

July 30, 1935.

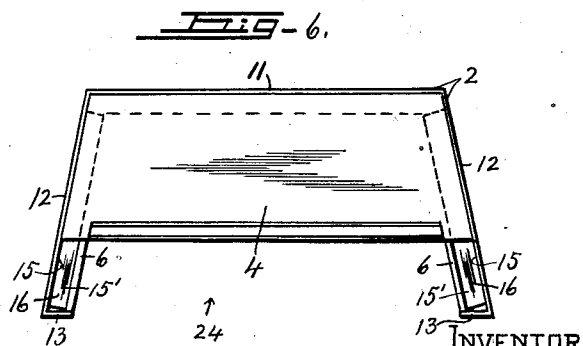
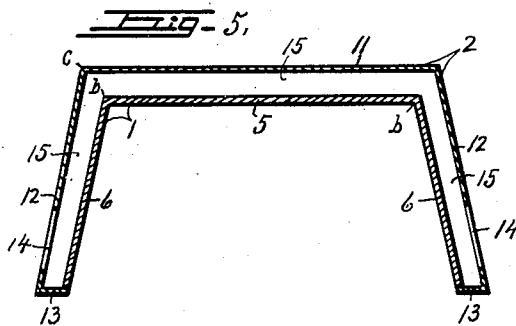
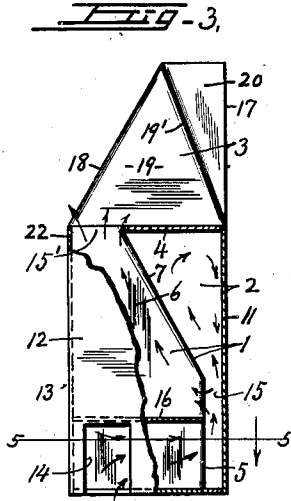
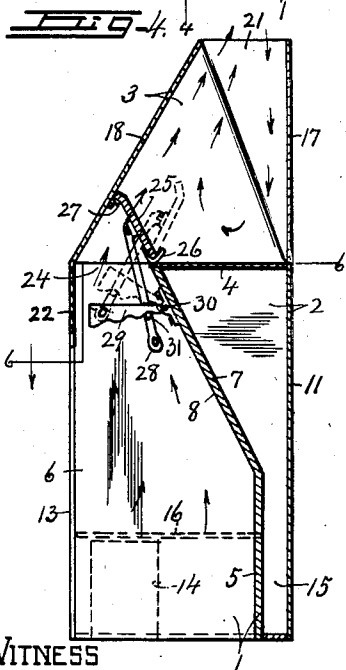
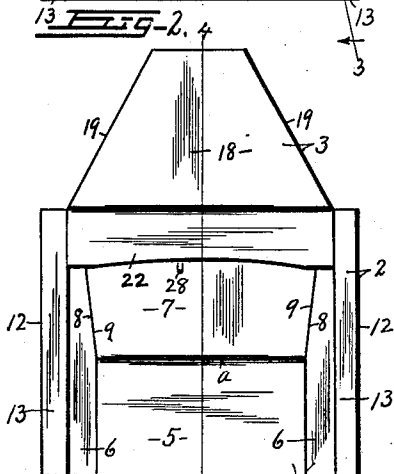
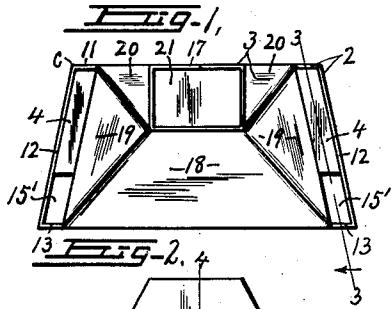
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2,009,642

OPEN HEARTH HEATER

Filed March 24, 1933

2 Sheets-Sheet 1



WITNESS

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2 Sheets-Sheet 2

Fig-7.

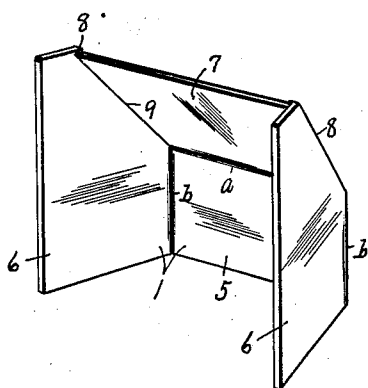


Fig-8.

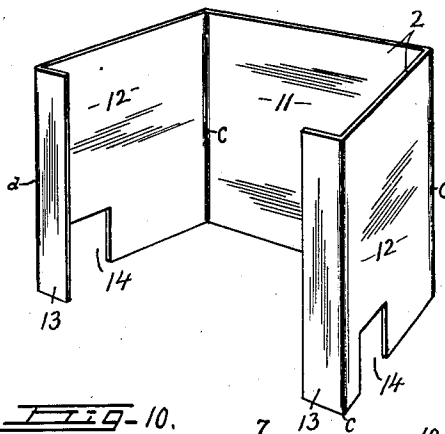


Fig-9.

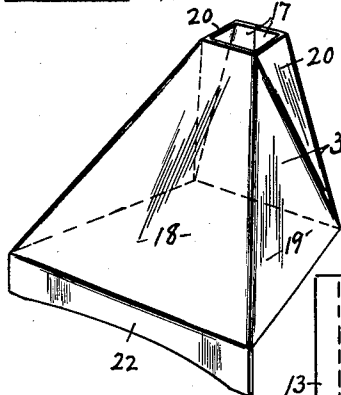


Fig-10.

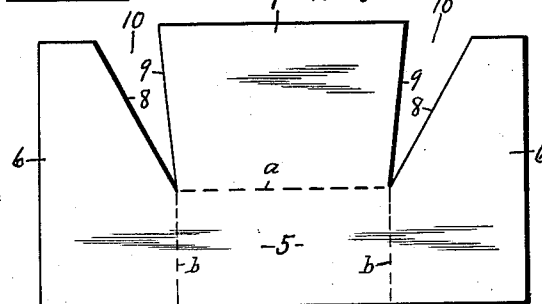


Fig-11.

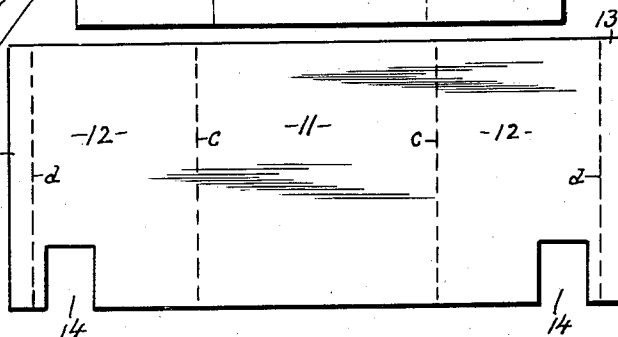
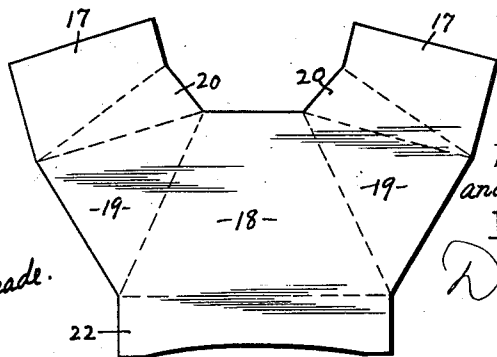


Fig-12.



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2,009,642

OPEN HEARTH HEATER

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Application March 24, 1933, Serial No. 662,508

4 Claims. (Cl. 126—121)

This invention relates to an all metal fire place form in which all of the elements necessary for combustion, heating and ventilation are combined in a single unit capable of being easily and quickly installed ready for use with or without a masonry enclosure or other decorative or utilitarian accessories.

It is well-known that the proper construction of a fire place entirely of masonry requires the use of preconstructed temporary forms, usually of wood, which must be removed when or before the fire place is completed, all of which involves considerable skill, time, labor and expense and in many instances introduces a serious fire hazard due to the necessarily large number of pieces and cement joints of widely varying fire and smoke resisting materials entering into such construction and also to the fact that the forms for different masonry fire places are seldom standardized.

The main object of the present invention is to provide an all-metal open hearth heater comprising essentially a one-piece fire place unit, a one-piece jacket unit, and a dome unit, each unit being preformed to a standard size and shape preferably from a single piece of sheet metal to reduce the liability of leaky joints so that the fire place unit may be used alone where extreme economy of installation is required and to which may be easily and quickly added the dome unit if required for directing the products of combustion to a chimney or other flue or, in order to further utilize the heat of the fire place unit for air heating and ventilating purposes, the jacket unit may be easily and quickly applied to said fire place unit to complete the open hearth heater as an improvement over the patents to Walters No. 1,681,448, August 21, 1928 and No. 1,771,663, July 29, 1930, in that the units are made and carried in stock as separate articles of manufacture and may be easily and quickly assembled on short notice according to the demands of the purchaser.

Another object is to enable the fire place unit and the other units assembled therewith to be used as a form or forms for the erection of masonry or other fire protective enclosures around and against the outer surfaces thereof under which conditions the several standardized units may be carried in stock in relatively small compact space and easily and quickly assembled when desired.

Other objects and uses will be brought out in the following description.

In the drawings:—

Figure 1 is a top plan of an open hearth heater

embodying the various features of my invention. Figure 2 is a front elevation of the same.

Figure 3 is a sectional view, partly in elevation, taken on line 3—3, Figure 1.

Figure 4 is an enlarged vertical sectional view taken on line 4—4, Figure 2.

Figure 5 is an enlarged horizontal sectional view taken on line 5—5, Figure 3.

Figure 6 is a horizontal sectional view taken on line 6—6, Figure 4.

Figure 7 is a perspective view of the fire box unit.

Figure 8 is a perspective view of the jacket or casing unit.

Figure 9 is a perspective view of the dome unit.

Figure 10 is a face view of a sheet metal blank for forming the fire box unit shown in Figure 7.

Figure 11 is a face view of a sheet metal blank for forming the jacket or casing unit shown in Figure 8.

Figure 12 is a face view of a sheet metal blank for forming the dome unit shown in Figure 9.

In order that the invention may be clearly understood, I have shown a one-piece fire box unit 1, a one-piece jacket or casing unit as 2 and a one-piece dome unit 3 together with a top plate 3 for the fire box unit 1, each of said units being standardized as to form and size and made separately from the other units.

The fire box unit 1 is substantially U-shaped horizontally from front to rear and comprises a lower substantially rectangular back portion 5, opposite side portions or wings 6 diverging forwardly from opposite ends of the back portion 5 and extending upwardly some distance above the upper edge thereof and an upper back portion 7 inclined upwardly and forwardly from the upper edge of the lower back portion 5.

The lower edges of the back portion 5 and side wings 6 are disposed in the same horizontal plane while the front edges of the wings are disposed in the same vertical plane at right angles to the plane of the lower edges of the fire box, the upper edges of the wings being disposed in a horizontal plane parallel with that of the lower edges.

The upper rear edges of the wings 6 above the upper edge of the lower back portion 5 are inclined upwardly and forwardly at 8 and are, therefore, disposed at an angle to the plane of the lower back portion 5 which is parallel with the front edges of the wings so that the upper edges of the wings are considerably narrower from front to rear than the lower edges, for a purpose hereinafter described.

The upper back portion 7 and upper rear edges 8

8 of the side wings 6 are disposed in about the same upwardly and forwardly inclined plane, the opposite end edges of the upper back portion 7 being inclined upwardly and outwardly at 9 to conform to the angle of divergence of the wings 6 relatively to the lower back portion 5 to form close fitting joints therewith.

That is, the opposite end edges of the upper inclined back portion 7 are flared upwardly and outwardly to conform to the angle of divergence of the side wings relatively to the lower back portion 5 so as to abut against the inner faces of the side wings whereby the rear face of the upper back portion 7 will be disposed in substantially the same plane as the inclined upper rear edges 8 of the side wings.

The upper front edge of the upper back portion 7 is straight and parallel with the upper edge of the lower back portion 5 and is disposed in a horizontal plane below that of the upper edges of the side wings approximately equal to the thickness of the metal plate 4, Figures 3, 4 and 6, to enable said plate to rest thereon with its upper face in substantially the same plane as the upper edges of the side wings, for a purpose hereinafter described.

As illustrated, the vertical height of the lower back portion 5 is somewhat less than half that of the side wings 6 but these relative heights may be varied without departing from the spirit of the invention.

It will be noted, however, upon reference to Figure 10 that the combined vertical widths of the lower portion 5 and upper portion 7 is somewhat greater than that of the side wings 6 due to the fact that when the upper back portion 7 is inclined forwardly between the side wings its upper edge must be only slightly below that of the upper edges of said side wings as previously described.

In Figure 10 is shown a sheet metal blank for forming the fire box unit 1 in which the lower edge is substantially straight while the opposite end edges are also straight and disposed at right angles to the lower edge.

This blank is provided with longitudinally spaced V-shaped cut-outs 10 equal distances from the opposite ends and from the transverse center and extending downwardly from the upper edge thereof to slightly more than half its vertical height or to the horizontal plane of the upper edge of the lower back portion 5, indicated by dotted lines a.

That is, the lower ends of the cut-outs 10 terminate in a direct line indicated at a parallel with the lower edge of the blank, the upper back portion 7 being bent forwardly along said dotted lines as represented in Figure 7.

The outer and inner walls of each cut-out 10 diverge upwardly to form respectively the upper rear inclined edges 8 of the side wings 6 and the opposite end edges of the upper back portion 7, the vertical angles of the edges 8 being somewhat greater than that of the edges 9 which, in turn, are of slightly less vertical length than the corresponding edges 8 and, therefore, the normal vertical height of the central portion 7 of the blank is slightly greater than that of the opposite ends of the blanks.

It will be noted that the upper edges of the portion 7 between the cut-outs 10 and also the upper edges of the opposite ends of the blank are straight and parallel or rather disposed in parallel planes.

The opposite ends of the blank are of the same

form and area and are adapted to be bent forwardly along the vertical dotted lines b coincident with the apexes of the cut-outs 10 to form the forwardly diverging side wings 6 of the fire box unit 1 while the portion of the blank between the cut-outs 10 form the back portions 5 and 7.

When the fire box unit 1 is formed in the manner described, it may be used independently of any masonry or other casing or as a form around which masonry may be built if desired and in either case the fire chamber will be formed by the back walls 5 and 7 and the side wings 6 for confining the fire and directing the products of combustion through the smoke outlet in front of the plate 4.

If the metal fire box unit 1 is to be used independently of any casing, the space in front of the upper edge of the upper back portion 7 between the upper edges of the side wings 6 may be connected in any suitable manner to a smoke flue with the assurance that the products of combustion generated within the fire box will be conducted upwardly and outwardly through the flue by the draft in said flue, thus permitting the heat resulting from such combustion to be radiated from all sides of the fire box unit into the room in which it is located.

It will thus be seen that this fire box unit may be made and sold at an extremely low cost to be used with any suitable hood or dome for conducting the products of combustion to a smoke flue with the assurance of a maximum amount of radiation of the heat into the room in which it is located.

If desired, the plate 4 may be placed in operative position upon the top of the fire box to extend rearwardly from the upper front edge of the upper back section 7, in which case it would be possible to use the dome unit shown in Figure 9, thus providing an exit for the products of combustion to a suitable smoke flue as will be hereinafter more fully explained, in which case the plate 4 serves as a baffle to prevent downdraft from the chimney into the fire chamber aided by a suitable damper, presently described.

The jacket unit shown in Figures 1 to 6 inclusive, but more clearly in Figures 8 and 11, may be used in connection with the fire box unit 1 and is preferably made in one piece consisting of a substantially rectangular back portion 11, opposite side portions 12 which are also substantially rectangular and diverge forwardly from opposite ends of the back portion 11, and have inturned front portions 13 extending toward each other in the same vertical plane to abut against the front edges of the side wings 6.

These side portions 12 are provided with air inlet openings 14 extending upwardly from the lower edges thereof near their front edges, as shown more clearly in Figures 8 and 11.

Aside from the openings 14, the lower edges of the back portion 11, side wings 12 and front portions 13 are disposed in the same horizontal plane while the upper edges of the same parts are also disposed in a plane parallel with the lower edges, the height of the jacket being substantially equal to the height of the fire box unit 1.

It will be observed, however, upon reference to Figures 1, 5 and 6, that the back portion 11 is of somewhat greater length than the fire box unit 1 and that the side portions or wings 12 are also of greater depth from front to rear than the fire box unit so that when placed around the fire box unit the back and side walls of the jacket will be

in uniformly spaced relation to the corresponding parts of the fire box unit.

This arrangement of the outer casing 2 and fire box unit 1 forms an intervening air space 15 communicating with the air inlet openings 14 and extending entirely around the back and sides of the fire box unit from bottom to top thereof.

In Figure 11 is shown a sheet metal blank for forming the outer jacket or casing 2 in which the junctions of the side members 12 with the back portion 11 are indicated by dotted lines c, while the junctions between the side members 12 and front members 13 are indicated by dotted lines d, it being understood that the blank may be bent along said dotted lines to form the central rectangular portion 11, side wings 12 and front members 13.

When the jacket unit 2 is used in connection with the fire box unit 1, it is evident that the distance between the upper edges of the upper back portion 7 of the fire box unit and upper portion of the back of the jacket unit 2 will be considerably greater than the distance between the lower portions of the same parts.

It will be noted upon reference to Figures 3, 4 and 6 that the top plate is of sufficient area to extend to and between the side wings 12 of the jacket 2 and from the front edge of the upper back portion 7 of the fire box to the back wall 11 of the jacket so that if the jacket unit is used in connection with the fire box unit, as shown more clearly in Figures 5 and 6, the top plate 4 would be placed in operative position to rest upon the upper edges of the fire box unit as shown in Figure 6, thereby leaving an open space between the front edge of the plate and front walls of the fire box unit and jacket unit, which space may be connected by any suitable hood to a smoke flue for permitting the escape of the products of combustion from the fire box unit to the exterior of the building in which the heater is located.

Under these conditions, the air entering the chamber 15 through the openings 14 would be confined within said chamber and thereby heated, the portions of the chamber 15 in front of the plate 14 being open at the top at 15' to permit the escape of the heated air from said chamber into the room in which the heater is located.

Suitable baffle plates 16 are placed within the opposite branches of the chamber 15 between the wings 6 of the fire box unit and adjacent wings 12 of the jacket unit to extend from the front walls of said branch chambers rearwardly to approximately the vertical plane of the lower back portions 5 of the fire box unit just above the upper walls of the air inlet openings 14, as shown more clearly in Figures 3 and 6.

The purpose of these baffle plates is to cause the inflowing air through the openings 14 to pass rearwardly around the lower portion of the fire box unit to expand into the overlying portions of the chamber 15 above the baffle plates where the heated air is free to pass out through the upper openings 15' into the room in which the heater is located, see Figures 1, 3 and 6.

The dome unit preferably consists of a one-piece hollow metal pyramid having its lower end adapted to rest upon the upper edges of the fire box unit and jacket unit and its upper end reduced and substantially rectangular to form an exit for the products of combustion adapted to be connected to any suitable flue leading to the exterior of the building.

As illustrated, this dome unit comprises an

upwardly tapered back portion 17, an upwardly tapered and rearwardly inclined front portion 18 and opposite similar side portions 19 and 20 which are also tapered upwardly and inclined inwardly from their lower edges so that the upper ends of the back portions 17 and 18 and side portions 19 and 20 form a substantially rectangular exit opening which is, therefore, disposed midway between the opposite sides of the dome unit and some distance to the rear of the vertical center of the base of said unit, as shown more clearly in Figures 1, 4 and 9.

The lower edge of the front portion 18 of the dome unit is of substantially the same width as the front portion of the fire box unit and, therefore, corresponds approximately to the distance between the inner edges of the front walls 13 of the jacket unit 2.

The lower edges of the side walls of the same unit converge rearwardly from the opposite sides of the lower end of the front portion 18 at an angle corresponding to the angle of convergence of the opposite side walls 6 of the fire box unit 1 and extend from the front walls 13 of the jacket 2 to the back walls thereof, Figure 1.

The dome unit 3 forms an upwardly tapered smoke chamber which is connected through a restricted passage with the fire chamber at the front of the plate 4 and terminates at the top in a restricted outlet for connection with a chimney, not shown.

When the dome unit is placed in operative position upon the fire box unit and jacket unit, the lower edges of its opposite sides will be parallel with the opposite sides 6 of the fire box unit 1 and also parallel with the opposite sides 12 of the jacket unit 2, as shown more clearly in Figure 1, thus bringing the rear wall 17 in the same vertical plane as the rear wall 11 of the jacket unit 2, as shown more clearly in Figures 1, 3 and 4.

Under this construction, the lower edges of the side walls 19 will be coincident with the upper edges of the side walls 6 of the fire box unit.

In order that the side walls of the dome unit may conform to the rectangular top and to the rearwardly converging sides of the bottom, the portions 19 and 20 of each side are disposed at an angle to each other in which the angles extend from the upper front corners of the rectangular portion of the top downwardly and rearwardly to the lower rear corners of the bottom portion of the unit, as shown more clearly in Figure 1.

The front wall 18 is provided with a pendant extension 22 projecting downwardly a relatively short distance between the upper portions of the side walls 6 as shown more clearly in Figures 2, 4 and 9, thus forming the front wall of an exit opening 24 in the top of the fire box unit through which the products of combustion may escape into the dome across the front edge of the top plate 4.

When the top plate 4 and dome unit 2 are used in connection with the fire box unit 1 the draft and products of combustion escaping through opening 24 may be controlled by a damper 25 having its lower end seated in a grooved member 26 on the plate 4 near and parallel with the front edge thereof and its upper end movable into and out of engagement with a stop shoulder 27 on the inner face of the front wall 18 of the dome unit, as shown more clearly in Figure 4.

The damper is provided with a suitable operating member 28, the lower end of which is accessible through the open front of the fire box

unit and is adapted to be held in place by a gravity detent 29.

The detent is preferably pivoted at 30 to the front face of the back wall 7 of the fire box unit 1 to extend forwardly therefrom and has its lower edge serrated or corrugated to engage a shoulder 31 on the operating member 28, as shown in Figure 4.

The damper operating means, however, may be of any suitable construction, it being understood that the damper 25 will extend practically the full distance between the opposite side walls 19 of the dome unit with just sufficient clearance at the ends to permit it to be operated without friction.

The dome unit is preferably made of a single sheet metal blank shown in Figure 12, said blank being substantially Y-shaped in plane in that it consists of the main central body forming the front wall 18 and outwardly diverging wings forming the side portions 19 and 20 and the back wall 17, the main body being shown as provided with the apron extension 22.

The various corners or angles of the dome unit are indicated in the blank, Figure 12, by dotted lines and although I have shown the blank as substantially Y-shaped in which the end edges of the opposite arms are adapted to meet in substantially the vertical center of the back portion 17 as the only joint in the walls of the dome unit, it is evident that the same unit may be made in one piece by other modifications of the blank without departing from the spirit of the invention.

Operation

As previously stated, the fire box unit 1 may be used independently of the other units with or without a masonry casing in which case any suitable smoke conduit could be connected to the opening 24 and to a chimney or other flue to conduct the products of combustion to the exterior of the building, thus affording a comparatively inexpensive fire box.

If, however, it should be desired to use the heat radiated from the fire box, the latter may be surrounded by the jacket 2 to form the intervening air chamber 15 in which case it would be preferable to use the top plate 4, thereby directing the exit of the heated air from said chamber through the outlet openings 15' which latter may be connected by any suitable conduits to the room or rooms to be heated.

Again, if it should be desired to use the dome unit 3, the latter may be placed in operative position upon the top of the units 1 and 2 and plate 4 to enable the products of combustion to pass from the fire box unit 1 upwardly through the opening 24 and thence into the dome 3 to be discharged therefrom through the outlet 21 into a suitable flue leading to the exterior of the building.

At the same time the heated air in the chamber 15 will be conducted outwardly through the outlets 15' to the room in which the open hearth heater is installed, the smoke exit 24 being controlled by the damper 25.

When the three units are assembled in the manner described, the inner edges of the flanges 13 on the front of the jacket unit 2 may be welded or otherwise secured to the front edges of the side wings 6 of the fire box unit to form air-tight joints therewith.

If necessary, the opposite ends and rear portions of the top plate 4 may be welded or otherwise secured to the upper edges of the side wings 6 and also to the upper edges of the jacket unit 2.

The lower end of the dome unit 3 may also be

welded or otherwise secured to the top of the fire box unit 1 and jacket unit 2, to form air-tight joints therewith.

When the fire box 1, jacket 2, dome 3 and plate 4 are constructed and assembled in the manner shown and described, they produce a complete all-metal fire place which may be manufactured, sold and installed at a comparatively low cost and used for an indefinite period of time with a maximum heating and ventilating efficiency without liability of leakage of fire, smoke or gas.

Or, if desired, the same unit may be used as a form around which masonry or other material may be constructed for decorative or utility purposes without in any way diminishing its heating and ventilating efficiency, thereby eliminating the necessity for extra forms, greatly reducing the cost of installation, and assuring a safer and more uniform construction of masonry than has heretofore been practised.

It is evident, however, that various changes may be made in the details of the construction without departing from the spirit of the invention.

What I claim is:

1. A smoke dome for fireplace constructions, comprising a unitary metallic structure including upwardly and inwardly inclined front and side walls and a vertically disposed rear wall, said side walls being each composed of two substantially triangular portions disposed at an angle to each other, one of said triangular portions having its base extending from the lower corner of the front wall to the lower corner of the rear wall and converging rearwardly, the apex of said triangular portion being disposed at the upper corner of the front wall, the other of said triangular portions having its apex disposed at the juncture of the lower rear corner of the aforementioned triangular portion and the rear wall, the base of said other triangular portion extending rearwardly from the apex of the aforementioned triangular portion to the rear wall, the upper edges of the front, rear and side walls defining a substantially rectangular smoke exit opening disposed midway between the opposite sides of the dome and towards the rear of the dome.

2. A smoke dome for fireplace constructions, comprising a unitary metallic structure including upwardly and inwardly inclined front and side walls and a vertically disposed rear wall, said side walls being each composed of two substantially triangular portions disposed at an angle to each other, one of said triangular portions having its base extending from the lower corner of the front wall to the lower corner of the rear wall and converging rearwardly, the apex of said triangular portion being disposed at the upper corner of the front wall, the other of said triangular portions having its apex disposed at the juncture of the lower rear corner of the aforementioned triangular portion and the rear wall, the base of said other triangular portion extending rearwardly from the apex of the aforementioned triangular portion to the rear wall, the upper edges of the front, rear and side walls defining a substantially rectangular smoke exit opening disposed midway between the opposite sides of the dome and towards the rear of the dome, and an apron depending from the lower edge of the front wall, the lower edge of the apron being substantially horizontal adjacent its ends and of arcuate form intermediate the horizontal portions.

3. An open hearth fireplace comprising a unitary metallic structure including a fire box comprising inner, back and forwardly diverging side

walls and spaced parallel jacket walls forming an air heating chamber, a top plate extending across the top of the fire box and over the heating chamber except at the forward part of the side portions thereof, whereby to form air outlets at said latter portions, and a dome section, the bottom of which coincides with the inner side walls of the fire box, said dome including upwardly and inwardly inclined front and side walls and a vertically disposed rear wall, said side walls being each composed of two substantially triangular portions disposed at an angle to each other, one of said triangular portions having its base extending from the lower corner of the front wall to the lower corner of the rear wall, the apex of said triangular portion being disposed at the upper corner of the front wall, the other of said triangular portions having its apex disposed at the juncture of the lower rear corner of the afore-

mentioned triangular portions and the rear wall, the base of said other triangular portion extending rearwardly from the apex of the aforementioned triangular portion to the rear wall, the upper edges of the front, rear and side walls of said dome defining a substantially rectangular smoke exit disposed approximately midway between the opposite sides of the dome and towards the rear of the dome.

4. An open hearth fireplace substantially as set forth in claim 3 in which the front wall of the dome is provided with a depending apron forming a throat for directing the products of combustion from the fire box to the dome and serving to limit the size of the front opening of the fireplace.

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