

Aug. 30, 1932.

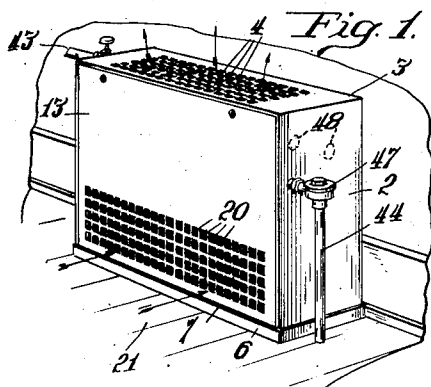
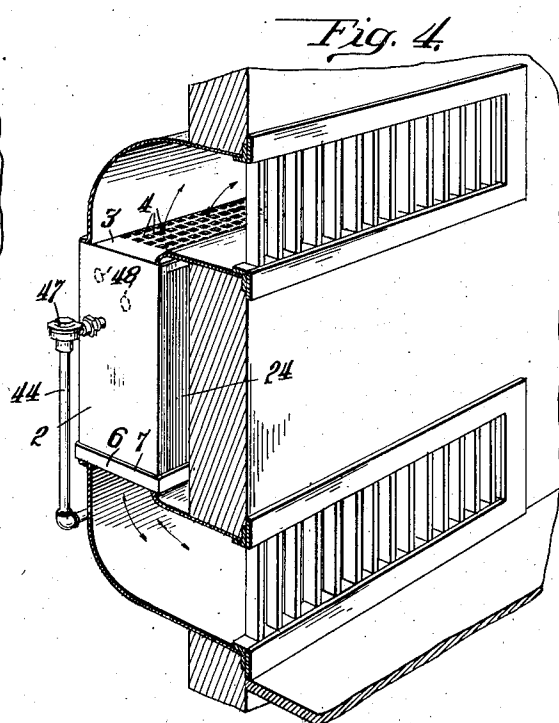
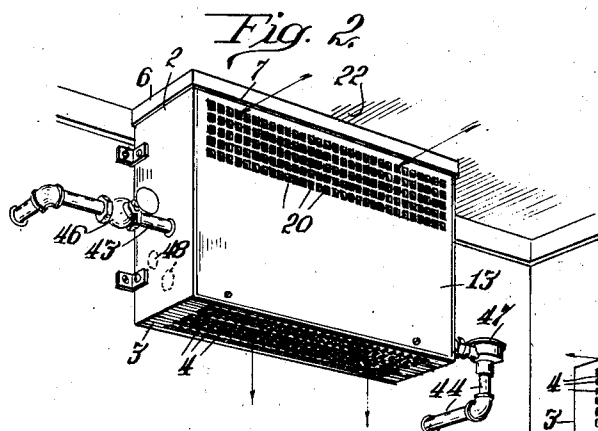
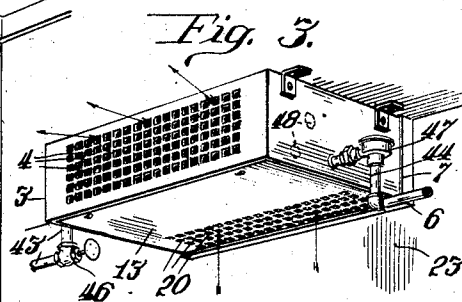
L. P. DWYER

1,874,940

CABINET TYPE UNIT HEATER

Filed March 16, 1931

4 Sheets-Sheet 1



Inventor.

Lawrence P. Dwyer

By *Barnes & Truman*
Attorneys

Aug. 30, 1932.

L. P. DWYER

1,874,940

CABINET TYPE UNIT HEATER

Filed March 16, 1931

4 Sheets-Sheet 2

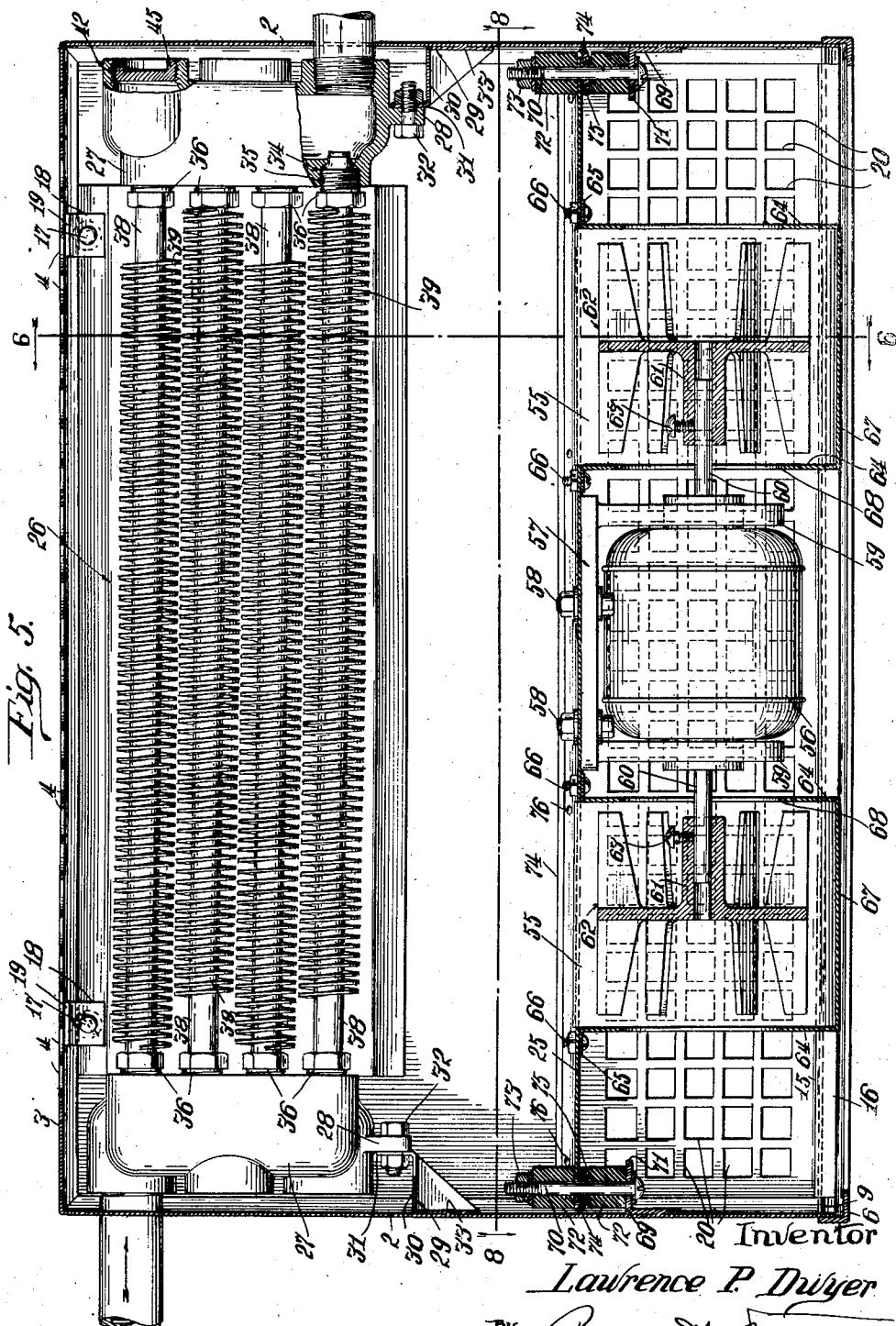


Fig. 5.

Inventor
Lawrence P. Dwyer
Barnett Truman
Attorneys.

Aug. 30, 1932.

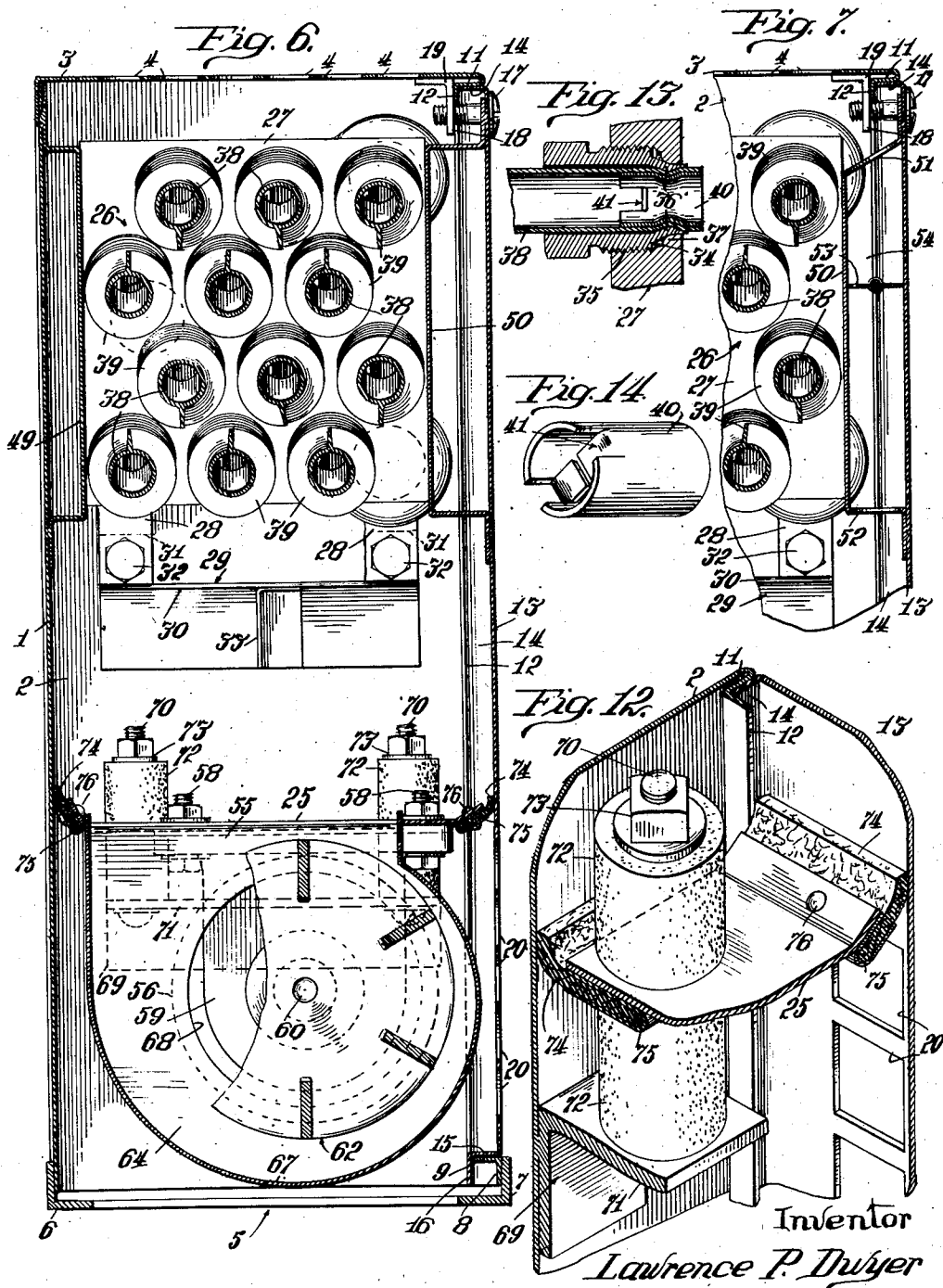
L. P. DWYER

1,874,940

CABINET TYPE UNIT HEATER

Filed March 16, 1931

4 Sheets-Sheet 3



Inventor
Lawrence P. Dwyer
By *Barnett & Arman*
Attorneys.

Aug. 30, 1932.

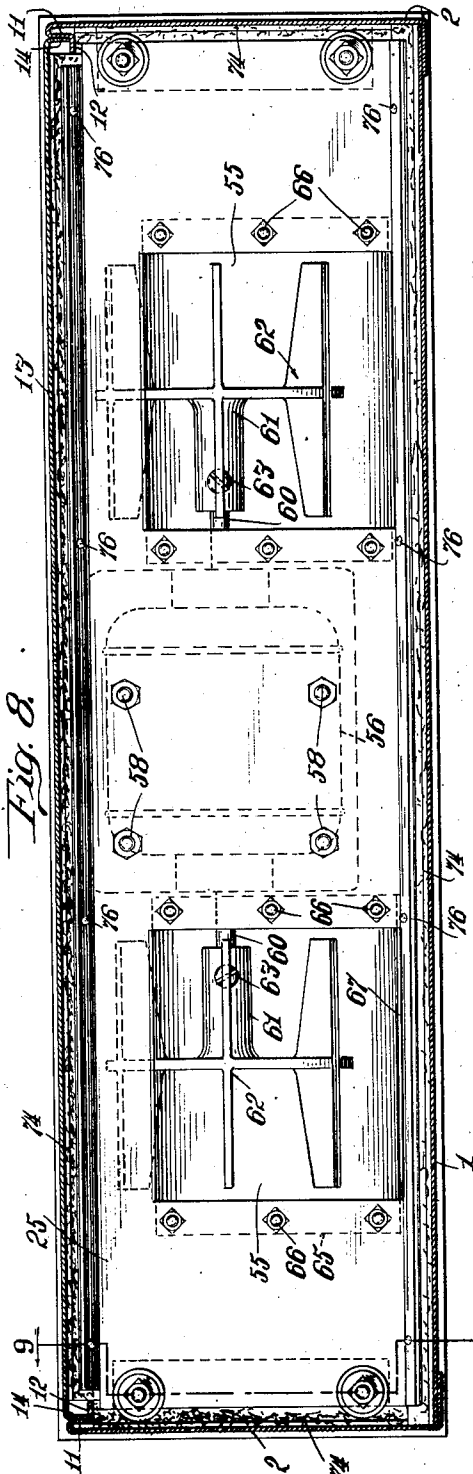
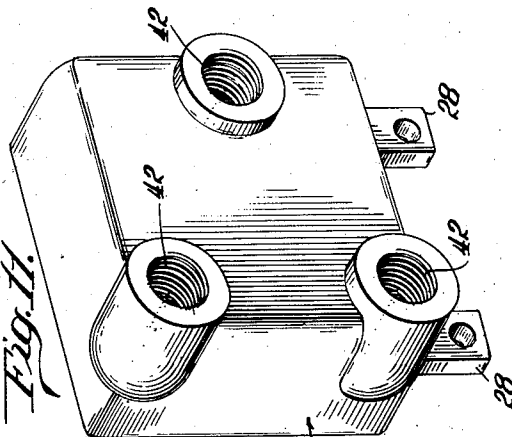
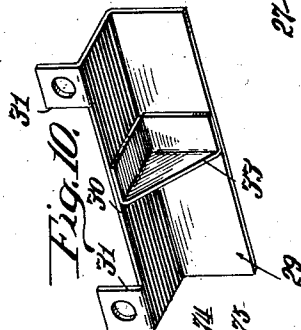
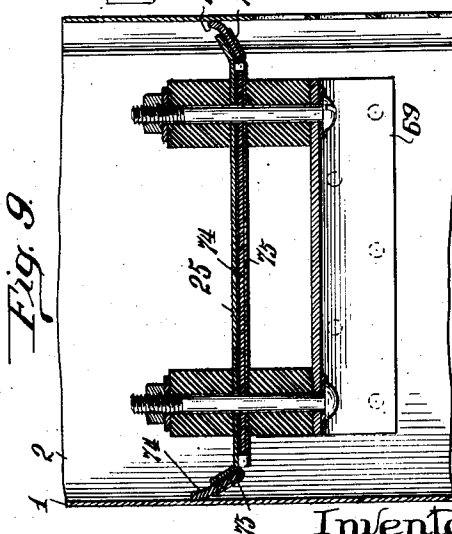
L. P. DWYER

1,874,940

CABINET TYPE UNIT HEATER

Filed March 16, 1931

4 Sheets-Sheet 4



Inventor
Lawrence P. Dwyer
Barrett & Truman
Attorneys

UNITED STATES PATENT OFFICE

LAWRENCE P. DWYER, OF WINNETKA, ILLINOIS, ASSIGNOR TO C. A. DUNHAM COMPANY, OF MARSHALLTOWN, IOWA, A CORPORATION OF IOWA

CABINET TYPE UNIT HEATER

Application filed March 16, 1931. Serial No. 523,137.

This invention relates to certain new and useful improvements in a cabinet-type unit heater, and more particularly to a heater of this type which is compact, self-contained and which is invertible or adapted for use in a plurality of different positions, so that it is of substantially universal application without any material alterations in the structure.

Modern building conditions demand that the heating apparatus be concentrated in the smallest possible amount of space, and in addition be adapted to a wide variety of installation applications. The radiators may be positioned adjacent the floor, adjacent the ceiling, or concealed in walls or flues. For one example, where radiators are located in basements, the practice in steam-heating or hot-water heating systems is to locate the radiator near the ceiling above the supply and return pipes so as to simplify the piping. When the ordinary type of radiator is thus located, it is impossible to satisfactorily heat the space adjacent the floor because the air tends to stratify into layers of varying temperatures, the higher temperatures prevailing adjacent the ceiling. It is, therefore, desirable to provide means for positively causing the heated air to circulate downwardly.

Unit heaters of the type with which this invention is concerned comprise a self-contained radiator and a blower or other means for causing air to positively move through the unit in contact with the heating surface. The present invention relates to such a unit which is capable of use in a variety of positions, either upright, inverted or partially inverted, and one which may be alternately used either adjacent the floor or ceiling or used in concealed radiating systems. The present unit heater is also designed to operate satisfactorily when the blower is not in operation, that is, the heating element will cause the desired aspirating effect on the air so as to cause circulation through the heater.

Briefly described, the improved heater comprises a substantially closed rectangular casing having permanently connected rear, end and top walls, the top wall being provided with a grille or openings for the discharge of the

heated air. The bottom of the casing is open, and the removable front wall is provided with openings or a grille in its lower portion, so that air may be alternatively drawn into the casing through the open bottom thereof or through the grille in the lower portion of the front wall. The casing is divided by an intermediate horizontal partition into upper and lower compartments, the radiating unit being mounted in the upper compartment so that all air passing through the casing must flow between the tubes of the radiators so as to be heated thereby. The blower apparatus is suspended from the partition within the lower compartment so as to positively cause the circulation of air through the heater. The air flow will always be in the same direction through the heater, but the heater may be bodily inverted or partially inverted without affecting the satisfactory operation thereof.

The principal object of this invention is to provide an improved unit heater of the type briefly described hereinabove and disclosed more in detail in the specifications which follow.

Another object is to provide a unit heater of substantially universal application, that is, one that may be installed in a plurality of different locations or positions.

Another object is to provide a compact unit heater which will develop a maximum efficiency for a minimum size.

Another object is to provide an improved unit heater capable of positively circulating air downwardly through a compartment to be heated.

Another object is to provide a unit heater in which the noise of the operating parts will be reduced to a minimum.

Another object is to provide a radiator for the unit heater which has alternative connections, whereby it may be inverted or installed in a plurality of different positions.

Another object is to provide a radiator which has a long life, is not subject to destructive corrosion, and which is less susceptible to freezing than radiators of this type in ordinary use.

Another object is to provide a unit heater

in which the individual radiator tubes may be easily removed, replaced, or put out of service without affecting the operation of the remaining parts.

5 Another object is to provide an improved blower or fan construction for a unit heater.

Another object is to provide an improved and simplified fan housing for a unit heater.

10 Another object is to provide improved means for sealing the air passages through the heater so as to cause substantially all of the air flow to be in contact with the radiating surfaces.

15 Another object is to provide a unit heater capable of satisfactory operation when the air circulates by gravity, that is when the blower mechanism is not in operation.

20 Another object is to provide an improved unit heater provided with a valve mechanism whereby the percentage of air-flow in contact with the radiating surfaces may be varied as desired.

25 Another object is to provide a unit heater which may be assembled and shipped as a unit.

30 Other objects and advantages of this invention will be more apparent from the following detailed description of one approved form of the apparatus constructed in accordance with the principles of this invention.

In the accompanying drawings:

35 Fig. 1 is a perspective view of the improved unit heater as installed in its normal upright position.

Fig. 2 is a similar view of the heater installed in inverted position adjacent the ceiling of a room or compartment.

40 Fig. 3 is a similar view of the heater installed in partially inverted or sidewise position in one upper corner of a room.

Fig. 4 is a sectional perspective view showing the heater installed in a wall or flue.

45 Fig. 5 is a vertical longitudinal sectional view through the heater, the view being taken looking from the rear toward the removable front wall.

Fig. 6 is a transverse vertical section, taken substantially on the line 6—6 of Fig. 5.

50 Fig. 7 is a partial vertical-section corresponding to the upper right hand portion of Fig. 6, but showing a modification.

Fig. 8 is a horizontal section taken substantially on the line 8—8 of Fig. 5.

55 Fig. 9 is a partial vertical section taken substantially on the line 9—9 of Fig. 8.

Fig. 10 is a perspective view of one of the brackets used for supporting the radiator.

60 Fig. 11 is a perspective view of one of the radiator headers.

Fig. 12 is a detail perspective view showing one of the cushioned supporting members for the intermediate partition of fan panel.

65 Fig. 13 is a longitudinal section through the end portion of one of the radiator tubes.

Fig. 14 is a perspective view of one of the tube restricting members.

70 In describing the various elements of the unit heater, the parts will be described with reference to the normal upright position of the heating unit, as shown in Fig. 1. It will be understood that when the unit is inverted, or partially inverted, as shown in Figs. 2 and 3, some of the terms used will no longer be strictly applicable, since what is described as 75 the top wall may become the bottom wall or a side wall. It is to be understood, therefore, that the terms hereinafter used are merely relative and do not necessarily identify the actual positioning of the parts described 80 when in service.

The heater casing is built up of sheet metal plates or panels comprising a rear wall 1, end walls 2, and a top wall 3, permanently united by having overlapping portions secured together by spot welding or in any other suitable manner. The rear wall 1 and end walls 2 are substantially imperforate, but the top wall 3 is provided with a plurality of openings 4 so as to form a grille through which the heated air is discharged. The lower side or bottom of the casing is opened, as indicated at 5, (Fig. 6), but a metallic angle member 6 extends around the four sides of this open bottom, the front portion 7 of this angle member remaining permanently in place, even when the removable front wall or panel has been removed. A second angle bar 8 is secured to the inner side of the front angle bar 7 so as to provide an inwardly projecting horizontal flange 9, as best shown in Fig. 6. The front edge portions of the end walls 2 and top wall 3 are return-bent inwardly, as indicated at 11, and then formed with a short flange 12 extending inwardly in a vertical plane parallel with the rear wall 1, thus forming a shoulder against which the removable front wall fits. The removable front wall or panel 13 comprises a sheet metal plate provided with inturned edge flanges 14 at its side and top edges, adapted to abut against the flanges 12 when the front wall is in position. Along its lower edge the front wall 13 is flanged inwardly at 15 and then downwardly at 16 to hook over the horizontal flange 9 of the angle bar 8, thus holding the lower portion of the front wall in place. Screw bolts 17 which pass through openings in the upper portion of front wall 13 are adapted to engage threaded openings in the downwardly extending flanges 18 of angle-brackets 19 which are secured to the top wall 3 directly behind the down-turned flange 12. It will now be apparent that in order to remove the front panel 13 it is merely necessary to unscrew the bolts 17 and then lift the front wall upwardly and outwardly so as to disengage the hooked lower edge 16 from the flange 9.

The lower portion of the front wall 13 is provided with a plurality of holes or openings 130

20 so as to form a grille through which air may be drawn into the casing. It is to be understood that the air to be heated may be drawn into the casing either through the grille 20 or through the open bottom 5, and the heated air will always be expelled through the grille 4 in the top wall 3. The direction of air flow is indicated by the arrows in Figs. 1, 2, 3 and 4. When the heater is mounted in normal upright position, as indicated in Fig. 1, the bottom opening 5 will be closed by the floor, indicated at 21. In a similar manner when the heater is inverted, as shown in Fig. 2, the open side will be closed by the ceiling 22, and when positioned, as shown in Fig. 3, the open side is closed by the side wall 23 of the building. In all of these installations, the air to be heated is drawn in through the grille 20 in the front wall 13. Ordinarily when the heater is mounted in a flue or wall passage (see Fig. 4) the air will be drawn in through the open bottom 5, and usually the installation will be such that the grille 20 in the front wall will be closed by an adjacent wall of the flue or passage. If this is not the case, a substitute front panel 24 may be used, which is exactly similar to the front wall 13 except that the grille openings 20 are omitted. Or, alternatively, the openings 20 may be closed by any suitable cover member, or it may be immaterial whether the openings are closed or not.

The casing is interiorly divided, above the grille 20 in the front wall 13, by an interior partition 25 which divides the casing into upper and lower compartments. This partition is referred to as a "fan-panel" since it supports the blower mechanism, all of which will be described hereinafter in more detail. The upper compartment above the partition 25, is substantially closed except for the outlet grille 4 in the top wall 3. The radiator, indicated as an entirety at 26, is mounted in this upper compartment. The radiator comprises a pair of similar headers 27, one of which is shown in perspective in Fig. 11. One of these headers is supported adjacent each end wall 2 of the casing, the header being in the form of a hollow casting formed with a pair of downwardly projecting supporting legs 28. A sheet metal supporting bracket (shown in Fig. 10) comprises a vertical supporting wall 29 which is spot-welded or otherwise secured to the end casing wall 2, a horizontal bracket wall 30, and upwardly projecting lugs 31 to which the legs 28 of the header are attached by means of the screw bolts indicated at 32. The bracket may be provided with a reinforcing web 33, welded or otherwise secured thereto.

Each header 27 is formed on its inner face with a plurality of similar spaced-apart openings 34, each comprising a larger interiorly threaded portion 35 adapted to receive an annular clamping nut 36, and a smaller inner

portion 37, through which the end portion of one of the radiating tubes 38 is adapted to project. These tubes 38 are formed of comparatively thin metal, preferably seamless drawn copper, and each provided with a spirally wound continuous copper fin 39 on its outer surface to increase the radiating surface. The header openings 34 for receiving the tubes are so arranged that the tubes 38 will be positioned in staggered relation, as best shown in Fig. 6, so as to provide devious air passages therebetween, and preferably the tubes will slant slightly downward toward one end, as shown in Fig. 5, so as to facilitate drainage. The brass clamping nut 36 is formed on its inner end with an annular wedge portion 36', which is adapted to be forced between the outer surface of tube 38 and the cam surface of the header formed about the reduced opening 37 so as to seal the opening and clamp the radiating tube tightly in position. A reinforcing thimble 40 is inserted in the end portion of tube 38 to prevent crushing the tube when the sealing nut 36 is screwed into position. Preferably the thimbles 40 at the steam inlet ends of the tubes will each be formed with a pair of inturned restricting fingers 41 (see Fig. 14) so as to impede somewhat the flow of steam or other heating medium through the tubes, and secure more equal distribution of steam into the several tubes.

Each header is formed in its outer surface with a plurality of spaced inlet or discharge openings 42, which are interiorly threaded to receive the end of a supply pipe 43 or a discharge pipe 44. The openings 42 which are not used for connection with the supply and discharge pipes will be closed by plugs 45. As shown in Fig. 11, two of these openings 42 will be positioned at the upper and lower corners along one side of the header, and the third opening will be positioned intermediately along the opposite side of the header. It will be apparent that since the two headers are duplicates, but one is reversed with relation to the other, the openings in one header will be positioned out of line with the openings in the opposite header, so as to tend to create a more uniform dispersion of the heating medium through the several radiating tubes 38. The restricting devices 41 in the ends of the tubes also serve to create a more uniform distribution of the heating medium. When steam is used as the heating medium, the inlet pipe 43 may be provided with a control valve 46, and the outlet pipe 44 provided with a steam trap 47 in the usual manner, and as illustrated in Figs. 1 to 4 inclusive.

In order to insure proper flow of the heating medium and proper drainage, the inlet pipe 43 should be connected with that opening 42 which happens to be positioned uppermost in one of the headers, and the discharge

pipe 44 should be connected with the lowermost opening 42 in the other header. It will be apparent that the openings used will depend upon the position in which the unit heater is installed, as in the example shown in Figs. 1 to 4 inclusive. When the unit heater is first assembled and shipped, closure plugs 45 may be provided in all of the openings 42. When the position in which the heater is to be installed has been determined, holes must be provided in the end plates 2 to receive the supply and discharge pipes. Such holes may be cut for this purpose, or partially severed cut-out plugs may be formed in the end wall opposite each opening 42, as indicated at 48 in Figs. 1 to 4. The proper holes will be punched out and the plugs 45 removed from the exposed openings 42, the other plugs 45 remaining in place to close the openings filled thereby. It will therefore be apparent that this radiator is adapted for use in practically any position in which the heating unit may be installed.

The header passages, and the passages in the radiating tubes 38 will preferably be made somewhat larger in cross-section than has hitherto been the practice, so that water will not be held therein, due to capillarity, thereby precluding the liability of water freezing in the pipes, and insuring proper drainage. It will be apparent that when the front wall or panel 13 has been removed from the casing all of the radiator tubes 38 are accessible so that any individual tube may be removed by unscrewing the nuts 36. In this way, a damaged or leaky tube may be removed and replaced without disturbing the remaining tubes, and if desired plugs may be screwed into the openings 35 to close these openings and permit the radiator to operate with the remaining tubes after one tube has been removed.

In order to insure the flow of air passing through the casing in contact with the radiating surfaces of the heating tubes, stop walls or baffle plates 49 and 50 are secured to the inner surfaces of the rear and front walls 1 and 2 opposite the radiator 26. It will be apparent that these baffle walls will prevent the flow of air upwardly along the front and rear walls and will force all of the air to flow up through the tortuous passages between the radiating tubes. In a similar manner, the supporting brackets 30 tend to prevent the flow of air upwardly beyond the ends of the headers 27. It will be noted that the baffle wall 50 is removed with the front wall 13 so as to permit free access to the radiator when this wall is removed.

In the modification shown in Fig. 7, the upper and lower walls of the stop member 50 are provided with a plurality of openings 51 and 52, respectively, and a valve 53 is provided to control the flow of air through the passage 54 between baffle wall 50 and front

wall 13. In this manner a measured flow of air may be shunted through this passage 54 so as to modify the heating effect of the radiator. The valve 53 may be adjusted from outside the casing in any desired manner.

The partition or fan-panel 25, hereinabove referred to, is formed of a single metal plate provided at each side of its central portion with a rectangular opening or air passage 55 (see Fig. 8). The motor 56 is mounted between the arms of a U-shaped bracket 57 secured to the under-side of partition 25 between the openings 55 by means of bolts 58. Non-metallic bushings will preferably be provided in the supporting brackets 59 for the motor trunnions so as to deaden the sound of the motor operations. On each of the projecting ends 60 of the motor shaft is secured the hub 61 of a suitable fan 62, by means of set-screw 63. The fans 62 are positioned one beneath each of the openings 55 in partition 25. Each fan 62 is enclosed in a sheet metal fan casing comprising scroll-shaped end plates 64 supporting by horizontally projecting flanges 65 bolted to the partition 25 at 66, at the respective ends of the opening 55 in the partition. The fan housing is completed by a continuous sheet metal wall 67 which is curved so that its edges fit in abutting relation with the edges of the two similar scroll members 64, the edges of these plate members 64 and 67 being spot welded together to complete the housing. Each end wall 64 is provided with a central air intake opening 68. It will be apparent that these fan-housings are of very simple and light construction, and are supported directly from the partition 25, but entirely independently of the motor and fans. When the motor 56 is running and the fans 62 are in operation, air will be drawn into the fan housing through the end openings 68 and projected upwardly through the partition openings 55 into the upper casing chamber, the air then flowing upwardly between the radiator tubes and being heated thereby, and then passing out through the grill 4 in the top wall of the casing. If desired, directing vanes may be placed on partition 25 across the openings 55 to guide and distribute the air projected toward the radiator. This direction of air flow through the unit heater will be the same, no matter in which alternative position the heater may be mounted, as in the examples shown in Figs. 1, 2, 3 and 4.

This intermediate partition or fan panel 25 and the blower assembly supported thereby are yieldably carried by the end walls 2 of the unit heater housing. Metallic angle brackets 69 are spot welded or otherwise secured to the end walls 2, and bolts 70 are passed through mating openings in the horizontal flange 71 of the bracket 69, and in the end portions of the metallic partition 25. Rubber thimbles 72, or other suitable cush-

ioning elements, are positioned around the bolt 70 at each side of the partition 25, that is, one thimble is positioned between the bracket flange 71 and the partition, and a similar thimble positioned between the thimble and the locking nut and washer 73 on the end of bolt 70. In this manner the vibratory movements of the motor and fan mechanism will be cushioned and not transmitted to the supporting housing, thus materially deadening the sounds created by the moving parts.

Suitable sealing strips are provided around the edges of partition 25 to prevent the passage of air between the edges of the partition and the casing walls without providing rigid metallic contacts at these edges. For this purpose, felt strips 74 have their free outer edge portions engaged against the walls of the heater casing (see Fig. 4) and their inner portions are encased in folded metallic binding members 75 so as to stiffen the inner portions of the strips and permit them to be secured to the partition 25 by a limited number of rivets or similar securing means 76. The similar sealing strips used at the respective ends of the partition may be held in place by the supporting bolts 70, as clearly shown in Figs. 5 and 12. It will now be apparent that all of the moving parts are carried by the partition or panel 25 and that this panel is completely cushioned with respect to the unit-heater housing from which it is supported, so that the vibrations of the moving parts will not be transmitted to the heater housing and the noises will be materially deadened.

This improved unit-heater is not only one that may be used in various positions and locations, so as to circulate the heated air either upwardly, downwardly or laterally, but when mounted in normal upright position the construction is such that air will circulate satisfactorily through the casing by convection. In ordinary types of unit-heaters, as heretofore known, the heat output has been varied entirely by stopping and starting the fan or blower. However, if circulation of the air in the room ceases, with the cessation of operation of the fan, sensations of chill will be experienced by the occupants of the room and the heating system is, for this reason, unsatisfactory. Since the air will continue to circulate through this unit-heater, to a modified extent, even after the blower has ceased to operate, such sudden temperature variations are avoided.

It will be noted that this unit-heater is entirely self-contained and may be assembled at the factory, and no material changes are necessary for adapting the heater to a wide variety of different installations. The construction is compact and comparatively light, the operation is substantially noiseless, and all of the operating parts are easily accessible for repair or replacement.

It is to be understood that in the claims

which follow the designation of certain portions of the apparatus as bottom and top, front and rear, upper and lower, etc., merely refer to the locations of these parts when the unit-heater is in normal upright position. These terms are merely relative and it is to be understood should be reversed or interchanged when the heater is inverted or partially inverted.

I claim:

1. A unit heater comprising a casing open at the top and bottom and having closed side and rear walls and a front wall with openings in the lower portion thereof, a radiator positioned between the closed upper walls of the casing, and means positioned in the lower portion of the casing beneath the radiator for causing a circulation of air through the casing and radiator, the air being drawn in through the bottom or open portion of the front wall and expelled through the open upper end of the casing, the unit being operable in inverted or partially inverted positions the direction of air flow through the casing remaining the same.

2. A unit heater comprising a casing having openings adjacent the top and bottom thereof, and closed end and rear walls and a removable front wall, a radiator comprising headers supported adjacent the end walls and a plurality of radiating tubes extending between the headers in spaced apart relation to permit the circulation of air through the casing between the tubes, the respective ends of each tube being removably and separately connected in communication with openings in the opposed headers, whereby any tube may be individually removed when the front wall is removed from the casing.

3. A unit heater comprising a casing having openings adjacent the top and bottom thereof, and closed end and rear walls and a removable front wall, a radiator comprising headers supported adjacent the end walls and a plurality of radiating tubes extending between the headers in spaced apart relation to permit the circulation of air through the casing between the tubes, the headers being formed with a plurality of openings to receive the tube ends, a portion of each opening being threaded to alternatively receive an annular locking nut for sealing the tube in position or a plug for closing the opening when the tube is removed.

4. A unit heater comprising a casing having openings adjacent the top and bottom thereof, and closed end and rear walls and a removable front wall, a radiator comprising headers supported adjacent the end walls and a plurality of radiating tubes extending between the headers in spaced apart relation to permit the circulation of air through the casing between the tubes, means for removably securing each tube end in communication with an opening in the header, and a

restricting means mounted in the open end portion of the tube to offer resistance to the flow of heating medium from one header to the other through the tube.

- 5 5. A unit heater comprising a casing having an open bottom, closed rear and side walls, a top provided with discharge openings, and a removable front wall closed in its upper portion and provided with inlet
10 openings adjacent the bottom thereof, a partition mounted within the casing above the openings in the front wall and dividing the casing into upper and lower compartments, the partition having openings therein, blower means supported by the partition within
15 the lower compartment and adapted to draw in air through the open bottom or the openings in the front wall and discharge the air into the upper compartment, a radiator
20 mounted within the upper compartment between the front, rear and side walls so that the air must pass through the radiator before being discharged through the openings in the top of the casing and alternative means
25 for connecting supply and discharge pipes for heating medium to the radiator, so that the unit may be used in any upright, inverted or partially inverted position.

- 30 6. A unit heater comprising a casing having openings adjacent the top and bottom thereof and closed end and front and rear walls, a radiator mounted within the casing and comprising a pair of headers positioned adjacent the end walls and a plurality of radiating tubes communicating with and extend-
35 between the headers in spaced apart relation, supply and discharge pipes for the heating medium adapted to be connected with the respective headers, each header being provided
40 in the side thereof adjacent the casing end with a plurality of alternative openings for receiving a supply or discharge pipe, and plugs for closing all but one of these openings.

- 45 7. A unit heater comprising a casing having openings adjacent the top and bottom thereof and closed end and front and rear walls, a horizontal partition mounted within the casing and dividing same into upper and
50 lower compartments, a radiator positioned in the upper compartment, the partition having openings therein, a blower means suspended from the partition in the lower compartment and adapted to force air upwardly through
55 the openings, and means for yieldingly supporting the partition from the end walls of the casing.

- 60 8. A unit heater comprising a casing having openings adjacent the top and bottom thereof and closed end and front and rear walls, a horizontal partition mounted within the casing and dividing same into upper and lower compartments, a radiator positioned in the upper compartment, the par-
65 tition having openings therein, a blower

means suspended from the partition in the lower compartment and adapted to force air upwardly through the openings, brackets on the end walls of the casing, bolts extending through the end portions of the partition
70 and the brackets, and cushioning means positioned about the bolts at each side of the partition.

9. A unit heater comprising a casing having openings adjacent the top and bottom
75 thereof and closed end and front and rear walls, a horizontal partition mounted within the casing and dividing same into upper and lower compartments, a radiator positioned in the upper compartment, the par-
80 tition having openings therein, a blower means suspended from the partition in the lower compartment and adapted to force air upwardly through the openings, brackets on the end walls of the casing, bolts extending
85 through the end portions of the partition and the brackets, and rubber thimbles surrounding the bolts at each side of the partition.

10. A unit heater comprising a casing hav-
90 ing openings adjacent the top and bottom thereof and closed end and front and rear walls, a horizontal partition mounted within the casing and dividing same into upper and lower compartments, a radiator positioned in
95 the upper compartment, the partition having openings therein, a blower means suspended from the partition in the lower compartment and adapted to force air upwardly through the openings, means for yieldingly
100 supporting the partition from the walls of the casing, and flexible sealing strips secured to the several edge portions of the partition and engaging the walls of the casing.

11. A unit heater comprising a casing hav-
105 ing openings adjacent the top and bottom thereof and closed end and front and rear walls, a horizontal partition mounted within the casing and dividing same into upper and lower compartments, a radiator positioned
110 in the upper compartment, the partition having openings therein, a blower means suspended from the partition in the lower compartment and adapted to force air upwardly through the openings, means for yieldingly
115 supporting the partition from the walls of the casing, and flexible sealing means comprising felt strips and metal binders reinforcing the inner edge portions of the strips, the reinforced inner portions of the strips
120 being secured to the edge portions of the partition, and the free outer edges of the felt strips engaging the inner walls of the casing.

12. A unit heater comprising a casing hav-
125 ing openings adjacent the top and bottom thereof and closed end and front and rear walls, a horizontal partition mounted within the casing and dividing same into upper and lower compartments, a radiator positioned
130

in the upper compartment, the partition having openings therein, a blower means suspended from the partition in the lower compartment and adapted to force air upwardly through the openings, brackets on the end walls of the casing, bolts extending through the end portions of the partition and the brackets, rubber thimbles surrounding the bolts at each side of the partition, and flexible sealing means comprising felt strips and metal binders reinforcing the inner edge portions of the strips, the reinforced inner portions of the strips being secured to the edge portions of the partition, and the free outer edges of the felt strips engaging the inner walls of the casing.

LAWRENCE P. DWYER.

20

25

30

35

40

45

50

55

60

65