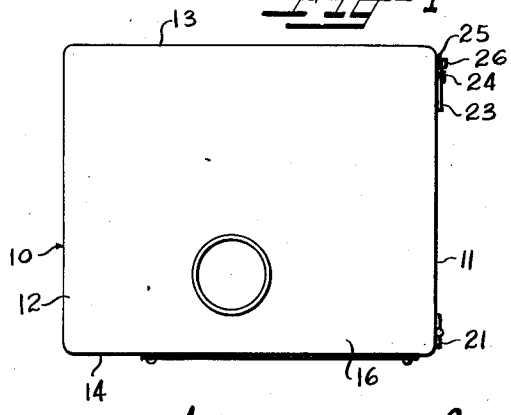
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CIRCULATING HOT AIR FURNACE

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Fig-1



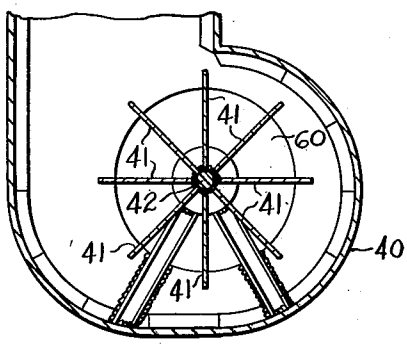


Fig-8

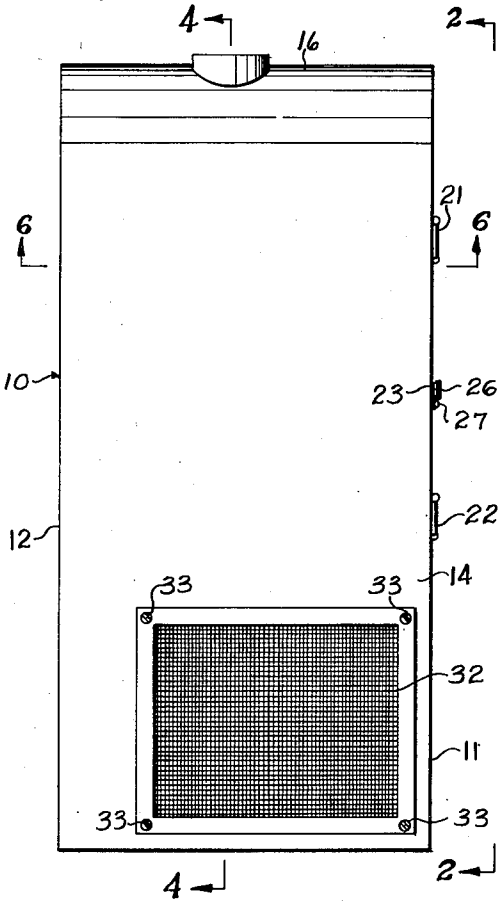


Fig-2

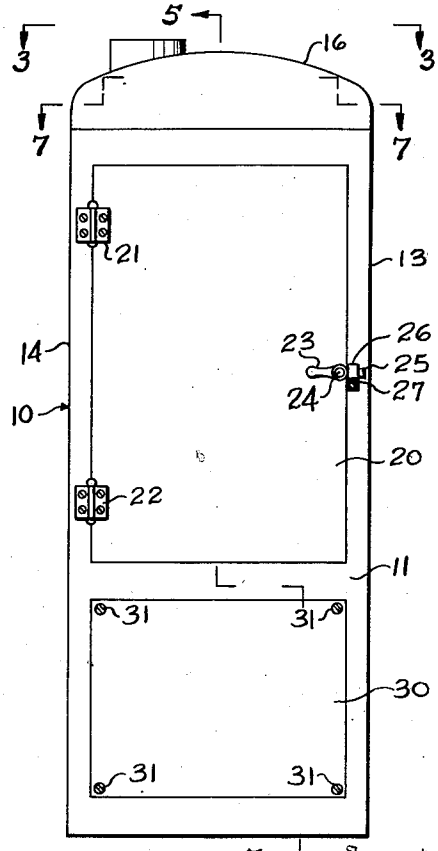


Fig-3

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CIRCULATING HOT AIR FURNACE

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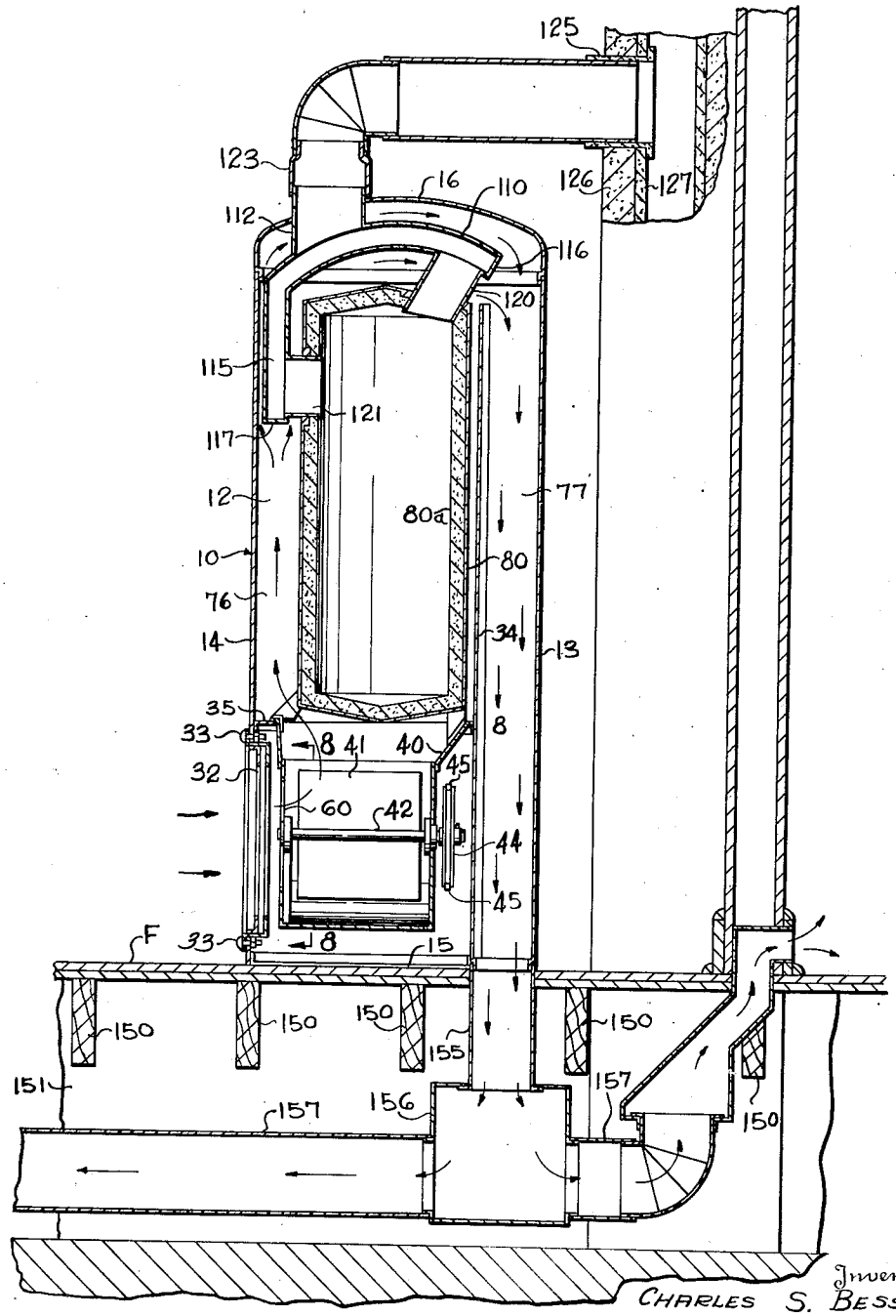


Fig-4

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CIRCULATING HOT AIR FURNACE

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Fig-6

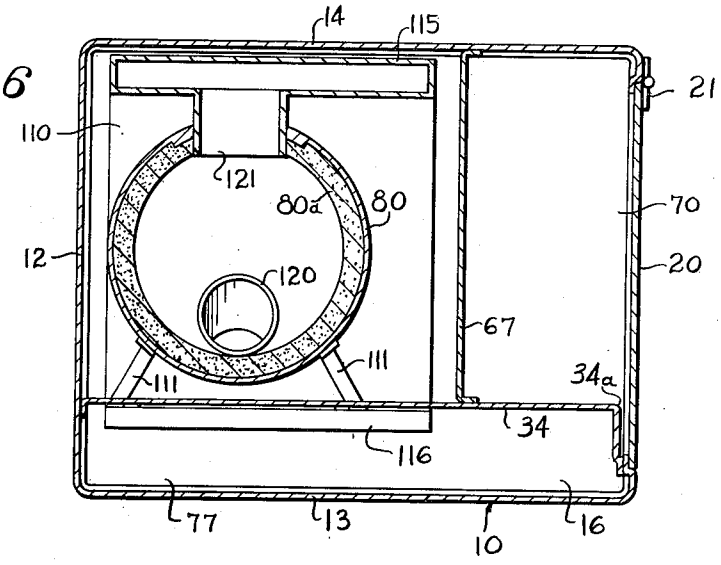
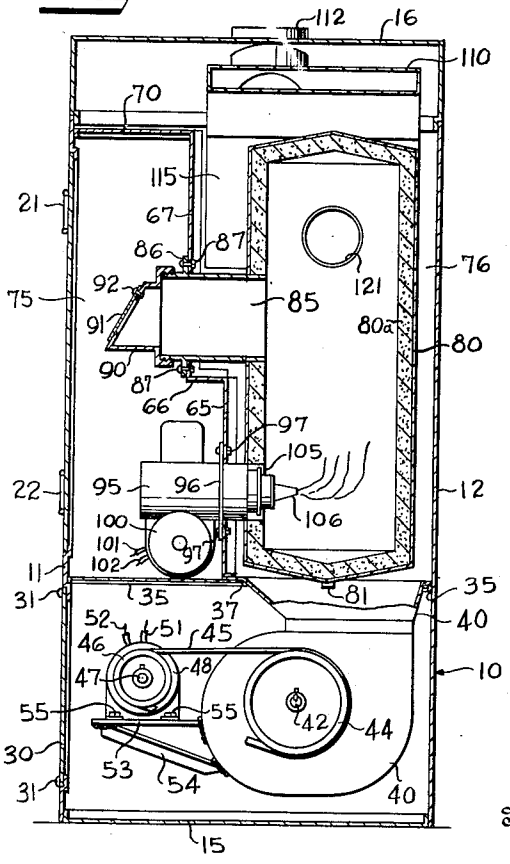


Fig-5



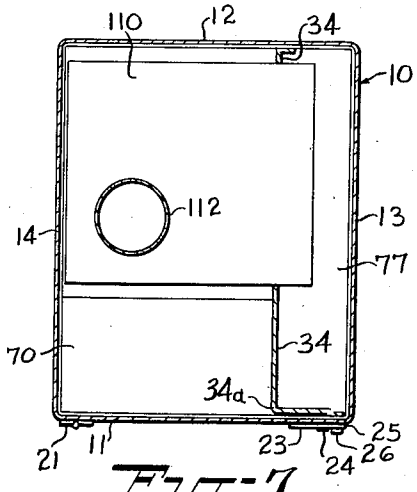


Fig-7

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2,564,775

CIRCULATING HOT-AIR FURNACE

Charles S. Besser, Charlotte, N. C.

Application July 21, 1948, Serial No. 39,837

6 Claims. (Cl. 126—110)

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This invention relates to hot air furnaces and more especially to a hot air furnace having a blower fan therein for circulating air through the building in which the heater is disposed.

The primary object of this invention is to provide a hot air furnace having at least two chambers therein, one of which has the heating and circulating means disposed therein and the other of which is adapted to direct the movement of air toward the bottom of the heater to where it is connected to a suitable duct system disposed beneath the floor on which the heater is disposed for directing the air to the various rooms of a house.

It is another object of this invention to provide a hot air furnace having a blower fan associated therewith and disposed at the bottom thereof and having a fire box disposed above the fan to which is connected and disposed thereabove a warm air radiator which is curved in such a manner that the air directed upwardly by the blower fan will be directed in an arcuate path through the upper portion of the furnace into a chamber which in turn directs the air downwardly to where the lower end of the furnace is connected to a suitable duct work for directing the air to various rooms of the house.

It is another object of this invention to provide a furnace which may be disposed on the main floor of a house, which is particularly important in the event that the house does not have a basement or that the house is only excavated for a short distance, of say three feet, below the floor of the house. This furnace is so designed that duct work need not enter the room in which the furnace is disposed, inasmuch as the hot air furnace is provided with a means for connecting the duct work through the floor to the bottom of the furnace and then such work would extend beneath the floor to the various rooms of the house.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which

Figure 1 is a top plan view of the hot air furnace before being installed in a house;

Figure 2 is an elevation looking up at the lower side of Figure 1;

Figure 3 is a front elevation of the furnace;

Figure 4 is a vertical sectional view through the furnace taken along the line 4—4 in Figure 2, and, in addition, shows the furnace as it is installed in the utility room of a house and

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showing a part of the duct work with which this furnace is adapted to be associated;

Figure 5 is a vertical sectional view taken along the line 5—5 in Figure 3;

Figure 6 is an inverted plan view looking upwardly along the line 6—6 in Figure 2;

Figure 7 is a sectional plan view taken along the line 7—7 in Figure 3;

Figure 8 is a vertical sectional view taken along the line 8—8 in Figure 4.

Referring more specifically to the drawings, the numeral 10 broadly designates a casing in which the various parts of this furnace are adapted to be mounted. There are many types of joints that may be used in assembling the various panels and other parts of this furnace and these various panels are shown as being spot welded together merely as a convenience in the description of the furnace.

The casing 10 comprises a front wall 11, a rear wall 12, right-hand and left-hand walls 13 and 14, respectively, a bottom panel 15 and a curved upper portion 16, all of which are joined together by any suitable means such as welding. It is obvious that the walls 11, 12, 13 and 14 could be made of one piece of material, if so desired.

The front wall 11 has a conventional door 20 therein which is hinged, as at 21 and 22, to the wall 11 and has a suitable handle 23 pivotally mounted, as at 24, on the door 20. This handle 23 has a catch portion 25 integral therewith which is adapted to engage a mating catch member 26 which is secured, as by a screw 27, to the front wall 11, for securing the door 20 in closed position. The front wall 11 also has a removable panel 30 secured thereto as by screws 31 (Figure 3). The left-hand wall 14 has an opening therein in which a suitable air filtering unit 32 is mounted and is secured to the vertical wall 14 by a suitable means such as bolts 33 (Figures 3 and 4). Disposed in spaced relation to the side wall 14 is a vertically disposed partition 34, the rear end of which is welded to the vertically disposed rear wall 12 and the front end of which is bent to the right in Figure 7 as at 34a and is secured, as by welding, to the front wall 11 adjacent the juncture of the right-hand side wall 13 and the front wall 11.

There is disposed in spaced relation to the bottom panel 15 a horizontally disposed partition 35 which is secured as by welding, to the vertical walls 11, 12 and 14 of the casing 10 and the vertically disposed partition 34. It will be noted that this horizontally disposed partition 35 is disposed adjacent the upper edge of the panel 30

(Figure 5) as well as the upper edge of the air filter unit 32 (Figure 4).

The horizontally disposed partition 35 has an opening 37 therein which is disposed closely adjacent the rear wall 12 and in which is mounted the funnel-shaped upper end of a blower fan housing 40. The blower fan housing 40 has a suitable rotary fan 41 therein having a shaft 42 which extends outwardly through and is journaled in the walls of the blower fan housing 40.

A pulley 44 is fixedly mounted on one end of the shaft 42 (Figure 5) and has a belt 45 mounted thereon, the belt 45 also being mounted on a pulley 46 fixedly mounted on a shaft 47 extending from an electric motor 48. The motor 48 has an electric wire 51 and another electric wire 52 extending therefrom to a suitable source of electrical energy, not shown.

Welded to the front surface of the blower fan housing 40 is a horizontally disposed plate 53 which projects outwardly having a diagonal bracing bar 54 welded to the outer end thereof, the other end of which is also welded to the front face of the blower fan housing 40. The motor 48 is secured to the plate 53 as by screws 55. The housing 40 has an opening 60 on that side which is remote from the pulley 44 and this opening 60 is disposed adjacent the air filtering unit 32 to thus permit air to pass through this air filtering unit into the blower fan housing 40 from whence it is forced upwardly by rotation of the fan 41 within the fan housing 40. It may be observed in Figure 5 that the panel 30 permits accessibility to the electric motor 48 and the blower fan housing 40 associated therewith.

The lower edge of a vertically disposed panel 65 (Figure 5) is welded to the top surface of the horizontally disposed partition 35 adjacent the front edge of the opening 37, in which the upper end of the blower fan housing 40 is mounted. This vertically disposed partition 65 is bent forwardly as at 66 in Figure 5, and then is bent upwardly to form another vertically disposed partition 67.

The upper end of the partition 67 is connected to the rear edge of a horizontally disposed partition 70, the front edge of which is welded to the inner surface of the front wall 11. The vertically disposed partitions 65 and 67 and the horizontally disposed portion 66, as well as the partition 70, are welded at their opposite edges to the proximate surfaces of the vertically disposed partition 34 and the left-hand wall 14 (Figure 6).

It is thus seen that the partitions 65 and 67 and the partitions 66 and 70, which are integral therewith, form a burner unit chamber 75 and a heating chamber 76 and the partition 34, the upper end of which is disposed a substantial distance from the inner top surface of the upper portion 16, forms a third chamber 77. Disposed within the chamber 76 is a circular fire box 80 having a suitable refractory material 80*a* applied to the inner walls thereof. This fire box 80 is supported on strap iron members 81 which are welded to the same and the lower ends of which are welded to the upper surface of the horizontally disposed partition 35, and, as may be observed in Figure 4, one of these supports 81 is welded to the upper angularly disposed wall of the blower fan housing 40.

The wall of the fire box 80 is penetrated by a horizontally disposed tubular access member 85 (Figure 5) which also penetrates the vertically disposed partition 67 and has a flanged portion 86 thereon which is penetrated by bolts 87 for securing the tubular member 85 to the partition 67.

This tubular member 85 extends beyond the partition 67, to the left in Figure 5, and has threadably mounted thereon a tubular port hole member 90 having a cover 91 over the outer end thereof which is pivotally secured, as at 92, to the tubular port hole member 90.

The partition 65 is penetrated by a conventional blow type oil burner 95 having a flanged portion 96 thereon for securing the oil burner 95 to the vertically disposed partition 65, as by bolts 97. The oil burner 95 has an electric motor 100 integral therewith which is a conventional part of the burner 95 and has electric wires 100 and 102 connected thereto which extend to a suitable source of electrical energy, not shown.

The oil burner 95 extends beyond the partition 96 and through an opening 105 in the wall of the circular fire box 80 and this oil burner has a nozzle 106 on the end thereof which is within the circular fire box 80 and from which the flame of the oil burner is projected to thus heat the air in the circular fire box 80 and heat is transmitted through the walls of the fire box to heat the air in the chamber 76 in the casing 10.

It may be observed in Figure 4 that there is disposed above the circular fire box 80, and being in spaced relation thereto, an arcuately curved tubular radiator 110 which is rectangular in cross-section and is positioned in spaced relation to the fire box 80. The fire box 80 may be supported by supporting strips 111 connected to the partition 34.

This radiator 110 also has a vertically disposed tubular portion 115 which is rectangular in cross-section and this vertically disposed portion, as well as the portion 110 are interconnected and are closed at their remote ends as at 116 and 117. The radiator 110 is of one piece welded construction. The lower wall of the radiator 110 is penetrated by a pipe 120, the lower end of which penetrates the upper wall of the circular fire box 80 and there is a similar pipe 121 which extends from the vertical wall of the fire box 80 and also penetrates the inner vertical wall of the vertically disposed portion 115 of the radiator 110 and it is thus seen that the flame from the burner 95 heats the air within the fire box 80 which also passes through the pipes 120 and 121 into the radiator 110 and the portion 115. The radiator 110 has a discharge pipe 112 extending upwardly therefrom and which penetrates the curved upper portion 16 of the casing 10 for discharging the gases created by the combustion of fuel in the burner 95 and, as may be observed in Figure 4, this discharge pipe is adapted to be connected to a suitable stack or the like 123, the other end of which is mounted in a conventional thimble 125 which is disposed in a conventional chimney 126 having a flue 127 therein.

When the circulating furnace is installed as shown in Figure 4, it is usually supported on a floor F supported on floor joists 150 which are in turn supported on a foundation 151. It will be noted that the chamber 77 extends from top to bottom of the casing 10 and the bottom edges of the walls 13 and 14 and portions of the bottom edges of the walls 11 and 12 are connected to a suitable duct 155, which penetrates the floor F and the lower end of which is connected to a conventional plenum 156 from which branch ducts 157 extend to the various rooms of the house.

Assuming that the flame is being ejected from the nozzle 106 of the oil burner 95, it is seen that

the air within the chamber 76 will be heated by the circular fire box 80 and as the fan 41 within the fan housing 40 is rotated, the air will be drawn through the air filter 32, through the opening 60 in the wall of the blower fan housing 40 and will be forced upwardly by rotation of the fan 41. This will cause the heated air surrounding the circular fire box 80 to move upwardly, and this is indicated by the arrows in Figure 4, and due to the arcuate shape of the radiator 110, the air will be forced in an arcuate path past the upper and lower surfaces of the radiator 110 and inasmuch as the radiator is also heated by the flame within the circular fire box 80, the air will be further heated as it passes adjacent the radiator 110 and then due, also, to the arcuate shape of the radiator 110, the air will be directed downwardly, as indicated by the arrows in Figure 4, and will then be forced into the duct 155 and to the various rooms of the house.

It is thus seen that I have provided a hot air circulating furnace having means for directing the heated air downwardly within the furnace and whereby the furnace is connected to a duct work mounted adjacent the lower end of the furnace and although a duct penetrates the floor on which the furnace is supported, the duct work need not enter the room in which the furnace is disposed in order to cooperate with the chambers through which the air is directed in the furnace to the duct work.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. A hot air furnace adapted to rest on the floor of a room and comprising a casing having a closed upper end and having a partition forming a pair of chambers therein interconnected at the top thereof, a fire box disposed within one of the chambers and being closed at its lower and upper ends, said fire box being spaced from the walls of the casing to provide an air circulation space for air to be heated, means for directing a flame into the fire box, a blower fan disposed below the fire box for directing air upwardly around the fire box, a curved hollow radiator disposed above the fire box and spaced from the upper end of the fire box and also spaced from the closed upper end of the casing and having one end adjacent the open upper end of the other chamber, an interconnecting pipe between one end of the radiator and the top of the fire box and an interconnecting pipe between the other end of the radiator and one side of the fire box, the flame within said fire box and said radiator serving to heat the air directed upwardly and around the fire box and the radiator by the fan, to thus direct the air in an arcuate path at the upper end of the casing and into the top of the other chamber, said other chamber being adapted to extend through the floor on which the casing is adapted to be supported, and a draft flue connected to the radiator and extending through the upper end of the casing.

2. In a hot air circulating furnace comprising a casing having a vertical partition forming first and second chambers and having a closed top and bottom, the partition stopping short of the top of the casing to provide communication between the upper ends of the two chambers, the first chamber extending from top to bottom of the casing in which a fire box is disposed, said fire box having a closed top and bottom and having walls spaced from the side walls of said chamber to provide a restricted passage for the air to pass entirely around the fire box as it is heated by the fire box, a blower fan disposed below the lower end of the fire box and for directing the air upwardly around the fire box, the top of the casing being in spaced relation to the upper end of the fire box, thus providing a passageway communicating with the second chamber, a hollow radiator disposed above and in spaced relation to the upper end of the fire box and also in spaced relation to the lower surface of the top of the casing and having one of its ends communicating with the top of the fire box and having its other end connected to the side of the fire box, a vent pipe connected to an intermediate portion of the radiator and penetrating the top of the casing for allowing the products of combustion to escape from the fire box, whereby the air directed over the top of the fire box is directed into the second chamber to direct the air downwardly, the second chamber being adapted to extend through the bottom of the casing.

3. A hot air furnace comprising a casing closed at its top and bottom, a tubular fire box disposed within the casing and being spaced from the walls of the fire box to provide an air space entirely surrounding the fire box, a suction blower fan disposed within the casing and below the fire box for drawing air into the casing and forcing it upwardly around the fire box, a hollow member disposed between the top of the fire box and the top of the casing and having a portion extending down along one side of the fire box and connected by ducts with the interior of the top of the fire box and with one side of the fire box, a smoke pipe leading from the hollow member through the top of the casing for carrying off the products of combustion, a duct disposed within the casing and having an open upper end communicating with the upper interior portion of the casing adjacent said hollow member and extending downwardly to a point below the bottom of the furnace.

4. A hot air furnace comprising a casing having a closed top and bottom and having first and second vertically extending compartments therein communicating with each other at their upper ends, a fire box disposed within the first compartment and having its bottom and sides and upper end closed, a hollow radiator member disposed above and on one side of the fire box and having piped connections with the top of the fire box and one side of the fire box, a fuel oil burner projecting through one side of the fire box and into the fire box, a smoke pipe leading from said radiator through the top of said casing for carrying off products of combustion, said fire box being of less transverse dimension than the width of the first compartment to thus provide an air space surrounding the fire box, a suction blower fan housing disposed below the fire box and having an intake portion for receiving air through an opening in the casing and having a discharge portion for forcing air upwardly around the fire box and around the exterior of the radiator disposed on top of and on one side of the fire box, the second compartment extending to a point below the bottom of the casing for conducting heated air downwardly and away from the furnace after it has been forced upwardly

around the fire box and around the radiator in the top of the casing.

5. A hot air furnace comprising a casing having a closed top and bottom, a vertically extending partition forming a first compartment within the casing, a fire box disposed within said compartment and spaced from said compartment partition and from the walls of the casing, a suction blower fan disposed below the fire box, one side of the casing having an opening through which air is drawn by the suction blower fan, a connection between the output side of the suction blower fan and the lower portion of the compartment within which the fire box is disposed whereby air is forced upwardly on all sides of the fire box, said casing having a second compartment disposed near the top of the casing and having communications with the first compartment and with a third compartment formed by the first-named partition and a portion of the side walls of the casing thus forming a duct through which the air is forced downwardly, a hollow radiator member disposed in the second compartment and having its two ends connected to the top and one side of the fire box and disposed in the path of air currents passing from the first-named compartment and through the second compartment and downwardly in the third compartment, the hollow radiator having a pipe extending upwardly therefrom through the top of the casing for the escape of the products of combustion, heat generating means disposed in the bottom of the fire box, the third compartment having a duct extending downwardly therefrom to a point below the bottom of the furnace.

6. In a heating system for a building, a hot air furnace adapted to be disposed on the floor

of one of the rooms of the building, said hot air furnace comprising a casing, a vertically extending partition dividing the casing into two compartments, a fire box disposed within one of the compartments and spaced from all of the side walls of the said first compartment, a hollow radiator member disposed above and on one side of the fire box and having a piped connection to the top of the fire box and also having a piped connection to one side of the fire box, heat generating means disposed in the bottom of the fire box, a smoke pipe leading from said radiator through said casing for carrying off the products of combustion, a suction blower fan disposed below the fire box and having an intake portion for receiving air through an opening in the casing and having a discharge portion for forcing air upwardly around the fire box and around the exterior of the radiator disposed on top of and on one side of the fire box, the upper ends of the two compartments communicating with each other and the second compartment having a duct connected to the lower end thereof and adapted to extend through the floor on which the furnace is adapted to be rested.

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