

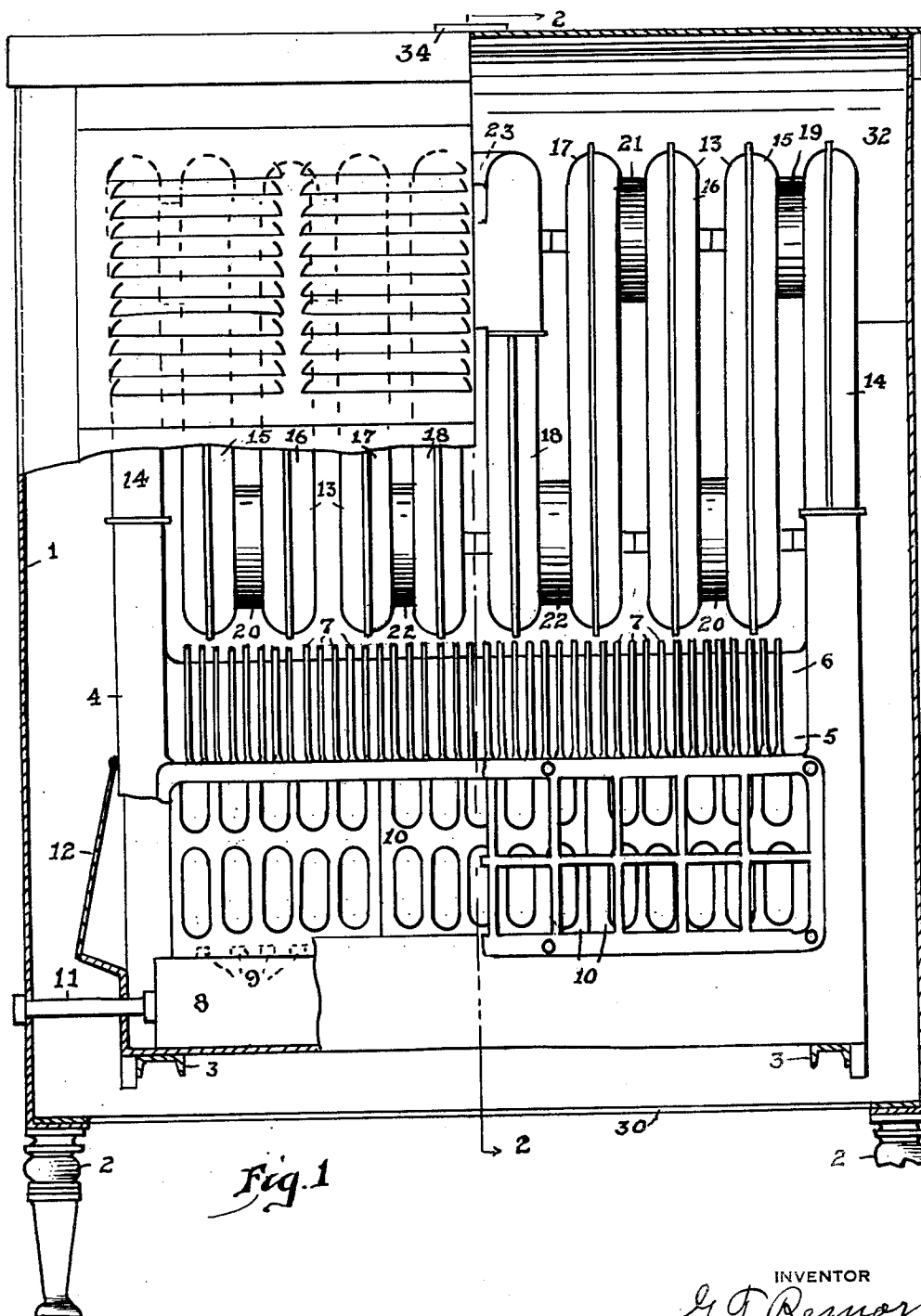
Jan. 9, 1934.

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1,942,936

GAS HEATER

Original Filed April 12, 1932 2 Sheets-Sheet 1



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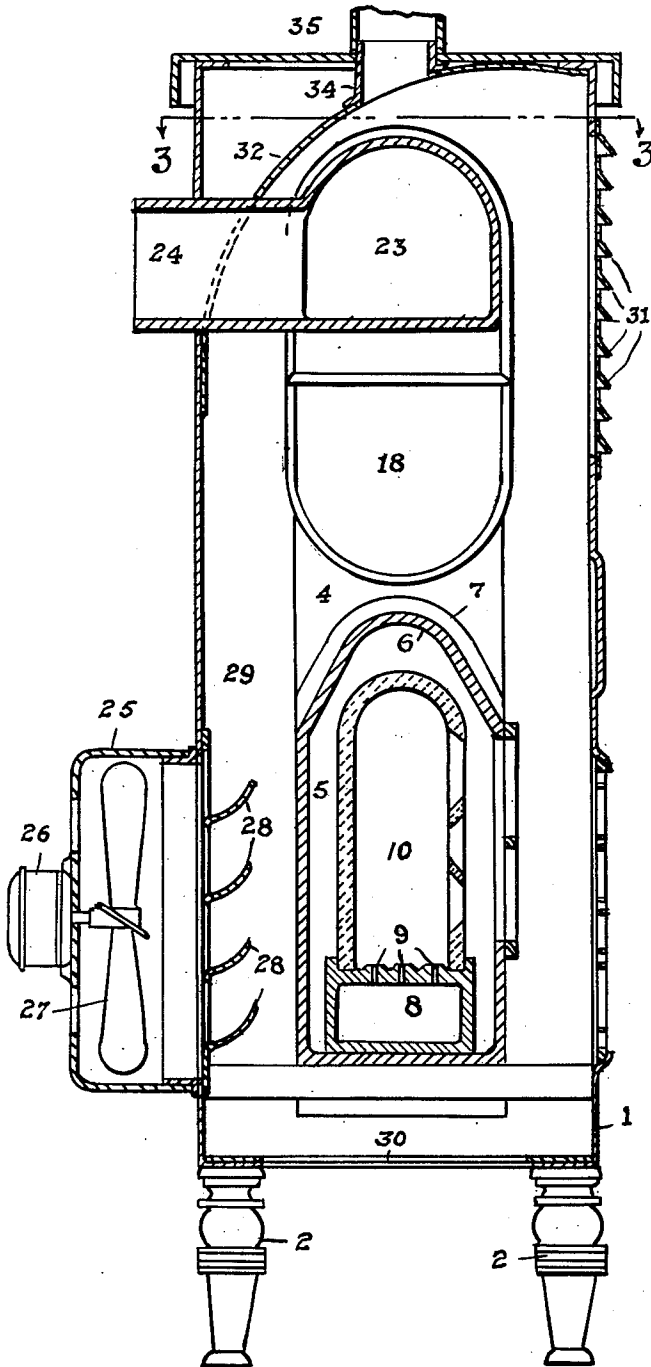


Fig. 2

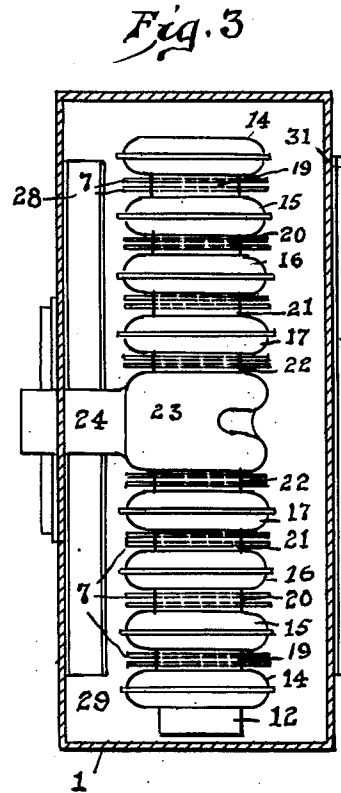


Fig. 3

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UNITED STATES PATENT OFFICE

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GAS HEATER

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a corporation of Pennsylvania

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6 Claims. (Cl. 126—90)

My invention relates to gas heaters.

Some of the objects of this invention are to provide in compact form a gas heating appliance of large capacity which is fully vented, to maintain an extremely high degree of efficiency and to provide means to apply forced air circulation or gravity circulation, as desired, in a simple and effective manner. Another object is to provide means whereby forced air circulation is so directed that it will come into contact with the heating surfaces. It is also an object that the means for circulating the air shall not restrict the use of the heater when the circulation depends upon gravity alone.

Referring to the accompanying drawings, Fig. 1 is a front elevation of my gas heater with parts broken away to show the interior structure. Fig. 2 is a vertical section on the line 2—2 on Fig. 1. Fig. 3 is a section on the line 3—3 on Fig. 2.

I provide a casing or jacket 1 supported by the legs 2. The jacket is provided with the horizontal channel bars 3 upon which the heating unit 4 rests.

The heating unit will be first described. It has the combustion chamber 5 extending nearly from one end of the jacket to the other. The chamber has the arched roof 6, the arched structure being concave on its underside. This roof covers the entire combustion chamber and the arch extends longitudinally of the jacket. The upper face of the roof 6 is provided with transverse fins 7 for facilitating the radiation of heat transmitted from the chamber 5 to the roof 6. The lower portion of the combustion chamber 5 contains the burner 8 with the ports 9 as shown in Fig. 2. Radiants 10 rest upon the top of the burner as shown in Fig. 2 and are arranged side by side throughout the length of the chamber 5. Gas is fed to the burner through the pipe 11. 12 is a door permitting access to the chamber 5.

Above the chamber 5 are two flues 13 having somewhat a serpentine or zig-zag shape. Each flue 13 is shown composed of the vertical pipes 14, 15, 16, 17, and 18. As the flues 13 are alike, only one need be described. The pipe 14 is connected through the roof 6 into one end of the chamber 5 and rises vertically therefrom. The upper end of the pipe 14 is connected to the upper end of the pipe 15 by the cross-pipe 19 and the lower end of the pipe 15 is connected to the lower end of the pipe 16 by the cross-pipe 20. The upper end of the pipe 16 is connected to the upper end of the pipe 17 by the cross-pipe 21 and the lower end of the pipe 17 is connected to the lower

end of the pipe 18 by the cross-pipe 22. The upper ends of the two pipes 18 are arranged near each other in the center of the jacket above the roof 6 and open into the off-take chamber 23 from which the waste products of combustion are conducted through the flue 24. Thus the serpentine or zig-zag flues 13 arise from the combustion chamber through the roof at each end and gradually approach each other until they reach the chamber 23.

The jacket 1 carries at its lower rear side the fan-casing 25 which supports the motor 26 for driving the fan 27 in the casing 25. The jacket has a number of openings opposite the fan provided with horizontal louvres 28 which enter the space 29 between the unit 4 and the jacket. These louvres curve upwardly as they extend into the jacket so as to direct air from the fan against the heating unit 4 and upwardly so as to abstract heat from the heating unit and create an upward suction in the jacket to cause air to flow upwardly into the jacket through the open bottom 30 of the jacket. The heated air escapes principally through openings in the upper front part of the jacket which are preferably provided with louvres 31 projecting preferably forwardly beyond the front face of the jacket.

It is to be noted that the space between the heating unit and the jacket is rather narrow so as to bring practically all of the ascending air into contact with the heating units and particularly with the serpentine flues 13. Thus, I have provided means whereby my fan with its louvres 28 acts as an injector pulling the air from the bottom of the heater up through the heating unit and around the same. When the fan is not operating the natural rising of the heated air flows up through the bottom and around the heating unit and through the plates which form the louvres 28.

In the construction described, an unusually long flue travel for the space taken up has been provided. An exceptionally large amount of heating surface exists of the arrangement of the heating surfaces so that they are all intimately in contact with the air to be heated. I have provided a minimum resistance to air flow which accounts for the high efficiency of this heater. The vertical up and down direction of the products of combustion in the flues 13 retards the speed of the flue products as well as lengthens the distance that these products must travel before reaching the outlet pipe 24. This makes it possible for the heat of the products of com-

bustion to be taken up and given off efficiently by the surfaces of the tubes. The finned hood which also runs over the full length of the combustion chamber adds very materially to the effectiveness of the heater. I prefer to project the heated air forwardly from the jacket rather than to project it upwardly through the top of the jacket. This construction prevents the accumulation of black streaks on the walls immediately above the heater, and also directs heated air horizontally giving greater diffusion of the heated air with the room air before it rises to the ceiling.

In order to direct the heated air forwardly toward the louvres 31, I prefer to place the upwardly and forwardly curved baffle or guide 32 to direct the heated air to the top of the jacket and beneath the cap or top 33. The top 33 preferably has an opening to receive the outlet pipe 34 having its lower end attached to the guide 32. The pipe 34 may be provided with a pipe or flue 35 leading to any desired place to be heated, for example, a room above that in which a heater is.

I claim:

1. In a gas heater, a heating unit comprising a combustion chamber, gas burners in the same, a flue connected into the upper portion of each end of the chamber to carry therefrom the products of combustion, each flue being composed of a series of vertical pipes connected at alternate ends with cross-pipes, the vertical pipes and the cross-pipes forming two continuous serpentine-like conduits extending toward the central portion of the heater, and a common off-take flue connected to the ends of the flues conduits at the said central portion of the heater.

2. In a gas heater, a heating unit comprising a combustion chamber, gas burners in the same, a flue connected into the upper portion of each end of the chamber to carry therefrom the products of combustion, each flue being composed of a series of vertical pipes connected at alternate ends with cross-pipes, the vertical pipes and the cross-pipes forming a continuous serpentine-like conduit, and an off-take flue connected to the ends of the flues most remote from their connection with the combustion chamber, in combination

with a jacket open at its bottom and inclosing the unit, a vertical fan at the lower rear side of the jacket, louvres on the inner wall of the jacket and in front of the fan curved upwardly and inwardly to direct air into contact with the unit and up along the same, and means in the upper part of the jacket to permit the heated air to escape from the jacket.

3. In a gas heater, a jacket with its lower end open, a heating unit in the jacket close to the walls of the jacket, a fan arranged at the lower portion of one side of the jacket, and louvres adjacent to the fan and in the space between the unit and the jacket, the louvres being shaped and arranged to direct air from the fan against the unit and up between the unit and the jacket, thereby creating suction drawing in air from the open lower end of the jacket.

4. In a gas heater, a jacket, a heating unit therein, a fan at the lower portion of the jacket to force air horizontally into the jacket, louvres to direct air upwardly from the fan and along the heating unit, louvres in the upper portion of the jacket and in the side thereof opposite the fan, and means to guide upwardly-directed air at the upper end of the jacket on a curved path to the louvres.

5. In a gas heater, a jacket, a fan arranged to blow air horizontally through an inlet in one side of the jacket and near the lower end thereof, a heating unit positioned within the jacket and opposite the fan and also at a higher level than the fan and separated from the sides of the jacket, louvres extending into the jacket and opposite the fan to direct air upwardly into contact with the heating unit, and louvres in the upper end of that side wall of the jacket which is opposite the said inlet.

6. In a gas heater, a jacket with its lower end open, a heating unit in the jacket close to the walls of the jacket, a fan arranged at the lower portion of one side of the jacket, and louvres adjacent to the fan, the louvres being shaped and arranged to direct air from the fan against the unit and up between the unit and the jacket, thereby creating suction drawing in air from the open lower end of the jacket.

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