

[54] **INFRARED HEATER AND VENTILATOR UNIT**[75] Inventors: **Ward H. Bumpus; Justin Brehm,**
both of Fayetteville, N.C.[73] Assignee: **Fasco Industries, Inc.,** Rochester,
N.Y.[22] Filed: **Aug. 18, 1972**[21] Appl. No.: **281,766**

[52] **U.S. Cl.** **219/343**, 98/40 DL, 219/220,
219/342, 219/352, 219/358, 240/2 V, 240/47
[51] **Int. Cl.** **H05b 1/02**, F21v 29/00, F24f 7/00
[58] **Field of Search**..... 219/220, 339, 342,
219/343, 347, 350-354, 358, 377, 361, 364,
363, 370, 369; 240/2 V, 47, 78 HA, 78 H;
98/40 DL

[56] **References Cited****UNITED STATES PATENTS**

3,692,977	9/1972	Duhamel et al.	219/220 X
2,614,202	10/1952	Jordan	219/358 X
3,636,306	1/1972	Bumpus	219/343 X
2,875,316	2/1959	Ford et al.	219/361 X
2,800,563	7/1957	Browne et al.	219/342 X
3,068,341	12/1962	Ortiz et al.	219/220

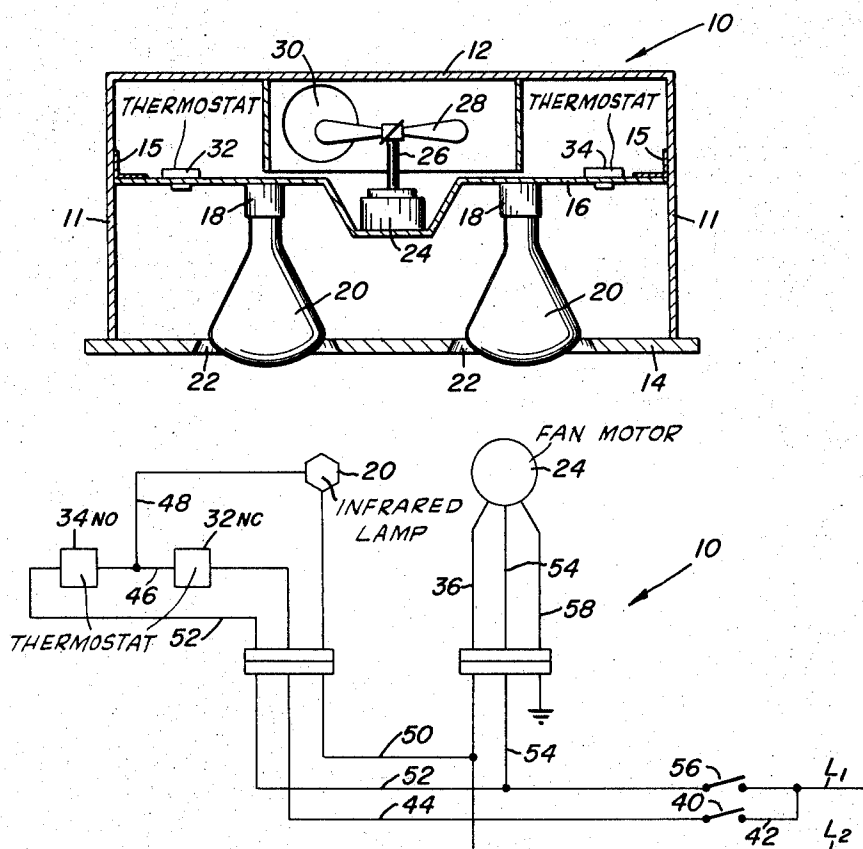
3,163,366	12/1964	Schraith et al.	240/47 X
2,919,338	12/1959	Covault et al.	219/376 X

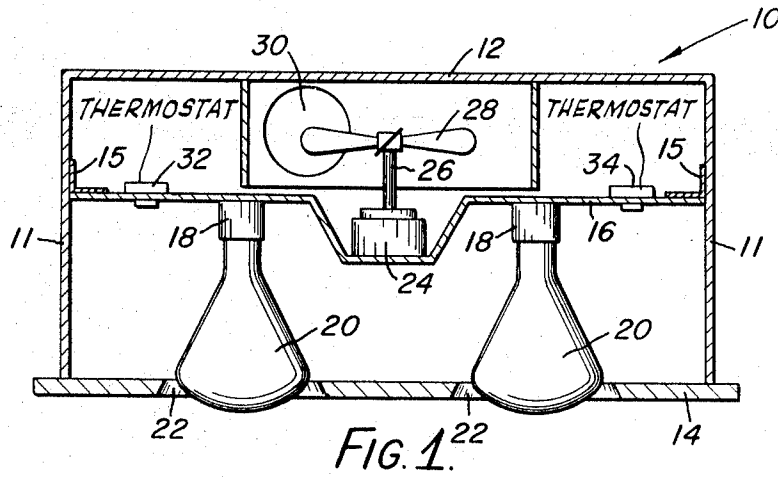
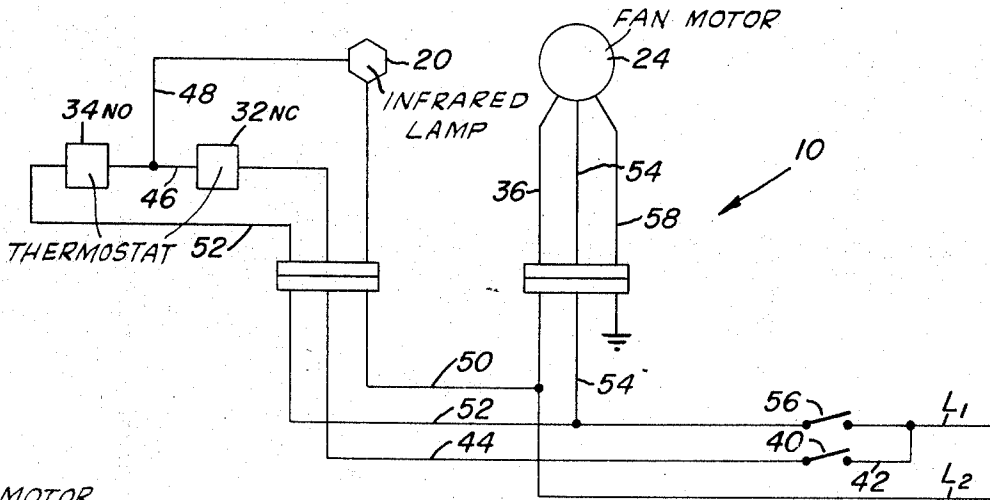
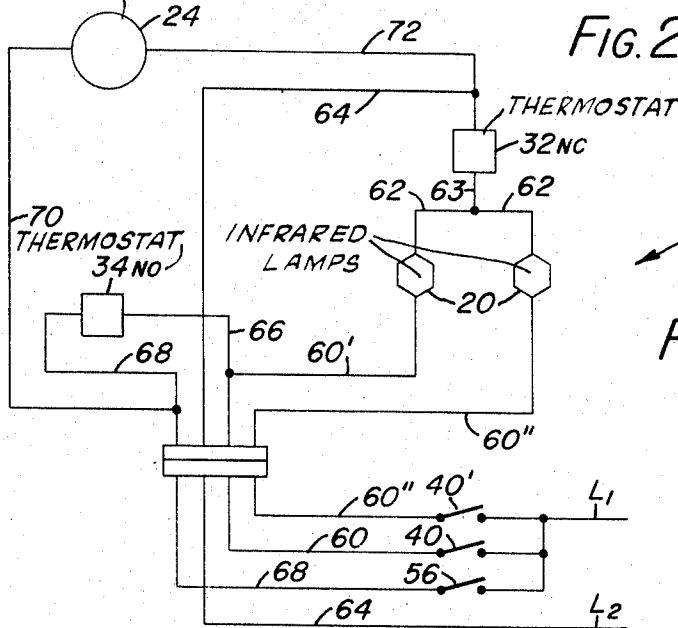
Primary Examiner—Anthony Bartis

Attorney—B. Edward Shlesinger et al.

[57] **ABSTRACT**

An infrared heater-ventilator unit comprises a housing adapted to be mounted in the ceiling of a room with the front of the housing substantially flush with the ceiling. Two infrared lamps are mounted on the front side of a strap that extends transversely across the housing. A motor and fan are mounted on the rear of the strap. The unit is wired so that one or both lamps may be illuminated by closing separate manually-operable switches. A normally-open thermostatic switch closes, if the temperature in the unit reaches a predetermined level, to actuate the motor to drive the fan to draw air into the housing through a front opening and vent it through a rear opening. If the temperature in the unit exceeds this level a normally-closed thermostatic switch opens to break the circuit to the lamps and motor. A separate manually-operable switch permits closing the circuit to the motor to drive the fan, if it is only desired to ventilate the room.

6 Claims, 3 Drawing Figures



INFRARED HEATER AND VENTILATOR UNIT

The present invention relates to combination heater-ventilators, and more particularly to an infrared heater-ventilator unit of the type adapted to be mounted in the ceiling or wall of a bathroom.

In known infrared heater-ventilator units, heating is effected by one or more infrared lamps and a circulating fan for blowing air across the lamps into the room; and ventilation has been achieved by sucking air from the room. With known constructions, separate motors are required to drive the blower which blows air over the lamps into the room, and for sucking air from the room to achieve ventilation. The blower also functions to circulate air inside the housing of the unit to provide cooling action when internal temperatures in the unit reach the maximum safely allowed.

A primary object of the present invention is to provide a combination heater-ventilator unit requiring only one motor, and eliminating a separate motor for the blower, but still providing the needed cooling action of circulating air to keep the internal housing temperature at a safe degree.

Another object of the invention is to provide an improved unit of the character described with which the infrared heating lamp or lamps and the ventilator can be used separately and may be in operation either when the lamp or lamps are on, or are off.

Other objects of the invention will be apparent hereinafter from the specification and from the recital of the appended claims, particularly when read in conjunction with the accompanying drawing.

The objects of the invention have been achieved by employing in a heater-ventilator unit of the type described, a single motor both for driving a fan for cooling the infrared heating lamps, and for ventilating the room in which the unit is mounted. At least two thermostats are mounted in the housing of the unit for automatically and selectively operating the fan, when the infrared lamps are energized. One thermostat controls the fan motor only, and the other controls both the fan motor and the lamps, and functions as a back-up control in case the first thermostat malfunctions.

In the drawing:

FIG. 1 is a vertical sectional view illustrating a combination heater-ventilator unit built according to one embodiment of this invention;

FIG. 2 is a wiring diagram illustrating one manner in which the unit may be wired for operation when one lamp is employed in the unit; and

FIG. 3 is a wiring diagram illustrating how the unit may be wired when two infrared lamps are employed in the unit.

Referring now to the drawing, 10 denotes generally the housing for the unit. This may be oblong in cross section, and has four side walls 11, of which only three appear in the figure FIG. 1, and a top wall 12. The bottom of the housing is closed by a cover plate 14. Secured by angle brackets 15 to opposed side walls of the housing is an elongate bar or strap 16. Fastened to the underside of this strap 16 are two conventional lamp sockets 18 for holding infrared lamps 20, which can be turned on or off by a suitably located wall switch 40 (FIG. 2). Openings 22 are provided in the cover plate 14 through which the lamps project.

The strap 16 is bent downwardly intermediate its ends, as shown clearly in FIG. 1 to provide a mounting

for a conventional electric motor 24, which can be turned on or off, separately from the lamps by a suitably located wall switch 56 (FIG. 2). Secured to the armature shaft 26 of this motor is a conventional fan 28. An opening 30 in one wall 11 of the housing permits exhausting air from the housing.

Mounted on the strap 16 adjacent opposite sides of the housing are two thermostats 32 and 34, respectively.

The thermostat 34 controls operations of motor 24. When the temperature in the housing 10 rises above a predetermined degree the thermostat 34 operates to turn the motor 24 on to cause fan 28 to draw air through openings 22 to ventilate and cool the unit.

Referring now to FIG. 2, one way is shown in which the unit may be wired to accomplish its purpose. Power is supplied to the unit through the main lines L_1 and L_2 which are connected to an alternating current power source. For heating the room in which the unit 10 is installed, the manually-operated switch 40 is closed. When this is done, lamp 20 is connected to the power source, the circuit then being made from the line L_1 through line 42, now-closed switch 40, line 44, thermostat 32, which is normally closed, line 46, line 48, lamp 20, line 50 and line L_2 .

When only the lamp is on and the internal temperature in the housing 10 increases, the normally-open preset thermostat 34 will sense the rise in the temperature, and will be actuated, and close a circuit to the fan motor 24 from line L_1 through closed switch 40, line 44, thermostat 32, line 46, now-closed thermostatic switch 34, line 52, line 54 to motor 24, and line 36 to line L_2 . This will cause the motor 24 to drive the fan 28 and suck air into the housing through the openings 22 in the cover 14, past the strap 16, and out the opening 30. This will provide air circulation to cool the interior of the housing. When the internal temperature of the housing is lowered to a predetermined degree, the thermostat 34 will shift back to its open position to open the circuit and turn the ventilator motor 24 off. On and Off cycling of the automatic fan delay thermostat 34 will continue as long as the lamp or lamps is or are On and produce excessive heat.

If for any reason the automatic fan delay thermostat 34 should fail, or become defective, the second normally-closed preset thermostat 32 in the circuit will sense the abnormal rise in the internal temperature of the housing and open automatically to switch off both the ventilator and the lamp circuits until the temperature in the housing cools to a predetermined degree. When this lower temperature is reached, the thermostat 32 will close again and energize the unit. The ON and OFF cycling of the lamps and ventilator motor by the second thermostat 32, acting as a limit control, will continue, thus giving the cue that service to the fan delay thermostat 34 is required.

When only ventilation of a room is desired, and not heating thereof, the switch 40 is opened, and the switch 56 is closed. Then the circuit is from the main line L_1 through the now-closed switch 56, the line 54, to the motor, and from the motor through the line 36 to main line L_2 .

One way in which the unit may be wired where two lamps 20 are used, is shown in FIG. 3. Here switches 40, 40' control lamps 20. When one lamp is to be used, the switch 40 is closed. The circuit is then made from line L_1 through this switch, the lines 60 and 60' left-

hand lamp 20 and through lines 62 and 63 and thermostatic switch 32 and line 64 to main line L₂. This puts left-hand lamp 20 on. When only this single light is on the unit will dissipate its own heat. Therefore, the thermostat 34 and motor 24 are not required to operate.

When full heat is desired the right-hand lamp 20, as well as the left-hand lamp, is put on. This is done by closing switch 40' which makes a circuit from line L₁ through line 60'', right-hand lamp 20, and lines 62, 63 and thermostat 32 and line 64 to main line L₂. If the unit heats up excessively with the two lights on, thermostat 34 shifts to closed position making a circuit from main line L₁, through the switch blade 40, lines 60 and 66, now-closed thermostat 34, lines 68 and 70; motor 24, line 72, and line 64 to main line L₂. If the thermostat 34 fails, and the unit continues to heat, the safety thermostat 32 opens, breaking the circuit to the fan motor 24 and to the lights, and will not close again until the unit has cooled down again. If the lamps and ventilator motor continue to cycle ON and OFF, it will be obvious that something is wrong, and that repair or replacement of thermostat 34 is required.

With the arrangement illustrated in FIG. 3, if ventilation only, as opposed to heating or the cooling of the unit is desired, the switch 56 is closed. This closes a circuit from line L₁ through switch 56, lines 68 and 70, motor 24, line 72, and line 64 to main line L₂.

While the invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modification; and this application is intended to cover any modifications of the invention that come within the scope of the invention, the disclosure, or the limits of the appended claims.

Having thus described our invention, what we claim is:

1. A combination heater-ventilator unit, comprising a housing adapted to be mounted in a wall of a room with its front facing outward and having an opening in its front extending to the exterior of the housing, and an opening adjacent its rear, a strap extending transversely across said housing intermediate its front and rear, a lamp socket mounted on the front side of said strap and adapted to hold an infrared lamp in alignment with the first-named opening, a fan disposed between said strap and the rear of said housing, a motor mounted in said housing for driving said fan and a first electric circuit for supplying power only to said motor to drive said fan, and including a first manually operable switch for closing and opening said first circuit, and a second circuit energizable independently of said first switch to supply power to said socket and selectively to said motor, said second circuit including a second manually operable switch, a normally-open thermostatic switch responsive to the temperature within said housing and which closes automatically to connect said motor in said second circuit, when the temperature

in said housing rises to a first predetermined level, and opens automatically when the temperature in said housing has been lowered to a predetermined degree, thereby to cause said fan to draw air into said housing through said first-named opening and to exhaust air through said second-named opening, when said thermostatic switch is closed, thereby to ventilate said housing.

2. A combination heater-ventilator unit according to claim 1, including

a second, normally-closed thermostatic switch in said second circuit responsive to the temperature within said housing and operative, when the temperature in said housing rises above said first predetermined level, to open and deenergize said second circuit.

3. A combination heater-ventilator unit as claimed in claim 1, wherein said motor is mounted on to rear of said strap, and said fan is mounted on the armature shaft of said motor.

4. A combination heater-ventilator unit, comprising a housing adapted to be mounted in a wall of a room with its front facing outwardly and having an opening through its front extending to the exterior of said housing and an opening at its rear for venting the housing,

a strap extending transversely across said housing intermediate its front and rear,

two lamp sockets mounted on the front side of said strap and adapted to hold infrared lamps,

a fan disposed between said strap and the rear of said housing,

a motor mounted in said housing on the rear of said strap for driving said fan to draw air through said front opening and exhaust through said rear opening,

first electric circuit means for connecting said lamps to an electric power source including two separate manually-operable switches operable independently of one another, electric conductors connecting said lamps with said two switches, respectively, a normally-closed thermostatic switch responsive to the temperature within said housing, and common conducting means for connecting each of said lamps through said thermostatic switch to said power source, and

second electric circuit means for supplying power from said source to said motor including a normally-open thermostatic switch responsive to the temperature within said housing for connecting said motor to one of said two separate manually-operable switches, and operative to close and energize said motor whenever said one switch is closed and the temperature in said housing exceeds a predetermined level.

5. A combination heater-ventilator unit as claimed in claim 4, having a third manually-operable switch for connecting said motor directly to said power source.

6. A combination heater-ventilator unit as claimed in claim 4, wherein said normally-closed thermostatic switch is adjusted to open at a temperature greater than said predetermined level.

* * * * *