Sept. 11, 1923. 1,467,474

H. L. DAY
FIREPLACE
Filed Nov. 26, 1921 3 Sheets-Sheet 1

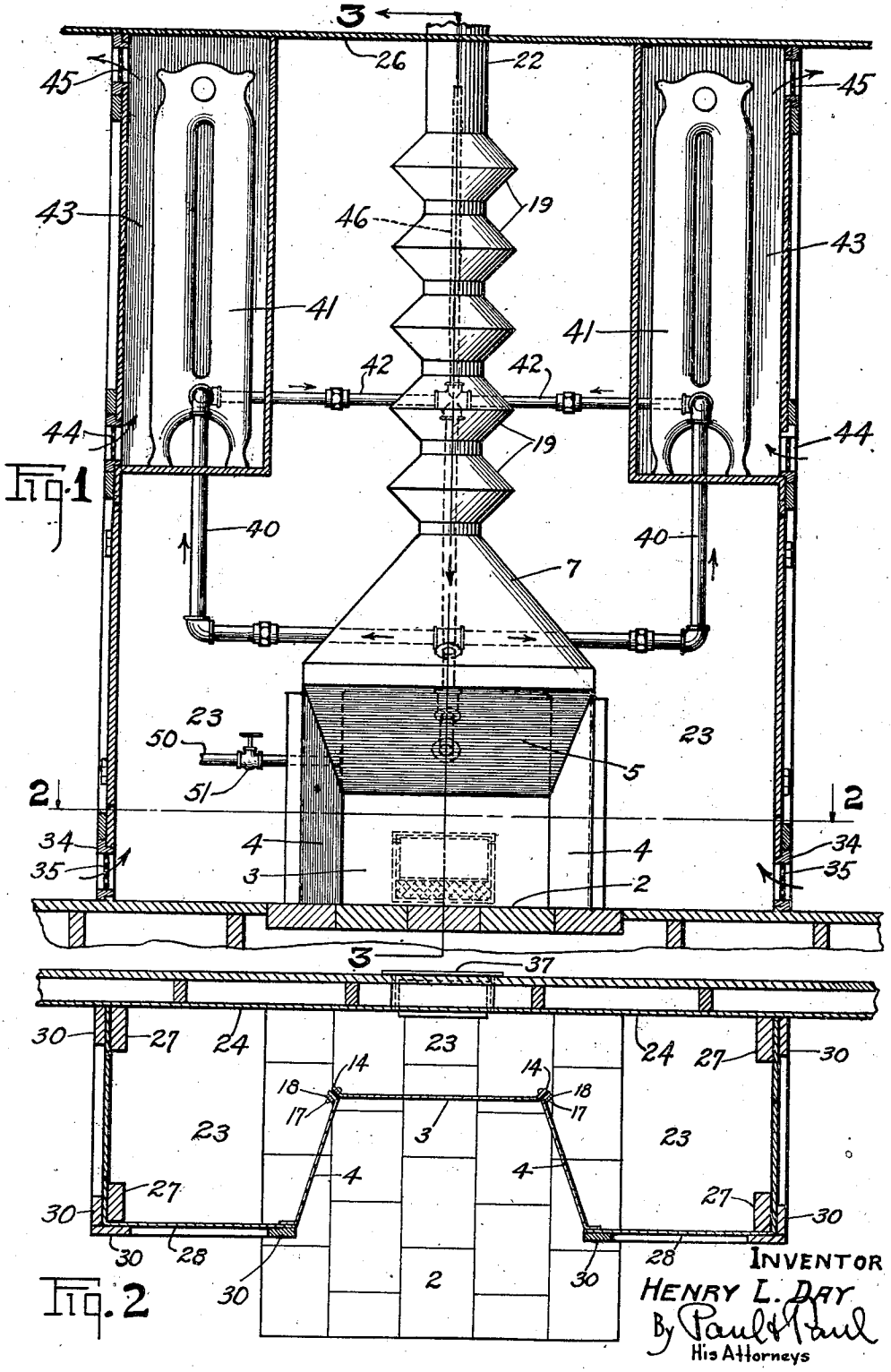

Fig. 1

Fig. 2

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By Paul & Paul
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FIREPLACE
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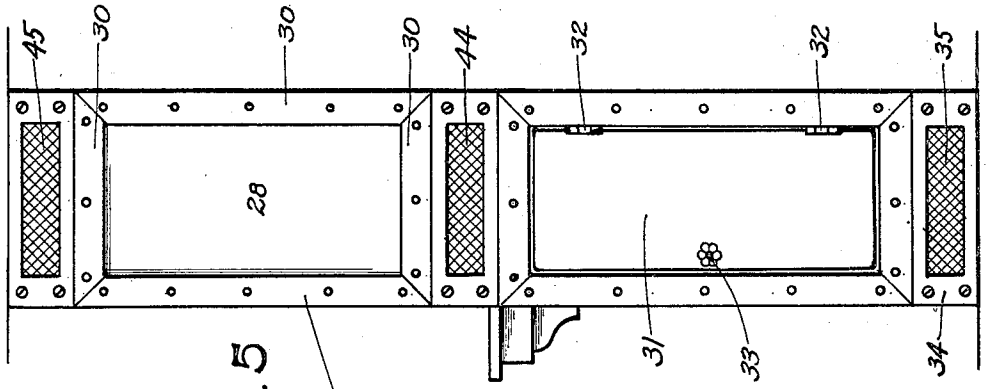

Fig. 5

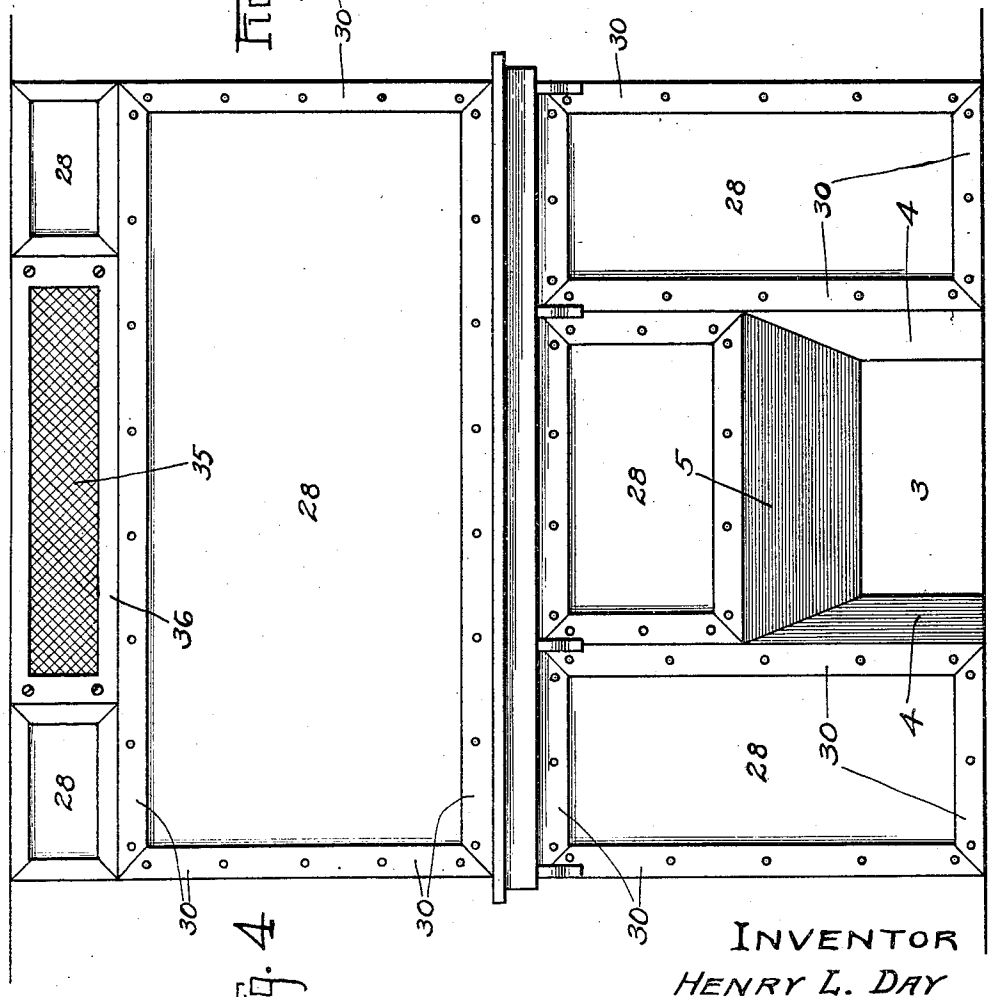

Fig. 4

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Sept. 11, 1923. **1,467,474**

H. L. DAY
FIREPLACE
Filed Nov. 26, 1921 3 Sheets-Sheet 3

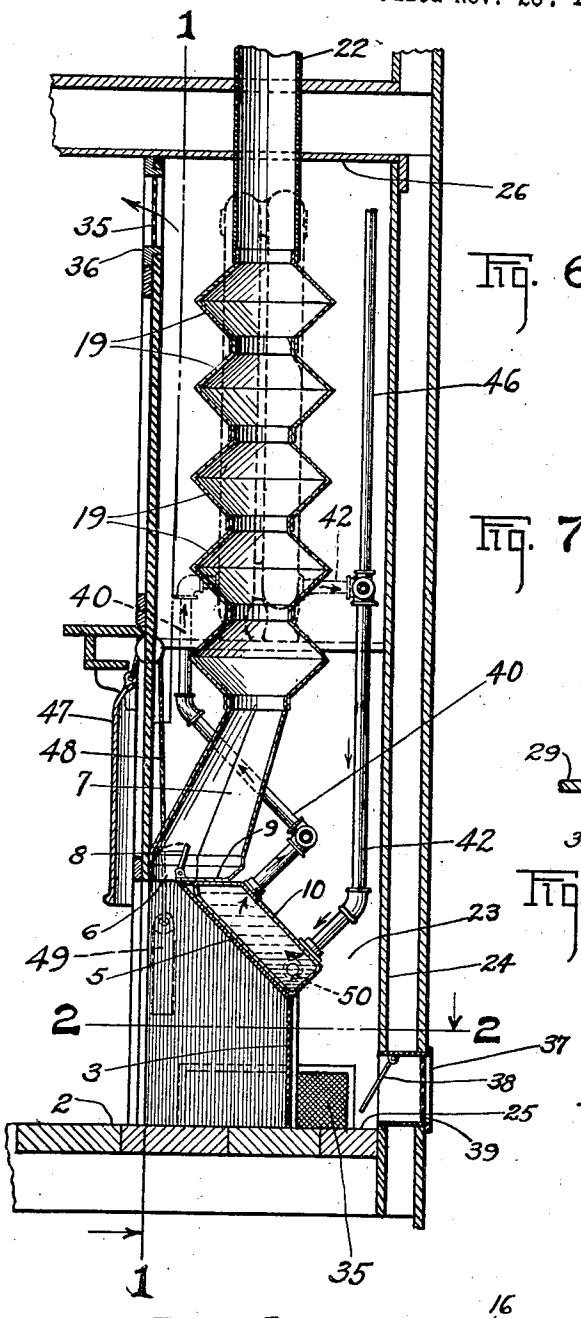

Fig. 3

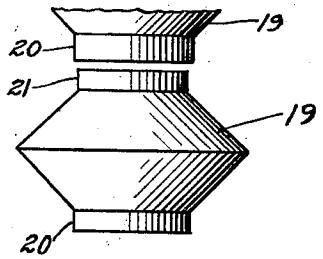

Fig. 6

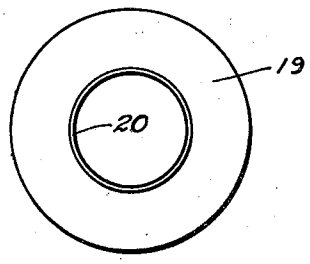

Fig. 7

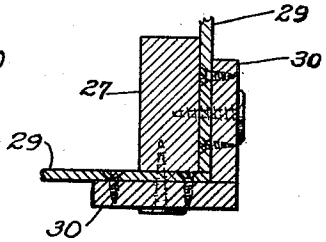

Fig. 8

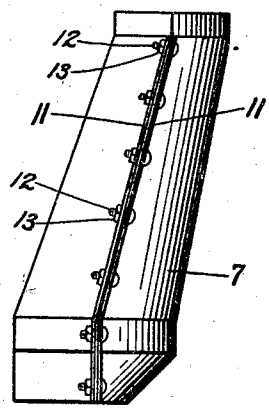

Fig. 9

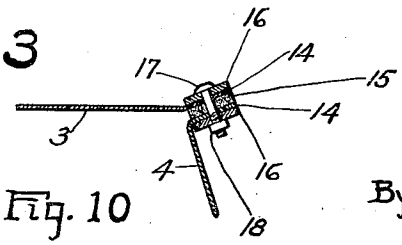

Fig. 10

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Patented Sept. 11, 1923. 1,467,474

UNITED STATES PATENT OFFICE.

HENRY L. DAY, OF MINNEAPOLIS, MINNESOTA.

FIREPLACE.

Application filed November 26, 1921. Serial No. 517,982.

To all whom it may concern:

Be it known that I, HENRY L. DAY, a citizen of the United States, resident of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Fireplaces, of which the following is a specification.

My invention has for its object to provide a fireplace heater in which the fire-chamber and the products of combustion flue leading therefrom will be formed in sections and a casing formed of sections and enclosing the fireplace heater and combustion flue and adapted to be set-up or installed in a room, without being set into the brick or masonry constituting the chimney, thus making it possible to form the various parts in the factory and ship them in sections ready for installation and affording a greater radiating heating surface in the room in which installed.

Other objects of the invention will appear from the following detailed description, taken in connection with the accompanying drawings, in which—

Figure 1 is a vertical section and partial elevation on the line 1—1 of Figure 3, looking in the direction of the arrow,

Figure 2 is a horizontal section on line 2—2 of Figure 3, looking in the direction of the arrow,

Figure 3 is a vertical section on line 3—3 of Figure 1,

Figure 4 is a front elevation of the fireplace and its enclosing chamber.

Figure 5 is an end elevation of the structure shown in Figure 4,

Figures 6 and 7 are details of one of the drums forming a part of the conduit for discharge of smoke and products of combustion.

Figure 8 is a horizontal detail section of the corner of the casing,

Figure 9 is an elevation of the lower section of the conduits for the smoke and products of combustion,

Figure 10 is a detail sectional view of one corner of the fire-chamber.

The fireplace chamber is of the usual form and is preferably provided with a base 2 formed of brick or tile, with a rear wall 3, backwardly inclined side walls 4—4, and an inclined top wall 5, at the front of which is preferably located an exit opening 6 communicating with a smoke box 7 forming the lower section of the conduit or flue for the smoke and products of combustion. Said smoke box is preferably provided with a suitable damper 8 by which the opening from the fireplace to the smoke box may be regulated.

The smoke box 7 is preferably in the form of a flattened cone, the lower end being of substantially the width of the fireplace chamber and fitting over the smoke opening 6 of said chamber (Figures 1 and 3). Said smoke box is also preferably provided with a horizontal wall 9, partially closing its lower end, and forming a broad base by which the box is supported upon the top of the fire chamber. A water back 10 is secured to said chamber as hereinafter described. The damper 8 is preferably pivotally secured to the horizontal wall 9 of the smoke box 7 as shown in Figure 3.

The smoke box 7 is preferably formed of copper and made in two longitudinal sections, provided with flanges 11—11, secured together by a series of bolts 12 and nuts 13 (Figure 9). This construction permits said smoke box to be shipped in a nested condition and assembled at the place of erection.

The walls 3 and 4 of the fire chamber are preferably formed of sheet copper, and are provided with flanges 14 between which I prefer to arrange an asbestos strip 15, with strips of band iron 16 arranged outside of the flanges, and bolts 17 provided with nuts 18 holding said parts together (Figure 10).

By using copper sheets for the walls of the fire chamber and for the smoke box the heat is more efficiently radiated from the outer surfaces of said sheets into the surrounding air chamber as hereinafter described, as copper is a good heat conductor. Moreover, the copper sheets are durable and will not rust.

The lower part of the fire chamber may be lined in the customary way with fire clay or other suitable lining. Arranged above the smoke box 7, and forming a continuation of the smoke flue, I preferably provide a series of double conical sheet metal heat radiating drums 19, provided with telescoping end sections 20 and 21 (Figures 6 and 7). Any suitable number of these drums may be employed. I have shown in the drawings five such drums, but a greater or

less number may be used as desired. The upper drum connects with a smoke pipe 22 that leads to a chimney or other suitable smoke flue, by which the products of combustion may be conducted to the outside air.

The products of combustion or hot gases passing from the fire chamber enter the smoke box 7 and pass upward into the lower drum 19. The walls of the smoke box are heated by the said products of combustion. The hot gases expand in each of the drums and heat the drum walls. The heated walls of the smoke box and drums heat the air in the surrounding chamber, as hereinafter described.

Surrounding the fire chamber, the smoke box, drums, and smoke flue, hereinbefore described, I provide an air heating chamber, which is arranged to permit air, either from the room in which the fireplace is located, or from out of doors, or both, to enter the lower part of the chamber and passing upward therein to be heated from the walls of the fire chamber, smoke box and drums, and after being so heated to pass outward into the upper part of the room in which the fireplace is located. By this means the heat from the walls of the fire chamber, smoke box and drums, is transmitted by convection to the room to be heated, which is preferably the room in which the fireplace is located. The room is, therefore, heated directly by radiant heat from the open fire in the fire chamber, and also by convected heat through the air chamber partially surrounding the fire chamber.

The back of the air chamber 23 is preferably formed by a vertical wall 24, which may be a wall of the room in which the fireplace is located. This may be an interior or an exterior wall of the building. In Figures 2 and 3 of the drawings I have indicated an exterior wall of the building as constituting the rear of the air chamber 23. The bottom of the air chamber is preferably formed by the floor 25 of the room in which the fireplace is located, and the top of the chamber by the ceiling wall 26.

The front and end walls of the chamber 23 are preferably formed of removable panels, with the front panels arranged at the sides and above the fireplace opening (Figures 2 and 4).

As here shown I provide upright studs or corner posts 27 for said air chamber 23. These posts may be located so as to provide a chamber 23 of any desired size.

Secured to the posts 27 are the series of imperforate panels 28, each of said panels being preferably composed of an imperforate sheet of wood, asbestos or fiber board 29, or a combination thereof, with a surrounding frame 30. One or more of the panels may be provided with a central section forming a door 31, held in position by suitable hinges 32, and having a knob or handle 33, providing means for closing or opening said door. This door gives access to the interior of the air chamber 23.

I prefer also to provide, at the lower part of the chamber 23, one or more open panels 34 having preferably a wire mesh center 35 permitting air to enter the lower part of said chamber. I also provide near the top of said chamber a corresponding open panel 36 having an open center also preferably covered with a wire mesh center 35.

I may also provide a cold air flue 37 connecting with the lower part of the air chamber 23 (Figure 3). This air flue may be provided with a valve or damper 38, and with a wire mesh covering 39. By means of this damper the amount of cold air entering the lower part of the chamber may be regulated. It will be seen that with this arrangement the air from the room, or from outside, may be permitted to enter the lower part of the air chamber 23, and it will then pass up and come into contact with the fire chamber, the smoke box 7 and the drums 19, and becoming heated in said chamber it will pass out through the open panel into the room to be heated. This may be the room in which the fireplace is located or if preferred this heat may be conducted to any other room or apartment that it is desired to heat.

I also prefer to provide means by which radiators located at any desired point may be heated from the fire chamber, either through water heated by the fire in the fire chamber or by steam generated by said fire. I have shown in the drawings a hot water back 10 located against the upper part of the fire chamber, and provided with water circulating pipes 40, extending to suitable radiators 41, with return pipes 42, extending to said water back. A pipe 46 is designed to be connected to a suitable expansion chamber (not shown).

The radiators may be located at any desired point. I have here shown them located in compartments 43 arranged within the breast of the fireplace, and provided with inlet and outlet openings 44 and 45, for the passage of air through said compartment, and in contact with said radiators. These radiators may, however, without any change in principle be located at any desired points in the room or rooms to be heated.

The smoke box 7 is preferably constructed as shown to provide an expansion space to intercept any wind or downward currents in the smoke flue.

A suitable blower 47 may be arranged to close or partially close the front of the fire chamber. This blower may be suspended and counterbalanced as by cords 48 and

weights 49 so as to be easily moved and held at any desired position.

Suitable means such as a pipe 50 connected to the water back 10 and having a valve 51, may be provided for supplying water to the water heating elements.

The heated air from the air heating chamber may be delivered in whole or in part to one or more other rooms than the one in which the fireplace is located. Conductors with dampers may be arranged to divert the warm air as desired.

The details of the construction may be varied in many particulars without departing from my invention.

I claim as my invention:

1. An open fire-place heater comprising a fire-chamber with an open front and formed of separable plates constituting its side, rear and top walls, a smoke-box in communication with the top of the fire-chamber and separable therefrom, a smoke-flue consisting of a series of independent sections connected with the smoke-box and separable therefrom, all of said parts being formed of heat conducting material, and a casing inclosing the fire-chamber, smoke-box, and smoke-flue, and forming air-chambers at opposite sides and at the rear of the fire-chamber, and around the smoke-box and smoke-flue, and having air inlets in the lower portions of its wall, the structure being adapted to be installed in a room outside of the usual chimney construction.

2. An open fire-place heater comprising a fire chamber having an open front, a smoke-box in communication with the fire-chamber, a smoke-flue connected with the smoke-box, a water heater formed as a part of the open front fire chamber, water circulating and return pipes connected with the water heater, and a casing enclosing the open face fire chamber, smoke-box, smoke flue and water heater and composed of sectional separable panels adapted for installation in a room outside of the usual chimney construction.

3. An open fire-place heater comprising a fire chamber having an open front, a smoke box in communication with the fire-chamber, a smoke flue connected with the smoke-box, a water heater formed as a part of the open front fire chamber, radiators, water circulating and return pipes connecting the radiators and water chamber, and a casing formed of sectional panels enclosing the open face fire chamber, smoke box, smoke flue, and radiators and adapted to be installed in a room outside of the usual chimney construction.

In witness whereof, I have hereunto set my hand this 14th day of November, 1921.

HENRY L. DAY.