March 11, 1947. H. COHN 2,417,103

GAS-FIRED UNIT HEATER

Filed April 1, 1943 2 Sheets-Sheet 1

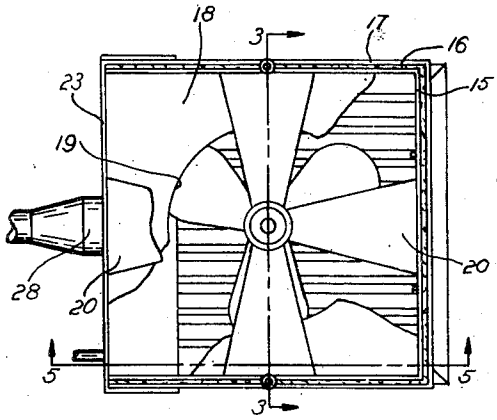


Fig. 1

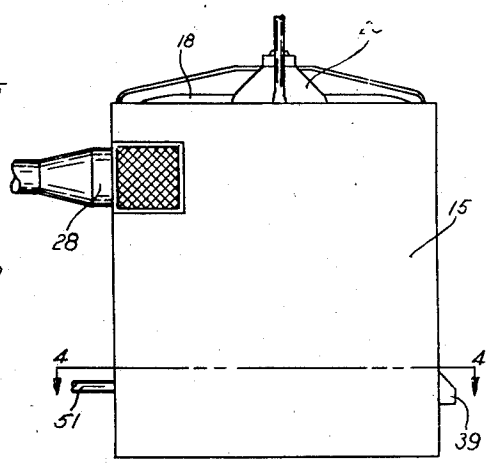


Fig. 2

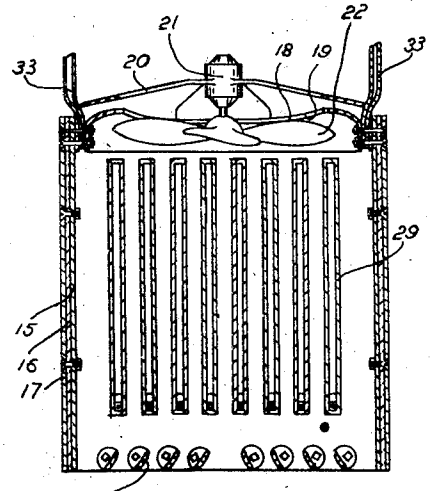


Fig. 3

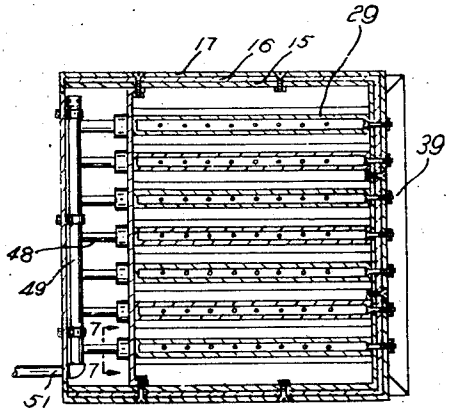


Fig. 4

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GAS-FIRED UNIT HEATER

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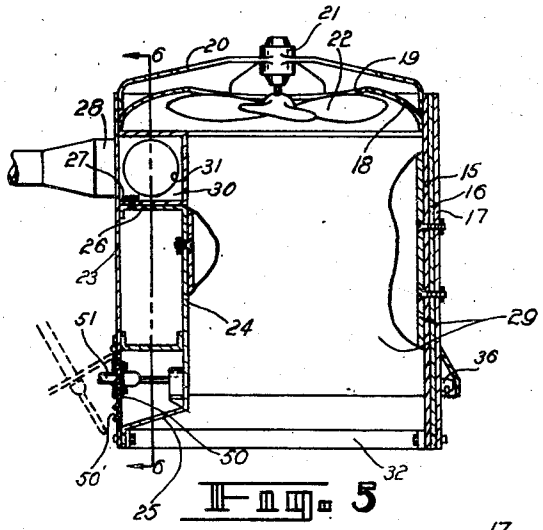


Fig. 5

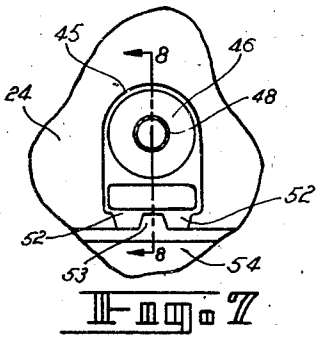


Fig. 7

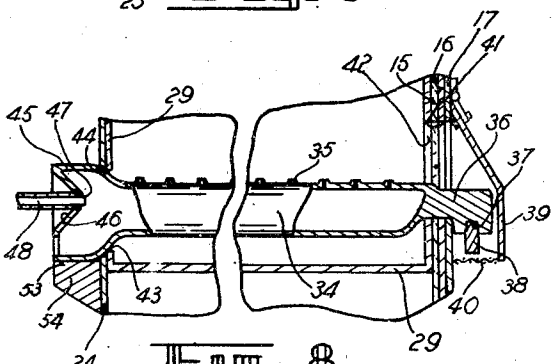


Fig. 8

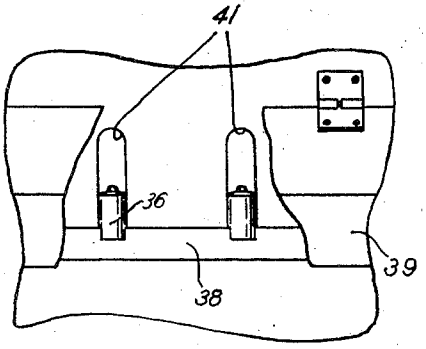


Fig. 9

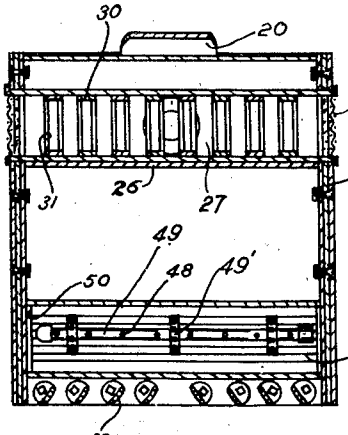


Fig. 6

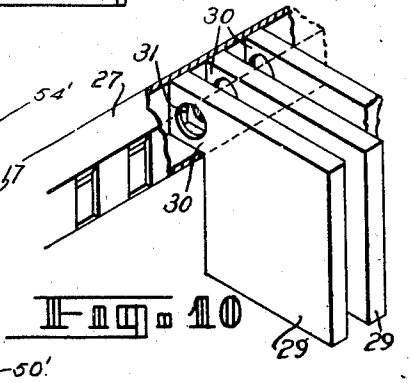


Fig. 10

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Patented Mar. 11, 1947

2,417,103

UNITED STATES PATENT OFFICE

2,417,103

GAS-FIRED UNIT HEATER

Henry Cohn, Detroit, Mich.

Application April 1, 1943, Serial No. 481,487

4 Claims. (Cl. 126—116)

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My invention relates to a new and useful improvement in a unit heater used for heating purposes and in which air is driven through and around the heating unit for effecting the heat transference.

It is an object of the present invention to provide a unit heater so constructed and arranged that there is a counterflow between the heating gases and the driven air.

Another object of the invention is the provision of gas fired unit heaters so constructed and arranged that the driven air travels downwardly through the heating unit while the heating gases are combusted at the lower part of the heating unit and exhausted from the top thereof, thus effecting a counterflow.

Another object of the invention is the provision in a unit heater of a plurality of heat exchangers so constructed and arranged that each heat exchanger serves as a combustion chamber for the gases which are delivered thereinto at the lower part thereof and ignited, with the exhaust gases being led off from the upper part of the heat exchanger.

Another object of the invention is the provision in a unit heater of an exhaust manifold open to the atmosphere at its opposite ends.

Another object of the invention is the provision of a unit heater embodying a plurality of heat exchanger and an exhaust manifold so constructed and arranged that each heat exchanger is independently mounted and quickly positioned in communication with the exhaust manifold.

Another object of the invention is the provision of a unit heater free from expansion joints and so constructed and arranged that it will not be affected by vibration.

Another object of the invention is the provision of a unit heater so constructed and arranged that the center of gravity acts centrally about the hangers, therefore, imparting no load to the gas line connection.

Another object of the invention is the provision of a unit heater so constructed and arranged that it has no front or rear construction, thus adapting it for mounting in any available space.

Another object of the invention is the provision of a unit heater so constructed and arranged that all of the parts are easily and quickly accessible and may be easily and quickly removed and replaced independently of the other parts.

Another object of the invention is the provision of a unit heater having the air-forcing fan mounted in a horizontal plane so that the vertical

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outlet of the air is accomplished without the use of outlet nozzles or ninety-degree elbows.

Another object of the invention is the provision of a unit heater having a novel type of mounting of the burners.

Another object of the invention is the provision of a construction whereby the burners may easily and quickly be rendered accessible and independently removed and replaced.

Another object of the invention is the provision of a unit heater having a nozzle-centering device constructed at the entering end of each burner by means of a guide wall shaped similar to a funnel, thereby making perfect alignment of burner and jet.

Another object of the invention is the provision of a unit heater which will be compact, durable, free from undesirable noises, and highly efficient in use.

Other objects will appear hereinafter.

It is recognized that various modifications and changes may be made in the detail of structure illustrated without departing from the spirit of the invention, and it is intended that such shall be embraced within the scope of the claims forming a part hereof.

Forming a part of this specification are drawings in which:

Fig. 1 is a top plan view with parts broken away.

Fig. 2 is a side elevational view of the invention.

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

Fig. 4 is a sectional view taken on line 4—4 of Fig. 2.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 1.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 5.

Fig. 7 is a fragmentary enlarged view taken on line 7—7 of Fig. 4.

Fig. 8 is an enlarged sectional view taken on line 8—8 of Fig. 7 with parts broken away.

Fig. 9 is an enlarged elevational view taken on line 9—9 of Fig. 5 with parts broken away.

Fig. 10 is a slightly enlarged, fragmentary, perspective view of manifold heat exchanger with parts broken away and parts shown in cross section.

As shown in the drawings, I provide an inner housing or shell 15, positioned around three sides of which is a layer 16 of insulating material enclosed by an outer housing or shell 17. A hood 18 is mounted on the inner housing 15 and pro-

vided with a central opening 19. Supporting brackets 20 serve to support an electric motor 21 which drives the fan 22 positioned below the hood 18. Connected to the outer casing 23 and attached solidly at both sides to the inner casing 15 is a partitioning baffle plate 24 having its lower end angularly turned to provide the wall 25, and angularly turned at its upper end to provide the wall 26. Resting on this wall 26 is an exhaust manifold 27 communicating with which, through an opening in the wall 23, is an outlet flue 28.

Positioned within the inner housing 15 is a plurality of heat exchangers 29, each comprising a box-like structure having a neck 30 projected outwardly from one side at the upper end thereof. This neck 30 is inserted through an opening into the manifold 27 and is provided with the openings 31 at opposite sides to establish communication of the manifold 27 with the interior of the heat exchanger 29.

Rockably mounted on the lower side of the inner housing 15 is a plurality of deflecting louvres 32. The construction is such that when the fan 22 is driven, air will be drawn inwardly through the opening 19, as shown in Fig. 3, and forced outwardly from the housing 15 through the louvres 32. This structure will be suitably supported by the hangers or straps 33. Positioned in the lower end of each of the heating units 29 and extending longitudinally thereof is a gas burner 34 having the gas outlets 35 in its upper side. This gas burner 34 is provided with the outwardly projecting neck 36, having a notch 37 formed therein and adapted to engage a supporting bar 38, which is suitably mounted on the housing 17. A hinged shell 39 serves as a cover for this structure and a screen or grid 40 is used as a closure for the lower side. The neck 36 is projected through the openings 41 formed in the members 15, 16, and 17. An opening 42 is also formed in the wall of the heat exchanger through which this neck may project. An opening 43 is formed in the opposite wall of the heat exchanger 29 and an opening 44 is formed in the partition 24. The burner 34 is provided with a hollow head 45 having one face dished inwardly to provide the conical structure 46 in which is formed a central opening 47, in which may engage the tapered end of a gas outlet jet 48. This gas outlet jet 48 connects to the gas distributor pipe 49 which is fixedly mounted by straps 49' on the swingable door 50 and which is connected by the pipe 51 to a suitable source of supply. The construction is such that upon disconnecting the pipe 51 from its connections, the door 50 may be swung outwardly into the dotted line position shown in Fig. 5, thus permitting access to each of the burners 34 from the front thereof. The door 50 is provided with louvres 50' to permit air to enter the chamber between the door 50 and the baffle 24. The holes 41 are also larger than the neck 36 so that secondary air may enter through the holes 41 into the combustion chamber.

Each of the burners is provided with a pair of spaced apart lugs 52 which straddle the rib 53 on the bracket 54 which is mounted on the wall 24. It is believed obvious that when access is permitted to the burner, the burner may be easily and quickly removed and replaced. If the burners are in position and the door 50 is swung from the dotted line position shown in Fig. 5 to the full line position, the outlet pipe 48 will engage the conical or concave portion 46 and slide into the opening 47.

It will be noted that there is a burner positioned in each of the hollow box-like heat exchangers and that the heat exchanger itself serves as a combustion chamber for the gases. The flow of these gases is from the lower end of the heat exchanger upwardly, whereas the flow of the air which is driven through the heating unit is from above to the discharge position at the bottom. Thus, there is a counterflow of the heating gases and the air currents which are to be heated. It will also be noted that the fan is in a horizontal position so that the travel of the gases and the air is vertical.

As shown in Fig. 6, the manifold 27 opens at its opposite ends to the atmosphere exterior of the outer shell or casing 17, the ends thereof being closed by suitable grill work 54' so that the draft diverter is thus built into the manifold itself.

It will be noted that each of the heat exchangers is an independent unit and may be individually removed and replaced. The neck 30 is merely inserted into the split formed in the wall of the manifold 27, either with or without a gasket, although preferably with a gasket.

This structure renders itself for mounting in any type of building and in any location, as either side of the structure may be exposed and either side placed adjacent a wall or the like. It will also be noted that the gas line is supported independently of the heating unit because, due to its construction, the heater cannot be out-of-balance, and there is therefore no need for using the gas line as a third point of suspension. The heating unit is also free from expansion joints and because of the direct drive, elbows and other means for changing the path of travel of the air from the fan to the outlet side are avoided.

It is believed obvious that the lightness and compactness of the structure will appear from the description given.

What I claim as new is:

1. In a heating device of the class described, a housing; a plurality of vertically disposed, spaced apart, hollow heat exchangers in said housing; an outlet flue communicating with each of said heat exchangers adjacent its upper end for conducting burned gases therefrom; a gas burner in each of said exchangers adjacent the lower end thereof, each heat exchanger forming a combustion chamber for the gases; a hollow inlet gas supply head on an end of each of said gas burners having a concave end face provided with a central opening therein; a supporting door swingably mounted on said housing; a distributing pipe mounted on said door; a plurality of gas jets communicating with and projecting outwardly from said distributing pipe and each adapted for engaging in the opening in a concave face upon swinging of said door to operative position.

2. In a heating device of the class described, a housing; a plurality of vertically disposed, spaced apart, hollow heat exchangers mounted in said housing, each of said heat exchangers having oppositely disposed openings formed at its lower end in the front and rear sides; a horizontally disposed supporting bar extending across said heat exchanger below the rear openings formed therein; a gas burner mounted in each of said heat exchanger; and a notched extension on each of said gas burners projecting through the opening in the rear side of the heat exchangers and engaging said bar with the notch for supporting the rear end of said burner.

3. In a heating device of the class described,

a housing; a plurality of vertically disposed, spaced apart, hollow heat exchangers mounted in said housing, each of said heat exchangers having oppositely disposed openings formed at its lower end in the front and rear sides; a horizontally disposed supporting bar extending across said heat exchangers below the rear openings formed therein; a gas burner mounted in each of said heat exchangers; a notched extension on each of said gas burners projecting through the opening in the rear side of the heat exchangers and engaging said bar with the notch for supporting the rear end of said burner; and a head on the opposite end of said burner engaging in the oppositely disposed opening.

4. In a heating device of the class described, a housing; a plurality of vertically disposed, spaced apart, hollow heat exchangers in said housing; an outlet flue communicating with each of said heat exchangers adjacent its upper end for conducting burnt gasses therefrom; a gas burner in each of said exchangers adjacent the lower end thereof, each heat exchanger forming a combustion chamber for the gases; a hollow inlet gas supply head on an end of each of said gas burners having an end face provided with a central opening therein; a supporting door swingably mounted on said housing; a distributing pipe on said door; a plurality of gas jets communicating with and projecting outwardly from said distributing pipe and each jet being adapted for engaging in an opening in one of said end faces upon swinging of said door to operative position.

HENRY COHN.

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