Dec. 16, 1924. 1,519,673

W. DOBLE

HEATER

Filed Aug. 1, 1921 2 Sheets-Sheet 1

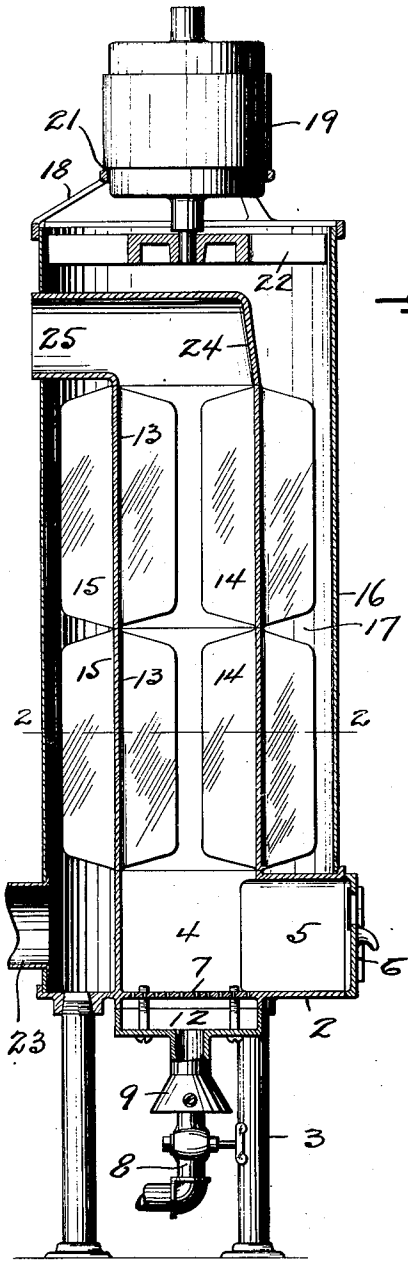
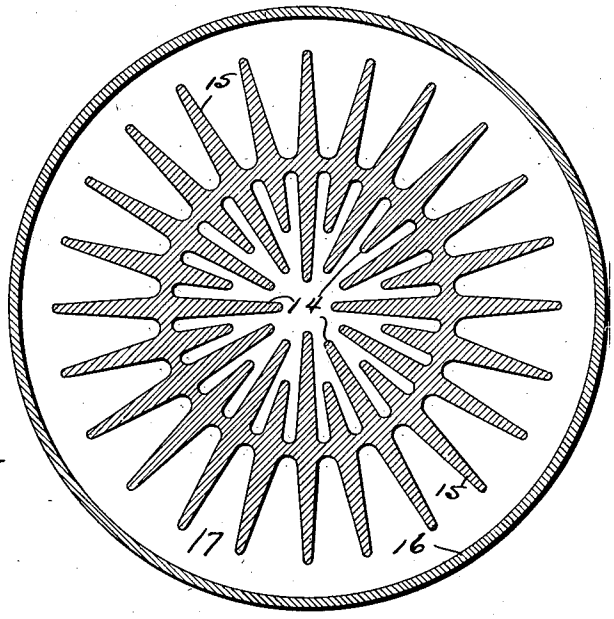


Fig. 1.

Fig. 2.



WITNESS
H. G. Sherburne,

INVENTOR
Warren Doble
BY
White First + Evans.
his ATTORNEYS

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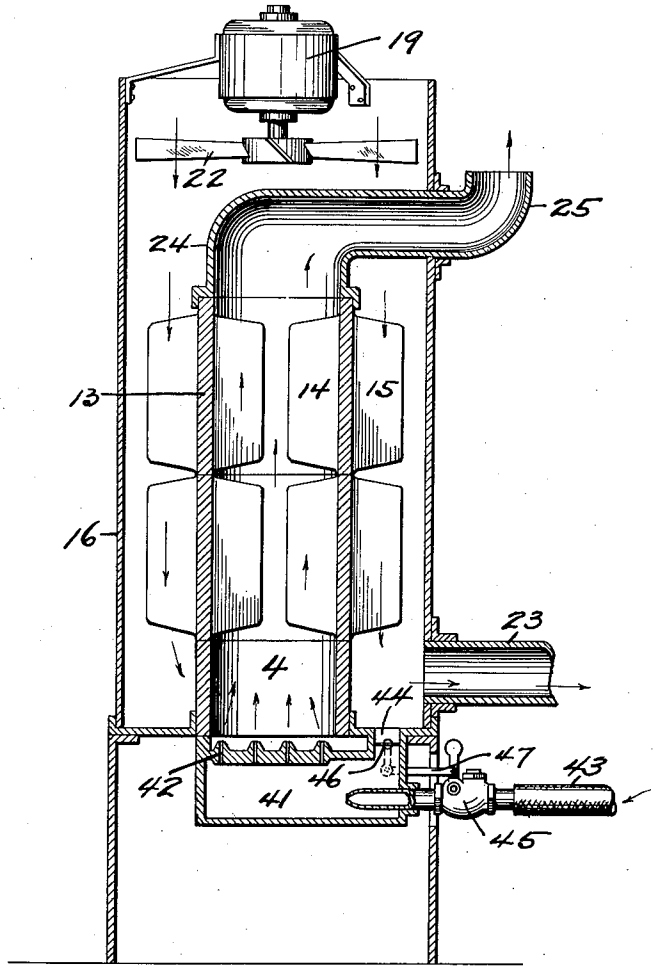

Fig. 3.

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1,519,673

UNITED STATES PATENT OFFICE.

WARREN DOBLE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO DOBLE LABORATORIES, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

HEATER.

Application filed August 1, 1921. Serial No. 489,037.

To all whom it may concern:

Be it known that I, WARREN DOBLE, a citizen of the United States, and a resident of the city and county of San Francisco and State of California, have invented a certain new and useful Heater, of which the following is a specification.

The invention relates to a device for heating air for the heating of homes, dwellings and other places of habitation.

An object of the invention is to provide a small heater having a large air heating capacity.

Another object of the invention it to provide an inexpensive efficient air heater.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where I shall outline in full that form of heater which I have selected for illustration in the drawings accompanying and forming part of the present application. In said drawings, I have shown one form of heater embodying my invention, but it is to be understood that I do not limit myself to such form, since the invention, as set forth in the claims, may be embodied in a plurality of forms.

Referring to said drawings:

Figure 1 is a vertical section of a heater embodying my invention.

Fig. 2 is a cross section of the heater taken on the line 2—2, Fig. 1.

Fig. 3 is a vertical section of a modified form of heater.

The heater of my invention comprises a burner, a highly efficient heat transferring structure, subjected on one side to the air being heated and means for causing the air to flow rapidly over the surface of the heat transferring structure.

The heater shown in Fig. 1 comprises a circular metallic base 2, supported above the floor by suitable legs 3. The base is provided with a cylindrical combustion chamber 4 to which access may be had through the passage 5, which is normally closed by the door 6. The fuel employed in the heater shown is gas, and as the gas burner is disposed below the combustion chamber, the perforated burner plate 7 forms the bottom of the chamber. Gas is admitted through the pipe 8 and air under the conical hood 9 and the air and gas are mixed in the chamber 12, of which the perforated plate forms the top.

Resting on and concentric with the wall of the combustion chamber is the unit 13 of the heat transferring structure of which one or more may be employed. Each unit comprises a hollow metallic cylinder, usually of cast iron, having a plurality of thin, closely spaced fins 14 springing from its inner surface, and a plurality of thin closely spaced fins 15 springing from its outer surface. The fins are radially disposed and the fins 14 are of different lengths so that they divide the gas passage into a plurality of thin passages, thereby causing an efficiently transfer of the heat from the gases of combustion to the metal of the heat transferring structure.

The unit 13 is surrounded by a cylindrical shell 16 resting on the base and spaced slightly from the outer edges of the fins 15, forming an air passage 17 which is divided into a plurality of narrow passages by the fins 15. Resting on the upper end of the shell, is a spider 18 on which is disposed an electric motor 19, the shaft of the motor being vertical and extending into the shell. A felt washer 21 is interposed between the motor and the spider to minimize vibration of the shell. Secured to the lower end of the motor shaft is a fan or propeller 22 which blows air downward through the air passage 17 and out through the hot air discharge conduit 23 at the bottom of the shell.

Arranged on the top of the upper heat transfer unit 13 is a cap 24 having a discharge passage 25 for the gases of combustion, passing through the unit 13. The gas discharge passage is connected to a suitable flue for discharge into the atmosphere. The hot air outlet conduit may be connected to suitable distribution conduits which distribute the heated air to different parts of the house.

The heat of the gases of combustion is transferred from the gases to the fins 14 and conducted by the metal to the fins 15 from which it is transferred to the rapidly moving stream of air. The air and gases pass in opposite directions, so that the gases of combustion give up a very large proportion of their heat before they discharge from the heater. Since the air is forced through the heater under pressure, and is forced through the distributing conduits, the heater

may be placed in any convenient location in the house.

In the construction shown in Fig. 3, air under pressure is introduced into the burner, creating a forced draft, which permits the combustion of a greater amount of fuel and causes a much hotter fire. This feature may be used in connection with the combustion of gaseous, liquid or solid fuel, and in the drawing I have shown it combined with a gas burner. The burner chamber 41 is disposed below the shell 16 as in the other constructions and the combustible mixture passes through the apertures 42 in the burner and is burned in the combustion chamber 4, as previously described. Fuel is introduced into the burner through the conduit 43 and the burner is connected to the interior of the shell at the bottom by the conduit 44, so that air under pressure produced by the fan or blower 22 and heated by contact with the fins 15, is forced into the burner chamber, producing a forced draft, and a very hot fire. The larger portion of the hot air passes from the shell through the conduit 23 and only the desired amount for combustion enters the burner. The size of the fire is controlled by a valve 45 in the fuel conduit 43 and the quantity of air under pressure introduced into the burner is controlled by a butterfly valve 46 in the conduit 44. These valves are preferably connected together by a link 47, so that the valves are movable concurrently, thereby maintaining the quality of the combustible mixture while varying the size of the fire.

I claim:

1. An air heater, comprising a heat transferring structure, a burner arranged to discharge gases of combustion in contact with one side of said structure, means for blowing air in contact with the other side of said structure whereby the air is heated and a conduit for conveying a portion of said heated air to said burner.

2. An air heater, comprising a heat transferring structure, a burner arranged to dischage gases of combustion in contact with one side of said stucture, a shell surrounding said structure, a conduit connecting the burner with the space between the shell and the other side of said structure and means for forcing air under pressure into said space.

3. An air heater comprising a heat transferring structure, a burner arranged to discharge gases of combustion in contact with one side of said structure, means for passing air under pressure in contact with the other side of said structure, a fuel conduit connected to the burner and a conduit for said heated air under pressure connected to the burner.

4. An air heater comprising a heat transferring structure, a burner arranged to discharge gases of combustion in contact with one side of said structure, means for passing air under pressure in contact with the other side of said structure, a fuel conduit connected to the burner, a conduit for said heated air under pressure connected to the burner, and a valve in said latter conduit.

5. An air heater comprising a heat transferring structure, a burner arranged to discharge gases of combustion in contact with one side of said structure, means for passing air under pressure in contact with the other side of said structure, a fuel conduit connected to the burner, a valve in the fuel conduit, a conduit for said heated air under pressure connected to the burner, a valve in said latter conduit and means operatively connecting said valves.

6. An air heater comprising a heat transferring structure, a burner arranged to discharge gases of combustion in contact with one side of said structure, means for passing air under pressure in contact with the other side of said structure, a fuel conduit connected to the burner, a conduit for said heated air under pressure connected to the burner and means for simultaneously varying the flow of fuel and air through said conduits.

7. An air heater comprising a heat transferring structure, a burner arranged to discharge gases of combustion in contact with one side of said structure, means for passing air under pressure in contact with the other side of said structure, a fuel conduit connected to the burner, a conduit for said heated air under pressure connected to the burner and means for simultaneously varying the supplies of air and fuel to the burner through said conduits.

8. An air heater comprising a hollow metallic heat transferring structure having a plurality of fins on its inner and outer surfaces, a burner arranged below the structure to discharge the products of combustion into the interior thereof, a shell surrounding said structure and forming therewith a passage in which the outer fins are disposed, a blower arranged to force air under pressure through said passage and a conduit connecting said passage with the burner.

In testimony whereof I have hereunto set my hand.

WARREN DOBLE.