

May 29, 1956

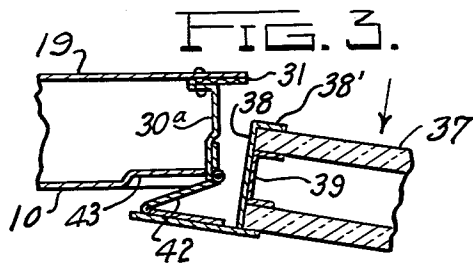
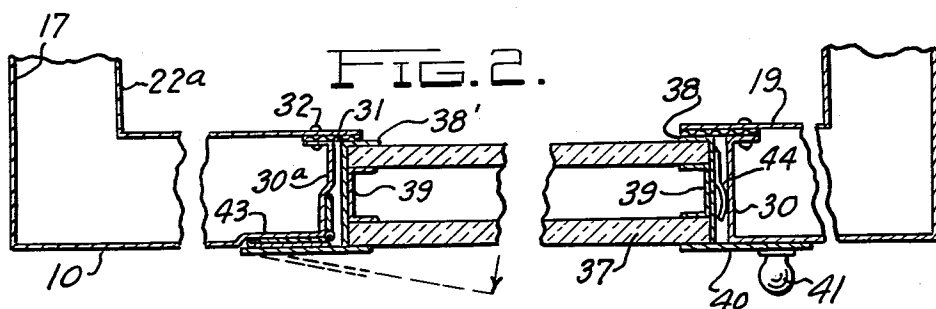
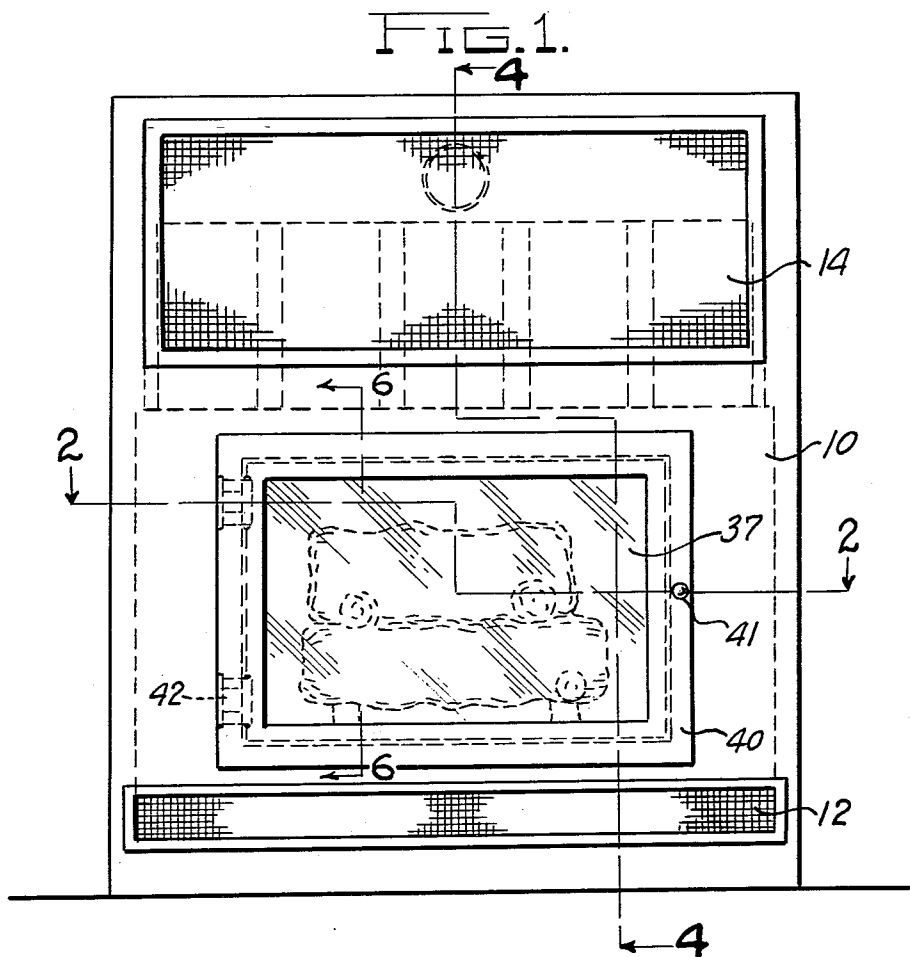
R. R. DUPLER

2,747,568

AIR-HEATING FIREPLACE STRUCTURE

Filed March 18, 1952

3 Sheets-Sheet 1



INVENTOR.
Raymond R. Dupler
BY
Deleah W. Praser
ATTORNEY

May 29, 1956

R. R. DUPLER

2,747,568

AIR-HEATING FIREPLACE STRUCTURE

Filed March 18, 1952

3 Sheets-Sheet 2

FIG 4

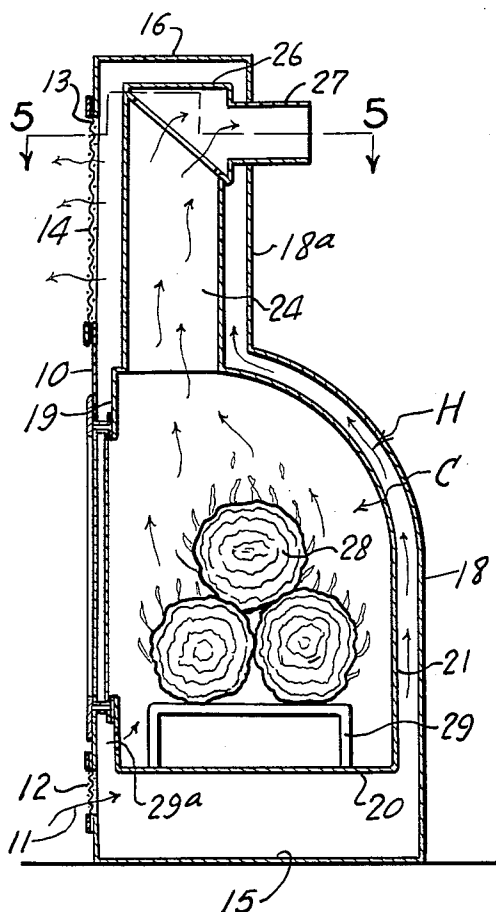


FIG. 6.

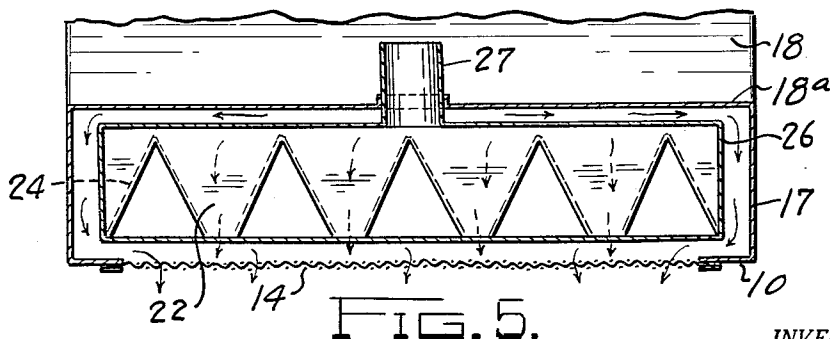
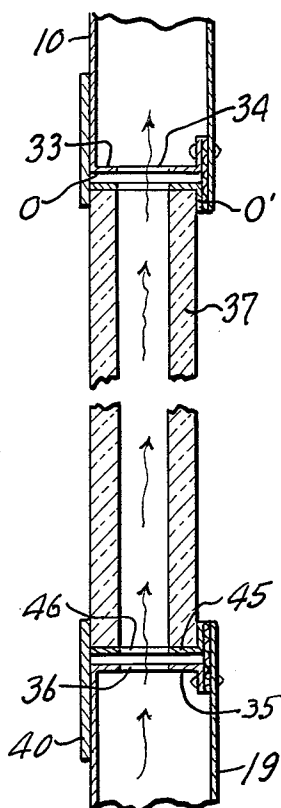


FIG. 5.

INVENTOR.

INVENTOR.
Raymond R. Dupler

BY,

Delcolumb, Praser

ATTORNEY

May 29, 1956

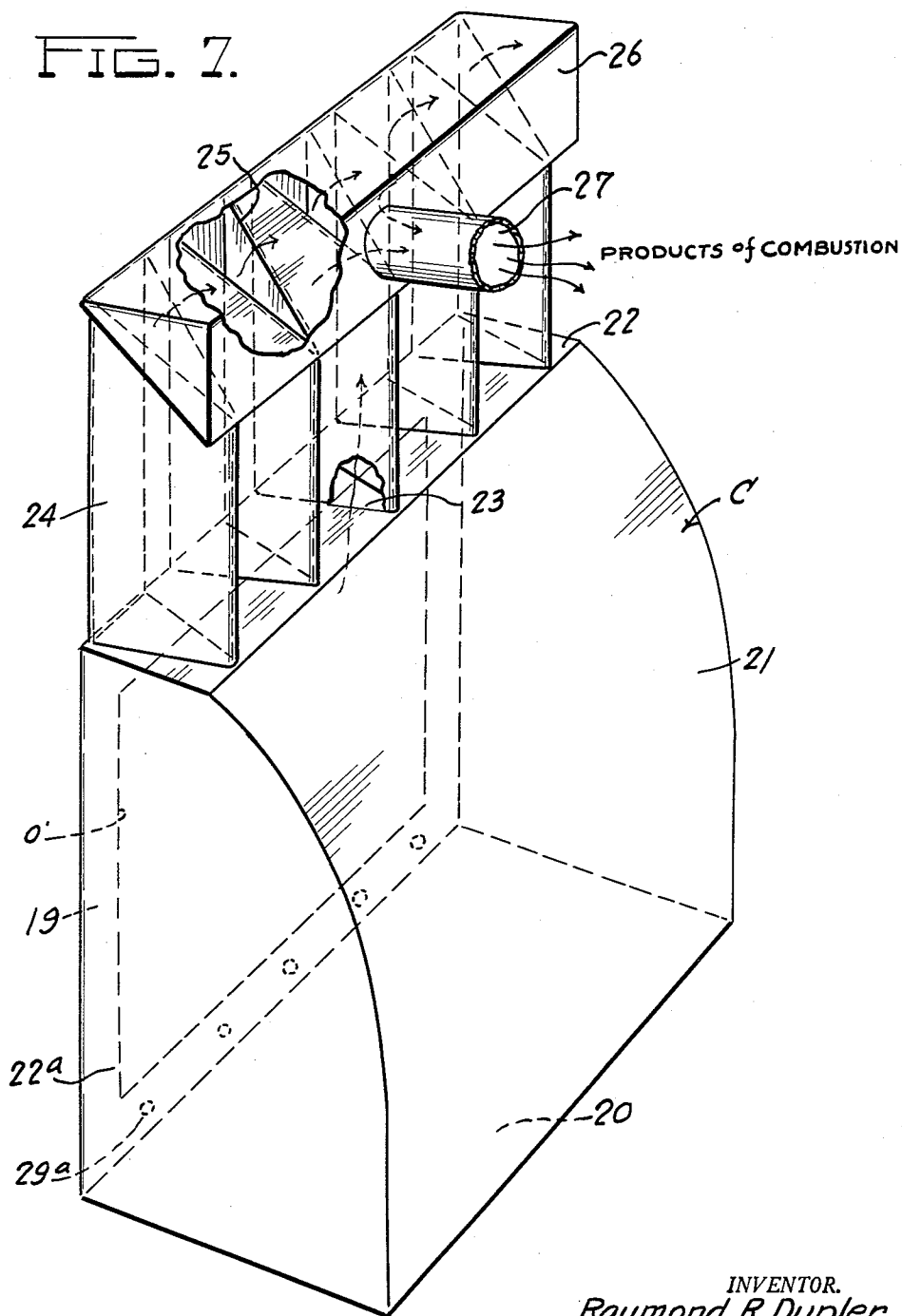
R. R. DUPLER

2,747,568

AIR-HEATING FIREPLACE STRUCTURE

Filed March 18, 1952

3 Sheets-Sheet 3



INVENTOR.
Raymond R. Dupler
BY
Delbert W. Praser
ATTORNEY

1

2

2,747,568

AIR-HEATING FIREPLACE STRUCTURE

Raymond R. Dupler, Toledo, Ohio

Application March 18, 1952, Serial No. 277,189

1 Claim. (Cl. 126—121)

This invention relates to hot air furnaces, but particularly to a furnace of this type which simulates in appearance, a wood burning fireplace by enabling the room occupants to view the burning of the furnace, such as a gas burner, but without the attendant disadvantages and messiness occasioned in the operation of a wood burning fireplace.

An object is to produce a new and improved furnace of the above type which is essentially of sheet metal construction and is efficient and reliable in operation.

Another object is to produce a hot air furnace simulating a fireplace and adapted to be installed in a fireplace-like opening in a room, the same having hot air heating means designed to afford maximum area over which the air to be heated passes by convection or otherwise.

A further object is to produce a hot air furnace of the above type having a new and improved door structure which can be opened manually or will open automatically in response to an explosion in the combustion chamber.

Other objects consist in details of construction, arrangement and operation, and for purposes of illustration, but not of limitation, and embodiment of the invention is shown on the accompanying drawings, in which

Figure 1 is a front elevation of the hot air furnace;

Figure 2 is an enlarged transverse sectional view substantially on the line 2—2 of Figure 1;

Figure 3 is a fragmentary sectional view showing the door in partly open position;

Figure 4 is a vertical sectional view substantially on the line 4—4 of Figure 1;

Figure 5 is a transverse sectional view substantially on the line 5—5 of Figure 4;

Figure 6 is an enlarged vertical sectional view substantially on the line 6—6 of Figure 1; and

Figure 7 is an enlarged perspective view of the combustion chamber, and associated parts.

The illustrated embodiment of the invention comprises a hot air furnace of sheet metal construction, having an inner combustion chamber C and an outer hot air chamber H. The hot air chamber comprises a vertical sheet metal front wall 10 which has a fresh air inlet 11 adjacent the lower end, a foraminous screen 12 covering the opening. It will be noted that the opening 11 is relatively narrow and extends almost from side to side of the front wall. In the upper portion of the front wall 10 is a hot air outlet 13 which is nearly four times the size of the inlet 12 and is also covered by a foraminous screen 14. The hot air chamber also has a bottom wall 15 and a somewhat narrower top wall 16, both of which extend at substantially right angles rearwardly of the front wall 10. The sides are closed by walls 17 which are rearwardly secured to the front, bottom, and top walls, and also to the rear wall. As shown, the rear wall has a lower portion 18 which extends upwardly from the base or bottom wall 15 for a distance and then gradually curves inwardly and upwardly to join a vertically extending portion 18a which is parallel to the front wall 10,

and is fixed at its upper end to the top wall 16, as well as to the side walls as above indicated.

The combustion chamber C which, as above indicated, is arranged within the hot air chamber H, comprises a vertically disposed front wall 19 which is spaced from the front wall 10 of the hot air chamber and also spaced substantially above the bottom wall 15 of the hot air chamber. The bottom wall 20 of the combustion chamber is also spaced above the bottom wall 15 and is welded or otherwise secured in fluid-tight relation to the front wall 19. The top of the front wall 19 is in a plane slightly below the lower end of the vertical portion 18a of the hot air chamber. Rising from the rear end of the bottom wall 20, is a rear wall 21 which is spaced inwardly from the rear wall portion 18 of the hot air chamber and extends substantially parallel thereto, terminating in a top wall 22 (Figure 7) which is flat and parallel to the bottom wall 20. The sides are closed by walls 22a which are rigidly secured to the adjacent walls to provide a fluid-tight enclosure for the combustion chamber.

Formed in the top wall 22 is a plurality of triangularly shaped openings 23, in this instance, five in number, which are spaced equi-distantly from each other. As shown, the triangles are isosceles triangles, the two rearwardly extending sides being equal and the side at the front bearing the shorter one. Rising from the triangularly shaped openings 23 is a series of vertically disposed tubes 24 which are triangular in cross section and have their lower ends welded or otherwise in fluid-tight engagement with the edge portions of the openings 23 respectively. The upper ends 25 of the tubes 24 are oblique, that is, they incline downwardly and rearwardly so that the front wall of each tube is substantially higher or longer than the rear apical portion. The upper slanting ends 25 of the tubes 24 are welded to the lower or bottom side of an elongate box 26, the bottom wall being downwardly inclined similar to the inclination of the tube ends 25. It will be understood that the connection between the tubes ends 25 and the box 26 is fluid-tight to prevent the escape of smoke and gases therefrom. The top wall of the box 26 is flat and substantially parallel to the top wall 22 of the combustion chamber and the sides and rear wall of the box are at right angles to the top wall thereof. Extending rearwardly from the rear wall of the box 26 is a smoke pipe 27 which may connect to the usual chimney for venting the smoke and products of combustion.

In this instance, gas logs 28 are arranged within the combustion chamber C and are supported upon a suitable standard 29 which rests on the bottom wall 20 of the chamber C. It will be manifest that gases and other products of combustion pass from the combustion chamber C up through the tubes 24 to the elongate box 26 from which they pass to the exhaust or smoke pipe 27. As shown, fresh air may be supplied to the inside of the combustion chamber C through one or more openings 29a arranged just above the inlet opening 11 in the front wall of the hot air chamber, these openings being in the lower portion of the front wall 19 of the combustion chamber C.

The front wall of the hot air chamber is provided with a rectangular opening O and rearwardly thereof is a rectangular opening O' in the front wall 19 of the combustion chamber. Integral with the front wall 10 of the hot air chamber are uprights 30 and 30a which provide the side portions of a door case. The inner edge portions of the uprights 30 and 30a are flanged outwardly and intermediate these flanged portions and the wall 19 of the combustion chamber, are strips of asbestos packing 31, rivets 32 extending through the flanged portions, packing and wall 19 for securely holding these parts together. Forming the top of the door case is a strip 33 integral

3

with the front wall 10 of the hot air chamber and terminating in a flanged portion which is riveted to the combustion chamber wall 19, similar strips of asbestos being provided between the flanged portions and wall 19 and rivets securing these.

The bottom of the door case is formed by a strip 35 integral with the front wall 10 and being similarly flanged at its opposite or free end portion and having an asbestos packing interposed between it and the wall 19, rivets also retaining this flanged portion to the wall 19, as shown. Formed in the top strip 33 of the door case is a plurality of apertures 34 and similarly in the bottom strip 35 of the door case is a plurality of apertures 36, the purpose of which will be hereinafter described.

Fitting within the door case above described is a door comprising a pair of laterally spaced glass panels 37 substantially filling the opening of the case. The sides of the panels 37 are engaged by uprights or stiles 38, 38' and spacing the panels 37 from each other are channel strips 39 which are welded to the inner faces of the stiles 38, 38'. The inner edge portions of the inner glass panels 37 are engaged by inwardly extending flanges 38' integral with the inner edges of the stiles, so that the inner glass panel is clamped between the channel members 39 and the flanges 38'.

Welded to the front edge portions of the stiles 38, 38' is a surrounding frame member of sheet metal construction 40 which projects laterally beyond the door to overlap the front wall 10 of the hot air chamber H. At one side of the frame member 40 is a handle knob 41 for enabling the door to be opened manually. The framing strip 40 cooperates with the channel members 39 for holding the front glass panel 37 in place. At the opposite side of the door are two concealed hinge members 42 of any suitable construction, recessed portions 43 being provided in the front wall 10 to accommodate one of the spring leaves when the hinge is in folded condition with the door closed, as will be readily understood.

In order to obviate rattles and to insure that the door fits snugly within the door case, a plurality of spring pickup leaves 44 are fixed to one of the stiles 38 and resiliently bear against the adjacent upright 30 of the case. The door frame is formed with top and bottom rail 45 which are welded to the stiles 38, their inner flanged edge portions as well as the framing strip or member 40. Each of the rails 45 has a series of openings 46 which register with the openings 34 and 36 to enable air to pass from the lower portion of the hot chamber H upwardly between the spaced glass panels 37.

In operation it will be understood that types of burners other than the gas burner 28 may be used to advantage. The gas burner is particularly satisfactory in this connection because of the flames which are visible through the glass panels 37, thereby providing the effect of a wood burning fireplace enabling the occupants of the room to view the flames and affording the pleasure therefrom without the objectionable odors and other disadvantages normally attendant to an open gas heater. It will be understood that the products of combustion from the burner 28 pass upwardly through the several tubes 24 to the box 26 from which the same pass out through the pipe 27 to the usual smokestack. The heat generated by the burner, heats the sheet metal walls of the combustion chamber, and such heated walls radiate heat to the air in the space between the combustion chamber and the hot air chamber. As a result, the air is drawn in from the room through the screened inlet opening 11 and then passes up by convection along the walls of the combustion chamber and out into the room through the screen. The maximum benefit of the heat from the burner is obtained and substantial surface is afforded over which the air passes, such surface being considerably increased by the conformation of the upright tubes 24, the inclined sides of the tube affording a substantial surface for the air to contact, and from which to radiate heat, and the

4

construction and configuration of the combustion chamber and associated parts being such as to give the maximum area with which the air from the room can contact during its passage from the inlet to the outlet opening.

A portion of the heated air passes upwardly between the glass panels 37 and although the innermost of these panels will be quite hot after the burner has been in operation for a period of time, the front panel 37 will be maintained relatively cool. As above mentioned, air to support the combustion of the burner 28 passes into the combustion chamber through the openings 29a.

As above explained, the door may be opened by pulling on the handle knob 41, thereby to gain access to the interior of the combustion chamber whenever this is desired. However, the door is so mounted that in the event that an explosion should occur within the combustion chamber, the door will automatically be forced outwardly, the concealed hinges being such as to enable this movement to be effected. In this manner, danger from an explosion is substantially reduced, if not entirely eliminated.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claim.

What I claim is:

A furnace, comprising an outer casing of sheet metal, said casing having a substantially vertical front wall, a rear wall offset forwardly intermediate its height to provide a lower section of relatively great horizontal depth from front to rear, and an upper section of relatively shallow depth from front to rear, a top wall for the upper section, side walls and a bottom wall said front wall having an inlet opening in the lower portion thereof for entrance of cold air and an outlet opening in the upper portion for exit or heated air, an inner sheet metal casing within the lower portion of the outer casing and having bottom, side, front and rear walls spaced from the corresponding walls of the outer casing so as to provide passages for air to be heated, said inner casing having a top wall provided with a series of laterally spaced openings, upright tubes having their lower ends communicating with said openings, said upright tubes lying within the upper portion of said outer casing and being disposed to the rear of the exit opening in the upper portion of the outer casing, a box-like collecting chamber supported on the upper ends of said upright tubes, and having the interior thereof connecting with the interiors of said tubes, said collecting chamber having all walls thereof spaced from the walls of said outer casing, a smoke pipe extending from the collecting chamber through the rear wall of the outer casing, there being registering, substantially similar door openings through the front walls of the lower portion of the outer casing and the front wall of said inner casing, a door hingedly mounted on the outer casing, said door having substantially coextensively superposed spaced apart front and rear glass panels for closing the door openings in said outer and inner panels, said door having marginal bottom and top openings located between the glass panels and communicating with the space therebetween, such openings communicating with the spaces between the front walls of the outer and inner casing below and above the door openings respectively when the door is closed, said door openings being disposed above the outer casing air inlet and below the outer casing air outlet, and a fuel support centrally disposed on the bottom wall of the inner casing.

References Cited in the file of this patent

UNITED STATES PATENTS

128,989	Webster	July 16, 1872
1,043,252	Revell et al.	Nov. 5, 1912
1,172,629	Petrie	Feb. 22, 1916

(Other references on following page)

2,747,568

5

UNITED STATES PATENTS

1,245,904	Hagan	Nov. 6, 1917
1,574,145	Andrews	Feb. 23, 1926
1,643,705	Dykes	Sept. 27, 1927
1,681,995	Miles	Aug. 28, 1928
1,717,637	Vastine	June 18, 1929
1,864,333	Aldrich	June 21, 1932
1,945,379	Roesch	Jan. 30, 1934

5

2,013,237
2,360,611
2,438,035

18,655
27,380
242,289

6

Funk	Sept. 3, 1935
Leonard	Oct. 17, 1944
Buhman	Mar. 16, 1948

FOREIGN PATENTS

Australia	Dec. 27, 1904
Great Britain	of 1906
Great Britain	Apr. 15, 1926