

[54] **NEW LOW PROFILE VENTILATOR APPARATUS MEANS**

[75] Inventor: **Edward Joy, Owosso, Mich.**

[73] Assignee: **Ventrola Manufacturing Company, Owosso, Mich.**

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[58] Field of Search **98/40 DL, 43, 43 R, 98/40 D, 40 B; 240/47, 9 A**

[56] **References Cited**

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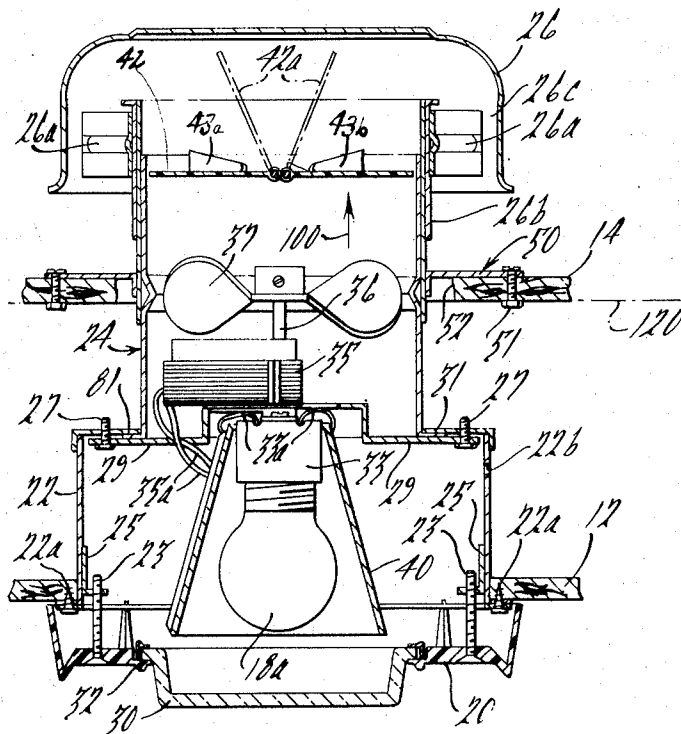
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Primary Examiner—William E. Wayner
Assistant Examiner—William E. Tapolcai, Jr.
Attorney—Harness, Dickey & Pierce

[57] **ABSTRACT**

A low profile ventilator apparatus means for use in mobile homes, modular homes, and the like which includes a structural combination of lighting means or a radiant heat lamp cooperatively associated with a bathroom fan such as to permit straight through or vertical discharge of air and being uniquely constructed to fit ceiling to roof depths ranging from approximately 4 to 13 inches.

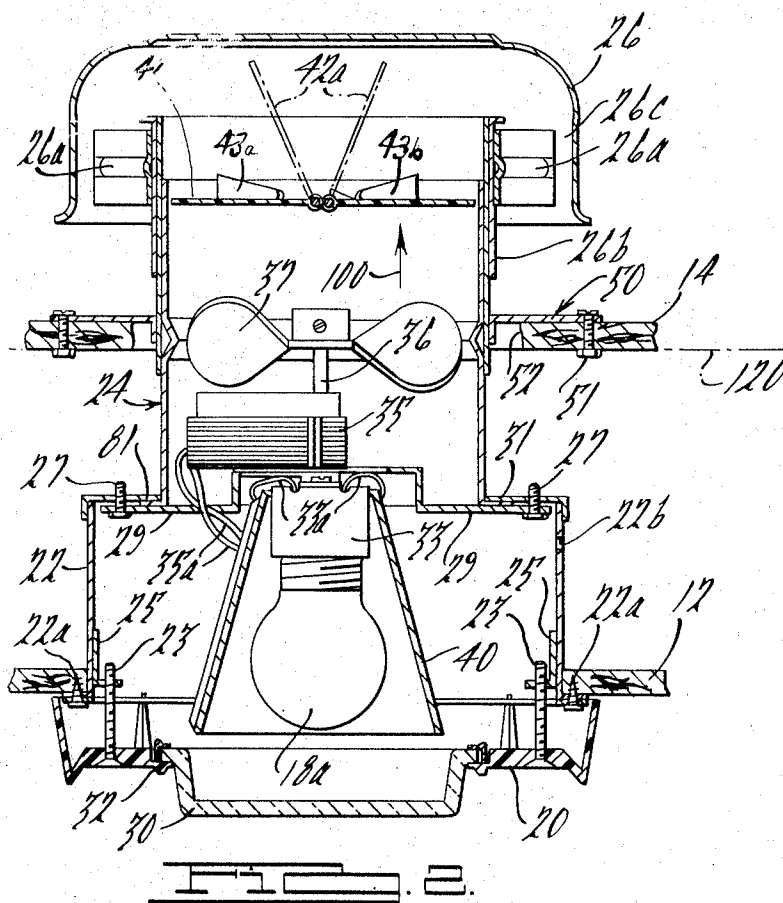
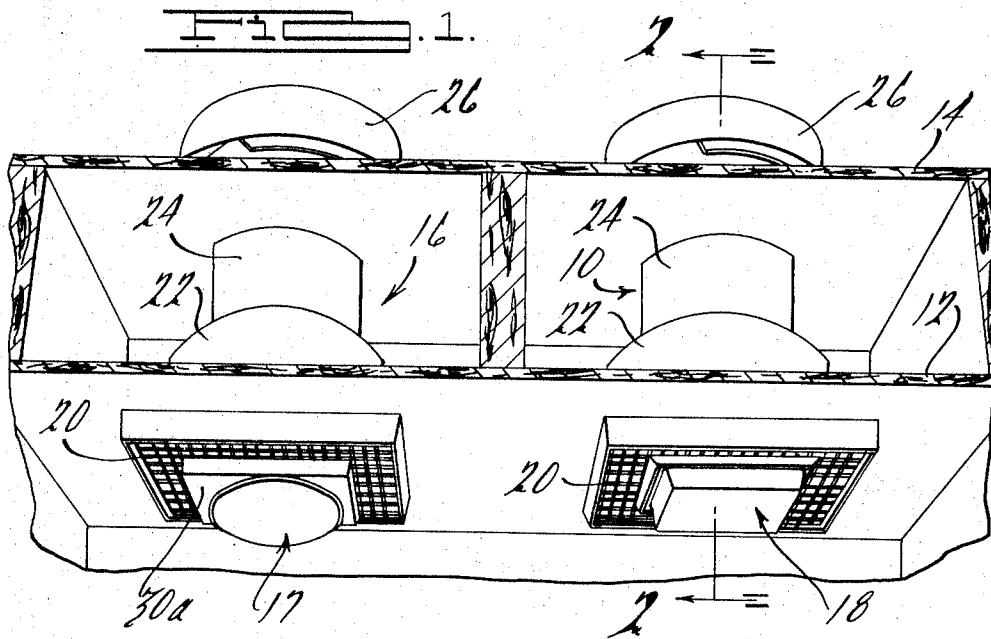
3 Claims, 6 Drawing Figures

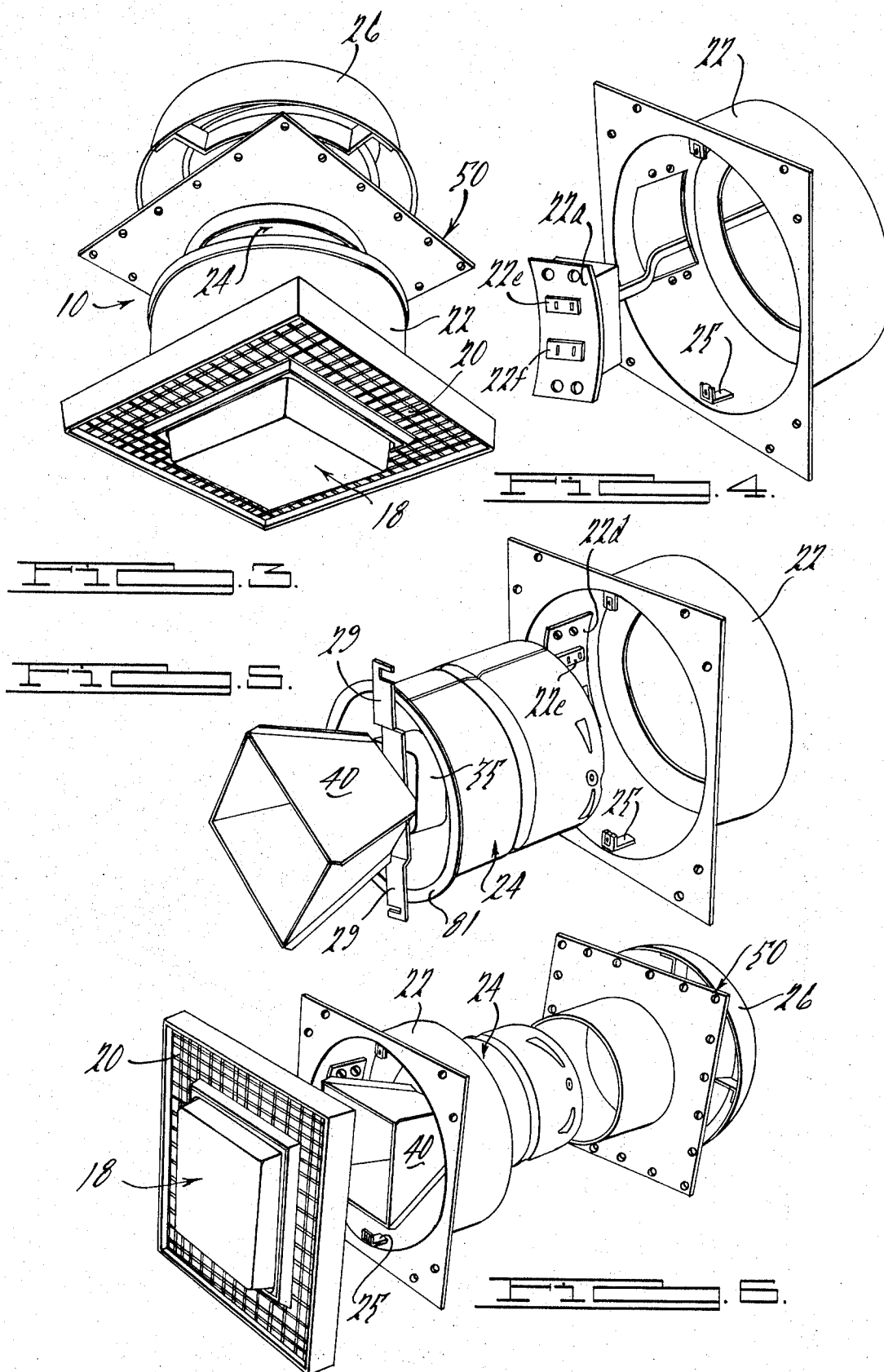


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NEW LOW PROFILE VENTILATOR APPARATUS MEANS

BACKGROUND OF THE INVENTION

The invention broadly relates to a new ventilator apparatus and its method of installation. More specifically, this invention relates to a new low profile ventilator construction particularly suitable for use in the mobile and modular home industry.

The state of the art is indicated by the following references which are cited here for the record: Pat. No. 2,785,622 C. W. Carrick; Pat. No. 3,028,475 A. E. Nash; Pat. No. 3,120,798 A. E. Nash; and, also reference is made to the Nutone Co. ventilator apparatus (description submitted concurrently with this application).

Accordingly, the main object of the present invention is to provide a new ventilator apparatus means.

Another object of the present invention is to provide a new method of installing a ventilator apparatus means which includes a lighting means cooperatively associated therewith in the bathrooms of mobile and modular homes.

Another object of the present invention is to provide a new low profile ventilator apparatus means which is uniquely constructed and which gives straight through or vertical discharge of the ventilated air.

Another object of the present invention is to provide a new method for installing a special low profile ventilator apparatus which method is economical and practical for use in the mobile and modular home industry.

Another object of the present invention is to provide a new ventilator apparatus means which can be installed such that there is no extension of the apparatus means above the roof line of the mobile or modular home until the power pack of the apparatus means is assembled into the unit, thus allowing for the housing of the apparatus means to be installed and prewired prior to roof installation.

Another object of the present invention is to provide a new ventilator apparatus means which includes ventilation openings in the housing to assist in removing condensation from between the ceiling and roof of a mobile or modular home without loss of air movement in the bathroom being ventilated by the assembly.

Another object of the present invention is to provide a new ventilator apparatus means which includes cooperatively associated therewith a lighting means or radiant heat lamp with both the ventilator fan and the lighting means being capable of simultaneous operation or separate operation.

Other objects, features, and advantages of the present invention will become apparent from the subsequent description and the appended claims, taken in conjunction with the accompanying drawings wherein like numerals in different figures indicate like elements.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates the low profile installation of the ventilator apparatus means in accordance with this invention;

FIG. 2 is a cross sectional view taken along the line 2-2 in FIG. 1;

FIG. 3 is an assembled view in perspective of the ventilator apparatus means shown in FIG. 2;

FIGS. 4, 5, and 6 illustrate various structural elements of the ventilator apparatus means disclosed

herein at various points in the sequence of installing the apparatus.

SUMMARY OF THE INVENTION

Briefly stated, the present invention comprises a new low profile ventilator apparatus means for use in mobile homes and modular homes for ventilating the air in a bathroom therein, said apparatus means including, lighting means being generally centrally located within the apparatus relative to the longitudinal axis thereof for lighting said room and operative to permit the ventilated air to generally pass around all sides of the lighting means, means defining a generally straight through ventilating path from inside the room to outside the home for the ventilated air around the sides of the lighting means, base housing means for mounting generally in the ceiling of the homes and which includes electrical conduit box means for supplying a first electricity source to drive the ventilator and a separate second electricity source for the lighting means, said base housing including a flange portion, motor-fan assembly means including a reflector means for generally centrally located mounting within said housing means, grille means for mounting on an inside portion of the apparatus facing the inside of the room, roof flange means and cap means for mounting on the other side of the apparatus.

In another aspect, briefly stated, the present invention comprises a new low profile ventilator apparatus means for use in mobile homes and modular homes and the like for ventilating the air in a room therein, said apparatus means including, lighting means for lighting said room and operative to permit the ventilated air to generally pass out of the room, means defining a generally straight through ventilating path for the ventilated air around the sides of the lighting means, housing means for mounting generally in an inside wall and which includes electrical supply means for supplying electricity source to drive the ventilator and the lighting means, a flange means associated with said housing means motor-fan assembly means for generally mounting within said housing means, and grille means for mounting on an inside portion of the apparatus facing the inside of the room.

From a method aspect, briefly stated, the present invention concerns a new method for installing a special low profile ventilator apparatus means for use in mobile homes and modular homes and the like for ventilating the air in a room therein, said apparatus means including, lighting means for lighting said room and operative to permit the ventilated air to generally pass out of the room, means defining a generally straight through ventilating path for the ventilated air around the sides of the lighting means, housing means for mounting generally in an inside wall and which includes electrical supply means for supplying electricity source to drive the ventilator and the lighting means, a flange means associated with said housing means motor-fan assembly means for generally mounting within said housing means, and grille means for mounting on an inside portion of the apparatus facing the inside of the room, said method comprising the steps of: mounting the housing means in an inside wall of the room such as the ceiling and including an electrical supply means therein and said housing means being mounted such that there is no extension beyond a line of an outer wall subsequently to be installed, installing an outer wall

such as a roof relative to said inside wall, forming an opening in the the outer wall properly located relative to the mounted housing means, mounting the motor-fan assembly means including said lighting means inside the housing means in general alignment with said opening, attaching the grille means to the housing means in proper alignment therewith and generally adjacent said inside wall.

DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 illustrates installed ventilator apparatus means 10 mounted in an operative position between a ceiling member 12 and roof member 14. The ventilator apparatus means 16 shown in mounted position next to the ventilator 10 of FIG. 1 is similar in construction except that a radiant heat lamp lighting means 17 is utilized in the ventilator 16 as opposed to a normal light bulb means 18 used in the ventilator 10 construction as will be explained hereinbelow.

The ventilator apparatus means constructions 10 and 16 in FIG. 1 are basically comprised of a grille 20, a base housing 22, and interior power pack housing 24, and a cap member 26. The grille construction 20 is similar for each of the ventilator apparatus constructions 10 and 16 except that the grille member in the apparatus 16 is of a structure which will accommodate the radiant heat lamp 17 whereas the grille member in the apparatus means 10 is of a slightly different structural configuration such that it will accommodate the light bulb means 18.

FIGS. 2, 3, 4, 5, and 6 are now discussed in regard to the ventilator apparatus means 10 and the structural details thereof.

FIG. 2 in cross sectional view illustrates the grille member 20 supporting a translucent glass lens member 30 held in engaged position within the grille member 20 by any suitable fastening means 32 and with the grille being held in fixed position relative to the base housing 22 through use of the connector screws 23 inserted in the receptive flange members 25 attached to the inside of the base housing 22. The base housing 22 is fixedly positioned relative to the ceiling 12 by any suitable connector means such as the screws 22a.

The base housing 22 also includes at least one or more small openings designated 22b with the purpose of these small openings being to serve as added ventilation openings in the base housing to help remove condensation between the ceiling 12 and the roof 14 without any substantial loss of air movement in the room itself which is being ventilated.

The interior power pack housing 24 is held in position through the use of fastening means 27, with the fastening means 27 typically being screws rotatably inserted through the support bracket 29 (best seen in FIG. 5) through a receptive aperture in the inwardly directed flange portion 31 which may be integral with or separate from the base housing 22.

The transverse support bracket 29 supports the downwardly oriented lighting means socket 33 and on the upward side of the support bracket 29, there is supported an electric motor 35 which drives the ventilator fan blade 37 through the fan motor shaft 36. The light socket 33 is adapted to receive typically a 100 watt light bulb designated 18a in FIG. 2 or correspondingly the light socket 33 may be used to hold a radiant heat lamp such as the lamp 17 shown in ventilator apparatus means 16 of FIG. 1.

The motor 35 has a capacity within the range of about 1/10 to about 5 amps at approximately 120 volts. If a radiant heat lamp such as 17 in FIG. 1 is used, then rather than a translucent lens member 30 being used, there is utilized an open aperture metal member designated 30a in the apparatus means 16 of FIG. 1.

A reflector member 40 is also supported from the support bracket 29 and light socket housing 33 as shown in FIG. 2 with the reflector 40 serving the purpose of directing the heat generated from the lighting means in a direction away from the electric motor above the support bracket 29 and with the reflector also serving the purpose of directing the light generated into the room served by the apparatus. At the upper end of the interior base housing 24 as shown in FIG. 2, a pair of back draft damper means 42 are rotatably mounted on suitable means 43 such that the back draft damper means 42 are normally weight biased to a closed position shown by the flattened out position of the damper means 42, whereas the draft dampers are forced into an open position as shown by the dotted line location of the dampers 42a. The hump-backed portions 43a and 43b prevent the draft dampers from oscillatory or chattering movement when the draft dampers are forced open by the flow of ventilating air.

A roof flange member means 50 is fixedly positioned to the roof member 14 by any suitable connector means such as 51, and the roof flange 50 is utilized to locate the interior power pack housing 24 relative to a roof opening 52, with the roof flange 50 being fastened into position by the connector means 51 after the roof flange has been positioned properly relative to the interior power pack housing member 24.

The cap member 26 includes spoke-like arms 26a which hold the cap 26 relative to its mounting sleeve 26b which is slidably positioned on the interior power pack housing 24 in order to place the cap in position above the roof 14. It is to be noted that there is enough inside clearance between the interior top of the cap 26 and the draft dampers 42 such that the dampers 42 can function freely without interference from the cap 26.

It is important to note with reference to the cross sectional view of FIG. 2 that the flow of ventilating air through the ventilator apparatus means herein is in a straight through or vertical direction as indicated by the arrow 100. The straight through flow of air enters through the grille 20 and is driven in a straight through direction or vertical direction due to the action exerted by the fan blade 37. Then the air passes upwardly through the ventilator apparatus and out through the annular passageway 26c formed by the cap member 26.

The light socket 33 and the ventilator fan motor 35 can satisfactorily be wired for simultaneous fan and light operation or separate operation of either the fan or the light. The wiring 33a for the light socket 33 in the wiring 35a for the motor 35 can suitably be connected to appropriate switching means which do not form a part of this invention for carrying out said simultaneous or separate fan and light operation.

The method of installing the ventilator apparatus means discovered and disclosed herein is important and this installation method has been discovered to be particularly advantageous and useful in the mobile and/or modular home industry.

With reference to FIGS. 4, 5, and 6 the method of installation is as follows. First, as shown by the view depicted in FIG. 4, the base housing member 22 is

mounted in the ceiling 12 and the pre-wired conduit box designated 22d is included in the base housing 22. The conduit box 22d includes two plug sockets as shown and designated 22e and 22f. The plug sockets 22e and 22f are adapted to receive the male plugs (not shown) attached at the ends of the wire means 33a and 35a to thus supply an electricity source to the light socket 33 and the motor 35 respectively. The conduit box is suitably wired as mentioned hereinabove such that the lighting means and the ventilator fan can be operated simultaneously or separately. It is to be noted that the base housing member 22 is dimensioned such that there is no extension of the base housing member above the roof line 120 (best seen in FIG. 2) until the power pack housing 24 is subsequently installed. Thus part of the discovery herein is that the base housing 22 can advantageously and suitably be installed and pre-wired in the mobile or modular home prior to the roof installation on same and this is quite significant in the industry.

Next, after roof installation the interior power pack housing 24 which holds the lighting means and fan in supported position therewithin is installed within the base housing by use of the connector means designated 27 and the electrical plugs from the lighting socket 33 and the motor 35 are inserted in the plug inlets at 22e and 22f.

Following installation of the power pack and the inserting of the electrical plugs the bulb 18a is installed and the grille 20 is connected to the base housing through the use of the connector means designated 23. Subsequent to this, the roof flange 50 and the cap member 26 are installed.

The above method sequence of installation has been found to be highly useful in the mobile and/or modular industry because it allows part of the ventilator apparatus means as described herein (FIG. 4) to be installed in the ceiling which is normally in place prior to installation of the roof and thus the roof may be subsequently installed without having to work around an extension or protrusion of the ventilator means. Subsequent to this, the remainder of the ventilator apparatus means herein (FIGS. 5 and 6) is assembled and put in place to arrive at the final installed ventilator apparatus means construction of this invention.

While the advantages of the invention discovered and disclosed herein should be fairly apparent from the above description, certain advantages in particular are referred to at this point.

First, it should be noted that the structure disclosed herein provides a combination ventilator apparatus which includes a lighting means and which provides for straight through or vertical discharge of the air which is being ventilated. Such a ventilator apparatus means is believed to be the first of its type and it is particularly useful in that it is easy to install, whereas prior ventilator constructions have required a 90° change in direction of the flow path of the ventilated air which change in the flow path of the air has caused difficulty in properly assembling prior art ventilator constructions.

Second, the ventilator apparatus means disclosed herein is economical to produce and install.

Third, the ventilator apparatus means herein has been discovered to be capable of air throughput flow rates in the range of approximately 70 to 90 cubic feet per minute and higher, and the ventilator apparatus

means possesses a desired low level sound rating in sones.

Fourth, the ventilator apparatus means discovered herein can be installed through small roof openings in the range of approximately 6 inches in diameter and higher.

Fifth, the lighting means and ventilator fan disclosed herein may be wired for simultaneous operation or separate operation as desired.

Sixth, during the sequence of assembling the ventilator apparatus means disclosed herein, there is no extension of the apparatus above the roof line until the power pack housing is assembled into the apparatus and thus, the base housing can be installed and pre-wired prior to roof installation and this is believed to be a very significant advantage in connection with the construction of mobile and/or modular homes.

Seventh, there are added ventilation openings provided in the housing of the ventilator apparatus means to assist in the removal of condensation which may form between the ceiling and the roof and this removal of condensation is carried out without any apparent loss of air movement in the bathroom or other room being ventilated within the mobile or modular home or the like.

Eighth, the ventilator or apparatus means herein is uniquely adapted to fit ceiling to roof depths varying in range from approximately 4 inches up to about 13 inches and more in dimension. Also, there may be provided in connection herewith a special adjustable roof cap and flange for minimum roof thicknesses or for longer ceiling to roof dimensions.

Ninth, the ventilator apparatus means disclosed herein includes back draft damper means constructed of very few moving parts such that the damper means is easily constructed and yet is very quiet in operation.

Tenth, the ventilator apparatus means herein can use a lighting means such as a radiant lamp to assist in providing immediate heat to the bathroom which is being ventilated.

Any or all of the above are particularly significant advantages in connection with this invention, however, other advantages are believed yet to be discovered and other advantages may well be apparent to those skilled in the art after having the benefit of this inventive disclosure.

While it will be apparent that the preferred embodiments of the invention are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation, and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. A new method for installing a special low profile ventilator apparatus means for use in mobile homes and modular homes and the like for ventilating the air in a room therein, said apparatus means including, lighting means for lighting said room and operative to permit the ventilated air to generally pass out of the room, means defining a generally straight through ventilating path for the ventilated air around the sides of the lighting means, housing means for mounting generally in an inside wall and which includes electrical supply means for supplying electricity source to drive the ventilator and the lighting means, a flange means associated with said housing means, motor-fan assembly means for generally mounting within said housing

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means, and grille means for mounting on an inside portion of the apparatus facing the inside of the room, said method comprising the steps of:

mounting the housing means in an inside wall of the room such as the ceiling and including an electrical supply means therein and said housing means being mounted such that there is no extension beyond a line of an outer wall subsequently to be installed,
installing an outer wall such as a roof relative to said inside wall,
forming an opening in the outer wall properly located relative to the mounted housing means,
mounting the motor-fan assembly means including

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said lighting means inside the housing means in general alignment with said opening,
attaching the grille means to the housing means in proper alignment therewith and generally adjacent said inside wall.

2. The method of claim 1 additionally including, installing a roof flange means and cap means at an opposite end relative to said grille means.

3. The method of claim 2 wherein, said roof flange means is operative to be adjustably positioned within the range of about 4 to about 13 inches longitudinal dimension from the housing flange.

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