Jan. 10, 1950 H. H. WALTERS 2,494,527

SHEET METAL OPEN HEARTH HEATER

Filed Jan. 16, 1947

Fig. 1.

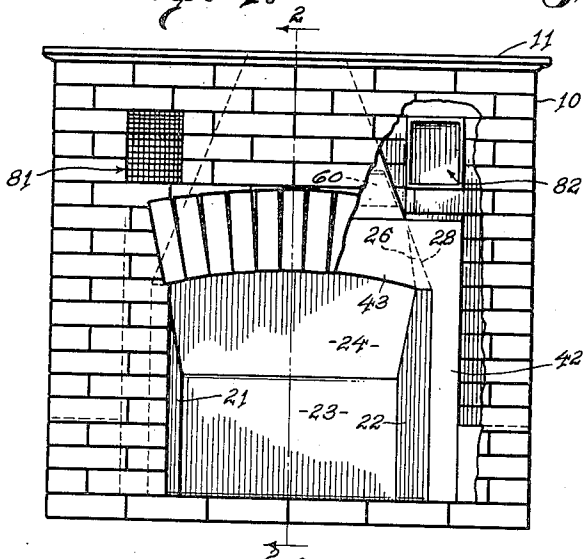



Fig. 2.

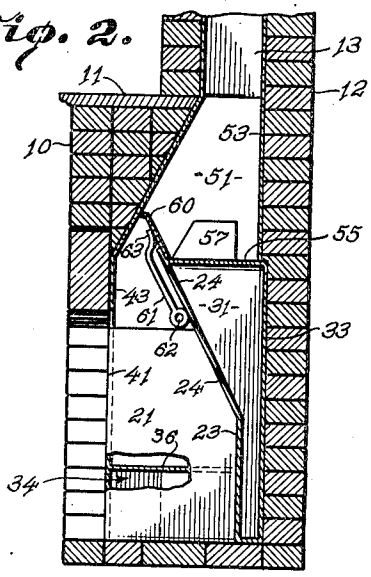



Fig. 3.

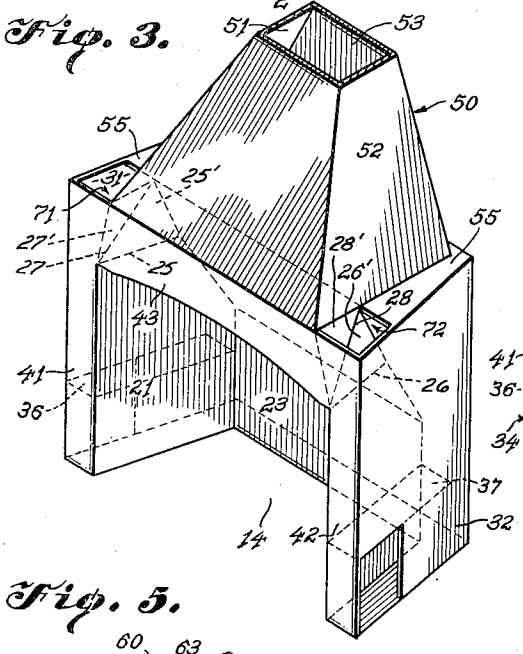



Fig. 4.

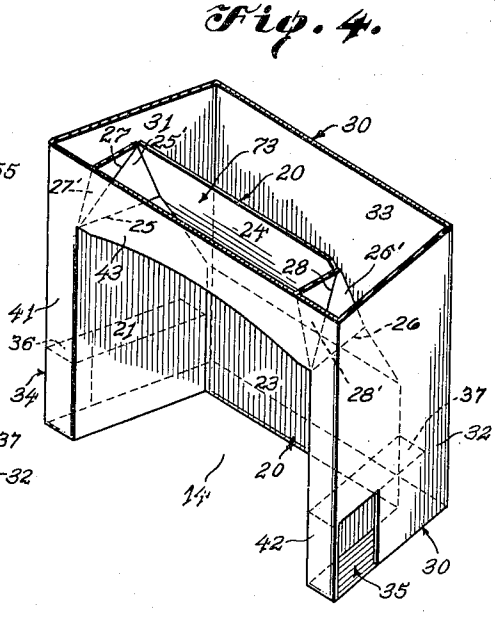
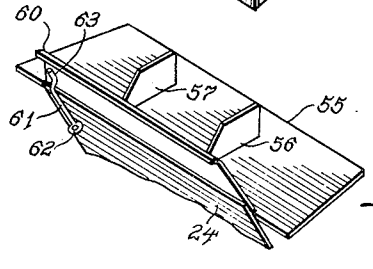



Fig. 5.




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## SHEET METAL OPEN-HEARTH HEATER

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4 Claims. (Cl. 126—121)

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This invention relates to an all-metal fireplace unit having the conventional open-hearth provision for heating by radiation; and, in addition, having spaces where air is heated and from which the heated air is conveyed to the room by convection.

The all-metal fireplace unit may be used alone where extreme economy of installation is required or the unit may be surrounded by decorative and utilitarian structure, ordinarily of brick.

The present invention embodies certain improvements over the type of fireplace structure disclosed in my Patents No. 1,681,449, August 21, 1928; No. 1,771,668, July 29, 1930, and Patent No. 2,009,642 granted jointly to Willard E. Jaquith and myself, and is particularly concerned with the provision of such a structure characterized by a low resistance channel for the flow of air through the air heating chambers and into the room.

In addition to the foregoing and main object of my invention, another object thereof is the providing of a direct low resistance course for the free flow of the products of combustion from the grates up to the flue or chimney.

A further object of my invention is the providing of a simplified damper assembly not requiring baffle pieces between the sides of the smoke dome and the ends of the damper blade.

Other and further objects of my invention will be apparent to those skilled in the art from the drawings and specification wherein I disclose one embodiment of the invention.

In the drawings:

Figure 1 is a front elevational view of a brick fireplace with some of the bricks cut away to more clearly show my all-metal unit therein;

Figure 2 is a side elevational sectional view of Figure 1 taken in the plane of line 2—2;

Figure 3 is an isometric perspective view of the all-metal fireplace unit which may be used alone or surrounded by brick structure as shown in Figures 1 and 2;

Figure 4 is an isometric perspective view like Figure 3 except that the dome structure and top plate are removed; and

Figure 5 is a perspective view of the damper assembly.

As illustrated, brick fireplace exterior 10 has mantlepiece 11, chimney 12 and flue 13. The all-metal fireplace unit has an inner shell generally designated 20 enclosing the combustion area 14 and comprising outwardly diverging sides

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21 and 22, vertical back 23 and forwardly inclined back 24.

The upper part of side 21 is bent on lines 25 and 27 so that the upper part of side 21 is formed into two triangular portions 25' and 27'; the side 21, portion 25' and portion 27' each being in a different plane. Similarly, the upper part of side 22 is bent on lines 26 and 28 forming two triangular portions 26' and 28', each being in a different plane. By this construction, the top edges of the top parts of the outwardly diverging sides 21 and 22 are disposed in parallel relationship with each other and at right angles to the top edge of the back 24. The advantages of having outwardly diverging sides 21 and 22 with parallel top edges will be apparent as the description proceeds.

The inner shell generally designated 20 may consist of a single sheet of metal cut to proper shape, bent, and welded where the edges of formed sides 21 and 22 meet the edges of the forwardly inclined back 24. It is apparent that the inner shell 20 is a unitary surface of complex contour.

The outer shell or jacket 30 of the all-metal fireplace unit comprises sides 31 and 32 and back 33. Openings 34 and 35 in sides 31 and 32, respectively, allow the entrance of cool air near the floor of the room to the air heating chamber between the inner shell 20 and outer shell 30. Horizontal baffle plates 36 and 37 channel the cool air rearwardly to between back 23 of the inner shell and back 33 of the outer shell. The front plate comprising side plates 41 and 42 and top arch plate 43 closes the space between the inner shell 20 and outer shell 30. The front plate may be formed integral with outer shell 30 or may be a separate plate welded in position in a number of obvious ways.

Dome 50 has the shape of a truncated pyramid having a rectangular opening at the base, a rectangular opening at the top for communication with flue 13, and a vertical back side. To promote the free upward flow of the hot gases resulting from combustion, the triangular portions 27' and 28' on the upper parts of sides 21 and 22, respectively, may be in the same plane as sides 51 and 52, respectively, of dome 50. As shown to advantage in Figure 3, a continuous partition is provided consisting of side 21, triangular portion 25', triangular portion 27' and dome side 51. A similar partition is provided on the other side consisting of side 22, triangular portion 26', triangular portion 28' and dome side 52. These partitions separate the fire pit 14, and the path

of the products of combustion from the path of the room air circulated through the air heating chamber between the shells **20** and **30**. It is apparent that a smooth and continuous transition is made from the sides **21** and **22** to the dome sides **51** and **52** by the interposal of triangular portions formed on the top part of sides **21** and **22**.

Top plate **55** is operative to close the top of the air chamber between inner shell **20** and outer shell **30** except for hot air exits **71** and **72**. Stops **56** and **57** on top plate **55** provide support for damper **60** when in the open position, and together with the upward extension of inner inclined back **24**, provides a V-shaped notch in which the lower edge of damper **60** pivots. Lever **61** attached to damper **60** at **63** and having an eye **62** is used to operate the damper. The ends of damper **60** are beveled to conform with the inner sides of truncated pyramid dome **50**, as shown to advantage in Figure 1.

It is obvious from the foregoing description that there are two separate air-flow paths in the open hearth fireplace sealed from each other. First, (when damper **60** is in the open position) the draft and products of combustion pass upwardly from fire pit **14**, through rectangular opening **73**, and through dome **50** to flue **13**. There are no abrupt changes in direction of the flow. In the second air flow path, cool air enters through openings **34** and **35** to the space between inner shell **20** and outer shell **30**. As this air becomes heated, it rises and flows out of openings **71** and **72** and openings **81** and **82** in the brick facade into the room. Since the movement of air is due entirely to convection currents caused by temperature differences, it is important to reduce resistance to air flow by eliminating corners or pockets in the air flow channel. The obtuse bending of the upper parts of sides **21** and **22** along lines **25**, **27** and **26** and **28** results in the creation of smooth, direct channels; on the one side, for the heated air, and, on the other side, for the combustion gases.

I have described one embodiment of my invention to which many changes may be made without departing from the spirit or scope of my invention.

What I claim is:

1. In an open-hearth radiation and convection heater having a firebox, a surrounding jacket forming an air heating chamber, and a top plate closing the top of said chamber except the forward side portions thereof which provide exits for the heated air: outwardly diverging side walls for said firebox, the upper part of each of the side walls having two triangular portions each being in a different plane to make the top edges thereof parallel; and a hood in the shape of a truncated pyramid with rectangular base and top openings, the top edges of the side walls being contiguous with two base edges of the hood; whereby a smooth direct channel is provided for the flow of hot gases from the firebox to the top of the hood and a smooth direct channel is provided for the outward flow of heated air from the chamber.

2. An open-hearth radiation and convection heater comprising: a firebox having a back wall, outwardly-diverging side walls and a front arch plate, the upper part of each side wall being bent inwardly along a horizontal line and also bent inwardly along a line between the top of the side at its juncture with the back wall and the point on the outward edge of the side wall where the horizontal bend line intersects said outward edge into two triangular portions each being in a different plane so as to make the top opening of the firebox rectangular; a jacket surrounding said firebox forming an air heating chamber therebetween; and a hood having the shape of a truncated pyramid, the base of the hood being in exclusive communication with the top opening of the firebox.



3. An open-hearth radiation and convection heater comprising: a firebox having a back wall, outwardly diverging side walls and a front arch plate, the upper parts of the side walls respectively having two triangular portions each of which is in a different plane and presenting for said side walls top edges disposed in parallel relation with each other and at right angles to the top edge of said back wall to make the top opening of the firebox rectangular; a jacket surrounding said firebox forming an air heating chamber therebetween, entrances for cold air to the chamber being provided by cut-outs at the bottom of the jacket; a top plate sealing the top of said heating chamber except the forward side portions thereof which provide exits for the heated air; and a hood having the shape of a truncated pyramid, the base of the hood being in exclusive communication with the top opening of the firebox.

4. An open-hearth radiation and convection heater comprising: a firebox having a back wall, outwardly diverging side walls and a front arch plate, the upper parts of the side walls respectively bent inwardly along horizontal and diagonal lines to present two triangular portions having top edges disposed in parallel relation with each other and the right angles to the top edge of said back wall to make the top opening of the firebox rectangular; a jacket surrounding said firebox forming an air heating chamber therebetween, entrances for cold air to the chamber being provided by cut-outs at the bottom of the jacket; a top plate sealing the top of said heating chamber except the forward side portions thereof which provide exits for the heated air; a hood having the shape of a truncated pyramid, the base of the hood being in exclusive communication with the top opening of the firebox, the top edges of the triangular portions of said side walls being contiguous with two base edges of the hood; and a damper within said hood for closing communication between said firebox and hood.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 165,134 | Tweeddale | June 29, 1875 |
| 902,002 | Rathbone | Oct. 27, 1908 |
| 1,644,219 | Alford | Oct. 4, 1927 |
| 1,756,511 | Dowler | Apr. 29, 1930 |
| 1,771,668 | Walters | July 29, 1930 |
| 2,009,642 | Jaquith et al. | July 30, 1935 |