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(54) **GRILLE**

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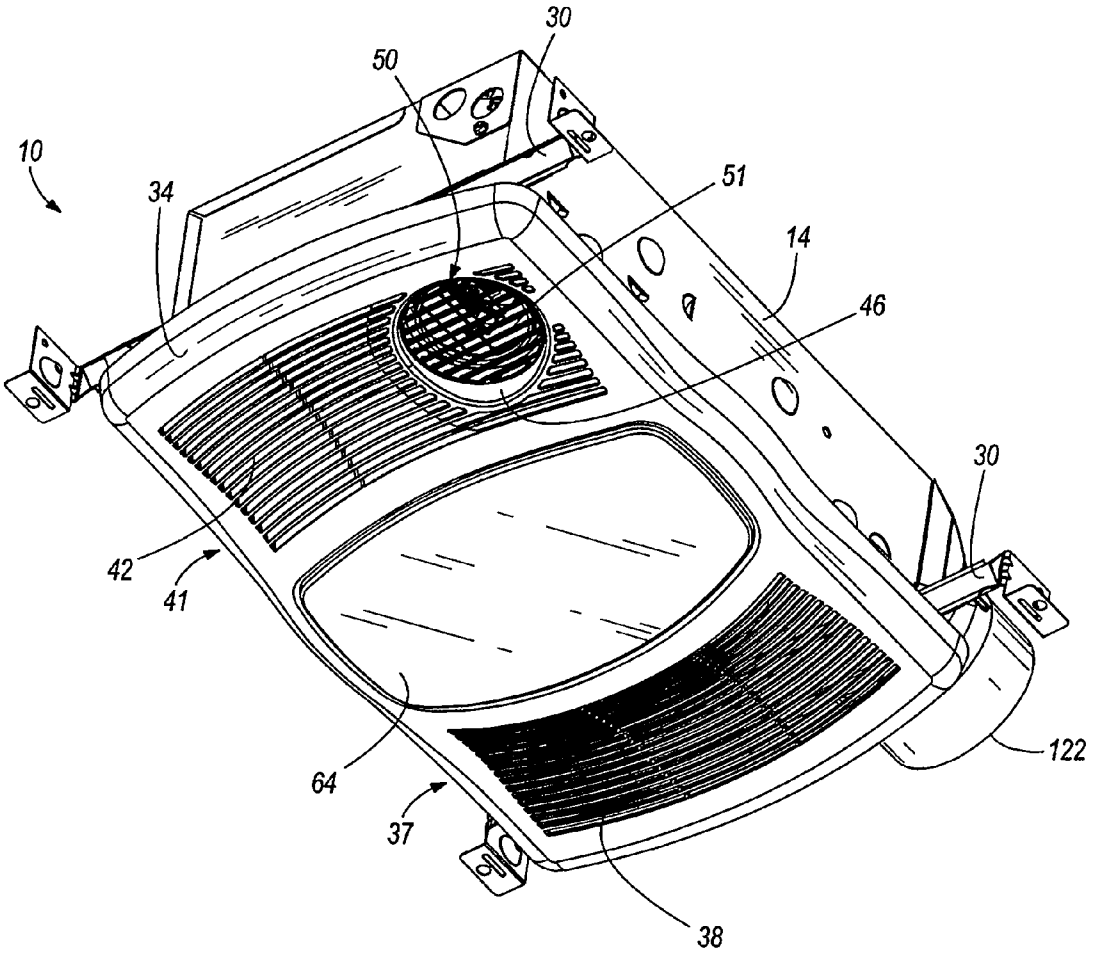
(57) **ABSTRACT**

The present invention provides, among other things, an exhaust vent fan including a housing having an inlet through which air is received within the housing and an outlet through which the air exits the housing, a fan wheel supported in the housing and operable to generate a flow of the air out of the outlet, a louvered first grille positioned across the inlet, a heating element supported in the housing, and a second grille supported on the housing and being moveable relative to the first grille while the first grille is secured to the housing to direct a heated air flow from the heating element out of the housing.



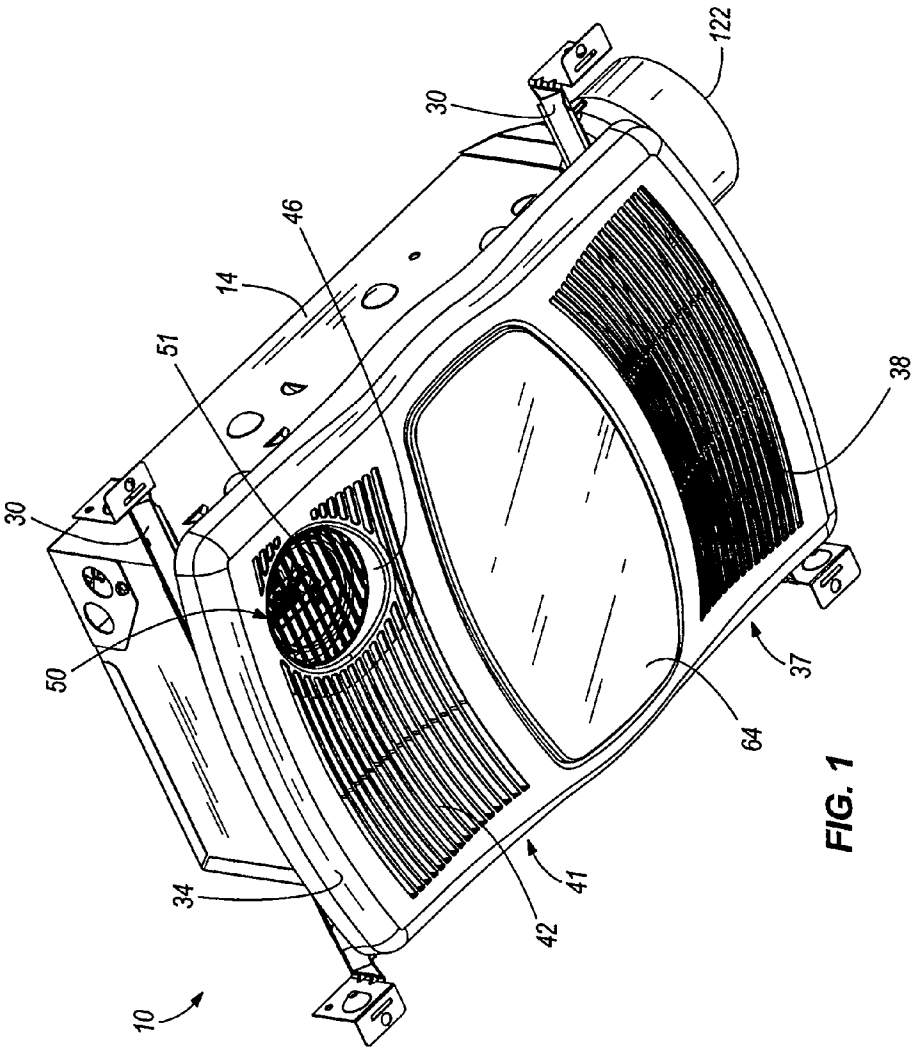


FIG. 1

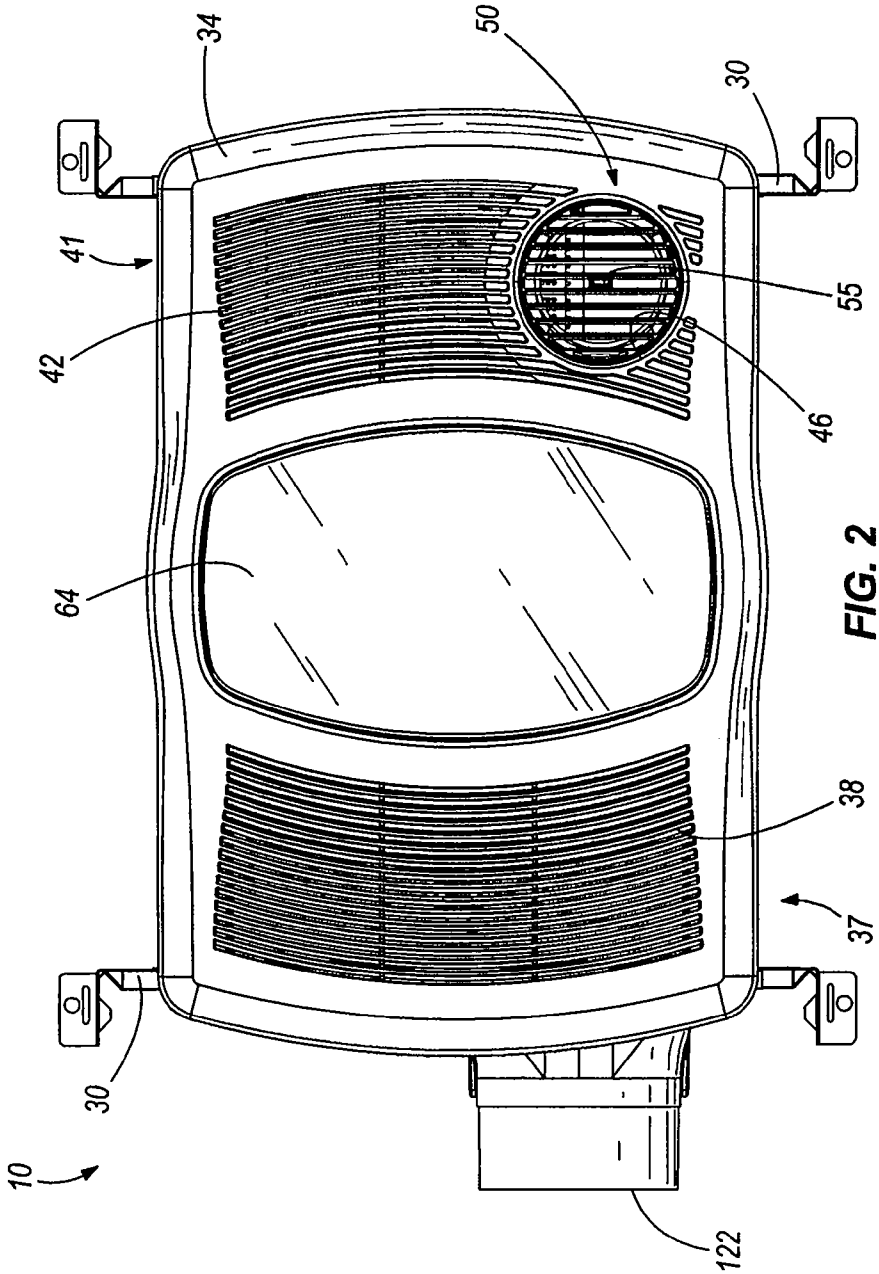


FIG. 2

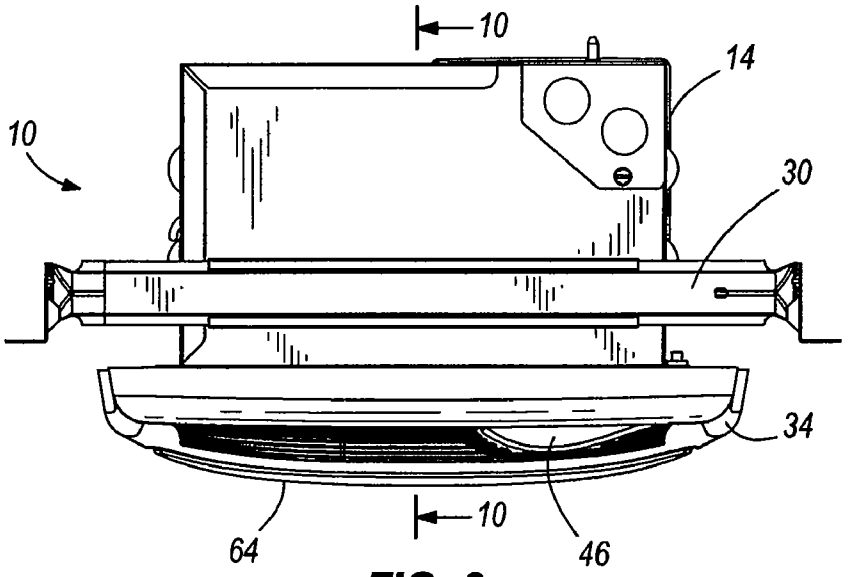


FIG. 3

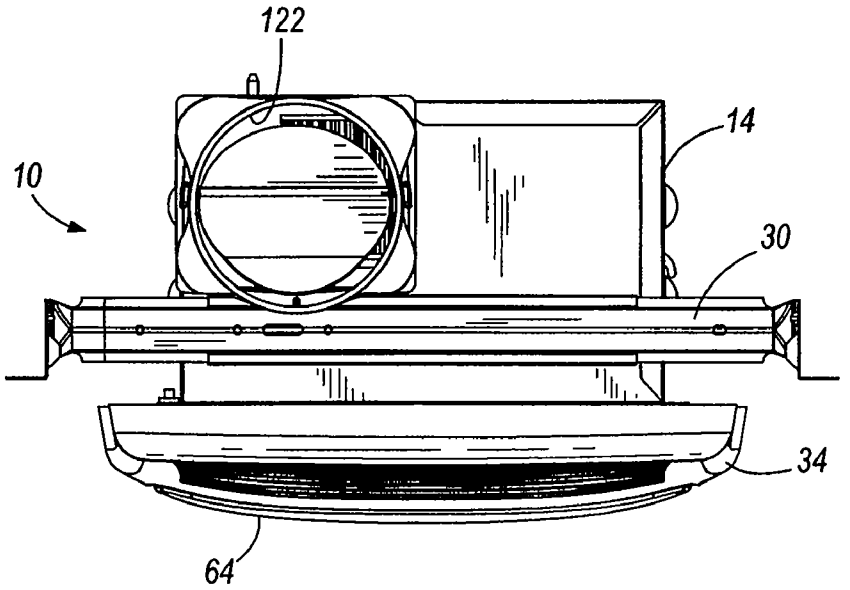


FIG. 4

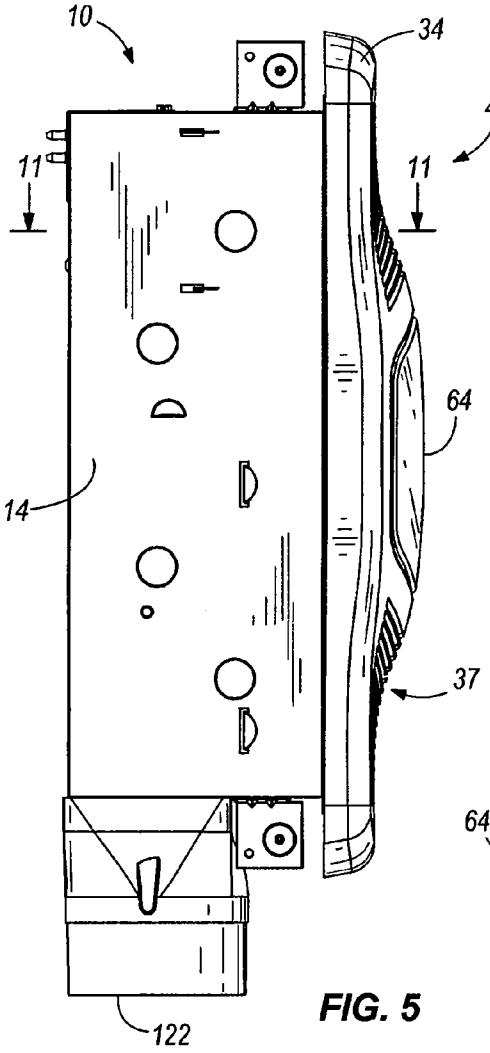


FIG. 5

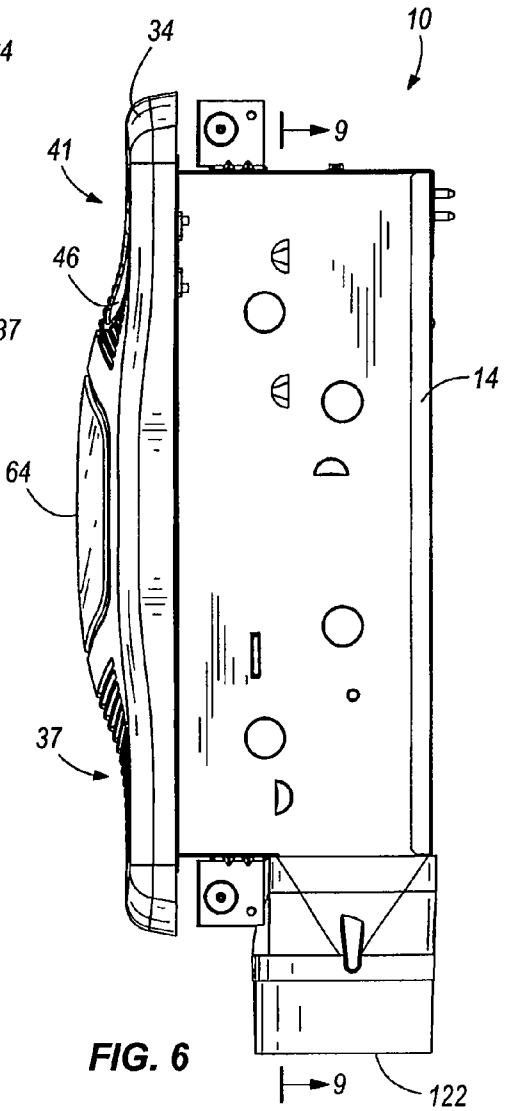


FIG. 6

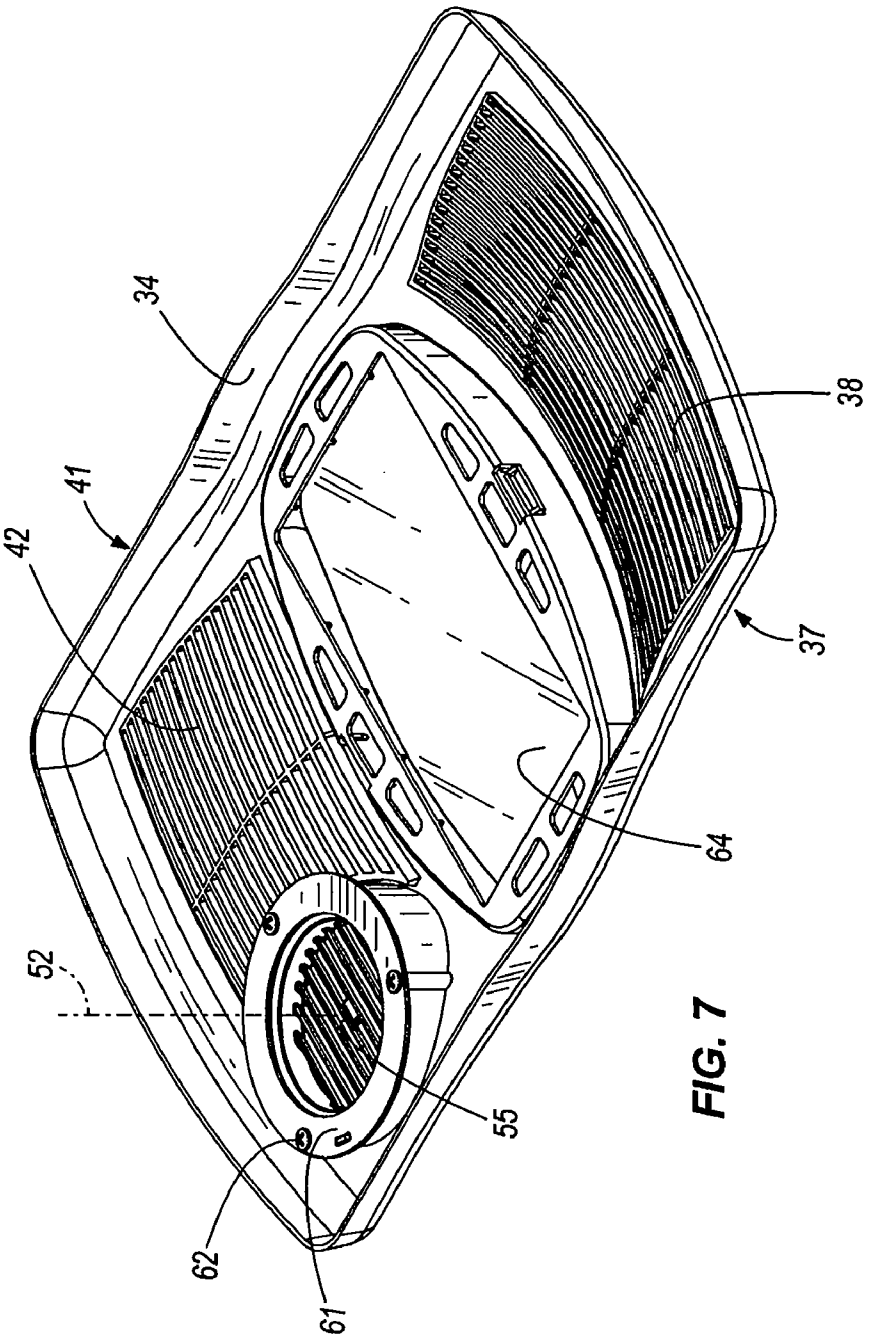


FIG. 7

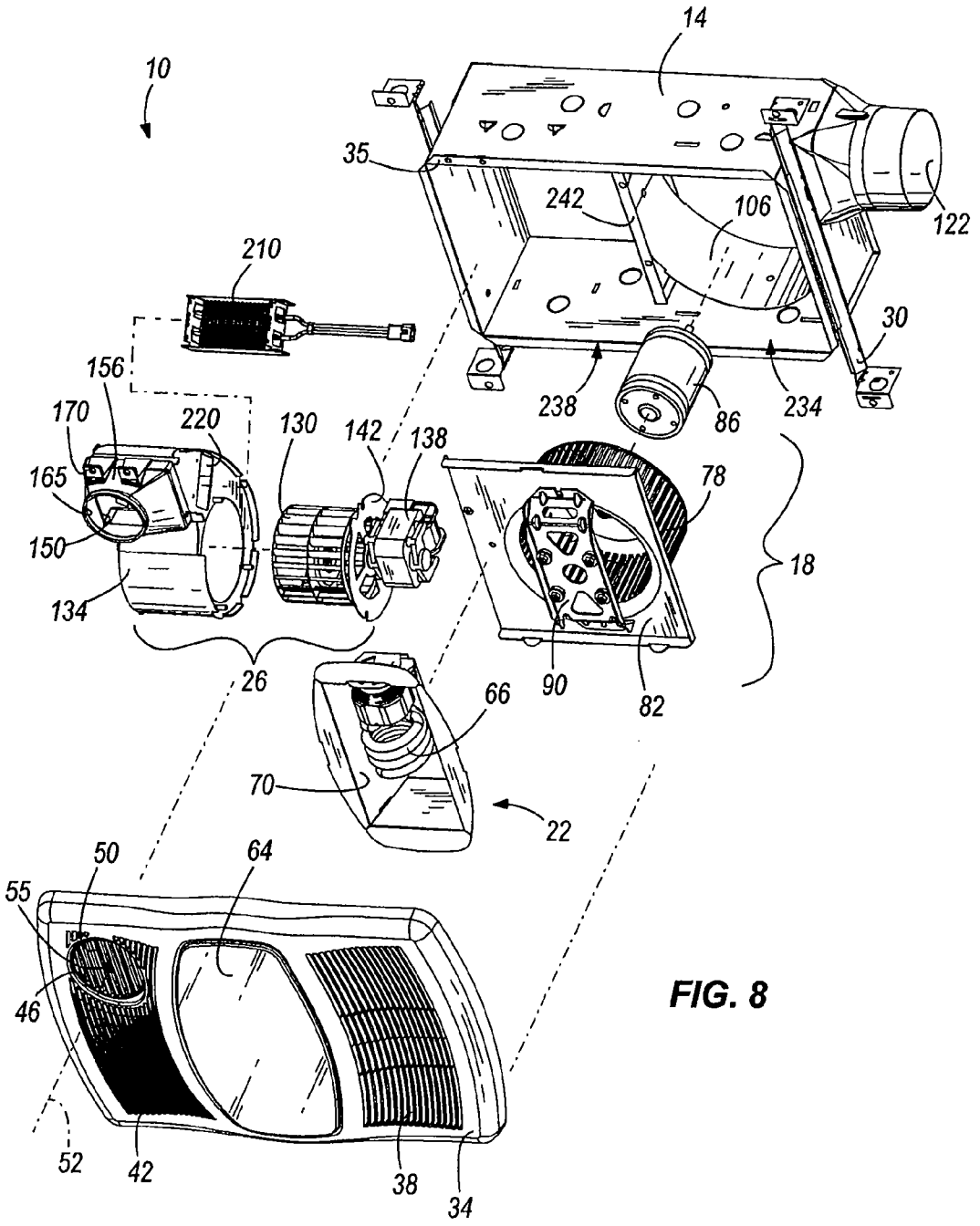

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FIG. 8

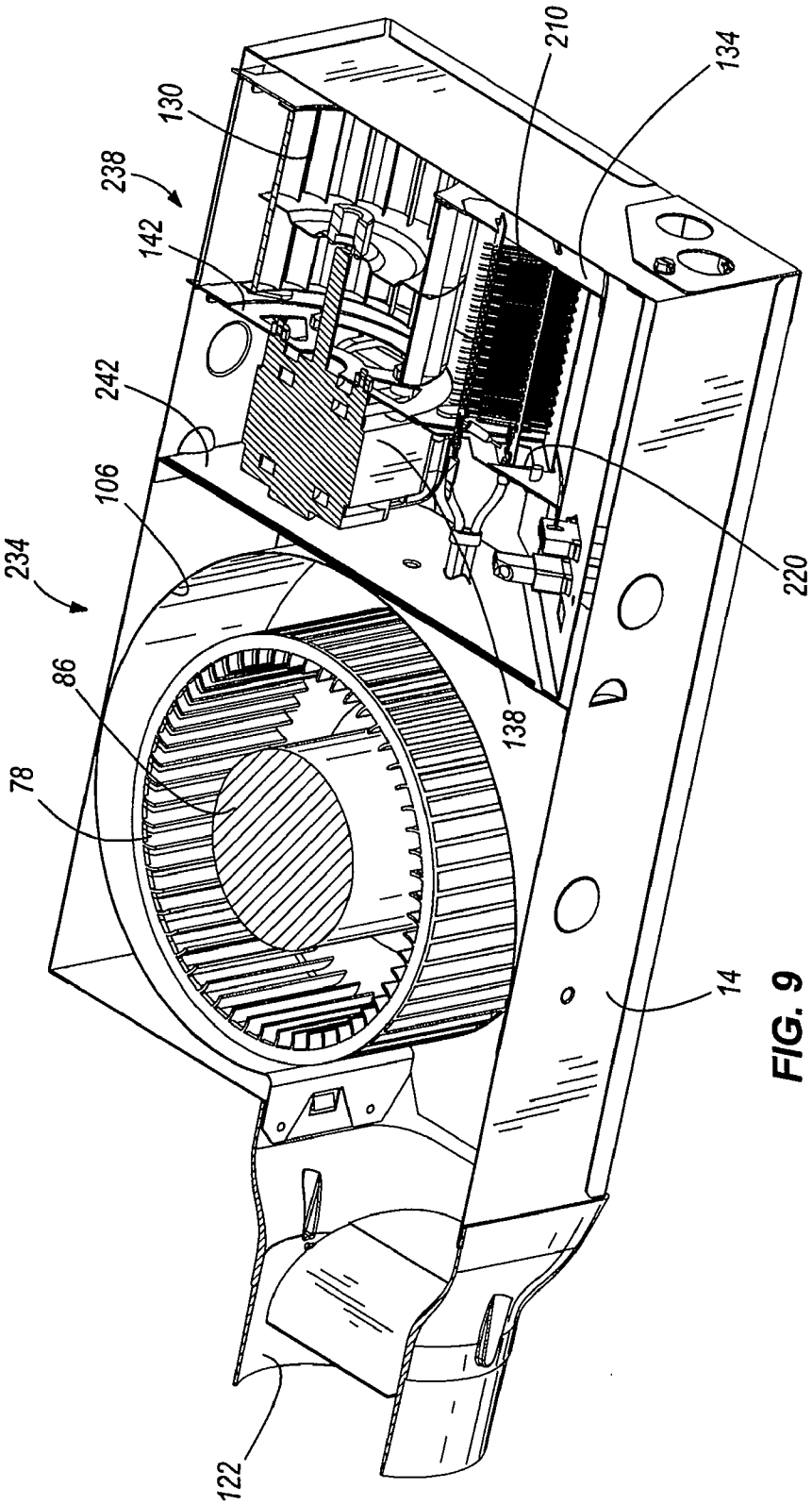

FIG. 9

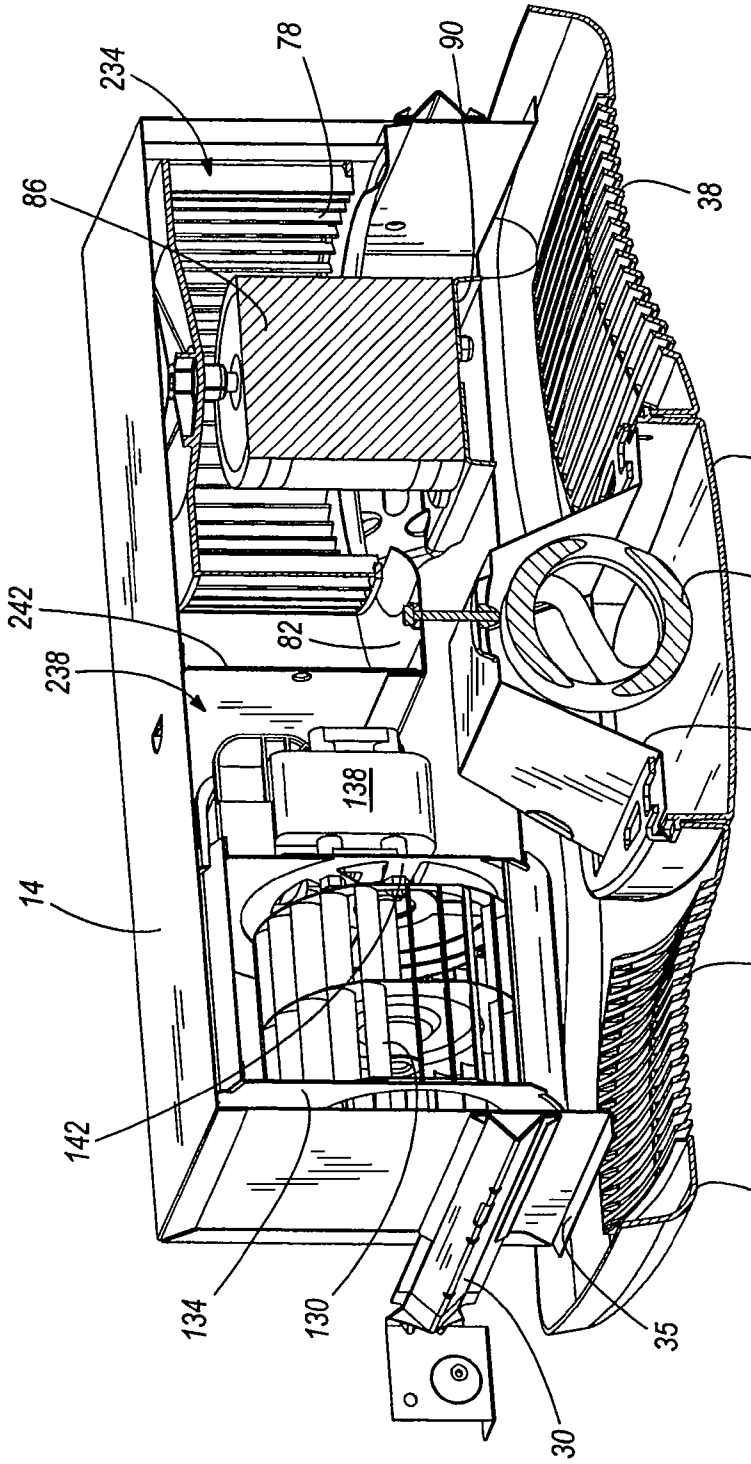

FIG. 10

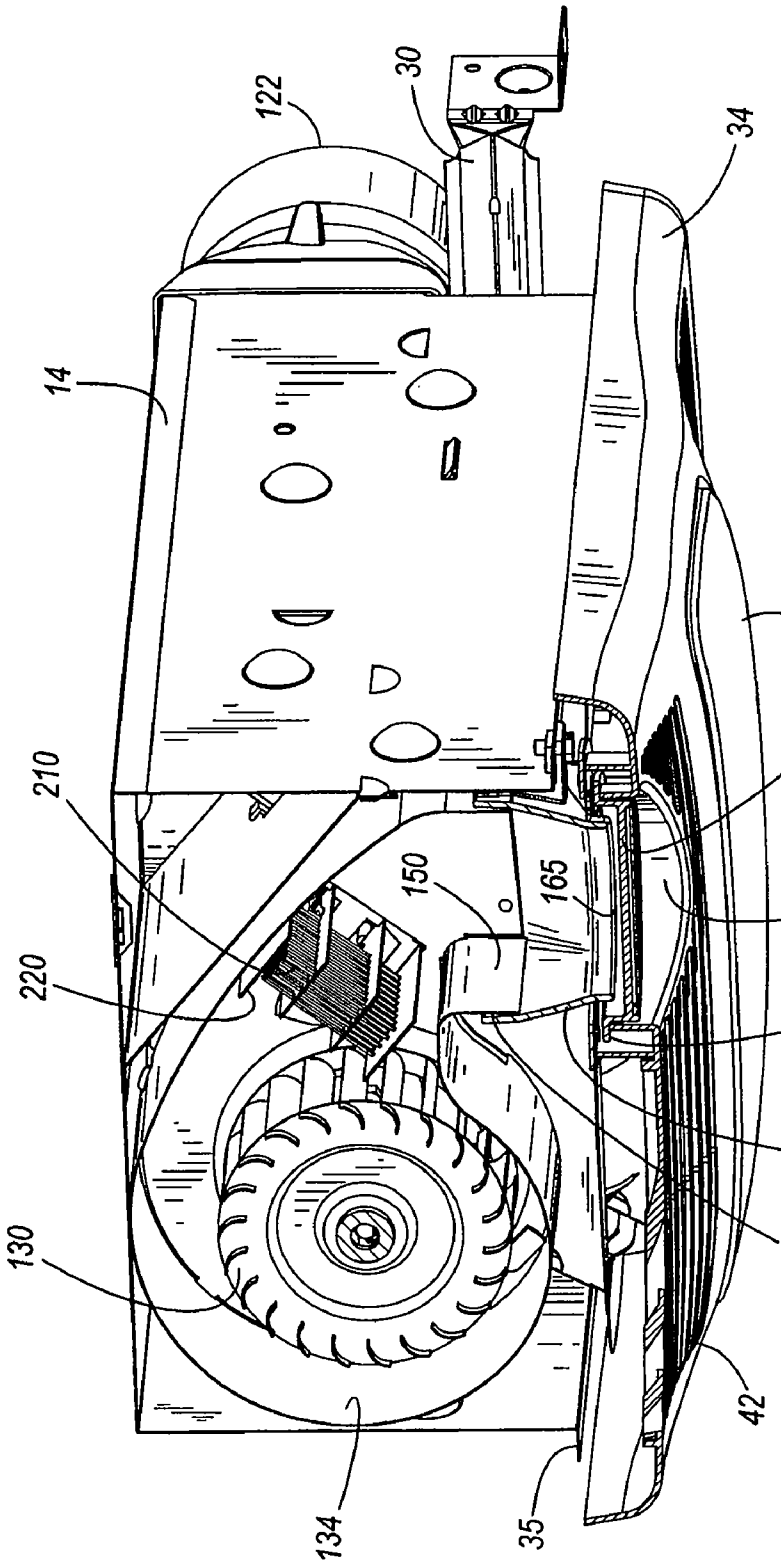

FIG. 11

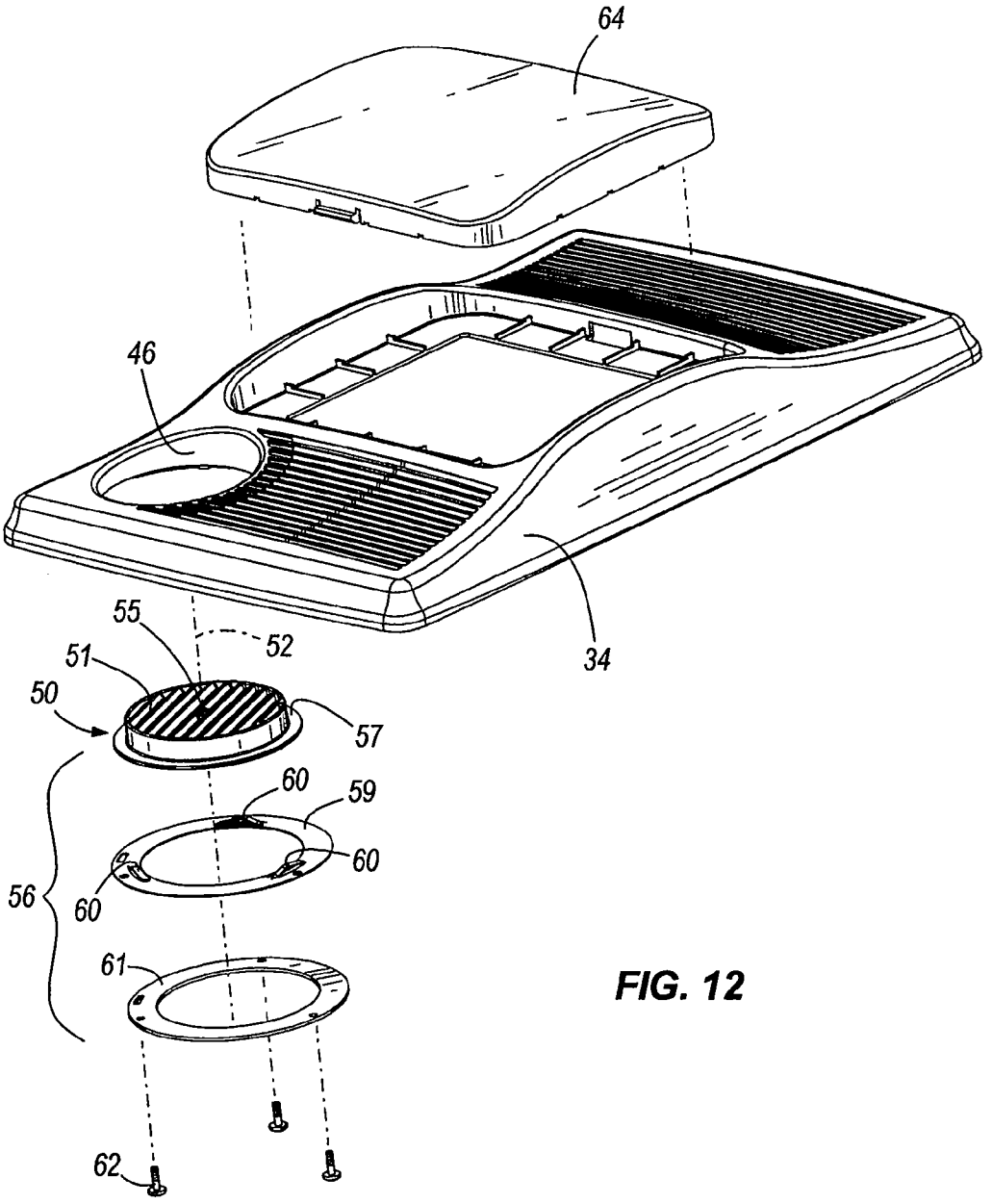

FIG. 12

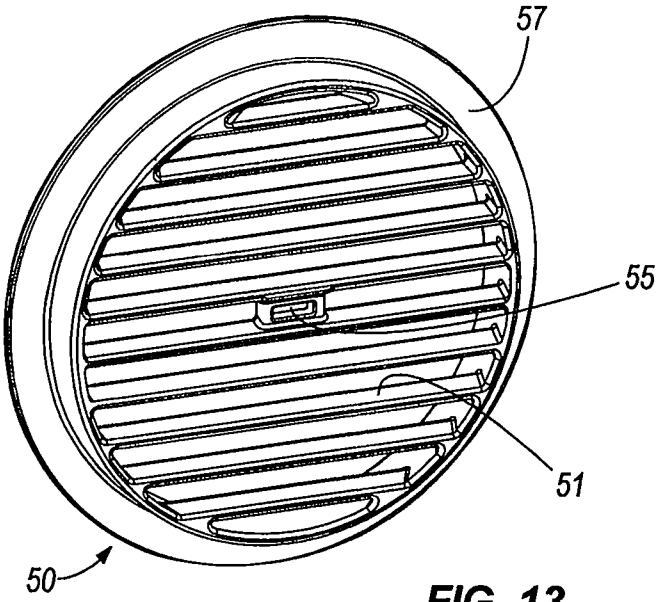

FIG. 13

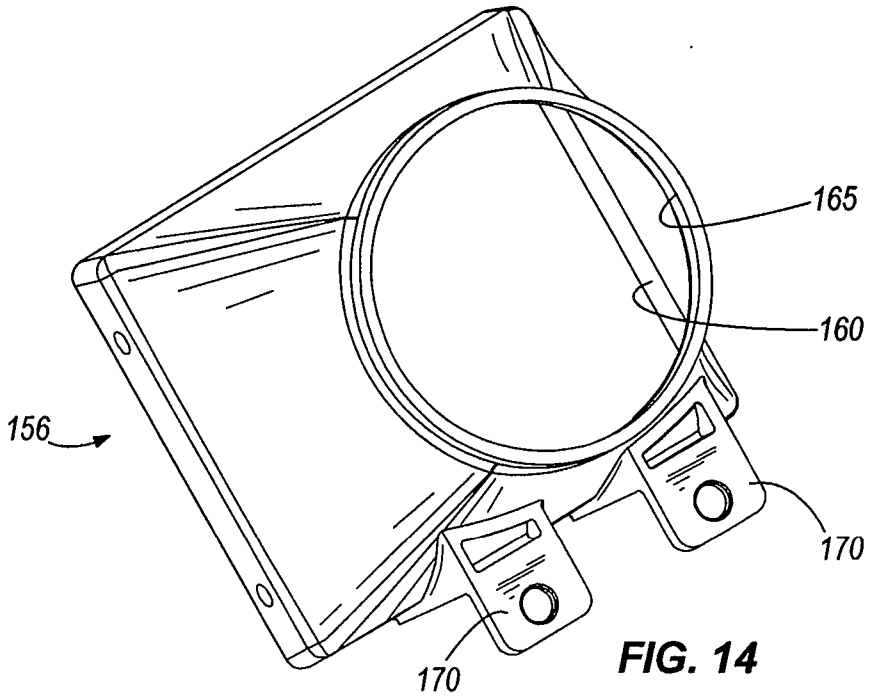

FIG. 14

GRILLE

FIELD OF THE INVENTION

[0001] The present invention relates to an exhaust vent fan and a method of operating an exhaust vent fan, and more particularly to an exhaust vent fan having a heating element and a method of operating the same.

SUMMARY

[0002] In some embodiments, the present invention provides an exhaust vent fan including a housing having an inlet through which air is received within the housing and an outlet through which the air exits the housing, a fan wheel supported in the housing and operable to generate a flow of the air out of the outlet, a louvered first grille positioned across the inlet, a heating element supported in the housing, and a second grille supported on the housing and being moveable relative to the first grille while the first grille is secured to the housing to direct a heated air flow from the heating element out of the housing.

[0003] The present invention also provides an exhaust vent fan including a housing having an inlet through which air is received within the housing and an outlet through which the air exits the housing, a fan wheel supported in the housing and operable to generate a flow of the air out of the outlet, a first grille positioned across the inlet, a second grille supported on the housing and being moveable relative to the housing to direct an air flow from the heating element out of the housing, and a locking arrangement including an actuator extending outwardly away from the housing proximate an exterior surface of the first grille and being engageable with a tool for moving the second grille with respect to the first grille.

[0004] In addition, the present invention provides a method of operating an exhaust vent fan. The method can include the act of operating a fan wheel supported in the housing to draw air into the housing through an inlet defined in the housing and through a first grille secured to the housing and to direct the air out of the housing through an outlet defined in the housing. The method can also include the acts of selectively activating a heating element supported in the housing to heat an air flow, directing the air flow from the heating element out of the housing through a second grille supported on the housing, and moving the second grille relative to the first grille while the first grille is secured to the housing to direct the heated air flow from the heating element out of the housing.

[0005] In some embodiments, the present invention provides an exhaust vent fan including a housing having an inlet through which air is received within the housing and an outlet through which the air exits the housing, a fan wheel supported in the housing and operable to generate a flow of the air out of the outlet, a louvered first grille positioned across the inlet, and a second grille extending through an opening in the first grille and being moveable relative to the housing to direct an air flow out of the housing.

[0006] Other aspects of the invention will become apparent by consideration of the detailed description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. **1** is a bottom perspective view of an exhaust vent fan according to some embodiments of the present invention.

[0008] FIG. **2** is a bottom view of the exhaust vent fan shown in FIG. **1**.

[0009] FIG. **3** is a rear view of the exhaust vent fan shown in FIG. **1**.

[0010] FIG. **4** is a front view of the exhaust vent fan shown in FIG. **1**.

[0011] FIG. **5** is a right side view of the exhaust vent fan shown in FIG. **1**.

[0012] FIG. **6** is a left side view of the exhaust vent fan shown in FIG. **1**.

[0013] FIG. **7** is a top view of a first grille and a second grille of the exhaust vent fan shown in FIG. **1**.

[0014] FIG. **8** is an exploded perspective view of the exhaust vent fan shown in FIG. **1**.

[0015] FIG. **9** is a perspective cross-sectional view of the exhaust vent fan taken along line **9-9**.

[0016] FIG. **10** is a perspective cross-sectional view taken along line **10-10**.

[0017] FIG. **11** is a perspective cross-sectional view taken along line **11-11**.

[0018] FIG. **12** is an exploded view of the first grille and the second grille shown in FIG. **7**.

[0019] FIG. **13** is an enlarged view of the second grille shown in FIG. **7**.

[0020] FIG. **14** is a perspective view of a transition outlet fitting shown in FIG. **1**.

DETAILED DESCRIPTION

[0021] Before any embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of "including," "comprising," or "having" and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items.

[0022] Unless specified or limited otherwise, the terms "mounted," "connected," "supported," and "coupled" and variations thereof are used broadly and encompass both direct and indirect mountings, connections, supports, and couplings. Further, "connected" and "coupled" are not restricted to physical or mechanical connections or couplings.

[0023] Also, it is to be understood that phraseology and terminology used herein with reference to device or element orientation (such as, for example, terms like "central," "upper," "lower," "front," "rear," and the like) are only used to simplify description of the present invention, and do not alone indicate or imply that the device or element referred to must have a particular orientation. In addition, terms such as "first" and "second" are used herein for purposes of description and are not intended to indicate or imply relative importance or significance.

[0024] With reference to the figures, an exemplary ventilating and heating apparatus, or exhaust vent fan, is shown generally at **10**. In some embodiments of the present invention, the apparatus **10** generally includes a main housing **14**, a ventilation assembly **18** for moving air into and through the apparatus **10**, a lighting assembly **22** for providing illumination, a heating assembly **26** for heating an airflow through the

apparatus **10**, and at least one mounting bracket **30** for mounting the apparatus **10** to one or more surfaces or support structures. Various embodiments of the present invention can employ any one or more of these elements and structures (and any combination thereof) as desired. Accordingly, the various features and elements of the present invention described herein and illustrated in the figures can be employed in assemblies having different structures and functional capabilities.

[0025] In some embodiments, the apparatus **10** is employed to ventilate, illuminate, and/or heat a room, area, or space. With reference to the exemplary embodiment of FIGS. **1-14**, the lighting assembly **22** can illuminate a room, the ventilating assembly **18** can draw air from the room into the main housing **14**, and the heating assembly **26** can draw air from the room, heat the air, and discharge the air back into the room at an elevated temperature.

[0026] The main housing **14** can be formed of any material desired, and in some embodiments is constructed of a material capable of withstanding varying temperatures and can also provide structural integrity to the apparatus **10**. In some embodiments, the main housing **14** is formed of sheet metal. In other embodiments, the main housing **14** is instead formed of a ceramic or a polymer material. The main housing **14** can have any shape, including a rectangular box-like shape as shown in FIGS. **1-14**, an oval shape, a hemispherical or spherical shape, a pyramidal shape, and the like. The main housing **14** can form a base or frame for the apparatus **10**, thereby providing points and areas of attachment for other components of the apparatus **10**.

[0027] In some embodiments, the main housing **14** of the apparatus **10** can include or be used in conjunction with one or more elongated mounting brackets **30** for mounting the apparatus **10** to a variety of support structures or surfaces. Any number and type of mounting brackets **30** known to those skilled in the art can be used with the apparatus **10**. The illustrated exemplary embodiment employs two mounting brackets **30** formed of sheet metal. Although the mounting bracket(s) **30** can be located in any position(s) on the main housing **14** suitable to support the apparatus **10** with respect to surrounding structure, in some cases the mounting brackets **30** are attached to opposite side walls of the main housing **14**. Alternatively, the main housing **14** can be mounted directly (via any of a variety of fasteners and fastening methods) to a support structure or surface, thereby eliminating the need for mounting brackets **30**.

[0028] Some embodiments of the apparatus **10** include a first louvered grille **34** connected to the main housing **14**. The illustrated exemplary main housing **14** has a generally box-like shape with an open end. The illustrated first grille **34** has a generally rectangular shape, but can instead take any other shape matching or substantially matching the shape of the main housing **14**. In other embodiments, the first grille **34** can have a shape different than that of the main housing **14** it covers.

[0029] The first grille **34** can be positioned over an open side of the main housing **14**. In some embodiments (e.g., the embodiment illustrated in FIGS. **1-14**), an open end of the main housing **14** is shaped and dimensioned to be received within an open end of the first grille **34**. In some embodiments, the first grille **34** is formed from a molded plastic material. In other embodiments, the first grille **34** is formed from a metallic material, such as sheet metal.

[0030] The first grille **34** can be secured to the main housing **14** by one or more snap-fit features on the first grille **34** and/or main housing **14**, any of a variety of conventional fasteners (e.g., screws, bolts, rivets, pins, clamps, and the like), welding, soldering, brazing, adhesive or cohesive bonding material, a combination thereof, and the like. In some such cases, the main housing **14** can be provided with one or more lips, flared edges, flanges, or other features to which the first grille **34** can attach. By way of example only, the main housing **14** in the illustrated exemplary embodiment has peripheral flanges **35** to which the first grille **34** can attach. In other embodiments, the first grille **34** can be shaped and dimensioned to be received within the main housing **14** for attachment thereto in any of the manners described above. In any of the main housing and cover configurations, the main housing **14** and/or the first grille **34** can be provided with apertures through which fasteners can be passed to secure the first grille **34** to the main housing **14**.

[0031] With reference to FIGS. **1**, **2**, **7**, **8**, and **10-12**, the first grille **34** can include a first set of apertures, or louvers **38** extending across a first inlet **37** defined by the main housing **14** for receiving a flow of air. The louvers **38** can be located anywhere on the first grille **34** depending at least partially upon the airflow path(s) available within the main housing **14** from the louvers **38** to the ventilating assembly **18**. In some embodiments, the louvers **38** are located in a part of the first grille **34** covering the ventilating assembly **18**. The first set of louvers **38** can guide air (which can include moisture, steam, smoke, exhaust, and the like) to the ventilating assembly **18**, which is operable to draw air into the main housing **14**. From the main housing **14**, the ventilating assembly **18** is operable to discharge the airflow to another location, such as an attic, outside the structure to which the apparatus **10** is secured, and/or into a ducting assembly. In the illustrated embodiment, the air is discharged out of a first outlet **122** in the main housing **14**.

[0032] The first grille **34** can also include a second set of apertures or louvers **42** extending across a second inlet **41** defined by the main housing **14**. The second set of louvers **42** can be located anywhere on the first grille **34** depending at least in part upon the airflow path(s) available within the main housing **14** from the second set of louvers **42** to the heater assembly **26**. By way of example only, the second set of louvers **42** in the illustrated exemplary embodiment is located at an end of the first grille **34** and main housing **14** opposite the first set of louvers **38**. In some embodiments, the second set of louvers **42** is located in a part of the first grille **34** covering the heater assembly **26**. The second set of louvers **42** can guide inlet air to the heater assembly **26**, which is operable to generate heated airflow in a room, area, and/or space.

[0033] In some embodiments, the first grille **34** can have a single set of louvers supplying air to the ventilating assembly **18** and to the heater assembly **26**, can have two or more sets of louvers supplying air to both assemblies **18**, **26**, or can have one or more dedicated sets of louvers for each assembly **18**, **26**.

[0034] In some embodiments, the first grille **34** has a second outlet **46** for discharging heated air from the apparatus **10**. The second outlet **46** can be located anywhere on the first grille **34**, depending at least partially upon the location of the heater assembly **26** and the outlet thereof. By way of example only, the second outlet **46** in the illustrated embodiment is adjacent to the second set of louvers **42**. When connected to the main housing **14**, the second outlet **46** in the first grille **34**

can correspond with and be in fluid communication with the heating assembly **26** to receive discharged and heated airflow therethrough.

[0035] Some embodiments of the present invention include a second grille **50** extending at least partially across the second outlet **46**. The second grille **50** can be moveable with respect to the first grille **34**. The second grille **50** can include louvers **51**, as shown in the figures. The louvers **51** are operable to both conceal an interior portion of the housing **14** and to direct air out of the second outlet **46**. In some embodiments, the louvers **51** can be angled between about zero degrees and about forty-five degrees from vertical when the apparatus **10** is mounted on a horizontal ceiling. In yet other embodiments, the louvers **51** can be angled between about ten degrees and about thirty degrees from vertical when the apparatus **10** is mounted on a horizontal ceiling. While reference is made herein to orientations in which the apparatus **10** is mounted on or in a ceiling, it should be understood that the apparatus can also or alternatively be mounted on a wall or in other locations within a structure.

[0036] In some embodiments, the second grille **50** includes one or more actuators to move the second grille **50** with respect to the first grille **34**. In the illustrated embodiment, an actuator **55** having a generally rectangular aperture is positioned in a central portion of the second grille **50** (see FIGS. **2**, **7**, **12** and **13**). In the illustrated embodiment of FIGS. **1-14**, the actuator **55** is operable to receive a tool, such as a standard (flathead) screwdriver. The actuator **55** can enable an operator to pivot the second grille **50** about a pivot axis **52**, with respect to the first grille **34**, thereby changing the direction of air flow out through the louvers **51**. For example, if an operator desires air to be directed in a specific direction, the operator can insert a standard screwdriver into the aperture in the actuator **55** and rotate the second grille **50**, to direct the air as desired.

[0037] In some embodiments, the pivot axis **52** is substantially perpendicular to the second grille **50** and the first grille **34**. In other embodiments, the pivot axis **52** can be non-perpendicular to one or both of the first and second grilles **34**, **50**. In some such embodiments, the outer surface of the second grille **50** can be oriented at a non-parallel angle with respect to the outer surface of the first grille **34**. In other embodiments, the second grille **50** can be supported on the first grille **34** for pivoting movement about the pivot axis **52** and/or about an axis extending through the first grille **34** in a direction substantially parallel to an outer surface of the first grille **34**.

[0038] In some embodiments, the operator can pivot the second grille **50** during operation of one or more of the ventilation assembly **18**, the lighting assembly **22**, and the heating assembly **26**. In some such embodiments, an operator can use a screwdriver or other similar tool to pivot the second grille **50** when the heating assembly **26** is operating so that the operator is not required to touch the second grille **50** and/or so that the operator does not need a stool or ladder to reach the actuator **55**.

[0039] In the illustrated embodiment, the actuator **55** is recessed below the outer surface of the first grille **34**. Further, in the illustrated embodiment, the outer surface of the second grille **50** is recessed below the outer surface of the first grille **34**. In some embodiments, the second grille **50** is formed form a metallic material, such as aluminum. In other embodiments, the second grille **50** is formed from a molded material, such as plastic.

[0040] As shown in FIG. **12**, the apparatus **10** can include a locking arrangement **56** operable to maintain the second grille **50** in any of a number of different pivoted positions with respect to the first grille **34** and with respect to the housing **14**. The locking arrangement **56** can include a flange **57** extending circumferentially around and outwardly from the outer perimeter of the second grille **50**. The flange **57** can be positioned adjacent to the first grille **34** at the second outlet **46**. The second grille **50** is illustrated as being recessed below the outer surface of the first grille **34**. The locking arrangement **56** can also include an elastic member, such as the illustrated wave washer **59** or a spring washer **59**, which can be positioned proximate the first grille **34** and between the first grille **34** and the flange **57**. The elastic member can be formed from a rigid or elastic material. The spring washer **59** can include one or more biasing elements **60** that protrude therefrom and bias the second grille **50** into frictional engagement with the first grille **34**. In some embodiments, the locking arrangement **56** locks the second grille **50** in place by friction alone.

[0041] The locking arrangement can further include a locking washer **61** adjacent to the spring washer **59** and in abutment therewith. A number of fasteners **62**, such as the illustrated screws, can extend through both the locking washer **61** and the spring washer **59** and into the first grille **34**. The fasteners **62** are operable to inhibit relative movement between the first grille **34**, the spring washer **59**, and the locking washer **61**. Therefore, in some such embodiments, only the second grille **50** is permitted to pivot relative to the first grille **34**. In other embodiments, the spring washer **59** and/or the locking washer **61** can pivot with the second grille **50**.

[0042] In some embodiments, such as the illustrated embodiment, the locking washer **61** can include an outwardly-extending first stop element **63***a* and the second grille **50** can include a second outwardly-extending stop element, which is selectively engageable with the first stop element to limit the pivoting movement of the second grille **50** with respect to the first grille **34**. In some such embodiments, first and second stop elements prevent the second grille **50** from pivoting more than about 270 degrees with respect to the first grille **34**. In other embodiments, the first and second stop elements can prevent the second grille **50** from pivoting more than 45 degrees with respect to the first grille, or alternatively, in other embodiments, the first and second stop elements can prevent the second grille **50** from pivoting more than 360 degrees. In yet other embodiments, such as the illustrated embodiment of FIGS. **1-13**, the first and second stop elements are not included to thereby allow unlimited pivoting movement of the second grille **50** relative to the first grille **34**.

[0043] As described above, some embodiments of the apparatus **10** include a lighting assembly **22**. As shown in FIGS. **8** and **10**, the lighting assembly **22** can be connected to the main housing **14** and can project light outwardly through an opening defined in the first grille **34**. In the illustrated embodiment of FIGS. **1-14**, the first grille **34** supports a lens **64** for diffusing light emitted by the lighting assembly **22**. In some embodiments of the apparatus **10**, the lens **64** can be releasably connected to the first grille **34** by any of a number fasteners (e.g., snap-fitting, fastening, and so forth). Alternatively, the lens **64** can be integrally formed with the first grille **34**, such as in cases where the first grille **34** is formed from a plastic material.

[0044] The lighting assembly **22** can include one or more lamps or other illumination devices **66**, which can be of any

type suitable to illuminate a room, area, or space. By way of example only, the illumination device(s) **66** can include incandescent, fluorescent, halogen, and other lights (whether in the form of flood lights, globe lights, light-emitting diodes, or otherwise) without departing from the present invention.

[0045] Some embodiments of the apparatus **10** can utilize a lighting assembly **22** having more than one illumination device **66**. In such embodiments, one of the illumination devices **66** can be configured to emit a bright light, while another illumination device **66** can be configured to emit a dull light. Such a dull light can be utilized as a "night light", if desired. In embodiments utilizing two or more illumination devices **66**, the illumination devices **66** can be configured to operate separately from one another or in groups. Also, one or more illumination devices **66** can be configured in any conventional manner to have one or more dimmed settings or to be controllable in a range of brightnesses.

[0046] Some embodiments of the lighting assembly **22** include an illumination housing **70**. The illumination housing **70** can include a heat resistant material, heat shielding, and/or a reflective surface to inhibit heat from contacting various components of the apparatus **10**. In the illustrated embodiment, the illumination housing **70** includes a reflective material to direct light outwardly through the lens **64**.

[0047] In the exemplary apparatus **10** of FIGS. **1-14**, the ventilating assembly **18** includes a centrifugal fan or fan wheel **78** connected to a motor plate **82** or other structure within the housing **14**. It should be noted that any other type of fan **78** other than a centrifugal fan **78** can be employed as desired (e.g., propeller-type fans, and the like).

[0048] In some embodiments, the apparatus **10** includes a motor **86** connected to the motor plate **82** by a bracket **90**. The motor **86** can include a motor shaft, which extends through the bracket **90** and/or the motor plate **82** to drive the fan wheel **78** to produce ventilating airflow. As shown in FIGS. **9** and **10**, in some embodiments, the ventilating assembly **18** is removably connected within the main housing **14** as a single integral unit.

[0049] When the ventilating assembly **18** is in an installed position within the apparatus **10**, the fan wheel **78** can be supported adjacent to an arcuate, upstanding wall **106** in the main housing **14**, as shown in FIG. **11**. Together with a bottom wall of the main housing **14** and the motor plate **82**, the upstanding wall **106** can form a scroll housing for generating airflow therein. The fan wheel **78** can be positioned relative to the upstanding wall **106** to form a scroll inlet to receive inlet air through the louvers **38**, and a scroll outlet to discharge pressurized outlet air out of outlet aperture **122**.

[0050] As discussed above, some embodiments of the present invention employ a heating assembly **26** to heat air that is blown into a room, area, or space. With reference to the illustrated embodiment of FIGS. **1-14** for example, the apparatus **10** includes a heating assembly **26** having a second centrifugal fan or fan wheel **130** positioned within a fan housing **134**. The fan housing **134** can have any shape desired, and in some embodiments has a scroll shape.

[0051] The heating assembly **26** can also include a motor **138** drivably connected to the fan wheel **130** to produce airflow into the heating assembly **26**. The motor **138** can be mounted in the apparatus **10** in any manner, such as by a motor bracket **142** attached to or defining a wall at least partially enclosing the fan wheel **130** (see, for example, FIG. **8**) or motor bracket **142** mounted to a wall or other structure of the housing **14**. If employed, the motor bracket **142** can be mounted in any suitable manner, including those described above with regard to the motor bracket **90** of the ventilating fan wheel **78**. Alternatively, the motor **138** can be directly mounted to a wall at least partially enclosing the fan wheel **130** or to a wall or other structure of the housing **14** in any suitable manner.

[0052] Any other type of fan **130** other than a centrifugal fan **130** can be employed for the heating assembly **26** as desired (e.g., propeller-type fans and the like). As shown in FIGS. **9** and **10**, the heating assembly **26** can be removably connected to the main housing **14** as a single integral unit (discussed in greater detail below).

[0053] As is known and understood in the art, rotation of the fan wheel **130**, upon driving by the motor **138**, draws the inlet air through louvers **42** into the center of the fan wheel **130** and pressurizes the air as it moves toward a discharge aperture **150** (see FIG. **11**). The discharge aperture **150** can have any shape desired, such as a round shape, an oval shape, a rectangular or other polygonal shape, an irregular shape, and the like. In the illustrated exemplary embodiment, the discharge aperture **150** is substantially rectangular in shape.

[0054] In some embodiments, a transition outlet fitting **156** can be included adjacent to the discharge aperture **150** to direct the air through a different cross-sectional shape or area. In the illustrated embodiment, the transition outlet fitting **156** has a substantially rectangular cross section **160** at the discharge aperture **150** and tapers down to a substantially circular cross section **165** as it directs air through the second grille **50**, see FIGS. **8**, **11** and **14**. The transition outlet fitting **156** can include one or more tabs **170** that can be connected to the housing **14**. For example, two tabs **170** are illustrated in the embodiment of FIGS. **8** and **12**.

[0055] With reference to FIG. **11**, a heating element **210** is shown positioned adjacent to the discharge aperture **150** of the fan housing **134** to heat the airflow generated by the heating assembly **26**. The heating element **210** includes a conventional electric resistance-type heater **210**. However, any other type of heater can instead be used. The heating element **210** is connected to the fan housing **134**, such as by inserting the heating element **210** into a heater aperture **220** in the fan housing **134** or is connected in any other conventional manner to the fan housing **134**. In some embodiments of the apparatus **10**, the heating element **210** is permanently secured in the fan housing **134**. In other embodiments, the heating element **210** can be removably connected to the fan housing **134**. As a result, a malfunctioning or non-functioning heating element **210** can be removed and serviced or replaced with a properly functioning heating element **210**. Conventional fasteners (e.g., screws, rotatable tabs, and the like) and conventional fastening methods (e.g., snap-fit connections, inter-engaging element connections, and the like) can be used to enable the removal and replacement of the heating element **210**.

[0056] As shown in FIGS. **8** and **9** of the illustrated exemplary embodiment, the main housing **14** can be generally divided into a first compartment **234** and a second compartment **238** by a first dividing wall **242**. The first dividing wall **242** can be located in any position in the main housing **14** to provide this result, thereby defining compartments **234**, **238** of any relative size desired. Like the main housing **14**, the first dividing wall **242** can be made from sheet metal, or can instead be made of any other rigid or substantially rigid material desired.

[0057] In some embodiments, the ventilating assembly **18** and/or the heating assembly **26** can be removably connected with the main housing **14** as one-piece unitary assemblies. For example, FIG. **8** shows that the ventilating assembly **18** is capable of being removed from the main housing **14**. To permit such one-piece removal of the ventilating assembly

18, one or more fasteners can be released to permit the motor plate **82** to be pivoted or lifted from a secured position in the main housing **14**.

[0058] FIG. **11** illustrates that the heating assembly **26** is capable of being removed from the main housing **14** as a single integral modular unit. To permit removal of the heating assembly **26** in this manner, one or more fasteners securing one or more parts of the fan housing **134** to the main housing **14** can be released to permit the fan housing **134** to be pivoted or lifted from a secured position in the main housing **14**. To remove the heating assembly **26** from the main housing **14** in the illustrated embodiment (by way of example only), the fasteners connecting the fan housing **134** with the side wall of the main housing **14** can be removed, and the fan housing **134** can be pivoted to allow the tabs of the fan housing **134** to disengage their corresponding slots in the main housing **14**. Upon the tabs disengaging the slots, the heating assembly **26** can be removed from the main housing **14** as one piece.

[0059] One or more power consuming devices, such as the motor **86**, the motor **138**, the heating element **210** and the illumination device **66**, can be powered by an internal electrical circuit of a building. For example, one common line from one side of the housing **14** can provide an inlet for one or more lines of power to enter the housing **14** and power one or more of the power consuming devices.

[0060] In some embodiments, one or more switches, such as wall switches can be used to turn the power consuming devices of the ventilating assembly **18**, the lighting assembly **22**, and the heating assembly **26** on and off. In some embodiments, three separate switches can be utilized to control the three separate operations of the ventilating assembly **18**, the lighting assembly **22**, and the heating assembly **26**. In some embodiments, the heating assembly **26** can have a timer, such that an operator can, for example, turn a dial to run the heating assembly **26** for a specific amount of time, at the end of which the heating assembly **26** would automatically shut off. In some embodiments, all three of the ventilating assembly **18**, the lighting assembly **22**, and the heating assembly **26** can operate simultaneously with the actuation of a single switch.

[0061] The embodiments described above and illustrated in the figures are presented by way of example only and are not intended as a limitation upon the concepts and principles of the present invention. As such, it will be appreciated by one having ordinary skill in the art that various changes in the elements and their configuration and arrangement are possible without departing from the spirit and scope of the present invention as set forth in the appended claims.

What is claimed is:

1. An exhaust vent fan comprising:

a housing having an inlet through which air is received within the housing and an outlet through which the air exits the housing;

a fan wheel supported in the housing and operable to generate a flow of the air out of the outlet;

a louvered first grille positioned across the inlet;

a heating element supported in the housing; and

a second grille supported on the housing and being moveable relative to the first grille while the first grille is secured to the housing to direct a heated air flow from the heating element out of the housing.

2. The exhaust vent fan of claim **1**, wherein the second grille is supported on the first grille for movement relative to the housing.

3. The exhaust vent fan of claim **1**, further comprising a locking arrangement for maintaining the second grille in a pivoted position with respect to the first grille.

4. The exhaust vent fan of claim **3**, wherein the locking arrangement includes an elastic member positioned between the second grille and the first grille and operable to maintain the second grille in the position with respect to the first grille.

5. The exhaust vent fan of claim **1**, wherein the second grille includes an actuator extending outwardly away from the housing and engageable with a tool for moving the second grille with respect to the first grille while the second grille is secured to the first grille.

6. The exhaust vent fan of claim **1**, wherein the second grille extends through an opening in the first grille.

7. The exhaust vent fan of claim **1**, wherein an exterior surface of the second grille is recessed below an exterior surface of the first grille.

8. An exhaust vent fan comprising:

a housing having an inlet through which air is received within the housing and an outlet through which the air exits the housing;

a fan wheel supported in the housing and operable to generate a flow of the air out of the outlet;

a first grille positioned across the inlet;

a second grille supported on the housing and being moveable relative to the housing to direct an air flow from the heating element out of the housing; and

a locking arrangement including an actuator extending outwardly away from the housing proximate an exterior surface of the first grille and being engageable with a tool for moving the second grille with respect to the first grille.

9. The exhaust vent fan of claim **8**, further comprising a heating element supported in the housing, and wherein the second grille is moveable relative to the housing to direct a heated air flow from the heating element out of the housing.

10. The exhaust vent fan of claim **8**, wherein the second grille is pivotable about an axis extending through the second grille and the housing at least 270 degrees with respect to the housing while the first grille is secured to the housing.

11. The exhaust vent fan of claim **8**, wherein the second grille extends through an opening in the first grille.

12. The exhaust vent fan of claim **8**, further comprising a locking arrangement for securing the second grille in a pivoted position with respect to the first grille.

13. The exhaust vent fan of claim **12**, wherein the locking arrangement includes an elastic member operable to maintain the second grille in the position.

14. The exhaust vent fan of claim **8**, wherein the actuator is recessed below an exterior surface of the first grille.

15. A method of operating an exhaust vent fan, the method comprising the acts of:

operating a fan wheel supported in the housing to draw air into the housing through an inlet defined in the housing and through a first grille secured to the housing and to direct the air out of the housing through an outlet defined in the housing;

selectively activating a heating element supported in the housing to heat an air flow;

directing the air flow from the heating element out of the housing through a second grille supported on the housing; and

moving the second grille relative to the first grille while the first grille is secured to the housing to direct the heated air flow from the heating element out of the housing.

16. The method of claim **15**, wherein directing the air flow through the second grille includes directing the air flow across louvers supported in the second grille.

17. The method of claim **15**, wherein moving the second grille relative to the first grille includes pivoting the second grille about an axis extending through the second grille and the housing at least 270 degrees with respect to the first grille.

18. The method of claim **15**, further comprising securing the second grille in a pivoted position with respect to the first grille with a locking arrangement.

19. The method of claim **15**, wherein moving the second grille relative to the first grille includes compressing an elastic member with one of the second grille and the first grille.

20. The method of claim **15**, wherein moving the second grille relative to the first grille includes engaging the second grille with a tool.

21. An exhaust vent fan comprising:

a housing having an inlet through which air is received within the housing and an outlet through which the air exits the housing;

a fan wheel supported in the housing and operable to generate a flow of the air out of the outlet;

a louvered first grille positioned across the inlet; and

a second grille extending through an opening in the first grille and being moveable relative to the housing to direct an air flow out of the housing.

22. The exhaust vent fan of claim **21**, further comprising a heating element supported in the housing, and wherein the second grille is moveable relative to the housing to direct a heated air flow from the heating element out of the housing.

23. The exhaust vent fan of claim **21**, wherein the second grille is moveable relative to the first grille while the first grille is secured to the housing.

24. The exhaust vent fan of claim **21**, wherein the second grille includes an actuator engageable with a tool for moving the second grille with respect to the first grille while the second grille is secured to the first grille.

25. The exhaust vent fan of claim **21**, further comprising an elastic member positioned between the second grille and the first grille and operable to maintain the second grille in a position with respect to the first grille.

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