April 29, 1958 H. C. JOHNSON 2,832,332

COMBINATION FIREPLACE AND FURNACE

Filed Dec. 22, 1953 2 Sheets-Sheet 1

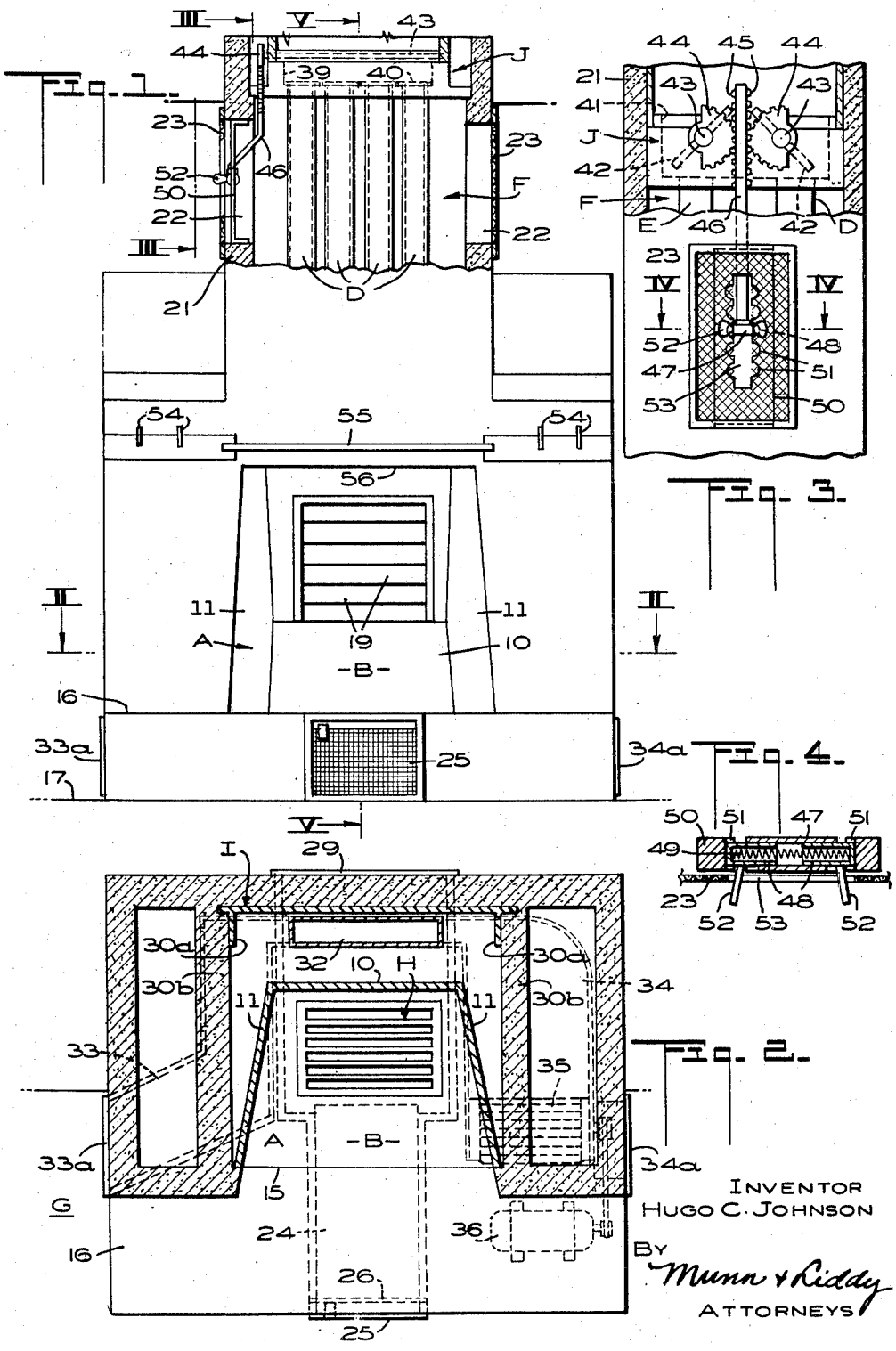


FIG. 1.

FIG. 3.

FIG. 4.

FIG. 2.

INVENTOR
HUGO C. JOHNSON
BY
Munn & Riddy
ATTORNEYS

April 29, 1958 H. C. JOHNSON 2,832,332

COMBINATION FIREPLACE AND FURNACE

Filed Dec. 22, 1953 2 Sheets-Sheet 2

Fig. 5.

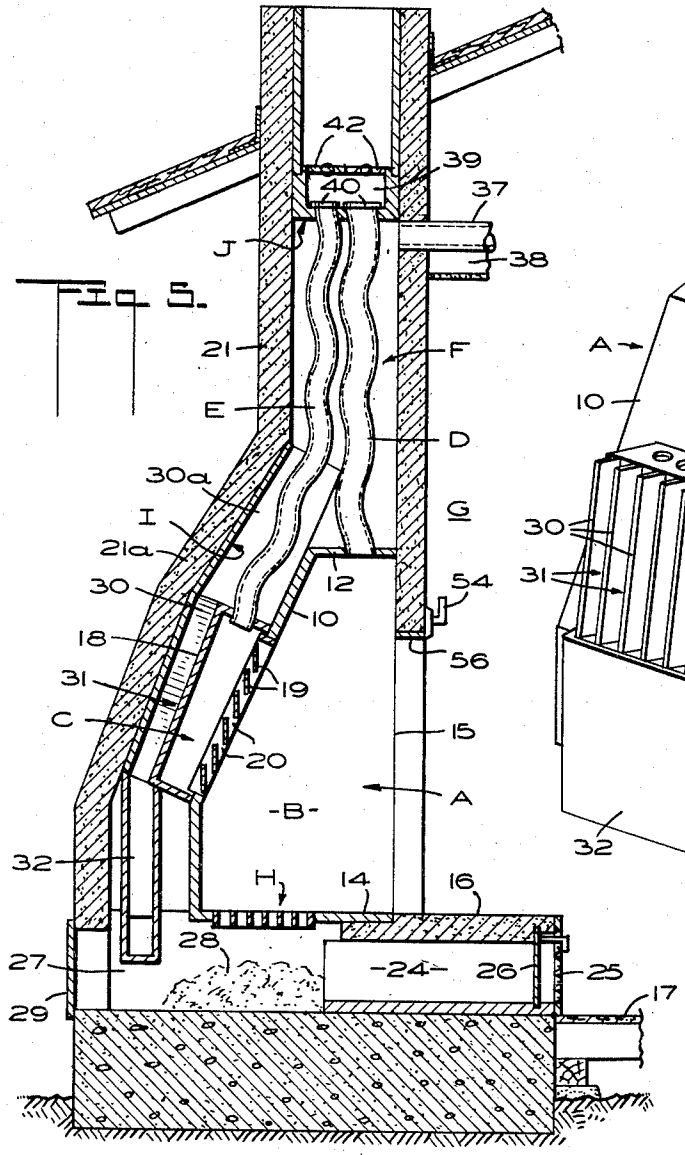


Fig. 6.

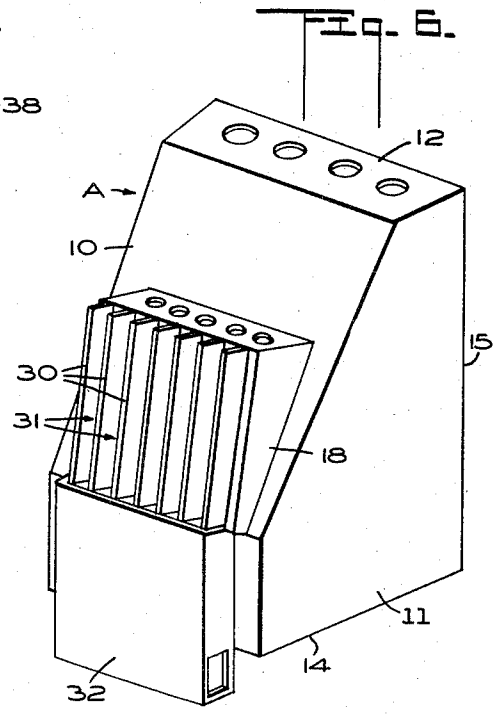
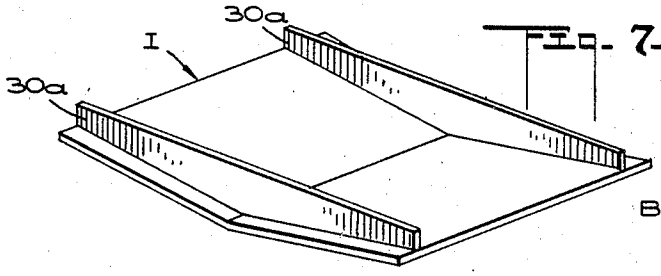


Fig. 7.



INVENTOR
HUGO C. JOHNSON
BY Munn & Liddy
ATTORNEYS

United States Patent Office

2,832,332

Patented Apr. 29, 1958

2,832,332

COMBINATION FIREPLACE AND FURNACE

Hugo C. Johnson, San Jose, Calif.

Application December 22, 1953, Serial No. 399,796

3 Claims. (Cl. 126—121)

The present invention relates to improvements in a combination fireplace and furnace. It consists of the constructions and arrangement of parts, as hereinafter described and claimed.

It will be appreciated, of course, that the ordinary fireplace is rather inefficient, since a considerable amount of heat is permitted to escape through the chimney. Moreover, there is a tendency for fireplaces to smoke, either due to faulty design or the lack of proper draft.

As the cardinal objects of this invention, it is proposed to provide a fireplace construction, embodying a circulatory system through which a proper draft may be established, absorbing the maximum amount of heat from the fire, and to deliver the heated air to locations where it is to be utilized, all with a great deal of efficiency. Furthermore, the arrangement is such as to preclude the fireplace from smoking. The heat may be delivered to the room in which the fireplace is disposed, as well as to other rooms of the house, thereby providing both a fireplace and a furnace.

Other objects and advantages will appear as the specification proceeds. The novel features will be particularly pointed out in the claims hereunto appended.

Drawings

For a better understanding of the invention, reference should be had to the accompanying drawings, forming part of this application, in which:

Figure 1 is a front elevational view of my combination fireplace and furnace, the upper portion being broken away so as to disclose the interior construction;

Figure 2 is a horizontal sectional view taken along the plane II—II of Figure 1;

Figure 3 is a side elevational view of a portion of the chimney, as seen from the line III—III of Figure 1, illustrating a damper control, part of the chimney being shown in section;

Figure 4 is an enlarged horizontal sectional view taken along the line IV—IV of Figure 3, illustrating a latching mechanism for the damper control;

Figure 5 is a sectional view taken along the vertical plane V—V of Figure 1;

Figure 6 is a perspective view of the fire chamber liner and associated parts, as observed from the back thereof; and

Figure 7 is an isometric view of a cover plate.

While I have shown only the preferred form of my invention, it should be understood that various changes, or modifications, may be made within the scope of the annexed claims without departing from the spirit thereof.

Detailed description

Referring to the drawings, it will be noted that a liner indicated generally at A provides a fire chamber B. This liner is preferably made of metal and defines a rear wall 10 having spaced-apart side walls 11—11 projecting forwardly therefrom, upper and lower walls 12 and 14, respectively, connected to the tops and bottoms of the rear and side walls. The front marginal rim 15 of the liner defines an opening giving access to the fire chamber, as clearly illustrated in Figures 1, 2 and 5. When installed, the lower wall 14 is set flush with an elevated hearth 16.

As disclosed in Figures 5 and 6, a housing 18 is mounted on the rear wall 10 of the liner in back thereof, forming a heat-receiving compartment C. Louvers 19 are arranged in the rear wall 10, and define openings 20 between adjacent louvers, which lead from the fire chamber B to the compartment C, thus allowing heated air to flow from the former to the latter.

It will be observed that a forward group of tubular flues D communicate with the fire chamber B, and extend upwardly from the upper wall 12 of the liner. Also, a rear group of tubular flues E communicate with the heat-receiving compartment C, and rise above the housing 18. Both groups of flues are curved back and forth to present a zigzag or sinuous outline, to retard the flow of heat through their respective bores.

Turning now to Figures 1, 3 and 5, a chimney 21 has been disclosed therein as surrounding both groups of flues, defining a heating chamber F through which the flues extend. Outlet ducts 22—22 are provided in opposing sides of the chimney to allow heat to escape from the heating chamber F into the room G into which the fireplace opens. Grills 23—23 have been mounted over these ducts.

In order to make a draft from underneath a fire in the chamber B, the lower wall 14 of the latter has been provided with a slotted grate H (see Figures 2 and 5). An air inlet conduit 24 leads from the atmosphere in the room G to a position below the grate to thereby deliver air for up-flow through the grate H, openings 20 and the tubular flues D and E. This will give the fire a better and quicker chance to get started, and will create a draft through the flues. A grill 25 has been provided over the entrance end of the conduit 24, and the latter has a slidable damper 26 arranged therein for controlling the amount of the draft established through this conduit.

It will be apparent from Figure 5 that a pit 27 is fashioned in the fireplace to receive ashes 28, which gravitate through the grate H. These ashes may be removed from the pit through a clean-out door 29 disposed exteriorly of the house. The pit may have considerable capacity, thus requiring only infrequent cleaning.

Reference is made to Figures 5 and 6, wherein it will be noted that a series of spaced-apart air-distributing fins 30 are mounted on the exterior of the housing 18. These fins provide parallel passageways 31, which communicate with the heating chamber F to deliver air to the latter for out-flow through the grills 23—23, after passing over the flues D and E. As shown in Figures 2, 5 and 7, a cover I has been applied over the fins so as to direct air flowing through the passageways 31 towards the tubular flues. This cover has parallel flanges 30*a* projecting therefrom so as to abut interior walls 30*b* of the fireplace construction. The lower end of this cover rests on the top of an inlet duct 32. The cover serves as a foundation against which the bricks in the outer wall 21*a* of the chimney are applied.

For the purpose of supplying air to the passageways 31, a vertical inlet duct 32 has been provided, whereby air may be directed over the surfaces of the flues to absorb heat therefrom. The duct 32 has branch ducts 33 and 34 extending therefrom, the entrance ends of which communicate with the atmosphere in the room G through grills 33*a* and 34*a*, respectfully (see Figures 1 and 2).

It may be desired, at times, to create a forced draft through the heating chamber F. Accordingly, a fan 35 has been provided in the branch duct 34 (see Figure 2).

This fan may be driven by any suitable source of power, for example, an electric motor 36. Cold air streams may enter the branch ducts 33 and 34, and will pass through the vertical duct 32 for flow into the heating chamber F, and thence through the ducts 22—22 and grills 23—23 to the room. There will be no tendency for the fireplace to smoke, since the up-draft created in the flues will draw the smoke therewith, and there will be no bottleneck of smoke.

Heat may be conveyed from the heating chamber F through additional ducts 37, which lead to other rooms in the house. The ducts 37 may be supported on the ceiling rafters 38 (see Figure 5). Inasmuch as the flues D—E do not communicate with the chamber F, smoke from the fire cannot enter the ducts 37.

The upper portion of the chimney 21 has a damper box J supported therein. The upper ends of both groups of flues communicate with the interior 39 of this damper box. Collar 40 may surround the tops of the flues D and E to prevent smoke, which reaches the box through the flues D, from leaking down into the heating chamber F.

As shown in Figure 3, the damper box is fashioned with an outlet 41 in its top, which is regulated by a pair of adjustable damper plates 42—42. These plates are fixed to rods 43—43, which in turn are journalled in the damper box. Segmental gears 44—44 are secured to these rods, and mesh with teeth of racks 45—45, the latter being carried by a vertically movable control bar 46. Figure 3 illustrates the damper plates as being partially opened, while Figure 5 shows them fully closed.

For the purpose of adjusting the bar 46, and thereby regulating the damper plates, this bar has a tube 47 secured to its lower end, in which a pair of latching detents 48—48 are slidably guided. These detents are yieldingly urged in opposing directions by a spring 49 interposed therebetween. As shown in Figures 1, 3 and 4, a latch plate 50 is mounted in one of the ducts 22, and is formed with a plurality of notches 51 therein at different elevations. Finger grips 52—52 are fixed to the detents 48—48, and project outwardly through a slot 53 provided in the adjacent grill 23.

Obviously, when these grips are pressed toward one another, the detents 48—48 are withdrawn from the notches 51. At this time, the bar 46 may be raised or lowered to adjust the damper plates. Upon releasing the grips, the detents will be urged outwardly into engagement with the selected set of notches 51, thereby holding the damper plates in adjusted position.

As shown in Figures 1 and 5, hooks 54 are provided on the face of the fireplace, on which various tools may be hung. Also, a rod 55 has been mounted on this same face slightly above the arch 56 to serve as a mounting for a screen. This fireplace eliminates the requirements for andirons and individual tool stand. The hearth 16 has been shown as being built above the floor 17 so as to constitute a seat.

I claim:

1. In a combination fireplace and furnace: a liner providing a fire chamber; this liner defining a rear wall having spaced-apart side walls projecting forwardly therefrom, upper and lower walls connected to the tops and bottoms, respectively, of the rear and side walls; a housing mounted on the rear wall of the liner in back thereof, and forming a heat-receiving compartment; louvers arranged in the rear wall of the liner, and defining openings leading from the fire chamber of the liner to the heat-receiving compartment of the housing; a forward group of tubular flues communicating with the fire chamber, and extending upwardly from the upper wall of the liner; a rear group of tubular flues communicating with the heat-receiving compartment of the housing, and rising from the latter; a series of spaced-apart air distributing fins mounted on the exterior of the housing; these fins providing passageways therebetween extending upwardly toward both groups of flues; a cover disposed over and bearing against the fins and projecting above the latter to direct air flowing through the passageways towards both groups of the tubular flues; and an air inlet duct leading from the atmosphere to the bottom portions of passageways between the fins for supplying an upflow of air through said passageways.

2. In a combination fireplace and furnace: a liner providing a fire chamber; this liner defining a rear wall having spaced-apart side walls projecting forwardly therefrom, upper and lower walls connected to the tops and bottoms, respectively, of the rear and side walls; a housing mounted on the rear wall of the liner in back thereof, and forming a heat-receiving compartment; louvers arranged in the rear wall of the liner, and defining openings leading from the fire chamber of the liner to the heat-receiving compartment of the housing; a forward group of tubular flues communicating with the fire chamber, and extending upwardly from the upper wall of the liner; a rear group of tubular flues communicating with the heat-receiving compartment of the housing, and rising from the latter; a series of spaced-apart air-distributing fins mounted on the exterior of the housing at the back of the latter; these fins providing passageways extending upwardly toward both groups of flues; a substantially rectangular-shaped air-duct housing mounted below the fins; the upper portion of the air-duct housing communicating with the lower ends of the passageways for supplying an up-flow of air through said passageways; and a cover disposed over and bearing against the back of the fins; the lower end of this cover resting on the top of said duct; the upper part of the cover projecting above the fins and being positioned to direct the up-flow of air towards both groups of the tubular flues.

3. The combination fireplace and furnace, as defined in claim 2; and in which the cover has a pair of spaced-apart and substantially parallel flanges projecting therefrom so as to abut interior walls of a fireplace; these flanges straddling the rear group of tubular flues; the cover having a rear surface serving as a foundation against which bricks of a chimney wall may be applied and supported.

References Cited in the file of this patent

UNITED STATES PATENTS

12,491	Smith et al.	Mar. 6, 1855
394,653	Jackson	Dec. 18, 1888
557,231	Rogers	Mar. 31, 1896
1,287,815	Anderson	Dec. 17, 1918
1,714,955	Helms	May 28, 1929
1,725,484	Sholar	Aug. 20, 1929
2,052,643	Modine	Sept. 1, 1936
2,181,624	Maurer	Nov. 28, 1938