

[54] **INFRARED HEATER AND VENTILATOR UNIT**
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[58] Field of Search **219/213, 220, 339-358, 219/366-371, 377; 240/2 V, 2 W; 98/33 R, 40 DL; 165/55-57**

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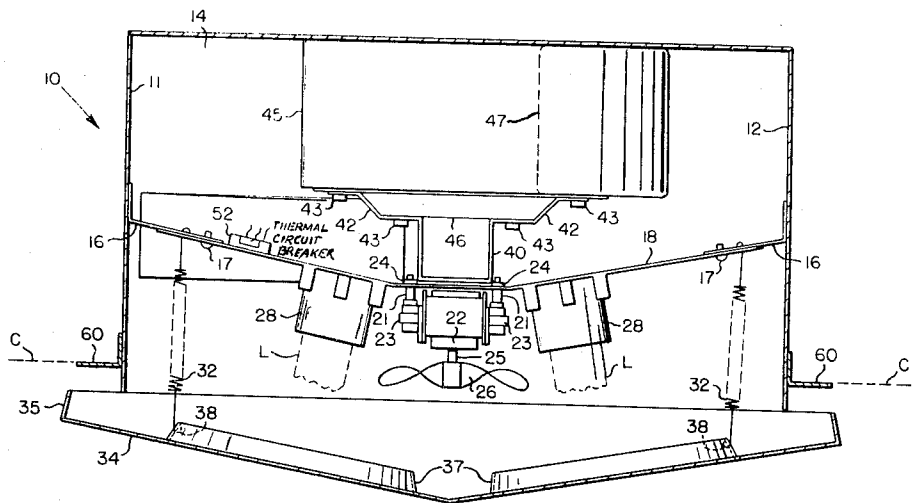
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[57] **ABSTRACT**

An infrared heater and ventilator unit comprises a rectangular, sheet metal housing adapted to be mounted in the ceiling of a room with the lower end of the housing approximately flush with the ceiling. Two infrared lamps are mounted in sockets that are fastened to the underside of a narrow bar or strap that extends centrally across the housing. A small fan is mounted on the strap between the lamps to blow heat therefrom downwardly into the room; and a ventilator blower is mounted above the fan to draw air upwardly into the housing from the room, and to exhaust the air into the space above the ceiling. The fan motor is wired to operate whenever one or more of the lamps is energized; and the blower is operable independently of the lamps.

2 Claims, 3 Drawing Figures



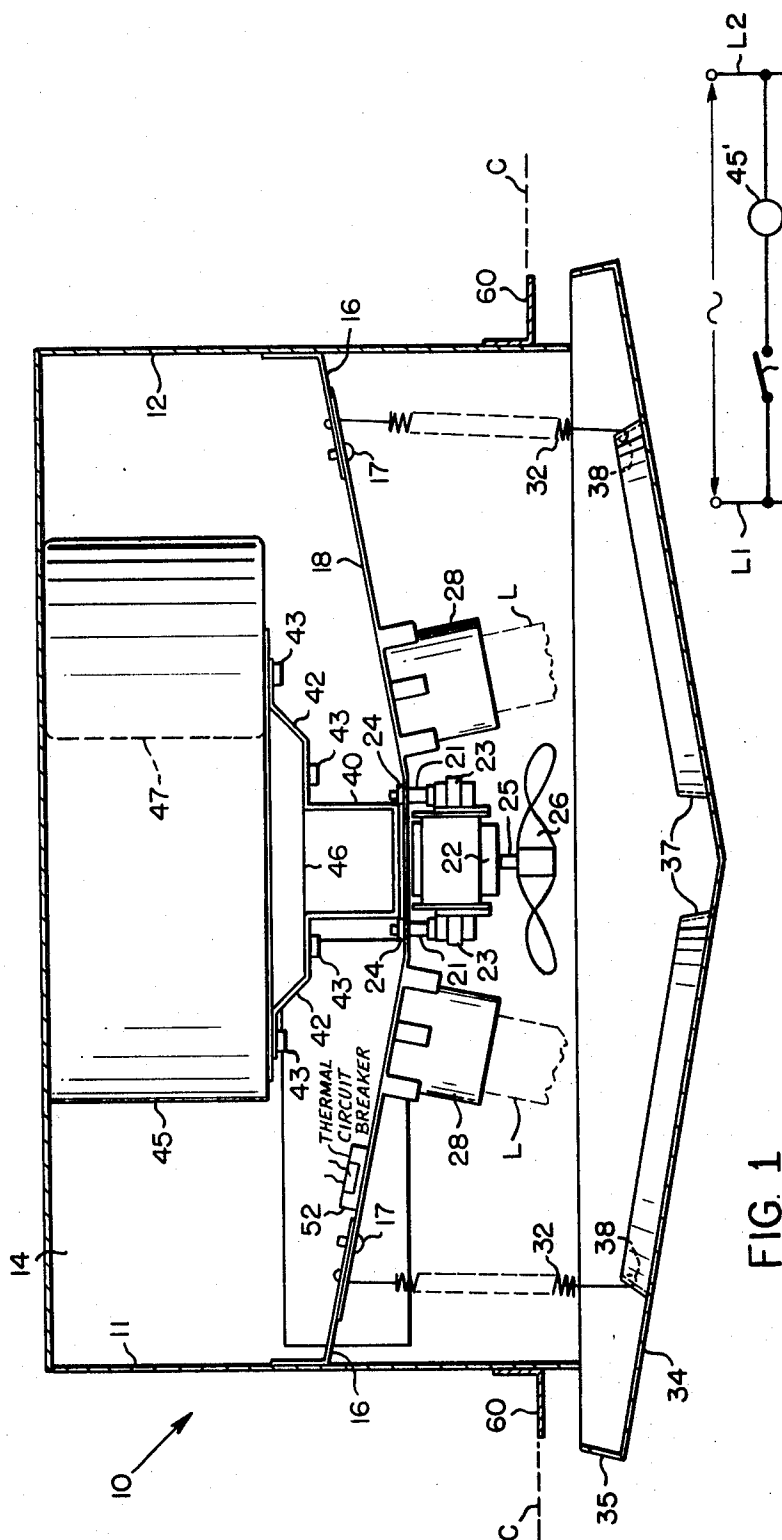


FIG. 1

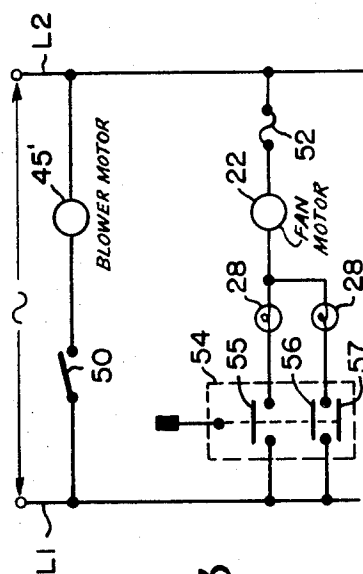


FIG. 3

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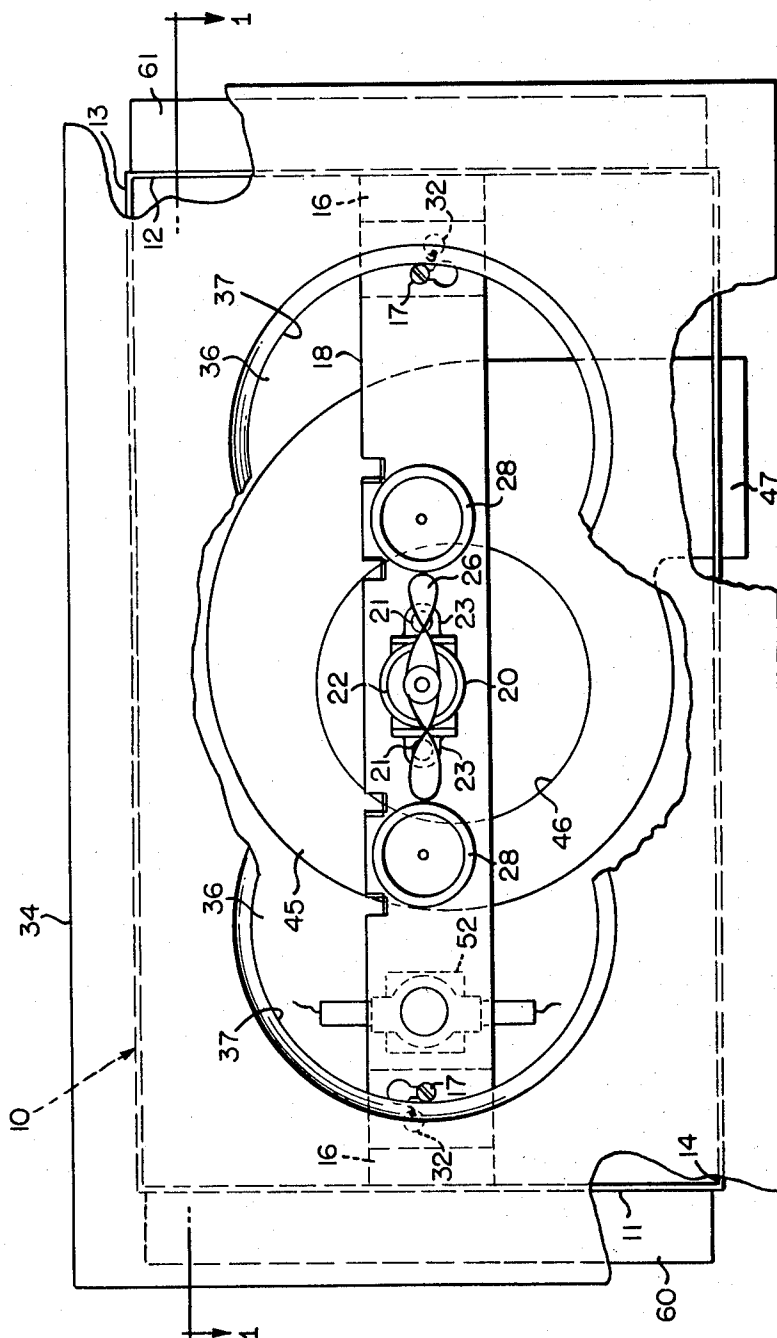


FIG. 2

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INFRARED HEATER AND VENTILATOR UNIT

The 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, or the like.

Quite frequently a room, a bathroom for example, is heated by a ceiling-mounted heater unit comprising an electric radiant heater, and a circulating fan for blowing warm air from the heater into the room. With such a unit it is necessary to use thermal insulation in the ceiling to prevent excessive heating of the ceiling. Despite the use of such insulation, however, it has heretofore been impossible to employ infrared heating lamps of any significant wattage in the ceiling units without creating excessive heating of the ceiling or the surrounding building structure.

It is an object of this invention to provide a novel infrared heater and ventilator unit which is entirely suitable for use in the ceiling in a conventional bathroom without requiring more than normal or average thermal insulation.

A concomitant object of the invention is to provide a unit for heating and ventilating a room that will operate so as not to transmit excessive heat to the structure of the building and/or its electrical wiring.

A further object of this invention is to provide an improved ceiling unit of the heater-ventilator type, which utilizes infrared lamps for heating purposes; and a centrifugal blower for ventilating purposes, and with which the infrared heating lamp or lamps and the ventilator blower of the unit can be operated in unison or independently of one another.

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

In the drawings:

FIG. 1 is a sectional view taken along the line 1-1 in FIG. 2 looking in the direction of the arrows, and illustrating in phantom a pair of infrared lamps mounted in the unit;

FIG. 2 is a bottom plan view of an infrared heater and ventilator unit made in accordance with one embodiment of this invention, a portion of the unit being cut away for purposes of illustration; and

FIG. 3 is a wiring diagram illustrating one manner in which the unit may be wired for operation.

Referring now to the drawings by numerals of reference, 10 denotes generally an oblong, sheet metal housing open at its bottom and having spaced, parallel end walls 11 and 12, and spaced, parallel sidewalls 13 and 14. Secured at one end to the inside surfaces of the end walls 11 and 12, and projecting at their opposite ends centrally into housing 10 are two angle brackets 16. Removably secured at opposite ends by screws 17 to the inner ends of the brackets 16, and extending across the central opening in housing 10, is an elongate metal bar or strap 18. The strap 18 is bowed or bent slightly downwardly from both ends as shown more clearly in FIG. 1.

Suspended beneath the midpoint of strap 17 by bolts 21 is a small, alternating current, single coil, C-frame motor 22. Bolts 21 project upwardly from a pair of brackets 23, which project from diametrically opposite sides of the motor, and are fastened at their upper ends to the strap 18 by nuts 24. The armature or drive shaft 25 of motor 22 projects downwardly, and has fastened thereon a conventional fan 26. This fan is constructed so that when motor 22 is energized, the fan 26 drives air downwardly out of housing 10.

Mounted to the underside of the inclined ends of strap 18 adjacent opposite sides, respectively, of fan motor 20 are two conventional lamp sockets 28 for holding infrared lamps L (broken lines in FIG. 2) so that they project downwardly and away from one another, and slightly below the bottom of housing 10.

Removably secured, as for example by tension springs 32, over the lower, open end of housing 10 is a rectangular grille or faceplate 34. This plate, which is generally oblong in configuration, is slightly larger than the housing 10, has an up-

turned marginal edge or flange portion 35. Intermediate its ends plate 34 is bent downwardly in parallelism with the lamp-supporting strap 18. At opposite sides of its midpoint, plate 34 has therethrough larger, circular openings 36, which register with the infrared lamps L mounted in the receptacles 28. The plate 34 is formed with truncated conical flanges 37 around the openings 36. Each spring 32 is fastened at its upper end to the underside of the strap 18, and on its lower end has a hook 38 removably engaged in an opening in one of the flanges 37.

Immediately above the motor housing 20 is a bracket 40 having two legs bent laterally outwardly and away from one another as at 42. Bolts 43 fasten bracket 40 to a conventional centrifugal blower 45 supported thereby in the upper end of housing 10. Blower 45 is mounted so that its inlet 46 faces downwardly toward bracket 40, and its outlet 47 projects through an opening in the housing wall 14 to the exterior of housing 10.

Referring now to FIG. 3, power is adapted to be supplied to the unit by main lines L1 and L2, which are connected to an alternating current (AC) power source. The motor 45' for the blower 45 is connected across lines L1 and L2 in series with a conventional ON-OFF switch 50. Also connected in parallel with one another between the lines L1 and L2, and in series with the fan motor 22 and a thermally responsive circuit breaker 52, are the two lamp sockets 28. The lamps in these receptacles are energizable selectively by a three-position switch 54 having contacts 55, 56 and 57, respectively. Switch 54 is movable manually between OFF position in which both of the lamps L are off, WARM position in which one only of the lamps is on, and HOT position in which both of the lamps are energized.

When the switch 54 is in its OFF position, as shown, all three of its contacts 55, 56 and 57 are open. When the switch is moved upwardly to its WARM position, contact 57 closes to complete the circuit from line L1 through the contact 57, one of the receptacles 28, fan motor 22, and circuit breaker 52 to line L2. When the switch 54 is moved down to its HOT position, the contacts 55 and 56 are moved to their closed positions, thereby energizing both lamps L, from line L1 through the now-closed contacts 55 and 56, both receptacles 28, fan motor 22 and circuit breaker 52 to line L2. Obviously the blower motor 45' can be operated by its switch 50 independently of the lamps.

In use the upper end of the housing 10 is inserted into a registering opening in the ceiling C (FIG. 1), for instance, of a room, and is secured to the ceiling by screws or the like, and by right-angular mounting brackets 60, which are fastened to the outsides of the housing end walls 11 and 12. The outlet 47 of the blower 45 will then exhaust into the space above ceiling C. The switches 50 and 54 are mounted in any convenient spot on the wall of the room. By manipulation of the switches 50 and 54, then, the ventilator or blower 45', and the lamps L, can be energized when desired. Whenever one of the lamps is energized, the fan motor 22 will also be energized so that the fan 26 will drive the heat from the lamps downwardly through the grille 34 and into the room, thereby not only heating the room but preventing undesirable concentration of the heat from the lamps around the wiring in the unit and the adjacent portions of the ceiling. Whenever the blower motor 45' is energized, air is drawn from the room upwardly through the openings 36 in the grille 34 and around the flanged edge of the grille, into the blower inlet 46, and is exhausted by the blower through its outlet 47 to the space above the ceiling. If desired, a duct (not illustrated) may be used to connect the exhaust 47 with the exterior of the building in which the unit is mounted.

The infrared lamps L employed in the above-disclosed heater-ventilator unit may be of the R/40 variety, and should not exceed approximately 250 watts each. With this construction, the unit may be mounted in a ceiling having thermal insulation with an R-factor of 12 or more, and used without excessively heating the surrounding structure. This was not possible with prior units.

From the foregoing, it will be apparent that the instant invention enables the use of infrared heating lamps in ceiling units without requiring any change in the specification of the insulation heretofore employed. With the fan motor 22 connected to operate when either or both of the lamps L are energized, the heat from the lamp, or lamps, is blown downwardly into the room in which the unit is mounted, therefore preventing an excessive buildup of heat in the immediate area of the unit. Furthermore, the inlet for the ventilator is positioned above and in registry with the fan 26, so that when both the fan 26 and blower 45 are operating, the air withdrawn from the room enters the lower end of housing 10 around the marginal edges of grille 34, while the hot air developed by the lamps L is blown down into the room through the large openings 36 in the grille. Moreover, the lamp receptacles 28 and the registering openings 36 in the grill 34 are inclined slightly to the vertical, and away from one another, so that heat emanating therefrom is distributed more evenly to all parts of the associated room, than would be the case if the axes of the receptacles 28 and openings 36 were parallel to one another.

Having thus described my invention, what I claim is:

1. A combination heater-ventilator unit, comprising an open-ended housing adapted to be secured in an opening in the ceiling of a room with an open end facing downwardly,
- a metal strap extending transversely across said housing above said open end and bowed downwardly intermediate its ends,
- an electric fan mounted on the underside of said strap centrally thereof and above said open end to blow air downwardly through the open end of said housing,
- a pair of spaced lamp sockets each removably holding an infrared lamp mounted on the underside of said strap at opposite sides, respectively, of said fan to diverge from one

- another,
- a centrifugal blower mounted in said housing above said strap and having its inlet facing said fan substantially centrally of said housing, and having an exhaust port communicating with an opening in one side of said housing,
- means for energizing said blower independently of said lamps and fan,
- means for selectively energizing either one or both of said lamps,
- means operative to energize said fan whenever at least one of said lamps is energized, and
- a grille mounted below said housing over its open end, said grille being bowed downwardly between its sides and having openings therein registering with said lamp sockets and the lamps mounted therein, through which air heated by said lamps is blown out into the room,
- said grille being spaced outwardly beyond said housing around the perimeter of said housing and being spaced downwardly from the ceiling to provide an opening between the housing and the grille through which air is drawn from the room into said housing when said blower is operating.
2. A combination heater-ventilator unit as defined in claim 1, wherein
 - said blower-energizing means comprises a first switch connected to said blower and movable into and out of closed position selectively to energize and deenergize said blower, and
 - said lamp-energizing means comprises a second switch movable independently of said first switch, and selectively between a first position in which it deenergizes said lamps and said fan, a second position in which it energizes said fan and one of said lamps, and a third position in which it energizes said fan and both of said lamps.

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