June 16, 1953 J. H. HOLLINGSWORTH ET AL 2,642,270

WALL HEATER

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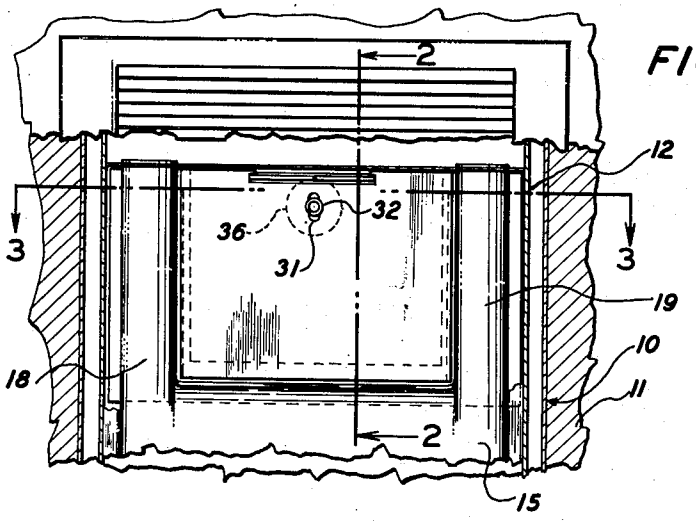

FIG. 1.

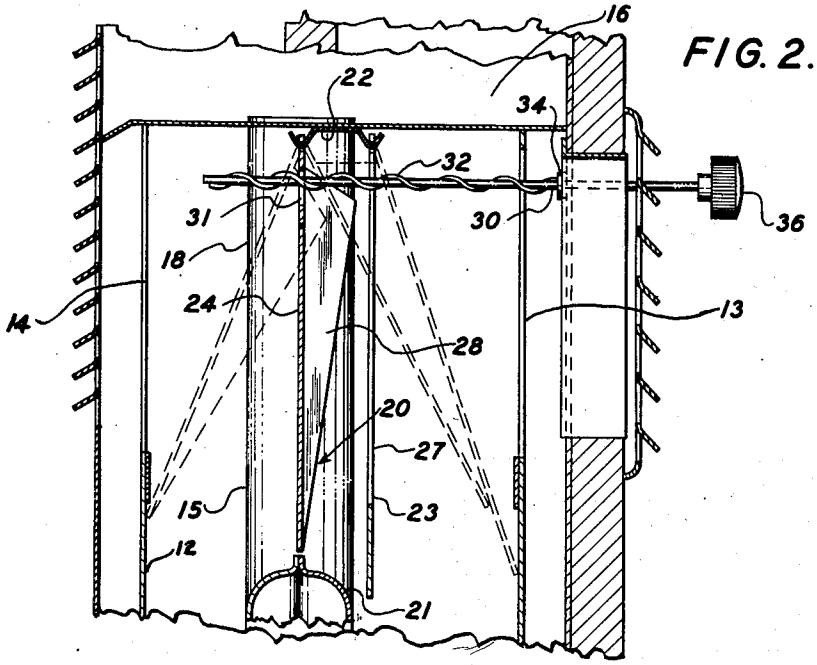

FIG. 2.

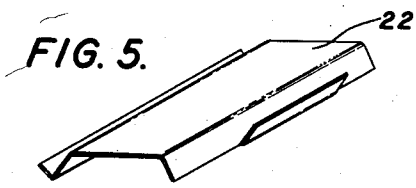

FIG. 5.

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FIG. 3.

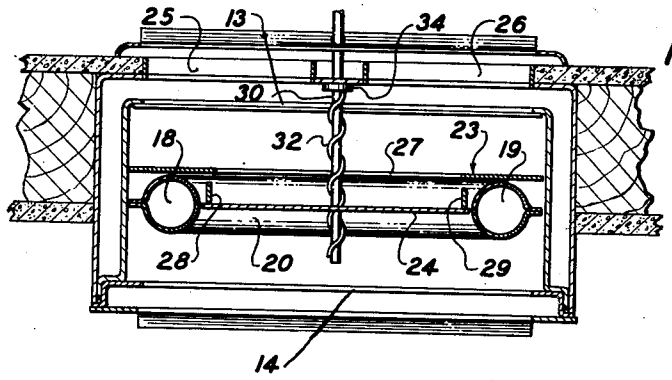


FIG. 4.

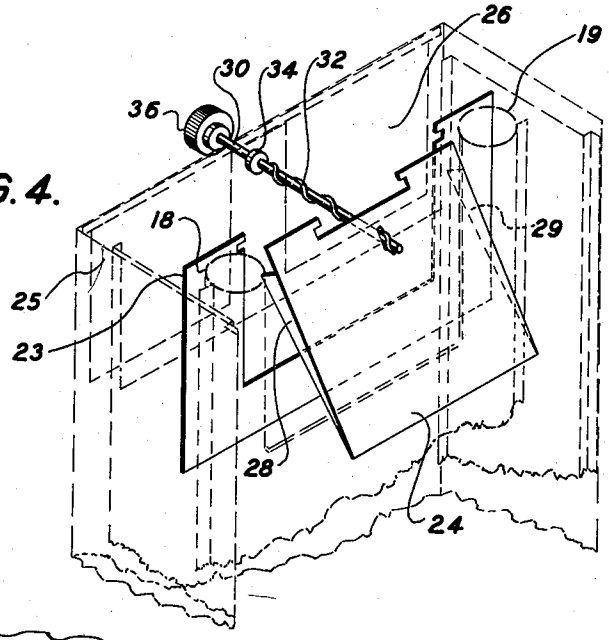
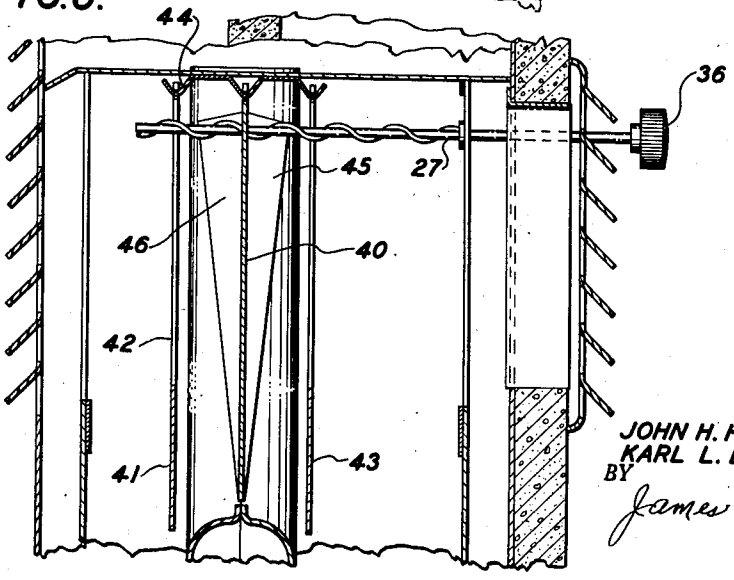


FIG. 6.



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WALL HEATER

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9 Claims. (Cl. 257—136)

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This invention is concerned with wall heaters and particularly with heaters placed in a wall between rooms or other spaces to be heated. The invention provides improved structures whereby heated air may be allowed to flow in both directions or in either.

Wall heaters customarily comprise a shallow chamber or shell at least partially set into a wall. A radiator or combustion chamber is mounted in the chamber, usually with space on all sides. Gaseous fuel is burned in the radiator, which heats a current of air flowing up through the chamber. The combustion products from the interior of the radiator are discharged into a flue extending above the chamber and usually enclosed in the wall. The air heated in the chamber is discharged through one or more openings or passages leading outwardly through the walls into the adjacent room or rooms.

When two spaces (say rooms) on opposite sides of the wall are to be heated, it is desirable to provide damper means so that either one or the other of the passages or registers can be wholly or partially closed, thus distributing the flow of hot air to the spaces in any desired ratio or entirely cutting off the flow to one of the rooms and permitting hot air from both the front and the back of the radiator to pass out the passage which is not closed. Dampers are suitable for this purpose, provided that they are so arranged that the flow of heat to the rooms cannot be interrupted to an excessive degree, which may cause overheating of the wall and burning of combustible materials employed in its construction.

Frequently, it is desirable to construct the passages which project through the wall from the heater chambers of different cross section, for example, a large passageway opening into a hall and a small passageway opening into an adjoining room. This complicates the problem of controlling the flow of hot air with dampers, for a damper of a size suitable to close the small passageway will not close the large passageway. Conversely, the bigger damper required to close the large passageway is frequently too large, due to obstructions in the heater chamber, to be moved to close the smaller passageway.

We have developed a simple damper structure for wall heaters that assures that two hot air exits from a wall furnace will not be closed simultaneously, with resultant elimination of fire hazard from such a happening. Moreover, our damper structure is such that it does not interfere with normal hot air flow when in a neutral position, but is easily regulated to adjust hot air

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flow in either direction or to divert substantially all of the flow from both front and back of the radiator in either direction.

In essence, our invention contemplates a wall heater comprising a chamber defined by a hollow jacket set into a wall with a combustion chamber type radiator mounted in the chamber and spaced from both front and back of the chamber to provide front and rear spaces or ducts through which air rises upwardly as it is heated. The interior of the radiator is connected to a flue by a hollow upwardly extending portion, but there is a window running from front to back connecting the two ducts, and outlets for hot air are disposed in the two sides of the wall adjacent the window and opening from the chamber respectively through the two sides of the wall. A damper structure is hung from a hinge adjacent the window and is adapted to swing through the window toward one hot air outlet or away from it toward the other hot air outlet, so that air from both front and rear of the radiator may be diverted to one of the outlets while the other is at least partially closed. When the hot air is to flow through both outlets, the damper structure hangs more or less vertically, and may, in fact, close the window, in which case the hot air from the rear space in the chamber passes out the rear outlet while the hot air from the front space in the chamber passes out the other outlet.

In the preferred apparatus of our invention, two dampers are hung adjacent the window. The two passageways which discharge hot air from the chamber in opposite directions are adjacent the dampers and the window. The latter may be defined by the top of the main radiator shell, two spaced pipes projecting up from the shell, and a header or flue with which the pipes connect. One of the dampers is small enough to swing in the window, touch the second damper, and move it out to block, at least partially, the air passage adjacent the second damper, which may be substantially larger than the first—since it does not have to swing through the window.

To assure that the second damper will not interfere with heat flow when it is in neutral position, it may have a cut-out portion of such size and position that it is closed, or at least partially closed, when the first damper is moved into contact with it.

These and other aspects of our invention will be clear in the light of the following detailed description of presently preferred forms of our damper structure incorporated in a wall heater.

The description is illustrated by the accompanying drawings, in which:

Fig. 1 is a fragmentary front elevation, partly in section, of a wall heater equipped with a damper arrangement of our invention.

Fig. 2 is a vertical section through the apparatus of Fig. 1, along the line 2—2;

Fig. 3 is a plan section through the apparatus of Fig. 1, along the line 3—3;

Fig. 4 is a fragmentary isometric phantom view of the apparatus of Figs. 1 to 3;

Fig. 5 is an isometric view of a damper support clip employed in the apparatus of the foregoing figures; and

Fig. 6 is a vertical section taken through a modification of the apparatus of Figs. 1 to 5.

In the apparatus illustrated in Figs. 1 to 5, a wall heater 10 is mounted in a wall 11. The heater comprises an elongated sheet metal box or jacket 12 which defines a chamber through which cold air circulates from an inlet at floor level (not shown) to outlets 13, 14 disposed opposite each other in the two sides of the jacket.

A hollow sheet metal radiator or combustion chamber 15 is disposed centrally in the jacket so that there is an annular space around its sides, front and back through which the heated air can rise to the outlet ducts. This space can be considered as comprising front and rear ducts through which air rises upwardly as it is heated. The radiator is heated on the inside by rising gases of combustion from a gas burner (not shown) disposed at its bottom, and discharges these combustion products into a conventional draft hood or diverter 16, which in turn discharges to a flue enclosed in the wall above the heater.

The connection of the radiator to the draft hood is through a hollow upwardly extending portion, say a pair of upright tubular extensions 18, 19 of the radiator. These pipes are disposed at the two ends of the jacket and are spaced from each other so as to leave a rectangular window 20 through the radiator, this being defined by the top of the main section 21 of the radiator, the two pipes and the bottom of the draft diverter.

A damper support clip 22 is fastened to the underside of the draft diverter at the top of the window, and comprises a metal sheet having longitudinal V-shaped channels on its sides (see Figs. 2 and 5). From this clip, two dampers 23, 24 are hung.

The first damper 23 is larger in outside dimensions than the window and is mounted on the back of the window, i. e. adjacent the heated air outlet on the back of the heater. This outlet is rectangular and the first damper is large enough, in outside dimensions, to cover the outlet and close it substantially completely. However, the first damper has a cut-out 27 portion in the center. This cut-out portion, which gives the damper a U-shape, is somewhat smaller in area than the window.

The second damper 24 is mounted in the window. It is generally rectangular in shape and of such size that it will swing through the window and close the cut-out portion of the first damper when it engages it. To the latter end, preferably it is provided with triangular wings 28, 29 on its vertical edges, these wings being bent at right angles to the main plane of the dampers and extending toward the first damper.

The second damper can be swung either through the window into contact with the first damper or in the opposite direction to act as a closure (complete or partial) for the second hot air outlet at the front of the heater. The movement of the second damper is controlled by a rod 30 which passes through a slot 31 in the damper and is disposed perpendicular to the plane of the wall. This rod is in reality a screw with a very steep flight, the screw portion being formed by winding a steep wire spiral 32 around the rod and welding it into place. The rod may project through either or both of the hot air outlets, but in the case illustrated it passes out through the rear outlet, being journaled in the grill which covers the outlet. An annular stop 34 is welded on the rod adjacent the outlet to prevent endwise movement of the rod, and a control knob 36 or handle is firmly affixed to its outside end. When the knob is turned the spiral threads turn in the hole in the second damper and swing it in the desired direction.

When both dampers hang vertically, both air outlets or passages are open. Hot air from the front of the annular chamber surrounding the radiator passes out the front or main outlet, while hot air from the rear portion of the register passes out the rear outlet.

If the flow of hot air through the rear outlet is to be interrupted more or less completely, the second damper is swung through the window (to the right as viewed in Fig. 2), this movement being continued until the first damper is moved over to seal the rear air outlet, as indicated in dotted outline in Fig. 2. When this position is attained the outside edges of the wings on the second damper and its bottom edge, abut the first damper and block off its cut-out portion. With the dampers in this position, flow of hot air out through the front outlet is unobstructed, and the rear outlet is sealed.

If the flow of hot air through the front outlet is to be obstructed, the second damper is swung in the opposite direction until it partially or completely closes the front hot air outlet. Under these conditions the first damper hangs vertically, and hot air from the front of the heater is free to pass through the window, through the cut-out portion of the front damper and thence through the rear outlet together with hot air from the rear of the radiator.

The damper structure of the invention is simple and inexpensive to construct and positive in its operation. No matter how the control mechanism is manipulated, it is impossible to close both hot air outlets at the same time. Thus dangers of burning out the heater or starting a fire in the wall in which it is mounted are minimized.

When the dampers hang vertically in their normal position, the second damper substantially blocks the window, so that the flows of air through the front and rear of the heater are substantially independent and the heat is more or less equally divided between the two outlets. When the second damper is moved to the right as shown in Fig. 2, to bring about the closing of the first damper, flow of hot air from the rear of the radiator to the front outlet takes place through the window and no stagnant spaces, which might become overheated, are developed. Conversely, when the second damper is swung to close the front outlet, flow of hot air from the front of the radiator to the rear outlet takes place through the window, again assuring an escape for all of the hot air and avoiding the

stagnant spaces which may cause internal overheating and damage.

The apparatus of Fig. 6 is the same as that of Figs. 1 to 5, except that it is provided with an extra damper. Thus the apparatus of Fig. 6 has a central damper 40 which is hung centrally in the window and fits loosely therein, being free to move in either direction, i. e. toward front or rear. The front damper 41 is hung just outside the window and is larger than the window, so that it can not swing into it. The front damper has a cut-out portion 42, as described previously with reference to Figs. 1 to 5. The rear damper 43 is substantially identical with the front damper. Both are hinged at the top from a hanger 44. The center damper has two sets of triangular wings 45, 56.

If the central damper is swung clockwise, as viewed in Fig. 6, it will touch the front damper and swing it over to close the front hot air outlet, at the same time covering and sealing the cut-out portion of the front damper. The triangular wings close the space between the main damper surfaces. A similar interaction with the rear damper takes place if the central damper is swung counterclockwise.

The apparatus of Fig. 6 has the advantage that it may be employed to close with substantial completeness either of two hot air outlets, both of which are larger than the window through the radiator.

We claim:

1. In a heater for disposition in a wall, the combination which comprises a hollow jacket having front, back and side walls adapted to be mounted in the wall, inlet means for admitting air into the jacket, a hollow combustion type radiator having a hollow upwardly extending portion adapted to be connected to a flue disposed in the wall above the jacket, the radiator being mounted in the jacket and spaced from both its front and its back walls to provide front and rear ducts through which air rises upwardly as it is heated, hot air outlet conduits in the front and rear respectively of the upper portion of the jacket to discharge hot air on opposite sides of the wall adjacent the hollow upwardly extending portion of the radiator, the latter being so shaped as to leave a window connecting the front and rear portions of the jacket between the hot air outlet conduits, a first damper disposed in the jacket to the rear of the window and being larger in at least one dimension than the window and only partially obstructing the window, the first damper being hinged from above and adapted to swing to the rear and at least partially obstruct the rear hot air outlet conduit, a second damper mounted in the window and hinged from above and of such size and so positioned that it will swing through the window and contact the first damper and move it in the direction of the rear hot air outlet, and swing in the opposite direction to at least partially obstruct the front hot air outlet conduit and means for swinging the second damper in either direction.

2. In a heater for disposition in a wall, the combination which comprises a hollow jacket having front, back and side walls adapted to be mounted in the wall, inlet means for admitting air into the jacket, a hollow combustion type radiator having a hollow upwardly extending portion adapted to be connected to a flue disposed in the wall above the jacket, the radiator being mounted in the jacket and spaced from both its front and its back walls to provide front and rear ducts through which air rises upwardly as it is heated, hot air outlet conduits in the front and rear respectively of the upper portion of the jacket to discharge hot air on opposite sides of the wall adjacent the hollow upwardly extending portion of the radiator, the latter being so shaped as to leave a window connecting the front and rear portions of the jacket between the hot air outlet conduits, a first damper disposed in the jacket to the rear of the window and being larger in at least one dimension than the window, the first damper being hinged from above and adapted to swing to the rear and at least partially obstruct the rear hot air outlet conduit, a second damper mounted in the window and hinged from above and of such size and so positioned that it will swing through the window and contact the first damper and move it in the direction of the rear hot air outlet, and swing in the opposite direction to at least partially obstruct the front hot air outlet conduit and means for swinging the second damper in either direction.

3. In a heater for disposition in a wall, the combination which comprises a hollow jacket having front, back and side walls adapted to be mounted in the wall, inlet means for admitting air into the jacket, a hollow combustion type radiator having a hollow upwardly extending portion adapted to be connected to a flue disposed in the wall above the jacket, the radiator being mounted in the jacket and spaced from both its front and its back walls to provide front and rear ducts through which air rises upwardly as it is heated, hot air outlet conduits in the front and rear respectively of the upper portion of the jacket to discharge hot air on opposite sides of the wall adjacent the hollow upwardly extending portion of the radiator, the latter being so shaped as to leave a window connecting the front and rear portions of the jacket between the hot air outlet conduits, a first damper disposed in the jacket to the rear of the window and being larger in at least one dimension than the window, the first damper being hinged from above and adapted to swing to the rear and at least partially obstruct the rear hot air outlet conduit, a second damper mounted in the window and hinged from above and of such size and so positioned that it will swing through the window and contact the first damper and move it in the direction of the rear hot air outlet, and swing in the opposite direction to at least partially obstruct the front hot air outlet conduit, the first damper being provided with a cut-out portion that is overlapped by the second damper when the latter is swung forward, and means for swinging the second damper in either direction.

4. In a heater for disposition in a wall, the combination which comprises a jacket having front, back and side walls adapted to be mounted in the wall, inlet means for admitting air into the jacket, a hollow combustion type radiator having a hollow upwardly extending portion adapted to be connected to a flue disposed in the wall above the jacket, the radiator being mounted in the jacket and spaced from both its front and its back walls to provide front and rear ducts through which air rises upwardly as it is heated, hot air outlet conduits in the front and rear respectively of the upper portion of the jacket to discharge hot air on opposite sides of the wall adjacent the hollow upwardly extending portion of the radiator, the latter being so

shaped as to leave a window connecting the front and rear portions of the jacket between the hot air outlet conduits, a first damper disposed in the jacket to the rear of the window and being larger in at least one dimension than the window and only partially obstructing the window, the first damper being hinged from above and adapted to swing to the rear and at least partially obstruct the rear hot air outlet conduit, a second damper mounted in the window and hinged from above and of such size and so positioned that it will swing through the window and contact the first damper and move it in the direction of the rear hot air outlet, and swing in the opposite direction to at least partially obstruct the front hot air outlet conduit and means for swinging the second damper in either direction comprising a screw threaded through the second damper and extending transversely thereof in the jacket to a point outside the wall.

5. Apparatus according to claim 4 in which the screw extends inwardly from the rear of the jacket and engages only the second damper.

6. Apparatus according to claim 4 in which the thread of the screw has a steep pitch so that the second damper is swung through a large arc by a small turning of the screw.

7. In a heater for disposition in a wall, the combination which comprises a jacket having front, back and side walls adapted to be mounted in the wall, inlet means for admitting air into the jacket, a hollow combustion type radiator having a hollow upwardly extending portion adapted to be connected to a flue disposed in the wall above the jacket, the radiator being mounted in the jacket and spaced from both its front and its back walls to provide front and rear ducts through which air rises upwardly as it is heated, hot air outlet conduits in the front and rear respectively of the upper portion of the jacket to discharge hot air on opposite sides of the wall adjacent the hollow upwardly extending portion of the radiator, the latter being so shaped as to leave a window connecting the front and rear portions of the jacket between the hot air outlet conduits, a first damper disposed in the jacket to the rear of the window and being larger in at least one dimension than the window and only partially obstructing the window, the first damper being hinged from above and adapted to swing to the rear and at least partially obstruct the rear hot air outlet conduit, a second damper mounted in the window and hinged from above and of such size and so positioned that it will swing through the window and contact the first damper and move it in the direction of the rear hot air outlet, and swing in the opposite direction to at least partially obstruct the front hot air outlet conduit, the first damper being larger than the second damper, and means for swinging the second damper in either direction.

8. In a heater for disposition in a wall, the combination which comprises a jacket having front, back and side walls adapted to be mounted in the wall, inlet means for admitting air into the jacket, a hollow combustion type radiator having a hollow upwardly extending portion adapted to be connected to a flue disposed in the wall above the jacket, the radiator being mounted in the jacket and spaced from both its front and its back walls to provide front and rear ducts through which air rises upwardly as it is heated, hot air outlet conduits in the front and rear respectively of the upper portion of the jacket to discharge hot air on opposite sides of the wall adjacent the hollow upwardly extending portion of the radiator, the latter comprising two pipes on the sides of the radiator and spaced from each other to leave a window connecting the front and rear portions of the jacket between the hot air outlet conduits, a first damper disposed in the jacket to the rear of the window and being larger in at least one dimension than the window and only partially obstructing the window, the first damper being hinged from above and adapted to swing to the rear and at least partially obstruct the rear hot air outlet conduit, a second damper mounted in the window and hinged from above and of such size and so positioned that it will swing through the window and contact the first damper and move it in the direction of the rear hot air outlet, and swing in the opposite direction to at least partially obstruct the front hot air outlet conduit and means for swinging the second damper in either direction.

9. In a heater for disposition in a wall, the combination which comprises a jacket having front, back and side walls adapted to be mounted in the wall, inlet means for admitting air into the jacket, a hollow combustion type radiator having a hollow upwardly extending portion adapted to be connected to a flue disposed in the wall above the jacket, the radiator being mounted in the jacket and spaced from both its front and its back walls to provide front and rear ducts through which air rises upwardly as it is heated, hot air outlet conduits in the front and rear respectively of the upper portion of the jacket to discharge hot air on opposite sides of the wall adjacent the hollow upwardly extending portion of the radiator, the latter being so shaped as to leave a window connecting the front and rear portions of the jacket between the hot air outlet conduits, two dampers disposed in the jacket respectively to the rear and to the front of the window each being larger in at least one dimension than the window and only partially obstructing the window, the two dampers being hinged from above and adapted to swing respectively to the rear and to the front of the window and at least partially obstruct the adjacent hot air outlet conduit, a second damper mounted in the window and hinged from above and of such size and so positioned that it will swing through the window and contact either of the first two dampers and swing it to at least partially obstruct the adjacent hot air outlet conduit and means for swinging the second damper in either direction.

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