

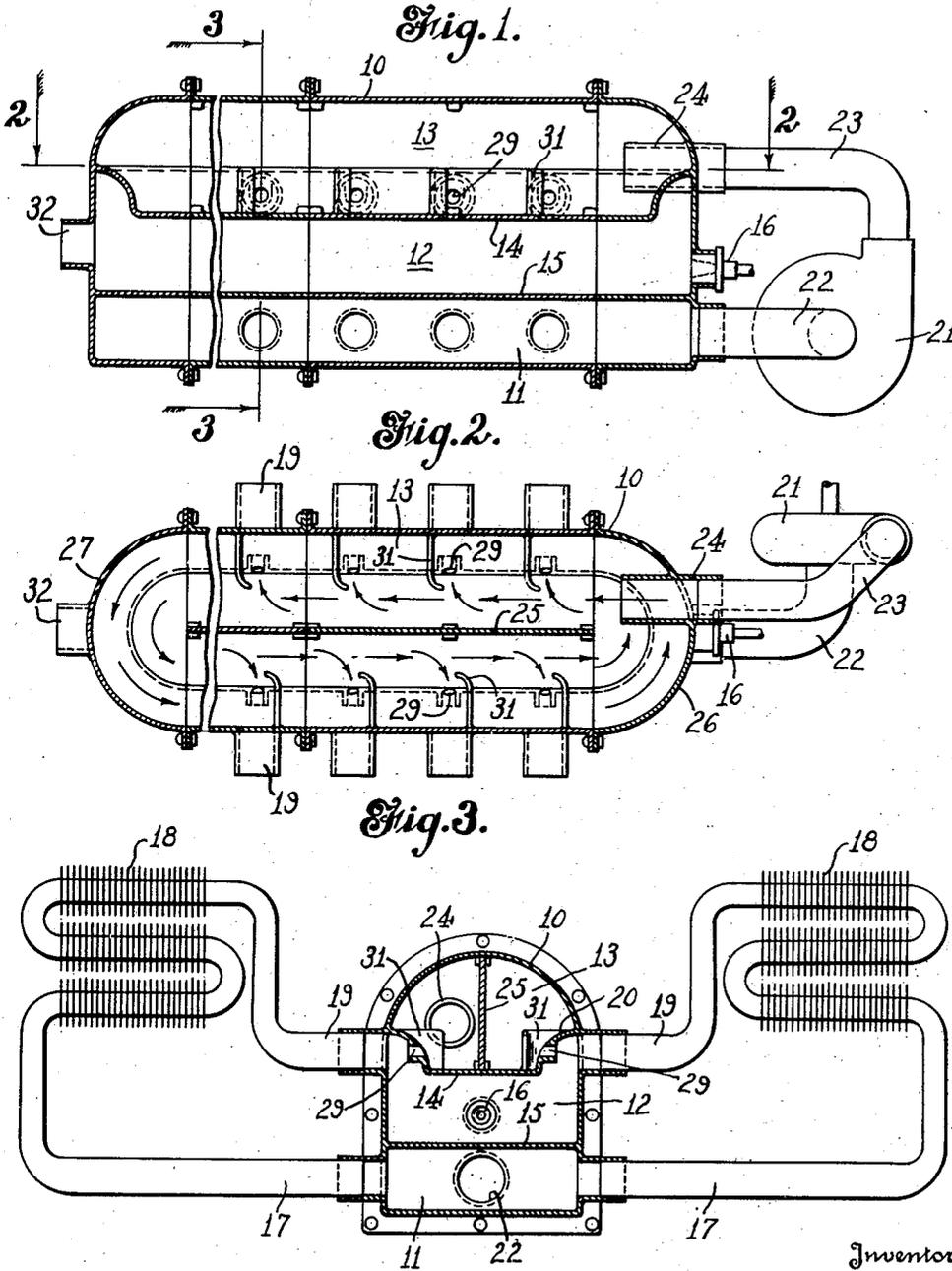
Oct. 25, 1949.

T. A. HOLMBERG

2,486,160

HEATING SYSTEM

Filed Sept. 20, 1947



Inventor

Theodore A. Holmberg

By *Gockwiler & Buchholz*
Attorneys

UNITED STATES PATENT OFFICE

2,486,160

HEATING SYSTEM

Theodore A. Holmberg, Stamford, Conn.

Application September 20, 1947, Serial No. 775,171

5 Claims. (Cl. 237-53)

1

This invention relates to heating systems, and more particularly to a system for distributing hot gases through radiators or the like, the gases being the products of combustion of the furnace.

In the usual hot air furnace, for example, air is heated by the firebox, and this air is distributed through the rooms of a building or other space to be heated. As the air is released or circulated in the heating chambers, the combustion chamber is usually tightly sealed from the air-circulating system, so that the products of combustion will not enter the latter.

In the present invention, however, it is proposed to circulate the products of combustion through a circulating system, including radiators or heat-distributing elements, which are positioned in the room or chamber to be heated. Means are provided for positively effecting circulation of the heated gases through the system, and, as additional combustion air must be supplied to the furnace burner when the latter is in operation, exhaust or vent means are provided to allow a portion of the inert or combustion gases to escape.

The device may be used to heat rooms, for example, or may be used industrially to heat any desired space or chamber. It is contemplated that the heater unit will be so constructed that it may be used as a central heating system to supply a plurality of radiators, so that the heat produced by the furnace may be conveyed to a plurality of rooms or other chambers. The device is so arranged that the heat will be evenly distributed to the radiators regardless of the position of the outlet openings of the central furnace with respect to the burner or with respect to the circulating means.

One object of the present invention is to provide a generally improved burner of this class which will be exceedingly simple and efficient in use.

A further object of the invention is to provide an improved central heating unit adapted to circulate the products of combustion to a plurality of radiators which may be located at distant points.

Still another object of the invention is to provide for efficient and even circulation of the hot gases, including the products of combustion to the various circuits leading to the several radiators supplied from the central heating unit.

Other objects of the invention reside in the improved construction of the central heating unit, so as to improve its efficiency in recirculating the inert gases through the system, these gases

2

being heated by their passage through the furnace, together with the hot products of combustion entrained by the inert gases during the circulation of the latter.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a vertical sectional view of a heating unit embodying my invention;

Fig. 2 is a sectional view on line 2-2 of Fig. 1; and

Fig. 3 is a transverse sectional view of the heating unit on line 3-3 of Fig. 1, with certain of the radiators and circulating conduits connected thereto, shown diagrammatically.

As illustrated in the drawings, the invention comprises a furnace designated by the numeral 10, the furnace being divided, generally speaking, into three horizontal compartments or chambers 11, 12 and 13 by generally longitudinal partitions 14 and 15.

The chamber 12 is the combustion chamber, and a burner 16, shown diagrammatically in Fig. 1, is mounted in a wall of the combustion chamber, so that it discharges combustion air and fuel thereinto to be burned in this chamber in the usual manner. The chamber 11 comprises the return chamber for the hot circulated gases, and a plurality of pipes 17 extend from each side of these chambers and each leads to a radiator 18, shown diagrammatically in Fig. 3, these radiators being disposed in the rooms or chambers to be heated.

The circulated hot gases are delivered to the radiators 18 through conduits 19 which communicate with the upper portion of the combustion chamber 12 of the furnace, as shown, for example, in Fig. 3. It will be noted at this figure that, adjacent its side edges, the partition 14 is curved upwardly, as shown at 20, so as to provide for the inlet openings of the conduits 19 to be positioned horizontally opposite the lower portion of the hot air chamber 13.

A circulating pump or fan is shown at 21 in Figs. 1 and 2, the inlet 22 of this fan being connected with the lower chamber 11 of the furnace, and the outlet pipe 23 of the circulator being connected with the upper hot air chamber 13 through the nipple 24, this nipple, as shown particularly in Figs. 2 and 3, being positioned at one side of the central vertical plane of the chamber 13.

Mounted in the chamber 13 is a central vertical partition member 25 which divides the chamber 13 into two parts, except at the end portions of

the chamber, the partition member being of less length than the chamber, and at its ends being spaced from the rounded end walls 26 and 27 of the chamber 13. It will be noted, from Fig. 2 of the drawings, that with this construction the gases delivered to the chamber 13 by the fan through the nipple 24 will pass down upon one side of the partition 25, as indicated by the arrows, and then pass along the rounded end 27 of the chamber and back toward the nipple 24 at the other side of the partition 25.

A plurality of injector or discharge openings 29 are provided in the upwardly curved portions 20 of the partition 14, one of these openings lying opposite the mouth of each of the pipes 19, so that the gases driven through the discharge openings 29 by the fan 21 will pass directly into the conduits 19 to be carried to the radiator. It will also be apparent from Fig. 3 of the drawings that, in the passage of this gas from the openings 29 to the conduits 19, it will pass through the upper portion of the combustion chamber 12 and entrain hot combustion gases from the chamber 12, carrying these gases to the radiators to heat the latter.

As shown more particularly in Fig. 2 of the drawing, baffles 31 are provided within the chamber 13 adjacent each of the discharge openings 29, so that a part of the gases will be directed through each of the openings 29, these baffles insuring an even delivery of the hot gases to the various discharge openings. This result is, of course, aided by the partition 25 which provides for circulation of the gases from the fan 29 down one side of the partition 25 and back along the other side. Thus, all of the radiators connected to the central outlet will be evenly and positively supplied with hot gases.

Due to the fact that additional air and fuel is continuously introduced into the combustion chamber when the furnace is in operation, provision must be made for the escape or venting of an equal amount of gas from the system to prevent building up excessive pressures. A vent opening may be arranged for this purpose in any suitable place, the opening being shown at 32 at one end of the combustion chamber.

It will also be noted that the partition 14, being above the flame of the burner 16 and the hot gases resulting from the combustion of the fuel, will be maintained at a high temperature. This will preheat the gas delivered into the chamber 13 by the fan 21, which will have been cooled to some extent by its passage through the radiators. Likewise, the partition 15 will be heated by the combustion of the fuel and the gases resulting therefrom, and will serve to preheat to some extent the gases returned to the chamber 11 by the return pipes 17 leading from the radiators. Thus, the recirculated air will be heated by its passage through the chambers 11 and 13 in addition to the heat which will be gained by the entraining of the products of combustion as the recirculated gases pass through the discharge openings 29 into the pipes 19.

With the burner 16 and impeller 21 in operation, it will be apparent that hot gases will be circulated through the radiators 18, returning to the return chamber 11 through the conduits 17, and then after being preheated in this return chamber carried to the supply chamber 13 by the impeller 21. These gases will be directed along one side of the partition 25 and return in the opposite direction along the other side thereof, a portion of the gases being directed by the

curved baffles 31 through each of the discharge or injector openings 29. In the circulation of the gases through the chamber 13, they will again become preheated by the heat from the combustion chamber 12.

In the passage of the gases through the openings 29 to the conduits 19, hot combustion gases existing in the chamber 12 will be entrained in the flow of gases through the upper part of the combustion chamber 12 and be carried to the radiators along with the preheated gases in the supply chamber 13. At the same time, the combustion chamber will be vented by the vent 32, so that an excessive pressure will not build up in the system.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claims.

What I claim is:

1. In a heating system, a furnace having a combustion chamber, a supply chamber thereabove to be heated thereby, a plurality of radiators, supply and return conduits connecting said radiators and supply chamber, means to effect a circulation of gases through said conduits, means to entrain gases from the combustion chamber into the circulated gases between the supply chamber and the supply conduits, said means comprising discharge openings in the supply chamber, each of said openings leading into the combustion chamber and being directed toward the inlet of one of said supply conduits, said discharge openings being arranged at each side of the supply chamber, a partition in the supply chamber spaced at its ends from the ends of the chamber, and said return conduits communicating with said supply chamber at one side of said partition.

2. In a heating system, a furnace having a combustion chamber, a supply chamber thereabove to be heated thereby, a plurality of radiators, supply and return conduits connecting said radiators and supply chamber, means to effect a circulation of gases through said conduits, means to entrain gases from the combustion chamber into the circulated gases between the supply chamber and the supply conduits, said means comprising discharge openings in the supply chamber, each of said openings leading into the combustion chamber and being directed toward the inlet of one of said supply conduits, said discharge openings being arranged at each side of the supply chamber, a partition in the supply chamber spaced at its ends from the ends of the chamber, said return conduits communicating with said supply chamber at one side of said partition, and baffles in said supply chamber adjacent said discharge opening to direct the gases therein.

3. In a heating system, a furnace having a combustion chamber, a supply chamber thereabove, a return chamber below the combustion chamber, a plurality of radiators, a supply conduit leading from the furnace to each of said radiators, a return conduit leading from each of said radiators to the return chamber, an impeller having its intake connected to said return chamber and its outlet connected to said supply chamber, said supply conduits leading from a part of the combustion chamber, and said supply chamber being provided with discharge openings directed through a part of the combustion cham-

5

ber toward the inlet of said supply conduits but spaced therefrom so as to entrain combustion gases in the combustion chamber.

4. In a heating system, a furnace having a combustion chamber, a supply chamber there-
 5 above, a return chamber below the combustion chamber, a plurality of radiators, a supply conduit leading from the furnace to each of said radiators, a return conduit leading from each
 10 of said radiators to the return chamber, an impeller having its intake connected to said return chamber and its outlet connected to said supply chamber, said supply conduits leading
 15 from a part of the combustion chamber, said supply chamber being provided with discharge openings directed through a part of the combustion chamber toward the inlet of said supply conduits but spaced therefrom so as to entrain combustion
 20 gases in the combustion chamber, and a baffle in said supply chamber adjacent each of said discharge openings to direct the gases thereinto.

5. In a heating system, a furnace having a combustion chamber, a supply chamber there-
 25 above, a return chamber below the combustion chamber, a plurality of radiators, a supply conduit leading from the furnace to each of said radiators, a return conduit leading from each of
 30 said radiators to the return chamber, an im-

6

peller having its intake connected to said return chamber and its outlet connected to said supply chamber, said supply conduits leading from a part of the combustion chamber, said supply chamber being provided with discharge openings directed through a part of the combustion chamber toward the inlet of said supply conduits but spaced therefrom so as to entrain combustion gases in the combustion chamber, the outlet of
 10 said impeller leading into the supply chamber at one side thereof, and a partition in said chamber spaced at its ends from the ends of the chamber whereby the gases delivered to the supply chamber by the impeller will pass down one
 15 side of the chamber and in a reverse direction along the other side of the chamber.

THEODORE A. HOLMBERG.

REFERENCES CITED

20 The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
25 810,974	Perkins -----	Jan. 30, 1906
1,711,273	Manker -----	Apr. 30, 1929
2,110,209	Engels -----	Mar. 8, 1938