Oct. 29, 1957 Z. M. EZDEBSKI 2,811,151

COIL TYPE HOT AIR HEATER

Filed June 1, 1956 2 Sheets-Sheet 1

Fig-1

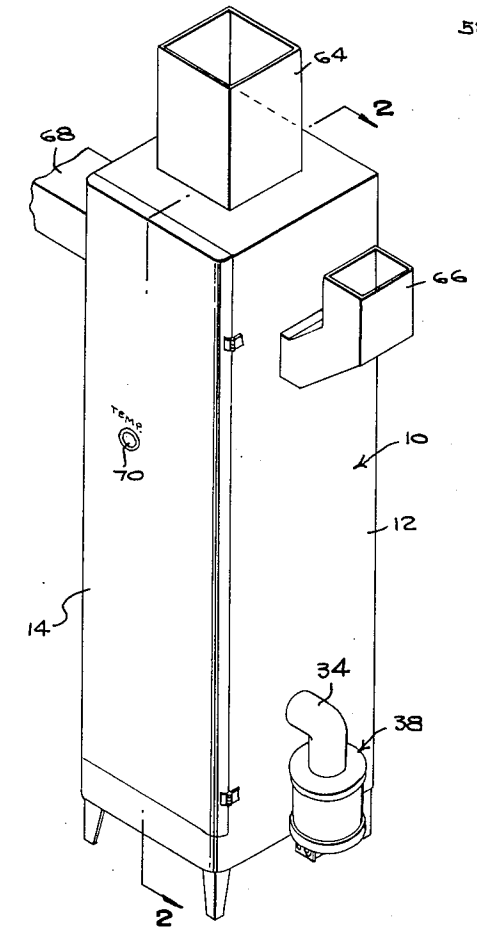
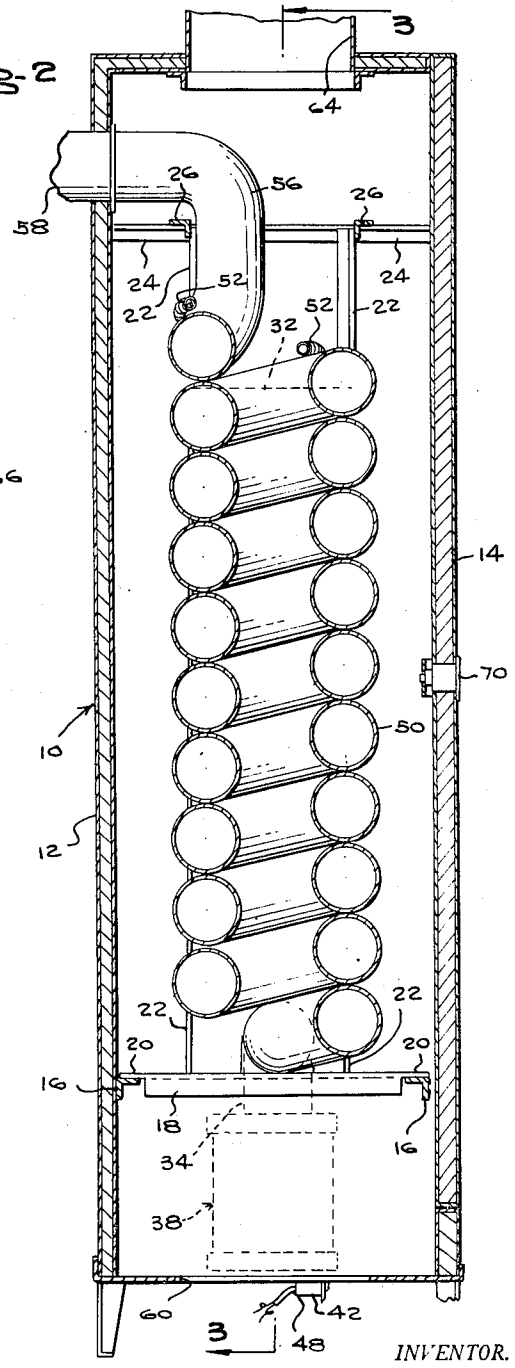


Fig-2



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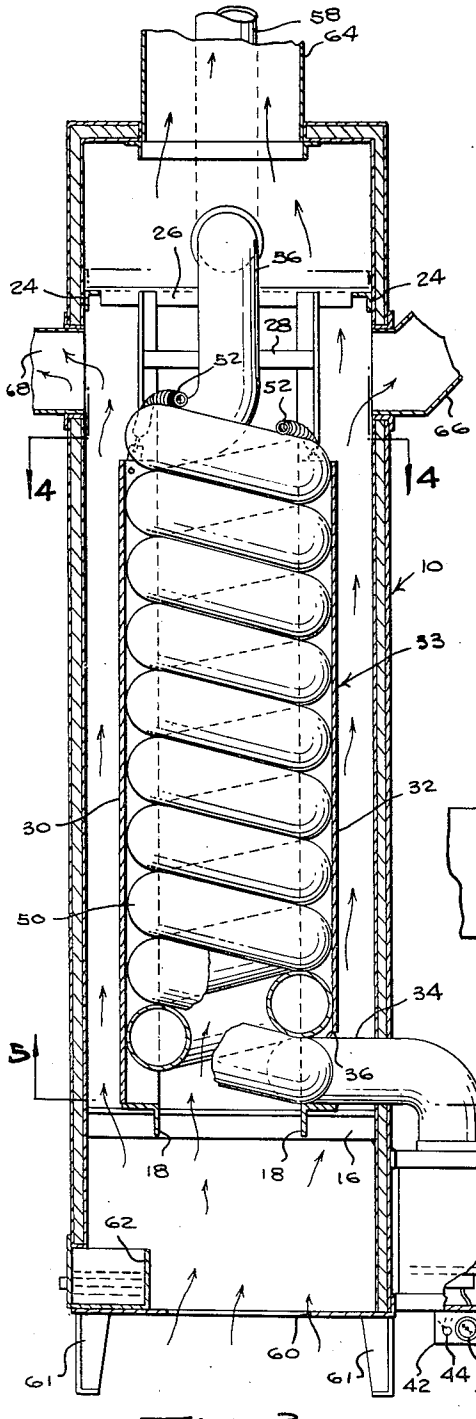


Fig-3

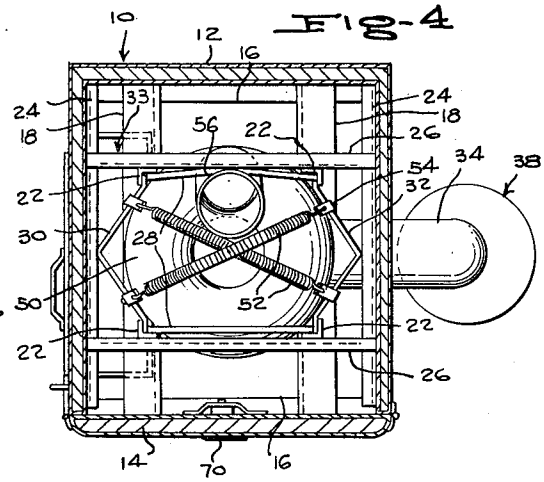


Fig-4

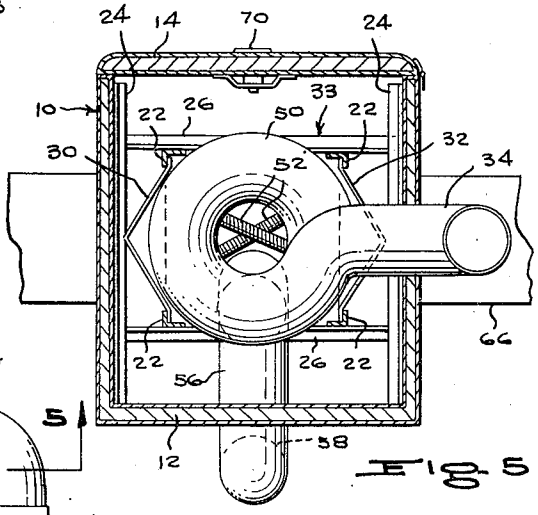


Fig-5

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COIL TYPE HOT AIR HEATER

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3 Claims. (Cl. 126—116)

This invention relates to coil type hot air heaters, and more particularly has reference to a space heater designed for mounting in a basement or other suitable enclosure, and having a plurality of ducts adapted to extend to different rooms of a house.

The main object of the invention is to provide a generally improved coil heater, and to this end, the invention, summarized briefly, is as follows:

A large, vertically extending, elongated coil, the wall of which is of a material having a high rate of heat exchange or thermal conductivity, is extended vertically and centrally of and within a casing of relatively small cross sectional area, thus to permit the device to take up a minimum amount of space within the enclosure in which it is mounted. The casing has a door extending substantially the full length thereof, providing access to the interior of the heater for the purpose of making repairs, maintenance, or for the purpose of cleaning the inside of the heater. The casing is spaced from the coils, so as to define a chamber in which air passing from the bottom to the top of the casing will be heated by the coil. At the bottom of the casing there is provided an air inlet opening, with the upper portion of the casing being connected in communication with a plurality of ducts.

The burner of the heater is disposed exteriorly of the casing, wholly out of the path of the air moving through the casing, thus to be conveniently located for cleaning, and thus to be, further, conveniently disposed to be hooked up to gas lines or other sources of fuel.

An object is to provide a heater which will be more efficient than heaters previously devised for the same purpose, due to the provision of a particular formation and relative arrangement of heating coil and casing, designed to heat with maximum efficiency air passing through the casing.

Another object is to so design the heater as to provide a novel support and mounting for the coil, including resilient, yielding, hold-down means extending over the top of the coil to hold the coil in a coil support frame without the necessity of making special connections of the coil to said frame.

A further object is to provide a heater as stated which will be designed to facilitate use of different components thereof that are individual per se, such as a water pan, conventional burner, thermostat, etc.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a perspective view of a heater formed according to the present invention;

Figure 2 is an enlarged longitudinal section through the heater on line 2—2 of Figure 1;

Figure 3 is a longitudinal section through the heater on the same scale as Figure 2, taken on line 3—3 of Figure 2;

Figure 4 is a transverse section, on the same scale as Figure 3, taken on line 4—4 of Figure 3; and

Figure 5 is a transverse section on line 5—5 of Figure 3 on the same scale as Figure 3.

Referring to the drawings in detail, the heater has been generally designated at 10, and includes a casing 12 having vertical side walls, said casing further having a vertical back wall and being formed open at its front, fully from the upper end of the casing toward a location adjacent the lower end thereof. The open front of the casing is closed by a door 14 hinged to one of the side walls. The casing further includes a horizontal top wall apertured for extension of a duct therethrough in a manner to be made more clearly apparent hereinafter.

The several walls, and also the door of the casing, are formed of any suitable material, and preferably are insulated to prevent loss of heat therethrough.

Adjacent the lower extremity of the casing, a pair of horizontally extending support bars 16 are fixedly mounted, extending between the respective side walls of the casing. The support bars 16, as shown in Figure 2, are respectively disposed in close proximity to the back wall and the door of the casing, and are formed of angle iron material.

Extending between the bars 16 is a pair of support members 18, having tongues 20 at their opposite ends seating upon the respective bars 16. Members 18 are also of angle iron material or the like, and fixedly secured at their lower ends to and projecting upwardly from the members 18 are elongated, vertically extending standards 22 of angle iron material. The standards 22 are rectangularly spaced as best shown in Figure 4 and at their upper ends are fixedly secured to parallel, horizontally disposed, upper frame members 26, the ends of which are seated upon and fixedly secured to upper support bars 24 fixedly connected to the respective side walls of the casing.

Rigidifying the coil support frame are cross braces 28, fixedly connected between the posts 22 as shown in Figure 3. For the purposes of the invention, the cross braces 28 are limited to the upper portions of the posts, and below the cross braces, opposed coil-retaining plates 30, 32 are provided. The coil-retaining plates, as shown in Figures 4 and 5 are of shallowly V-shaped cross section, with the plates being bowed outwardly from one another. The purpose of the plates 30 and 32 is to aid in reducing vibration of the coil and to form with the coil and casing 12 a plurality of air conduits in heat exchange relation to the coil.

There is thus defined a coil support frame extending vertically, centrally of the housing, and defined by the components 16 through 32. Said frame has been generally designated at 33.

Extending into the lower portion of the coil support frame, through one of the side walls of the heater, is an L-shaped conduit 34 which would preferably be formed of cast iron or the like, said conduit extending inwardly through the retaining plate 32 through a recess 36 formed in the lower end of the retaining plate.

At its outer end, the conduit 34 is connected to the outlet of a heater casing of a burner generally designated 38, and mounted within said casing of the burner is a burner element 40. The burner element is a gas heater capable of connection to a source of gaseous fuel such as the conventional gas line of a house. The burner has a thermostat 42 having a setting dial 44 and an indicator dial 46, said thermostat being adapted to control the operation of a switch to permit or prevent the flow of gas, the switch-operating current being supplied through a line 48. It is mainly important to note that the burner element is adapted to supply heat through the conduit 34 to the interior of the heater casing. Further, the entire burner is mounted exteriorly of the casing, so as to be readily acces-

sible for the purpose of repair or for the purpose of viewing the operation thereof.

The coil has been designated at 50, and comprises a coiled conduit of large diameter, the wall of which has a high value of thermal conductivity. The conduit at its lower end is connected to the lower end of the coil, and the coil is extended upwardly within the coil support frame, in engagement with the respective retaining plates 30, 32. The coil is thus centered within the heater casing by the coil support frame, and at its upper end is held down by crossing, expansion springs 52 connected by clips 54 to the upper ends of the retaining plates 30, 32. The springs serve as a hold-down means whch eliminates the necessity of special fastener elements for mounting the coil in place within the coil support frame. Merely by disengaging the springs, the entire coil can be removed, following disconnection from the conduit 34, and installation of the coil is accomplished with equal facility.

At its upper end, the coil merges into a flue 56, passing outwardly through an opening in the wall of the casing and connected in communication with a stack or the like, not shown, through the medium of a connector pipe 58.

In the bottom wall of the casing there is provided an opening 60. In this connection, the casing is supported upon short legs 61, so as to dispose the bottom wall of the casing upwardly from the floor surface, thereby to permit the free movement of air upwardly into the casing through opening 60 in the manner shown by the arrows in Figure 3.

Adjacent the air inlet openings 50 there is mounted in the casing a water pan 62 to provide the desired humidifying effect upon the air.

The air, passing upwardly within the casing, impinges against the coil, passing both interiorly and exteriorly of the coil, so as to be heated during the upward movement of the air within the casing. The heating of the air of course causes the air to be continuously directed upwardly within the casing, drawing fresh air into the inlet 16 and causing the heated air to pass upwardly through a main duct 64 connected in the top wall of the casing, and auxiliary ducts 66, 68 projecting outwardly from the opposite side walls of the casing. The main duct may extend to a first floor register, while the auxiliary duct may extend to registers on other floors, and in other rooms of the building.

In the door 14 there may be mounted a temperature gauge 70, reflecting at all times the temperatures within the casing.

If desired, one may associate a blower with the heater, to insure the flow of air upwardly through the casing into the duct 66, 64, 68.

It will be seen that the heater is one that occupies a minimum amount of floor space, it being found that maximum efficiency, adapted for heating a substantial area, can be produced by a heater occupying no more than approximately one square foot of floor space. The heater is nevertheless of substantial area, due to its vertical elongation, and can extend the full height of the room in which it is mounted. Thus, in a basement installation where the basement has an 8-foot clearance, the heater might be from six to almost eight feet in length. This, of course, will depend upon the desires of the particular manufacturer, and the requirements of the particular installation.

Further, the heater is characterized by its adaptability for manufacture at low cost, and its relative simplicity of design. Still further, the heater is easily assembled, due to the provision of the particular coil support frame, and the adaptability for insertion of the coil through the upper end of said frame with the coil being held down against the lower edge of the frame by means of crossing, contractile springs connected between the retaining plates of the frame. Another important characteristic resides in the provision of a door extending the full length of the heater, providing access to the interior thereof from top to bottom of the heater for cleaning or repair purposes. Still further, the disposition of the burner fully exteriorly of the casing provides a maximum area for flow of air through the casing, and further facilitates the connection of the burner to a suitable source of supply of fuel, while also facilitating maintenance and repair of the burner.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A coil type heater comprising a vertically elongated casing; a tubular coil having its axis extending vertically, centrally within said casing and spaced inwardly from the wall of the casing to provide an air chamber surrounding the coil, the casing having an air inlet at its lower end end and an air outlet at its upper end; burner means adapted to direct its output to the lower end of the coil, said coil including a flue connection at its upper end for discharge of the products of combustion passing through the coil; and a coil support frame having its axis mounted centrally, vertically within the casing and enclosing said coil, said coil support frame having its opposite ends spaced inwardly from the opposite ends of the casing, and including rectangularly spaced posts, transverse frame elements connected to the opposite ends of the posts and extending to the walls of the casing, and opposed retaining plates of angular cross section carried by and extending longitudinally of the posts and bearing against diametrically opposite portions of said coil, said plates and the casing walls adjacent the same having flat, confronting surfaces defining between each plate and its adjacent casing wall a flat-walled air conduit forming part of said chamber.

2. A coil type heater comprising a vertically elongated casing; a tubular coil having its axis extending vertically, centrally within said casing and spaced inwardly from the wall of the casing to provide an air chamber surrounding the coil, the casing having an air inlet at its lower end and an air outlet at its upper end; burner means adapted to direct its output to the lower end of the coil, said coil including a flue connection at its upper end for discharge of the products of combustion passing through the coil; and a coil support frame having its axis mounted centrally, vertically within the casing and enclosing said coil, said coil support frame having its opposite ends spaced inwardly from the opposite ends of the casing, and including rectangularly spaced posts, transverse frame elements connected to the opposite ends of the posts and extending to the walls of the casing, and opposed retaining plates of angular cross section carried by and extending longitudinally of the posts and bearing against diametrically opposite portions of said coil, said plates and the casing walls adjacent the same having flat, confronting surfaces defining between each plate and its adjacent casing wall a flat-walled air conduit forming part of said chamber, said frame further including crossing, contractile springs detachably clipped at their opposite ends to the respective retaining plates and overlying the coil.

3. A coil type heater comprising a vertically elongated casing; a tubular coil having its axis extending vertically, centrally within said casing and spaced inwardly from the wall of the casing to provide an air chamber surrounding the coil, the casing having an air inlet at its lower end and an air outlet at its upper end; burner means adapted to direct its output to the lower end of the coil, said coil including a flue connection at its upper end for discharge of the products of combustion passing through the coil; and a coil support frame having its

axis mounted centrally, vertically within the casing and enclosing said coil, said coil support frame having its opposite ends spaced inwardly from the opposite ends of the casing, and including rectangularly spaced posts, transverse frame elements connected to the opposite ends of the posts and extending to the walls of the casing, and opposed retaining plates of angular cross section carried by and extending longitudinally of the posts and bearing against diametrically opposite portions of said coil, said plates and the casing walls adjacent the same having flat, confronting surfaces defining between each plate and its adjacent casing wall a flat-walled air conduit forming part of said chamber, said frame further including crossing, contractile springs detachably clipped at their opposite ends to the respective retaining plates and overlying

the coil, said springs being connected to the retaining plates at a level below the upper end of the coil, the springs being bowed upwardly over the upper end of the coil so as to exert a downward pressure upon the coil tending to seat the same within the coil support frame.

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