

June 16, 1942.

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2,286,719

AIR HEATING FURNACE

Filed Jan. 31, 1940

2 Sheets-Sheet 1

Fig. 1.

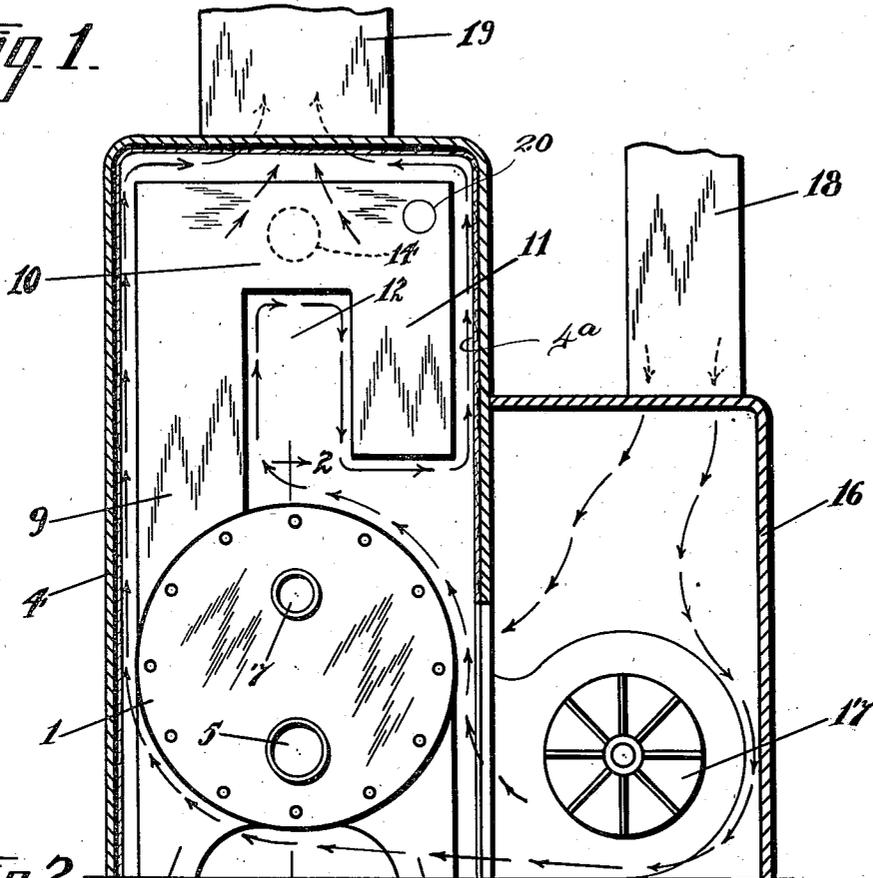
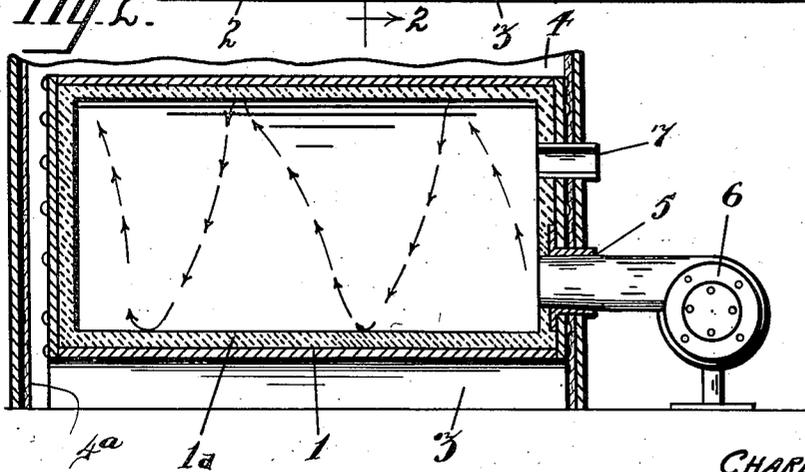


Fig. 2.



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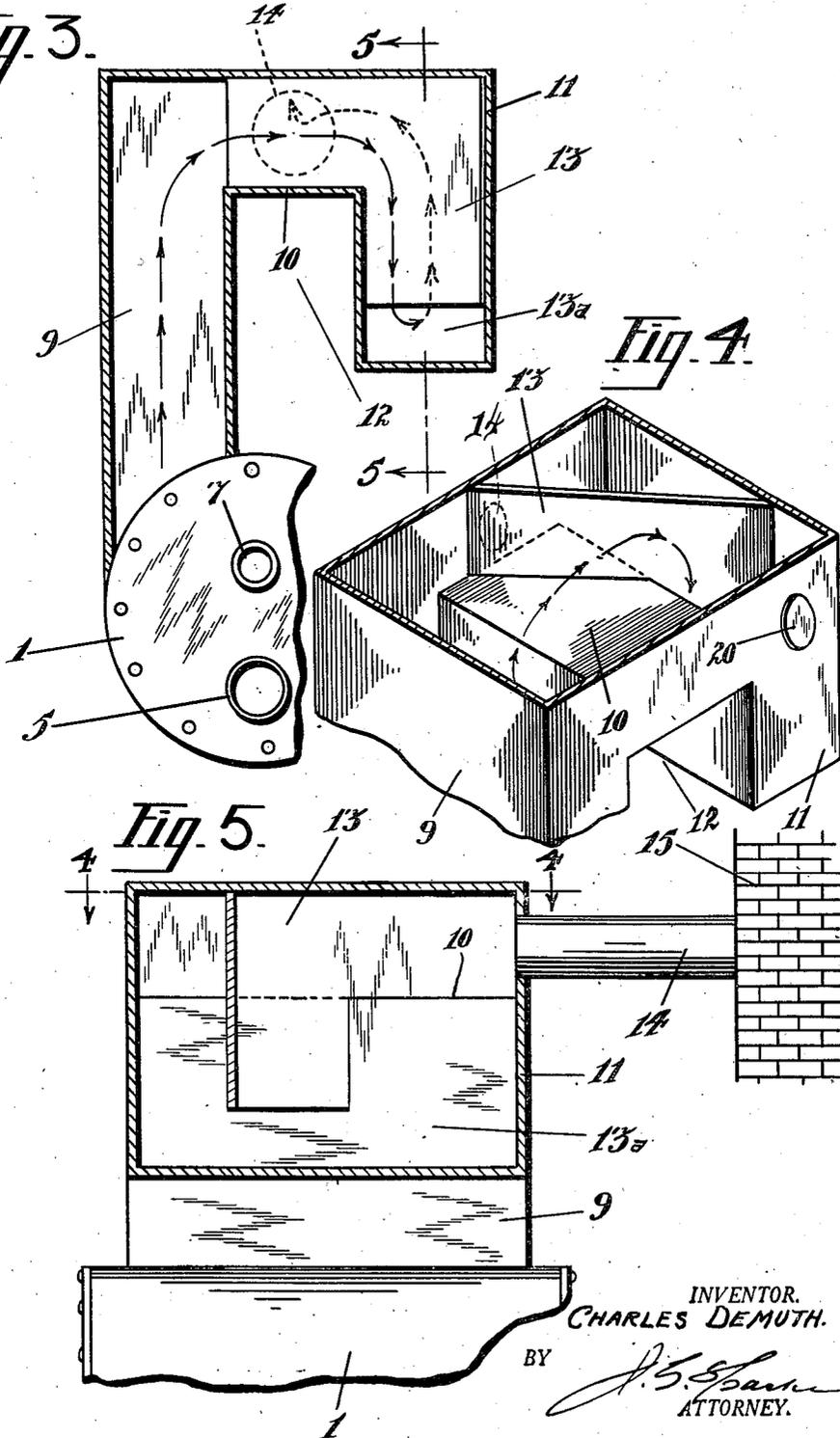
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE

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## AIR HEATING FURNACE

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2 Claims. (Cl. 126—110)

My invention relates to improvements in heating units especially designed for heating the air by direct contact with the walls of the passages for the burnt gases.

The principal object of my invention is to provide a means whereby the flame when thrown into a fire chamber will tend to retard the speed of travel of the hot gases and to retain them within the body for a comparatively long period of time before they are discharged into the flue, and in this manner the walls of the fire chamber are maintained at a high temperature with the consumption of a small amount of fuel. It has been found that heating units constructed as herein described may be successfully and efficiently operated with materially less fuel than other types of heating units at present available.

Another object of my invention is to provide in a heating unit a means whereby the length of travel of the heat from the fire chamber proper to the flue is increased and thereby providing a maximum amount of heating surface.

A further object is to provide a furnace or the like that is extremely compact and economical to construct.

In order to more clearly disclose the invention, reference is made to the accompanying drawings, in which:

Figure 1 is a front elevation of the heating unit with parts of the outer jacket broken away and shown in section.

Figure 2 is a longitudinal view on the line 2—2 of Figure 1.

Figure 3 is a front elevation of the heating unit with the flue member in section.

Figure 4 is a perspective view taken on the line 4—4 of Figure 5, illustrating the distributing or baffle element.

Figure 5 is a longitudinal view taken on the line 5—5 of Figure 3.

Similar reference numerals refer to similar parts throughout the drawings.

In the drawings, 1 is a longitudinal cylindrical fire chamber mounted upon supports 2 and 3 and housed within an external jacket 4. This jacket is preferably lined with some type of insulating material 4A, such as asbestos sheet. The fire chamber 1 has an opening 5 in one end and near the bottom, which is adapted to fit onto the end of an oil burner 6. An opening 7 is provided above the opening 5 for inspection purposes to observe the flame of the oil burner.

The compartment 1 is preferably lined with fire brick or other refractory 1a, and which be-

comes incandescent as a result of the flame from the oil burner.

It will be noted with particular reference to Figure 2, that the use of a cylindrical fire chamber, in which the oil burner flame enters through the round end, is important, because it permits the flame from the oil burner to have a whirling action, as indicated by the arrows. In the old type of oil burners, the flame is thrown into the fire chamber through the cylindrical wall, the whirling action is lost, and a large amount of heat passes directly to the open flue, and in fact some of the oil is never burned at all.

Joined at the top of the cylindrical compartment 1 and spaced from the center thereof is a rectangular flue 9. It has been found that by spacing the flue from the center of the fire box 1 that the flame as it is injected into the fire box will rise to the top thereof and become retarded and not flow directly to the flue. The flame emitted from the nozzle of the burner generally has a helical action, and the cylindrical compartment 1 is especially adapted to permit a continuation of this whirling action. Likewise, the arrangement of the flue 9 tangential to the compartment 1 permits the burned gases to continue this whirling action when passing out of the compartment 1. This whirling action through the cylindrical chamber stirs up all of the oil particles and causes them to burn out entirely within the compartment 1. The cylindrical chamber with the oil burner entering the end is especially adapted to this action, in that there are no pockets in which any of the oil or gas can be caught and left unconsumed. By this means, a greater degree of efficiency in consumption of oil has resulted.

The rectangular flue 9 extends upwardly vertically, and thence turns to connect into the horizontal member 10 and thence into another vertical member 11. This arrangement of members 9, 10, and 11 leaves an opening 12 for a purpose to be described.

Referring to Figures 3, 4, and 5, it will be noted that inside of members 10 and 11 there is an L shaped baffle plate 13 disposed diagonally within said members, as shown clearly in Figure 4. This baffle member 13 acts as a deflector for detouring the gases rising out of the compartment 1, and flowing through the flues 9 and 10 and thence in a downward path to reach the lower part of the member 11, as at 13a, whereupon it rises again on the other side of the baffle to reach the pipe flue 14 and chimney 15.

It will be noted in the foregoing construction

that I have lengthened the heating surface by means of deflecting the gas downward through the member 11 thereby causing the gas to give up practically all of the heat units which are to be transferred to the rooms to be heated.

It will be noted in Figure 1 that I have provided a compartment 16 which houses a fan 17 which draws fresh air through the duct 18 and passes it over the surfaces 1, 9, 10, and 11, and a considerable amount of the air will flow through the opening 12, and thence to the outlet 19. It will be noted that a maximum amount of heating surface has been exposed to the air passed thereover from the compartment 16, in which the blower fan is located. It will also be noted in Figure 1 that I have spaced the unit 1 from the sidewalls and ends, to provide free passage for the air flowing therethrough.

On the upper portion of the member 11 there is provided a covered opening 20 for the purpose of cleaning the flues as desired.

Having described my invention, what I claim is new and desire to secure by Letters Patent is:

1. In a hot air heating furnace, a horizontal cylindrical fire chamber with an oil burner located at the bottom of the front thereof, a heating chamber connecting tangentially thereto in a vertical and upward direction and thence extending in a horizontal and thence in a downward and vertical direction, and a flue connecting

to the rear wall of the said heating chamber, an insulating jacket surrounding the fire chamber and the heating chamber and spaced away therefrom to form a hot air chamber, a blower system attached to the side wall of the said insulated jacket adapted to flow air over the heated surfaces of the said chambers, and an opening in the top of the said insulated jacket for conveying the heated air into a compartment to be heated.

2. In a hot air heating furnace, a horizontal cylindrical fire chamber with an oil burner located at the bottom of the front thereof, a heating chamber connecting tangentially thereto in a vertical and upward direction and thence extending in a horizontal and thence in a downward and vertical direction, baffle means to extend the path of the heated fire gases mounted in the said heating chamber, and a flue connecting to the rear wall of the said heating chamber, an insulated jacket surrounding the fire chamber and the heating chamber and spaced away therefrom to form a hot air compartment, a blower system attached to the side wall of the said insulated jacket adapted to flow air over the heated surfaces of the said chambers, and an opening in the top of the said insulated jacket for conveying the heated air into a compartment to be heated.

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