternative form of ventilating apparatus 80 which is completely mounted within a wall 81 of a room 82. This apparatus, however, could be mounted completely outside said wall.

The ventilator 80 includes a casing 85 having an inlet 86 in its inner wall in registry with a ventilating opening 87 in wall 81 and which opens into room 82 near the floor thereof. An inclined flap 90 is swingably mounted in casing 85 in a similar manner to flap 45, and overlaps and is normally spaced from the inlet 86. This flap is so positioned that it can swing into a substantially vertical position closing inlet 86.

Casing 80 is provided with an outlet 93 spaced below the level of inlet 86. In this example, outlet 93 is formed in the outer wall of the casing near the bottom thereof. A hood 94 covers outlet 93 and opens downwardly at 95.

Suitable baffle means is provided between outlet 93 and inlet 86. This is in the form of a first baffle plate 98 secured to the inner wall of casing 85 and curving upwardly therefrom towards the outer wall of said casing, as clearly shown in FIGURE 4. This baffle plate has downwardly-curved edges 99 and 100 which converge to an opening 101 at the top of the plate 98. A second

baffle plate 105 is mounted on the outer wall of casing 85 and curves upwardly and inwardly therefrom. This plate also has downwardly curved edges 107 and 108 which converge upwardly and inwardly to an opening 109 which faces the outer surface of flap 90.

Stale air or gases near the floor level of room 82 pass out through the ventilating opening 87 and casing inlet 86 into casing 85. The heavy air and gas move downwardly through the casing and out through outlet 93 thereof. The closing and opening of doors or movement of people in room 82 causes flap 90 to swing back and forth to help suck air and gas out of the room. Hood 94 prevents outside air from being blown directly through entrance 93. However, air will move through said entrance, and this air is prevented from getting up underneath the lower edge of flap 90 by the baffle plate 98. This plate directs the outside air towards baffle 105 which, in turn, directs it against the outer surface of flap 90 to cause the latter to close the ventilating opening 87. This action prevents the outside air from entering the room, and it also causes the flap to swing back and forth to create the suction action referred to above.

What I claim as my invention is:

1. A ventilator for a room having an opening in a wall thereof near the room floor, comprising a closed casing to be positioned outside said room wall over the opening therein, said casing having an inlet therein adapted to register with the wall opening and opening means below the level and outwardly of said inlet and through which air may be discharged from the casing to the atmosphere outside the room wall, a flap swingably mounted and hanging in the casing over the inlet thereof, said flap being balanced normally to an open position inclined away from the inlet and extending generally toward said opening means to permit air to flow out of the room through the inlet and out through the opening means, and baffle means in the casing for directing outside air entering the casing through said opening means against the flap, said baffle means comprising a first baffle mounted and extending upwardly in the casing below the flap between the latter and the opening means for directing air entering through said opening means upwardly in the casing and away from the flap and the inlet, and a second baffle in the casing above and extending over the first baffle towards the flap to direct all air from said first baffle against the flap, whereby said flap in its normally inclined position directs gently flowing outside air back to and through the opening means to suck air through the inlet from the room and is swung to close the inlet by a strong flow of outside air as said flap directs the latter air to the opening means.

2. A ventilator for a room having an opening in a wall thereof near the room floor, comprising a closed casing to be positioned outside said room wall over the opening therein, said casing having an inner inlet therein adapted to register with the wall opening and an outlet opening below and outwardly of the inlet and an outer inlet opening above the outlet opening, said outlet and inlet openings being positioned to communicate with the atmosphere outside the room wall, a flap swingably mounted and hanging in the casing over the inner inlet thereof, said flap being balanced normally to an open position inclined away from the inlet and extending generally towards said outlet opening to permit air to flow out of the room through the inlet and out through the outlet opening, and baffle means in the casing for directing outside air entering the casing through said outer inlet opening against the flap, said baffle means comprising a first baffle mounted in the casing between the outlet and inlet openings and extending upwardly past but spaced from the flap, and a second baffle mounted in the casing spaced above the first baffle and extending over said first baffle towards the flap on the side thereof remote from the casing inner inlet, said first baffle directing air entering the casing through the outer inlet opening against the

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second baffle and the latter directing said air against the flap, whereby said flap in its normally inclined position directs gently flowing outside air back to and through said outlet opening to suck air through the inner inlet from the room and is swung to close the inlet by a strong flow of outside air as said flap directs the latter air to the outlet opening means.

3. Apparatus for ventilating a room having a relatively small ventilating opening in a wall thereof, comprising a closed casing to be positioned outside said room wall over the opening therein and having an inner and an outer wall, a top and a bottom; said casing having an inlet in the inner wall thereof adapted to register with the wall opening, an outlet opening in said bottom outwardly of said inlet and an inlet opening in said outer wall near said bottom, said outlet and inlet openings being positioned to communicate with the atmosphere outside the room wall; a flap swingably mounted near an upper edge thereof in the casing and hanging down over said inlet in said inner walls, said flap being balanced normally to an open position inclined away from the inlet and extending generally towards said outlet opening to permit room air to flow out of the room through the inlet and out through the outlet opening, and baffle means mounted in the casing outwardly of the flap for directing all outside air entering the casing through the inlet in said

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outer wall opening against said flap, said baffle means comprising a first baffle mounted in the casing between the outlet and outer inlet openings and extending upwardly in the casing to direct all air entering said inlet in said outer wall opening in an upward direction, and a second baffle mounted in the casing above the first baffle and extending from the outer casing wall towards the flap to direct said air from the outer inlet opening against said flap, whereby said flap in its normally inclined position directs gently flowing outside air back to and through said outlet opening to suck air through the inlet in said inner wall from the room and is swung to close the inlet by a strong flow of outside air as said flap directs the latter air to the outlet opening means.

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