July 5, 1938. L. W. CHILD 2,122,454

HEAT TRANSFER UNIT

Filed Nov. 2, 1935 2 Sheets-Sheet 1

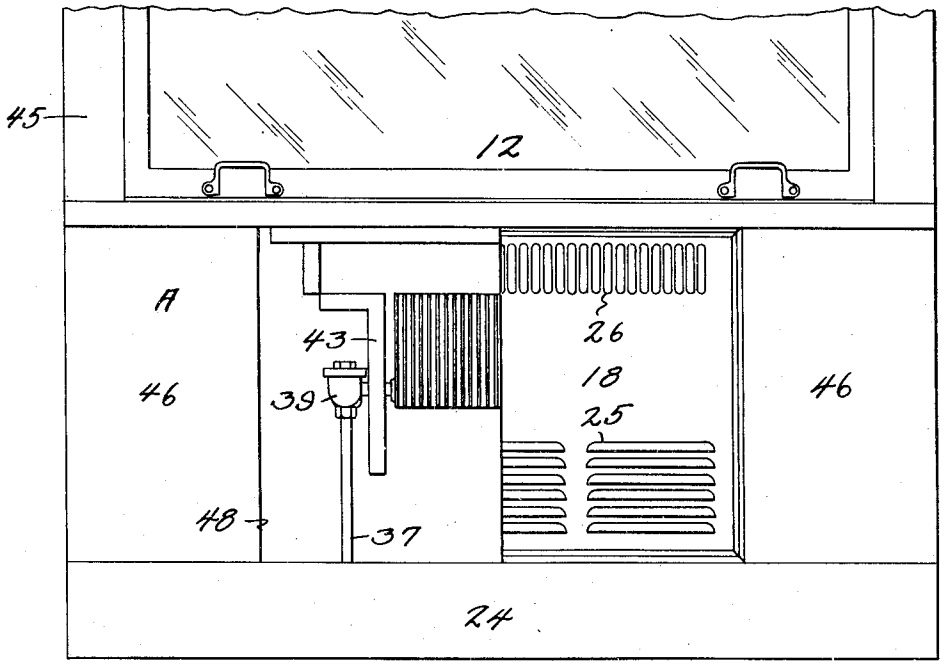


Fig 1

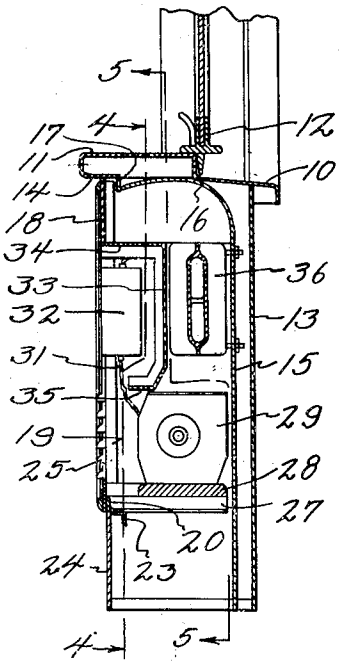


Fig. 2

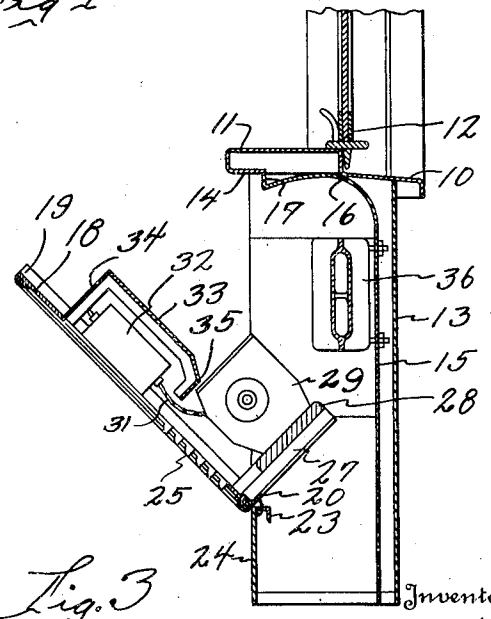


Fig. 3

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Filed Nov. 2, 1935 2 Sheets-Sheet 2

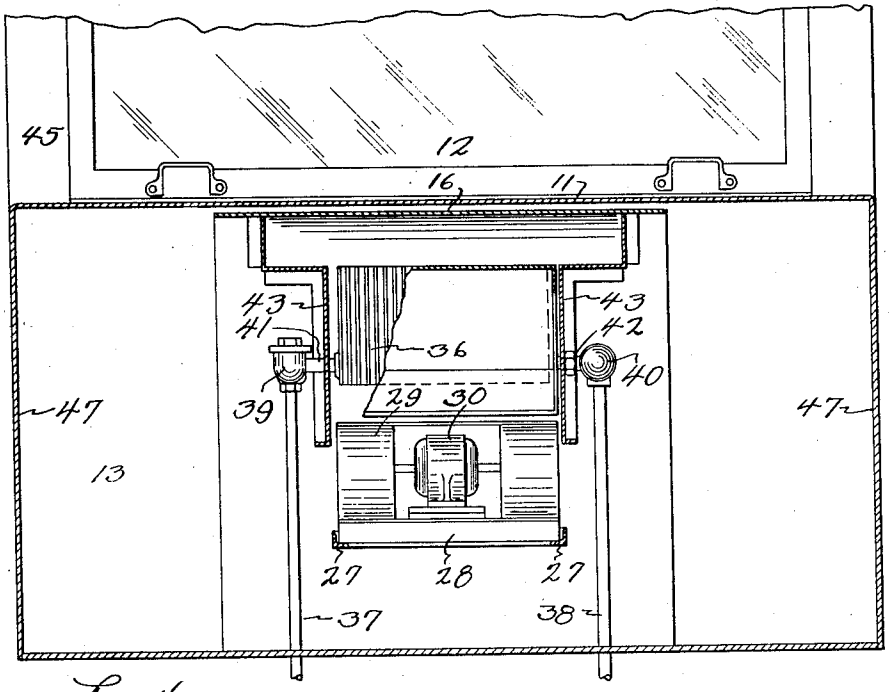


Fig. 4

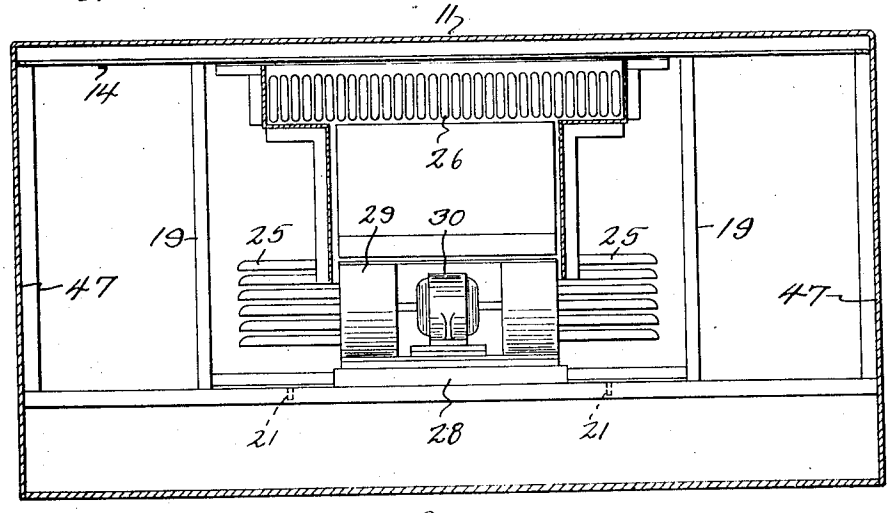


Fig. 5

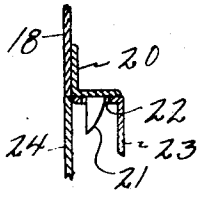


Fig. 6

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UNITED STATES PATENT OFFICE

2,122,454

HEAT TRANSFER UNIT

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Application November 2, 1935, Serial No. 47,965

6 Claims. (Cl. 257—137)

This invention relates to heat exchange units, and has for its object to provide as a new article of manufacture, a built-in heater combined in a novel manner with a steel frame window, and has especially to do with rendering the mechanism of the unit readily accessible.

The invention is illustrated in a unit designed for installation in combination with a window frame, and including a casing beneath the sill, a radiator in said casing, a blower for passing a current of air over said radiator, and intake and discharge openings for allowing circulation of air through said casing.

An important object is to provide an arrangement of this type such that the radiator and blower, or their equivalents, are readily accessible for inspection. This object is attained in a general way by mounting one of them in a fixed position within the chamber, and mounting the other upon a front panel which is hinged to move outwardly so as to simultaneously disclose the radiator and move the blower from a position beneath the radiator to one projected forwardly therefrom. It will be understood in this connection that for efficient operation of a forced draft heater (or cooler) of this type, it is desirable that the blower be located directly below the radiator or directly contiguous thereto. The problem of inspection is greatly facilitated by arranging the two so that they can be inspected upon opening movement of the front panel.

Another object is to provide an arrangement wherein a forward insulator wall is mounted upon the hinged panel so as to disclose the radiator upon opening movement of the panel.

A further object is to provide an arrangement wherein the necessary electric controls for the blower such as transformers, switches, etc., are carried between the panel and the front insulator wall in fixed relation to the blower.

The foregoing objects are intimately connected with a general object which is to provide an arrangement of a heater with a window structure such that cold air from a region near the floor of a building may be taken into the heater chamber through an intake opening in the lower region of the casing, thence passed upwardly through a suitable radiator, and thence projected back into the room through a discharge opening just beneath the window sill whereby any cold air that may seep into the room between the window sill and its adjacent sash, may descend upon and mix with the horizontally moving stream of heated air projected just below the window sill.

With these and other objects in view my invention consists in the combination, construction, and arrangement of the various parts thereof, whereby the objects contemplated are attained, as more fully set forth in the accompanying specifications, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a front elevation of a window and heater assembly embodying my invention, half of the hinged movable panel being broken away to illustrate the internal construction;

Figure 2 is a vertical central sectional view through the same;

Figure 3 is a similar sectional view showing the hinged panel in a forwardly projecting or open position;

Figure 4 is a vertical longitudinal sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a vertical longitudinal sectional view looking in an opposite direction and taken on the line 5—5 of Figure 2; and

Figure 6 is a detail sectional view of the hinge connection between the panel and the fixed portion of the casing.

My novel unit is herein illustrated as used with a metal window including a sill 10, an apron 11, a sash 12, a side frame member 45, and a heater casing A. The sheet of metal which forms the apron 11 is bent back beneath itself as at 14 to given an appearance of thickness.

The heater casing A includes a rear or outer wall 13, the sill 10, the apron members 11 and 14, side frame members 45, the front wall members 46 connected at their lower ends by a horizontal wall member 24, and the end wall members 47. The apron member 14, front wall members 46, and horizontal member 24, form between them an opening 48 into which a novel panel 18 fits. I provide a rear insulator wall 15 which is installed in spaced relation to the rear casing wall 13 and which at its upper end is formed with a forwardly projected hood 16 terminating in an upwardly projecting flange 17. The flange 17 registers with the inturned portion 14 of the sill and forms a shoulder against which the movable front panel 18 rests at its upper extremity.

The panel 18 is reinforced by frame members including side bars 19 and a lower longitudinal rib 20. Secured to and depending from the rib 20 are a pair of hinge fingers 21 (Figure 6) which project through openings 22 in a longitudinal beam 23 reinforcing the upper edge of the forward casing wall member 24. The panel 18 is provided in its lower region with intake

louvers 25 and in its upper region with discharge openings 26.

Rigidly secured to the rib 20 are a pair of inwardly projecting arms 27 on which is mounted the base 28 of the blower 29. The blower assembly includes an electric motor 30 which is provided with current through wires 31 connected to suitable control devices 32 mounted upon the panel 18. The control device 32 includes a transformer and a four-way switch, while the motor 30 is a variable speed unit, controlled by the four-way switch so as to give several varying air currents, adapted to abstract varying amounts of heat from the radiator.

The forward insulator wall 33 is secured, by means of the upper horizontal portion 34, to the panel 18, and at its lower end is extended forwardly as at 35 beneath the control device 32. It will therefore be noted that the control device 32 is positioned between the panel 18 and the forward insulator wall 33 and protected by said wall.

The insulator wall 33 and the insulator wall 15 form between them a constricted space in which is snugly received the radiator 36. A steam radiator is shown, although it will be understood that an electrical heating element or radiator, or a cooling unit, might be employed in its stead. The radiator 36 is hung upon the rear insulator wall 15 and is positioned sufficiently below the hood 16 so that air after passing through the radiator may be deflected forwardly through the discharge openings 26. Connections to the radiator 36 may include vertical steam pipes 37 and 38, a trap 39, a valve 40, and connecting nipples 41 and 42.

The nipples 41 and 42 are preferably extended through the end insulator walls 43 suspended from the hood 16. The end walls 43 serve to close the ends of the constricted space in which the radiator is mounted and project somewhat below the upper extremity of the blower.

In the operation of the device, air is taken by the blower 29 through the louvers 25 and discharged upwardly through the radiator 36 and thence forwardly through the discharge openings 26.

In inspecting the device, the panel 18 is simply pulled forward, hinging around the bottom 23, the blower 29 swinging forwardly from beneath the radiator 36 into the position shown in Figure 3, where it is accessible for inspection. The forward insulator wall 33 moves forwardly with the panel 18 and away from the radiator 36 so that the latter is also accessible for inspection.

The upper edge of the panel 18 is received below the sill portion 14 and is normally held by the weight of the blower assembly against the shoulder 17. The ends of the arms 27 may be arranged to contact the lower edges of the end insulator walls 43 so as to limit the upward movement of the panel 18 to the position shown in Figure 3. Should it be desirable to remove the panel entirely, the lower extremities of the end walls 43 may be forced apart slightly, allowing the arms 27 to slip between them and by simply lifting upon the panel, the fingers 21 may be slipped out of the openings 22 and the panel removed.

The rear insulator wall 15 prevents heat losses to the outside of the building through the wall 13, and the forward insulator wall 33 prevents undue radiation in the near vicinity of the heater and the two insulator walls serve to concentrate the heat produced by the radiator for delivery to the air stream passing through the chamber. Thus the most efficient type of heating is produced, since a much better distribution is secured by the forced circulation of the heated stream of air than by simple radiation or convection.

It is particularly advantageous to arrange the heater directly beneath a window sill so that the heated current of air may absorb and temper any cold air seeping into the room beneath the window sash 12.

While one illustrative embodiment has been described in detail, it is not my intention to limit the scope of the invention to that particular embodiment, or otherwise than by the terms of the appended claims.

I claim:

1. A casing including inner and outer wall members and forming a heater chamber, said inner wall member having an opening, an insulator wall adjacent and spaced from said outer wall member the upper portion of said insulator wall being extended forwardy to provide a deflector hood, a heat exchange device mounted in a fixed position within the casing below said hood and adjacent said insulator wall, a panel hinged to said inner wall member and closing said opening, and a blower carried by said panel and positioned directly below said device when the panel is closed whereby to direct a stream of air upwardly through the radiator to be deflected forwardly by said hood said panel having air inlet means adjacent the blower and air outlet means opposite the deflector hood.

2. A heater comprising a casing one side of which includes a hinged panel, a rear insulator wall adjacent and spaced from the opposite side wall of the casing, a pair of end wall members carried by the casing in a position substantially at right angles to and adjoining said rear insulator wall, a forward insulator wall carried by the panel and forming, when the latter is closed, together with said rear insulator wall and end walls, a constricted space which is open at top and bottom, a heat exchange device mounted in a fixed position relative to the casing within said space, and a blower carried by the panel and positioned to discharge into the lower opening of said space when the panel is closed.

3. In a heater, a casing one side of which includes a hinged panel, a blower carried by said hinged panel, a forward insulator wall carried by said panel and spaced therefrom, electrical control mechanism carried by the panel behind said forward insulator wall, and a heat exchange device mounted in a fixed position within the casing adjacent the discharge end of said blower when the panel is closed.

4. A heater including a casing one side of which is provided with a hinged panel, a pair of end insulator walls carried by the fixed portion of the casing, a pair of arms rigidly secured to the panel and projecting into the casing, the ends of said arms being adapted to contact the lower extremities of said insulator walls to limit the opening movement of said panel, a blower mounted upon said arms, and a heat exchange device mounted in a fixed position in the casing adjacent the discharge of said blower when the panel is closed.

5. A heater comprising a casing provided with a heat exchange device rigidly secured to one side thereof, and a panel hinged in the opposite side adapted to be opened for access to the interior of the heater and carrying air inlet and outlet means, air circulating means, and control means for the air circulating means, said panel and casing being so arranged that when the

panel is closed it completes a restricted air passage containing the heat exchange device.

6. A heater comprising a casing, a rear insulator wall located forwardly of the rear wall thereof and projected forwardly at its upper end to form a deflector hood, a heat exchange device secured closely to the insulator wall below said hood, a pair of inner side walls secured to the insulator wall and the deflector hood immediately adjacent the ends of the heat exchange device and extending a short distance therebelow, a front casing wall formed with an opening exposing all the aforementioned structure, a hinged panel adapted to close this opening and having mounted thereon immediately below the heat exchange device (when the panel is closed) a blower, a front insulator wall secured to the panel immediately adjacent the heat exchanger so that it is completely and closely inclosed by a restricted air passage, and air outlet means in the panel opposite the deflector hood.

LACHLAN W. CHILD.