May 2, 1939. J. O. BAILEY 2,156,423

GAS HEATER

Filed March 10, 1938

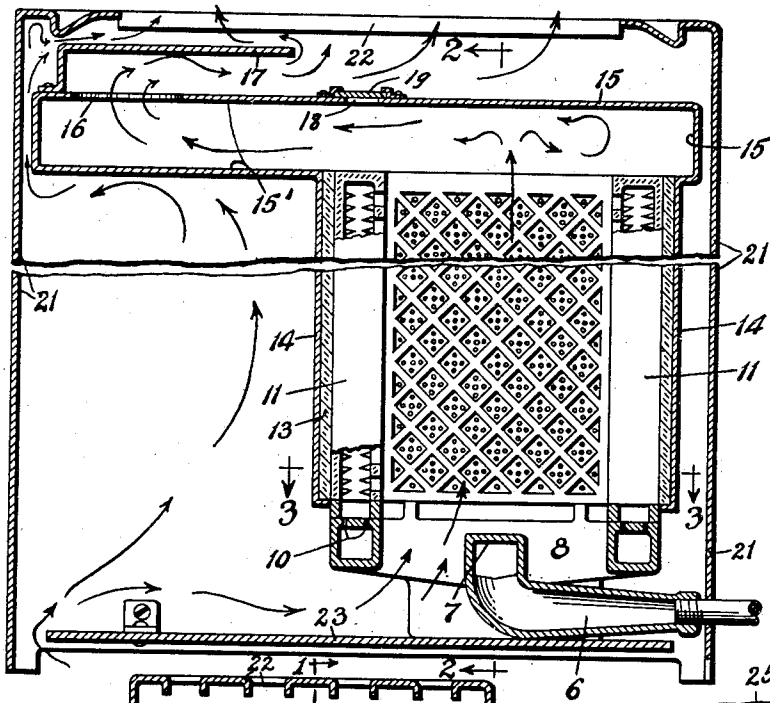


Fig. 1

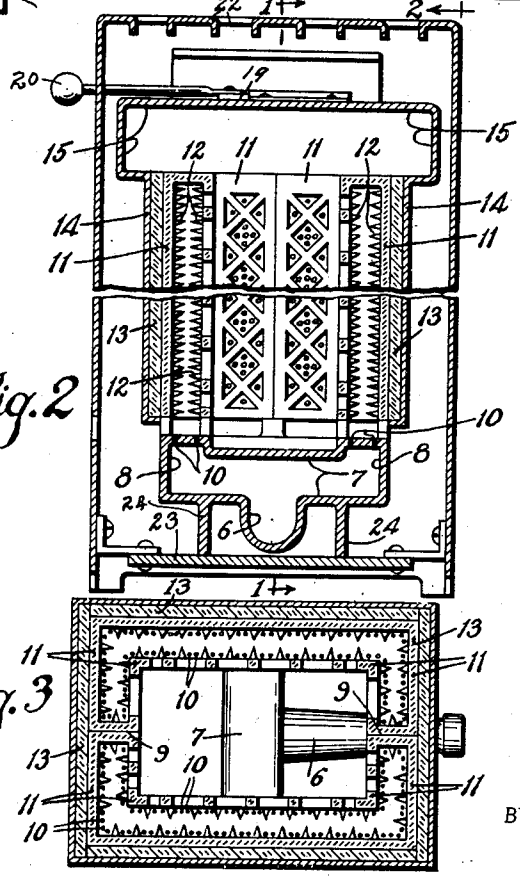


Fig. 2

Fig. 3

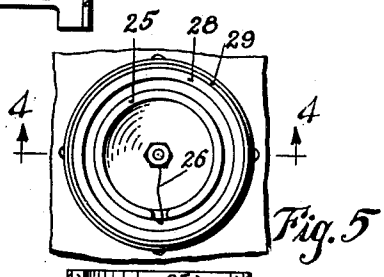


Fig. 5

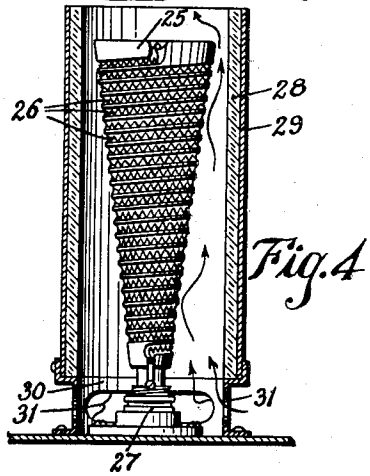


Fig. 4

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GAS HEATER

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6 Claims. (Cl. 126—92)

My invention relates to gas heaters, although the principle involved can be embodied in a heater which is electrically heated.

My invention has as its principal object to provide a heater in the form of an elongated flue or chimney, with a heating medium applied thereto in such a way as to cause an updraft through said flue or chimney of the products of combustion, or of heated air, such current being directed through a circuitous course for the purpose of heating surfaces with which the surrounding and upflowing outside air will be heated before it passes upwardly into the room.

In my preferred embodiment of my invention, I provide a flue of composition radiant elements facing inwardly and forming the wall of such flue or chimney, with a gas burner formed to position the gas jets under the open end of said radiant elements, under the inner, opposite faces thereof, whereby the combustion takes place along the back wall and also along the inside of the front wall, where the usual projections formed in such heating elements become incandescent and this makes for more perfect combustion, the products of combustion being caused to flow upwardly and outwardly into the flue or chimney formed by said surrounding heat elements at greater speed, causing a current of heated products of combustion through a course of travel which heats the drums or conduits through which such products of combustion pass, until they are mixed with such air currents and pass into the room to be heated. By reason of the construction and arrangement there is perfect combustion of the gases before the heat therefrom passes into circulation in the room.

I have also shown how an electrically heated flue or chimney can be substituted for the gas flue or chimney, in the same general structure.

In order to explain my invention more completely, I have shown the same on the accompanying sheet of drawings, which I will now describe.

Figure 1 is a vertical sectional view through a gas heater, embodying my invention, taken on line 1—1 of Fig. 2;

Figure 2 is a vertical sectional view taken through Fig. 1, on line 2—2 thereon;

Figure 3 is a horizontal sectional view taken on line 3—3 of Fig. 1;

Figure 4 is a vertical sectional view taken through an electrically heated flue or chimney unit to be substituted for the gas heating unit; and

Figure 5 is a plan view of the showing in Fig. 4.

Referring now more in detail to the drawing, I have shown a gas burner having a neck portion 6, adapted to be connected with a source of supply of gas, and having a cross portion 7, with the opposite ends of which are two burner heads, as 8, 8, of rectangular form, with their ends brought together, as at 9, whereby to form a square or rectangle, as seen in Fig. 3, with the jet openings, 10, 10, formed in the top surface thereof. This burner casting may be formed as one casting with a continuous or integral square or rectangular head, as may be most practical and economical.

Seated upon said burner head, as best seen in Fig. 3, are two rectangular, composition radiant elements, 11, 11, with their ends brought together, also as at 9, thus forming a flue or chimney of two hollow radiant elements of special formation, to form the flue therebetween, across the bottom of which flue or chimney is seen the cross member 7 of the burner, in Fig. 3.

It will be noted that the gas jet openings 10, 10, are not in the middle of the inside of each radiant element, but said jet openings 10, 10, are directly beneath the oppositely projecting points 12, 12, in the inner opposite faces of each of said elements, as will be clear from Figs. 1, 2 and 3, whereby the gas mixture is discharged upwardly at the opposite inner sides of said composition elements and in contact with said points which become incandescent with the heat.

An insulation 13 surrounds said flue or chimney, and outside of said insulation 13 is a sheet metal case or enclosure, designated 14, and which is formed into an open drum or conduit, as 15, extended to one side, as at 15', Fig. 1, with an opening 16 in its top, and with a deflecting baffle plate 17 extended out over said opening 16, as clearly shown in Fig. 1. An opening 18, in said top is shown directly above one of said radiating elements 11, with a slide closure 19 therefor, and a handle 20, extended out to one side for operation. This affords a view down into the burner to determine when ignited and also for lighting the same.

This structure, thus far described, is shown placed within a housing or outer case, designated 21, adapted to stand upon the floor, as a portable heater, or, as will be understood by those versed in the art, it can be suspended from a floor as a floor furnace, but which form is not here shown. A grate or register 22 is shown, as a top therefor, and up through which the heat and heated air can pass, as indicated by the arrows, Fig. 1. A bottom plate or sheet 23, is shown in Figs. 1 and 2, with space around its edge for air from the floor to pass upwardly through the heater. On this

plate the gas burner is shown rested, as at **24**, Fig. 2.

Thus I have provided a specially formed flue or chimney, the wall of which is formed of the hollow radiant element, the fronts, or inner faces of which are open, as seen in the face views thereof in Figs. 1 and 2, where the side and end faces are shown respectively, and through which to the flue or chimney the products of combustion or heat passes in a direct up draft of increased force. This is one of the objects of the invention, namely: to create a forced up draft or flow of heat because of the flue or chimney form.

In Figs. 4 and 5, I have shown a heating unit, composed of a conical form of composition, designated **25**, with electrical resistance coils **26**, wound spirally thereon, around the outside thereof, and connected at the bottom with a socket member **27**. Around this, and spaced therefrom as shown is an insulation wall, forming the flue or chimney, with the outer metal case, designated **28** and **29**, respectively, and supported on a collar **30**, having air inlet holes **31** therethrough.

A most important feature of my invention is the use as the heating means of a flue structure formed of refractory material, similar to the well known radiant elements, but formed into a square or rectangular flue in cross section, with the double walls, opening inwardly into the flue proper, and having the points or projections within said double wall structure to be heated to incandescent. This makes for more perfect combustion of the gas and causes a definite updraft through said flue structure of the heat currents and products of combustion. The gas burner is also formed in square or rectangular form, with gas jets opening into the lower ends of said double wall structure, near the inside of the back or outer wall and near the inside of the inner wall, whereby to create within the double wall structure intense heat to consume the gas mixture from said burner. This intense heat and updraft of heated air and products of combustion is directed into a drum structure over said flue structure, and through a circuitous course and thence upwardly into the room being heated.

The drum structure is such as to heat the air passing upwardly through the housing, on its way upwardly into the room being heated. The air heated by contact with the outside of the drum structure, is mixed with the heat currents from the flue heater and the drum structure.

While I have shown and described in detail one practical form of my invention, with gas as the heating medium, I am aware that changes in the details of construction and arrangement can be made therein without departing from the spirit thereof, and I do not, therefore, limit my invention to the showing made for explanatory purposes, except as I may be limited by the hereto appended claims.

I claim:

1. A gas heater including a housing having means for air to pass upwardly therethrough, a flue structure of refractory radiant material to form a hollow wall for said flue structure with its inner faces open to the interior of said flue structure, a gas burner formed to underlie the open wall and having gas jet openings upwardly in said hollow wall structure, whereby to heat the inner faces of said double wall structure and create an updraft of heat and products of combustion through the central part of said flue structure, a drum structure over said flue structure to receive said heat current therefrom, said drum structure having lateral extension to form a circuitous passageway for said heat currents from said flue structure upwardly through said housing, said drum structure heating the air passing upwardly through said housing outside of said drum structure.

2. In a gas heater, the combination with a housing and drum structure therein, of a heating means including a flue structure formed of radiant elements of refractory material and having their faces open inwardly to the inside of said flue, a gas burner under said radiant elements to heat the inside thereof and cause the heat and products of combustion to flow upwardly and inwardly into the flue formed by said radiant elements to cause an updraft, said flue discharging into said drum structure, and means for directing air upwardly through said housing and around said drum structure.

3. In a gas heater, a housing having means for passing air upwardly through said housing, a drum structure therein around which and in engagement with which said air passes, a heating member in said housing and constituting a flue structure of radiant elements of refractory material having their open faces forming the inner wall of said flue structure, and a gas burner formed to underlie said elements and having gas jets discharging upwardly within said elements and then inwardly through their open faces into the flue formed thereby and into said drum structure, for heating said drum structure, for the purpose described.

4. A gas heater having a housing with means for causing the circulation of air upwardly therethrough, a flue structure within said housing, said flue structure being of rectangular form in cross section with its outer wall closed and having a lining of hollow refractory radiant elements having their inner faces only open to the flue, a gas burner having gas jets discharging up into said hollow radiant elements and thence inwardly through the inner open faces of said elements into the flue, and an overhanging drum structure open to the upper end of said flue to receive the upflow current of air and products of combustion, substantially as shown.

5. In a gas heater, a heater flue composed of an open ended vertical box-like member, lined with radiant elements of refractory material, open only in their front faces into the interior of said flue, a gas burner having jet openings up into the interior of said radiant elements, substantially as shown, and a heating drum over the upper end of said flue to receive the heat from the inwardly discharging radiant elements, said flue being open at its lower end for the passage of air upwardly therethrough.

6. A heating element for heating and causing circulation of air consisting of a tubular flue of refractory material of relatively small cross sectional area, an air heating medium in said flue, surrounded thereby, and radiating heat wholly within said flue, and means for directing air upwardly through said tubular flue and in contact with said heating medium, said flue being open at its upper and lower ends.

JOHN O. BAILEY.