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GAS WALL HEATER

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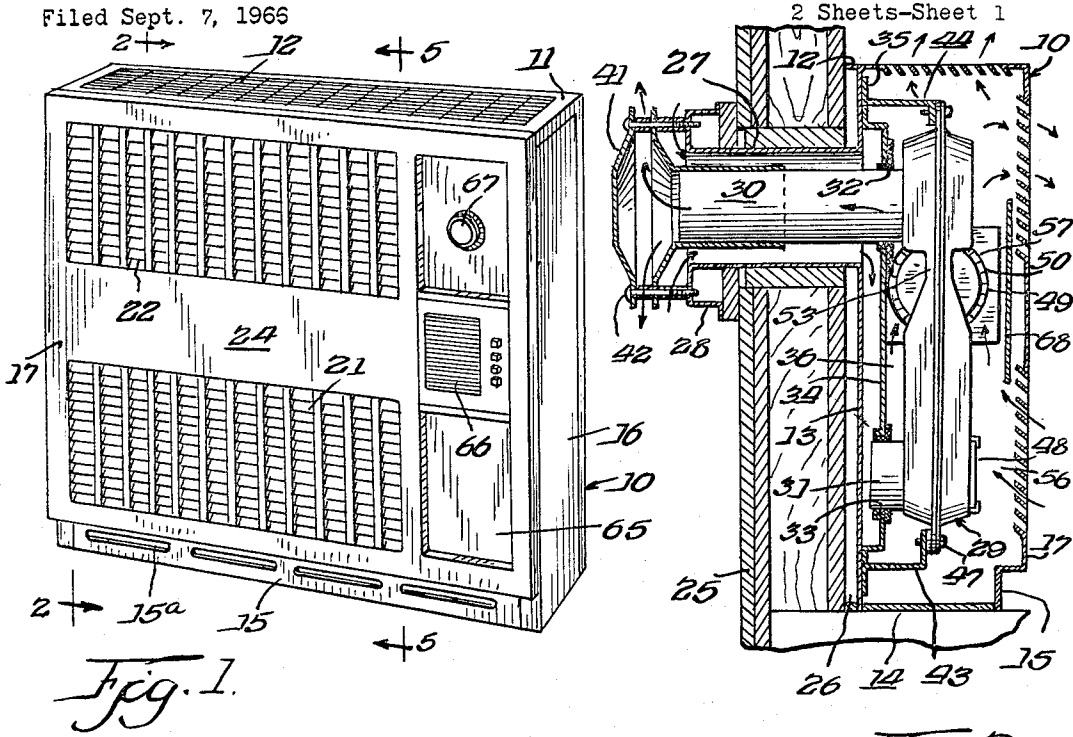


Fig. 1.

Fig. 2.

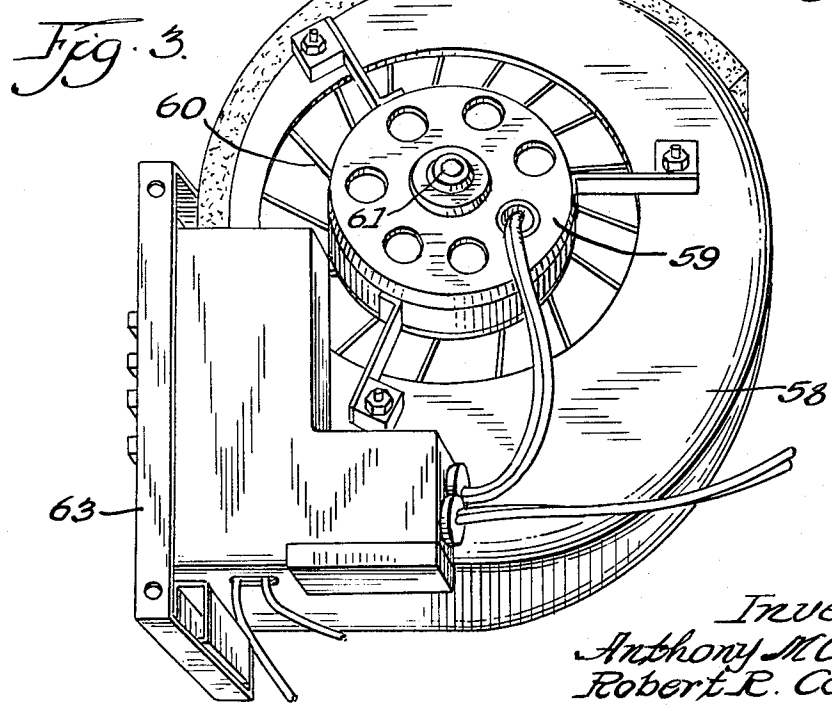


Fig. 3.

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GAS WALL HEATER

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ABSTRACT OF THE DISCLOSURE

A gas wall heater equipped with an auxiliary air blower. The heater includes an outer casing and a radiator casing mounted therein. The radiator casing is provided with an air-directing channel for directing air in a generally horizontal direction, and an air blower is mounted in the outer casing adjacent the air directing channel for withdrawing heated air from the channel and discharging the air into the room to be heated.

Background of the invention

This invention relates to gas wall heaters, and more particularly to a heat exchanger, blower and front panel assembly for a gas wall heater. The inventive features have particular utility with gas wall heaters of the gravity circulation type which are equipped with an auxiliary blower.

Many gas wall heaters are commonly designed to function primarily as circulation heaters. That is, heavier cold air is drawn in near the bottom of the heater, heated and discharged as lighter hot air at or near the top of the heater. However, it is often desirable to increase the circulation of the heated air in the room by adding an accessory motor-driven blower. Also, since the light, heated air tends to rise, the air near the floor of the room being heated tends to remain cold, and it is desirable to use an accessory blower to direct heated air toward the floor of the room. However, since the blower is not intended to be the prime air mover, but only an aid to gravity circulation, the blower must be positioned so that it does not nullify the natural gravity circulation of the heated air.

It is, therefore, an object of this invention to provide a gas wall heater of the gravity circulation type with a motor-driven air blower to increase the circulation of heated air through the room to be heated without interfering with the gravity circulation. Another object of the invention is to provide a gas wall heater of the gravity circulation type with a motor-driven air blower to direct heated air to the colder, lower region of the room to be heated.

Further objects and advantages of the invention will be apparent as the specification proceeds.

The invention is explained in conjunction with the accompanying drawing, in which:

FIG. 1 is a perspective view of a gas wall heater embodying the present invention;

FIG. 2 is a sectional view taken along the lines 2-2 of FIG. 1;

FIG. 3 is an enlarged perspective view of the air blower;

FIG. 4 is a perspective view of the heater of FIG. 1 with the front cover partially removed;

FIG. 5 is sectional view taken along the line 5-5 of FIG. 1; and

FIG. 6 is front elevational view of the heater with the front cover removed.

Referring now to the drawing, and in particular to FIGS. 1 and 2, the numeral 10 designates generally a gravity circulation gas wall heater of the through-the-

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wall type. The heater 10 includes an outer frame 11, which includes top wall 12, rear wall 13, bottom wall 14, front wall 15 and side walls 16. Removably attached to the outer casing 11 is front panel 17, which includes attaching hooks 18 (FIG. 4) which are received in slots 19 provided in the side walls 16 and attaching clips 20 which are inserted over front wall 15 of the outer casing.

Front panel 17 is provided with louver-equipped air intake grille 21 and louver-equipped air outlet grille 22. The top wall 12 of the outer casing is also provided with louver-equipped grille 23. Grilles 21 and 22 of the front panel are separated by an imperforate portion 24.

The rear wall 13 of the outer casing is offset from the rear edges of the top bottom sides 12 and 14, and rear wall 13 and room wall 25 provide air space 26. Attached to rear wall 13 and extending through an opening provided in room wall 25 is cylindrical inlet air collar 27 (see FIG. 2). The outside end of inlet air collar 27 is bent outwardly to form flange 28.

Radiator casing 29 provides a combustion chamber in the lower portion thereof and serves as a heat radiator heating the ambient air surrounding the radiator casing on all sides. Radiator casing 29 is supported by flue exhaust tube 30 and inlet air tube 31 which extend through openings 32 and 33, respectively, provided in support wall 34. Support wall 34 is generally rectangular in shape and includes an outwardly extending perimetric flange 35 which is spot welded to rear wall 13. Support wall 34 and rear wall 13 provide inlet air passage 36 therebetween (see FIGS. 2 and 5). Openings 32 and 33 of support wall 34 are defined by perimetric flanges 37 and 38, respectively, provided by the support wall (see FIG. 5). Gasket 39 may be provided between flue exhaust tube 30 and perimetric flange 37 and gasket 40 may be provided between inlet air tube 31 and perimetric flange 38 in order to insure a tight fit between these parts and also to avoid metal-to-metal contact between these parts.

Flue exhaust tube 30 extends through inlet air collar 27, and received on the end of flue collar 30 in tight connection therewith is vent hood 41, which is attached to flange 28 by means of screws 42.

In order to insure that radiator casing 29 is spaced the proper distance from rear wall 13 and support wall 34, aligning brackets 43, 44, 45, and 46 are provided which are spot welded to rear wall 13 and extend outwardly therefrom. Radiator casing 29 is attached to aligning brackets 43-46 by sheet metal screws 47 so that the radiator casing is spaced from the support wall 34 and rear wall 13, thereby allowing the passage of air between these parts.

The lower portion of radiator casing 29 is provided with an opening which is covered by burner access door 48 (see FIG. 4). Burner access door 48 is removably secured to radiator casing 29, and provides access to the main burner (not shown) which is located within the combustion chamber provided in the lower portion of radiator casing 29. For a more detailed description of the burner access door and the main burner, see our co pending application, Ser. No. 550,825, filed May 17, 1966 entitled "Gas Wall Heater."

At an intermediate level of radiator casing 29, the front and back thereof extend inwardly toward each other to form restricted neck portion 49. The front of neck portion 49 provides air-directing channel 50 defined by inwardly and upwardly-extending wall 51 (FIG. 5) and outwardly and upwardly extending wall 52. The rear of neck portion 49 provides air-directing channel 53 defined by inwardly and upwardly extending wall 54 (FIG. 5) and outwardly and upwardly extending wall 55. Both air-directing channel 50 and air-directing channel 53 extend generally horizontally across the front and

back faces, respectively, of radiator casing 29. However, it is to be understood that neck portion 49 may be provided by the inward extension of one or both of the front or back of casing 29.

Attached to rear wall 13 of the outer casing and extending parallel to side walls 16 is fire wall 56 (see FIGS. 2 and 4), having an opening 57 aligned with air-directing channels 50 and 53. Opening 57 preferably extends radially outwardly beyond the front and back spaces of radiator casing 29, as can be seen best in FIG. 2.

Mounted on fire wall 56 is a conventional motor-driven air blower 58 of the squirrel-cage type (see FIG. 3). The air blower 58 includes an electric motor 59 and a squirrel-cage impeller 60 mounted on driveshaft 61 of the motor. Air intake portion 62 of the air blower 58 is positioned at the opening 57 of the fire wall 56 (see FIG. 4). Air outlet portion 63 of the air blower extends through an opening 64 provided in control panel 65, which is secured to fire wall 56 and side wall 16. Air outlet portion 63 may be covered by louver-equipped grille 66. Motor control knob 67 may be mounted on control panel 65 and electrically connected to motor 58 for regulating the speed thereof.

Attached to front panel 17 and generally coextensive therewith in the horizontal direction is baffle plate 68. Baffle plate 68 is opposed to and extends above and below air-directing channel 50. Similarly, support wall 34 and rear wall 13 are opposed to and extend above and below air-directing channel 53.

The burner of the gas heater is ignited in the conventional manner and cold air is drawn from outside the room through inlet air collar 27, passes through air passage 36, and enters the radiator casing through inlet air tube 31. Hot combustion products rise upwardly inside the radiator casing 29, heating it thoroughly, and are expelled through flue tube 39 and vent hood 41 to the outside atmosphere. The neck portion 49 of the casing tends to decrease the rate at which the flue products are exhausted by the flue collar 30 so that maximum heat may be transferred from the flue products to the casing. The radiator casing heats the surrounding air, and the light heated air rises through outlet grilles 22 and 23 of front panel 17 and top wall 12, respectively. Heavier cold air is then forced through intake grille 21 and slots 15a. As this air is heated, it passes upwardly, completely surrounding casing 29, and in turn eventually passes through grilles 22 and 23. The direction of gravity-air circulation is shown by arrows in FIGS. 2 and 5. Air space 26 provided between rear wall 13 and room wall 25 serves to prevent the outer casing from becoming excessively heated and allows additional circulation of hot air.

If it is desirable to increase the circulation of heated air or to eliminate cold spots on the floor of the room that is being heated, the air blower 58 is used. Since the air blower is not intended to be the prime air mover but only an aid to gravity-forced circulation, the air blower must be positioned so that it does not interfere with the natural operation of the gas heater by gravity circulation. The air blower must also be positioned so that the air entering the intake portion of the air blower is sufficiently heated to accomplish the desired heating effect. For these reasons, radiator casing 29 is provided with the intermediate neck portion 49 and air-directing channels 50 and 53. The air intake 62 of the air blower is positioned in horizontal alignment with the air-directing channels, and fire wall 56 provides a heat barrier between the radiator casing and the motor 59 of the air blower. The motor 59 may be adapted for multispeed operation, and the wiring control which is necessary for speed selection may also be positioned behind the protective fire wall.

As the air which enters intake grille 21 and slots 15a is heated by the radiator casing and rises along the front and back of the casing, some of the air enters air-directing channels 50 and 53 and is restrained against further

upward movement by upper walls 52 and 53 of neck portion 49. The air in the channels is drawn by the air blower through air intake 62 as shown by the arrows in FIG. 6. After the air is drawn through the air intake, the squirrel-cage impeller 60 forces it through the outlet portion 63 into the room.

The air-directing channels 50 and 53 are positioned at an intermediate portion of radiator casing 29 above the combustion chamber-providing portion of the casing so that air which enters the channels has passed over a substantial area of the radiator casing and is well heated. Baffle plate 68 serves to prevent cold air from being drawn through outlet grille 22 directly into channel 50 or into the air intake 62 of the air blower. As an alternative to providing the baffle plate, the imperforate portion 24 of front panel 17 may be extended above and below air-directing channel 50. The upper walls 52 and 55 of the neck portion 49 may extend substantially horizontally outwardly rather than being inclined upwardly if it is desired to retain more air in the air-directing channels.

Baffle plate 68 is spaced away from the front of radiator casing 29 and channel 50 so that some air will rise upwardly past channel 50 and flow through outlet grilles 22 and 23. Likewise, support wall 34 and rear wall 13 are spaced away from the back of radiator casing 29 and channel 53 so that some air rising behind the casing passes channel 53 and flows through outlet grille 23. Thus, even when the air blower is being operated, the gravity-flow operation of the gas heater is not interrupted.

As can be seen in FIG. 4, the outlet portion 63 of the air blower 58 is positioned closer to the floor of the room than the intake portion 62. The louvers of grille 66 may be adjustable so that air forced through outlet portion 63 may be directed downwardly, thereby eliminating cold spots in the lower regions of the room which would be present if only gravity circulation of the heated air were used. The louvers may also be adjusted so that the heated air is expelled in a generally horizontal manner if merely increased circulation of heated air is desired.

The air blower may be equipped with an adjustable switch which activates the motor by sensing the temperature rise in the combustion chamber upon heatup.

From the foregoing, it is seen that a gas heater has been provided with an air blower for aiding the circulation of heated air. The configuration of the combustion chamber casing and the positioning of the air blower are such that maximum efficiency of the air blower is obtained without interference with the normal gravity-forced circulation of the heated air.

While in the foregoing specification a detailed embodiment of the invention was set forth for purposes of explanation, it will be apparent to those skilled in the art that many of the details herein given may be varied considerably without bearing from the spirit and scope of the invention.

We claim:

1. In a wall heater having an outer casing, a radiator casing mounted within said outer casing in spaced relation thereto, said outer casing having a front panel providing an air intake grill in the lower portion thereof and an air discharge grill in its upper portion, said radiator casing having an air-directing channel provided by a restricted neck portion of said radiator casing for directing heated air in a generally horizontal direction, and air blower means mounted on said outer casing adjacent said air-directing channel for withdrawing heated air from said channel and discharging said air into the room to be heated.

2. The wall heater of claim 1 in which said neck portion provides an inwardly and upwardly inclined lower wall and an outwardly and upwardly inclined upper wall.

3. The wall heater of claim 1 including a baffle plate mounted on said outer casing in opposed relation to said air-directing means and extending above and below said air-directing means.

4. The wall heater of claim 1 in which said front panel

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also provides an imperforate portion between said air intake grille and said air discharge grille, said imperforate portion extending above and below said air-directing means.

5. The wall heater of claim 1 in which said air blower means includes a motor-driven squirrel-cage impeller having an air intake and air outlet, said air intake being in general horizontal alignment with said air-directing means and said air outlet being directed toward the room to be heated.

6. The wall heater of claim 1 in which said neck portion provides a second air-directing channel opposite the first mentioned channel, said neck portion providing a

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pair of opposed inwardly and upwardly inclined lower walls and a pair of opposed outwardly and upwardly inclined upper walls.

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