Aug. 8, 1950 J. W. MILLER 2,517,909

COMBINED FORCED AND CONVECTION FLOW AIR HEATING DEVICE

Filed Aug. 2, 1944 2 Sheets-Sheet 1

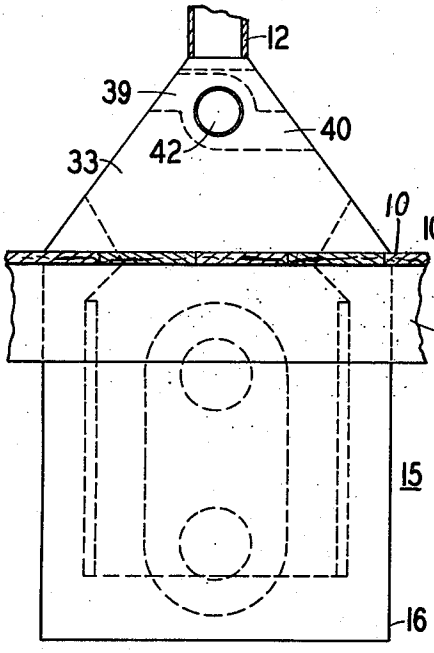


FIG. 1

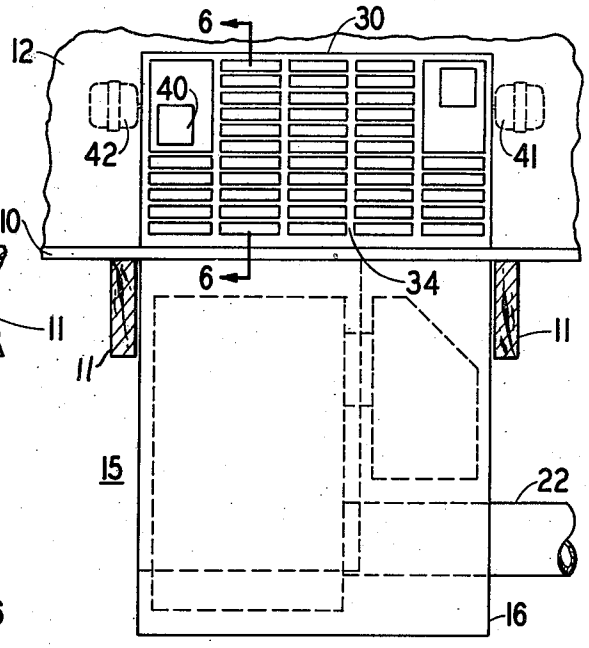


FIG. 2

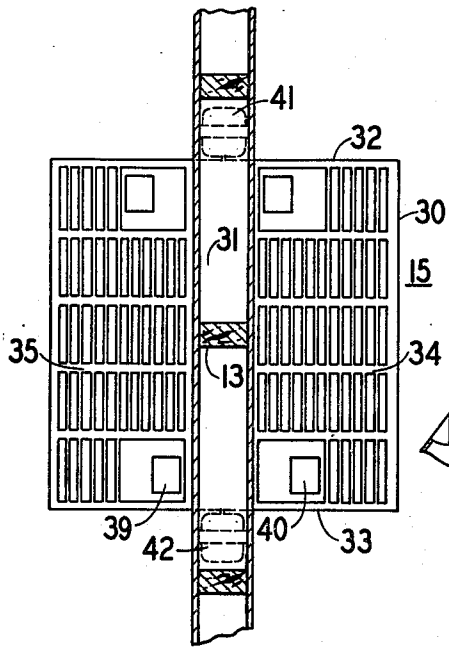


FIG. 3

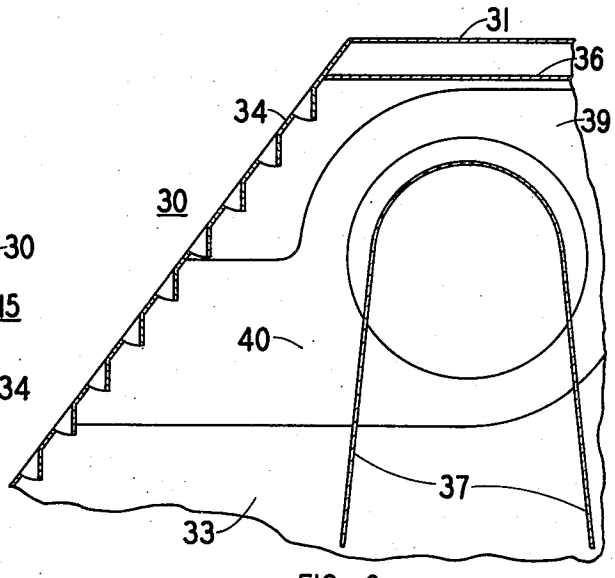


FIG. 6

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Aug. 8, 1950 J. W. MILLER 2,517,909

COMBINED FORCED AND CONVECTION FLOW AIR HEATING DEVICE

Filed Aug. 2, 1944 2 Sheets-Sheet 2

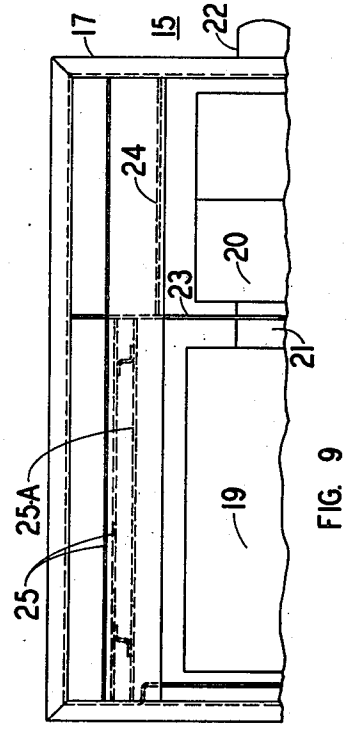


FIG. 9

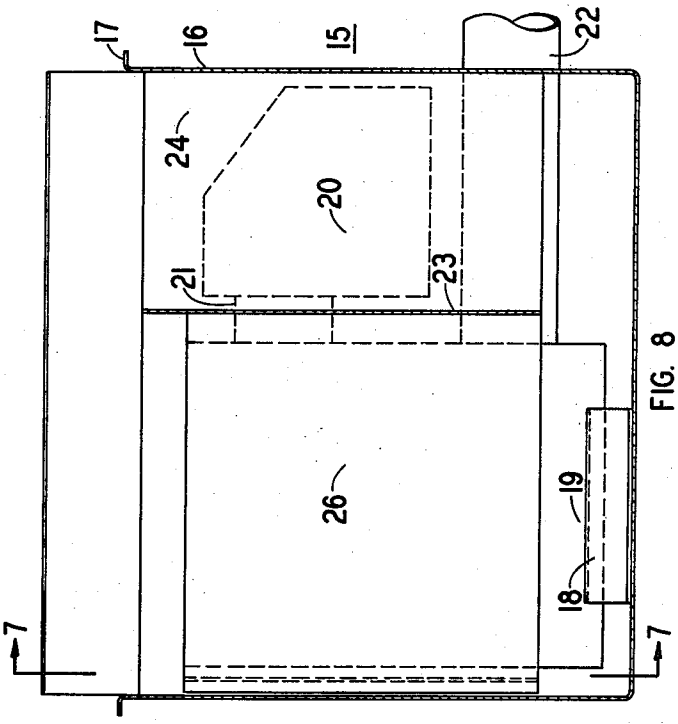


FIG. 8

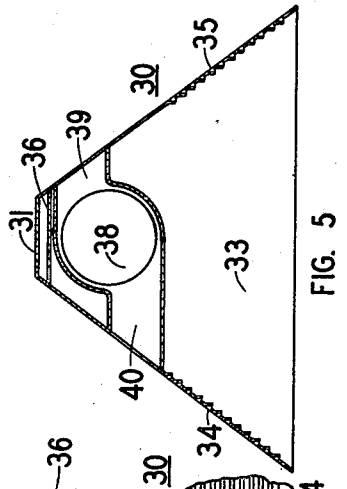


FIG. 5

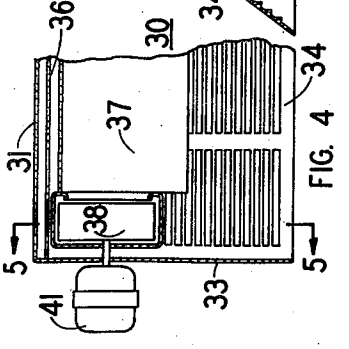


FIG. 4

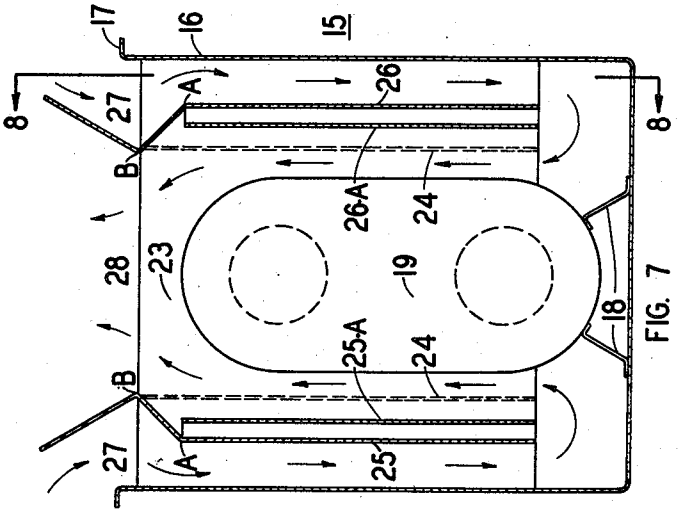


FIG. 7

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COMBINED FORCED AND CONVECTION FLOW AIR-HEATING DEVICE

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Application August 2, 1944, Serial No. 547,666

1 Claim. (Cl. 126—110)

1

This invention relates to combustion apparatus and more particularly to a novel combination of apparatus of that type with the floor and partitions of a building to be heated.

The principal object of the invention is to provide a simple and economical construction and arrangement of parts for heating a plurality of rooms with a furnace of the so-called floor type and to provide for both a gravity and a forced circulation of air which may function simultaneously or independently of each other.

In attaining the foregoing and other incidental objects of the invention, a floor of the building to be heated is provided with an opening adjacent a room partition and a furnace is installed in the opening partly above and partly below the floor. The portion above the floor includes air passageways associated with openings in the partition whereby cold air is withdrawn and warm air is introduced into the spaces on opposite sides of the partition.

Preferably a fan or blower is provided for discharging a part only of the warm air. The blower is mounted in the upper part of the furnace above the floor and in close proximity to the discharge openings so as to dispense with the usual ducts or pipes.

By utilizing the blower for discharging only a part of the air, provision is made so that the apparatus can function exclusively on natural draft. This has the advantage of making the apparatus safe in case the blower fails to operate and of permitting the use of the apparatus where electrical current is not available for operating the blower.

The present invention is capable of various embodiments, two of which are shown in the accompanying drawings, wherein:

Figures 1, 2 and 3 are end and side elevations and a top plan view of one embodiment;

Figure 4 is a fragmentary sectional view of the apparatus shown in Figures 1, 2 and 3;

Figure 5 is a sectional view taken on the line 5—5 of Figure 4;

Figure 6 is a sectional view taken on the line 6—6 of Figure 2;

Figure 7 is a sectional view of a part of the apparatus taken on the line 7—7 of Figure 8;

Figure 8 is a sectional view taken on the line 8—8 of Figure 7; and

Figure 9 is a fragmentary top plan view of the portion of the apparatus shown in Figures 7 and 8.

Referring first to Figures 1 to 3 inclusive, there is shown a section of a floor 10 supported by spaced joists 11, and a vertical partition wall 12

2

including spaced studs 13. The floor 10 is provided with an opening between adjacent joists 11 and the partition 12 is provided with an opening immediately above the opening in the floor 10. A furnace of the floor type, designated generally by the reference numeral 15, is installed in the openings in the floor and partition with a portion below and a portion above the floor. The detailed construction of the upper part of the furnace 15 is shown in Figures 4, 5 and 6; and of the lower portion of the furnace in Figures 7, 8 and 9.

As shown in Figures 7, 8 and 9, the lower part of the furnace 15 includes an outer casing 16 which is provided at its upper edge with laterally extending flange 17 adapted to overlie the floor 10 about the opening therein to support the furnace from the floor. Disposed within the casing 16 and supported from the bottom thereof by legs 18 is a heat exchanger in the form of a combustion chamber 19. A burner 20 of any suitable type, such as oil for example, is mounted within a separate compartment of the casing 16 and connected to the combustion chamber 19 by a pipe 21. Products of combustion are discharged from the combustion chamber 19 through a discharge pipe 22 which is adapted to be connected to a chimney, not shown.

The interior of the casing 16 is divided into two main compartments by vertical partition 23 which separates the combustion chamber 19 from the burner 20. The burner 20 is further enclosed by a pair of vertical partitions 24. Partitions 23 and 24 extend from near the bottom of the casing to near the top for a reason which will become apparent later.

A pair of vertical baffles 25 and 26 are arranged on opposite sides of the combustion chamber 19, extending horizontally from wall 23 to the remote wall of the casing 16. The vertical extent of the baffles 25 and 26 are from near the bottom of the casing to a zone substantially above the top of the casing. At their upper extremities the baffles 25 and 26 are bent first inwardly and then outwardly as indicated at A and B. The upper extremities of the baffles 25 and 26 cooperate with the upper portion of the furnace as shown in dotted lines to form separate cold and warm air passageways 27 and 28 to and from the heat exchanger 19. The cold air enters the casing through passageways 27 and the warm air is discharged through passageway 28. In order to prevent an exchange of heat between cold air passageways 27 and warm air passageway 28, an additional baffle 25A is arranged in spaced rela-

tion to baffle 25 and an additional baffle 25A is arranged in spaced relation to baffle 26.

As shown in Figures 4, 5 and 6, the upper portion of furnace 15 comprises a hood structure 30 adapted to be mounted upon the upper edge of casing 16 and to cooperate therewith to completely enclose the heat exchanger. Hood 30 consists of an imperforate top wall 31, substantially imperforate end walls 32 and 33, and grilled side walls 34 and 35. In order to prevent the radiation of heat through top wall 31, there is provided in spaced relation below that wall a partition 36.

Within the hood 30 and extending longitudinally thereof is a baffle 37 which traps some of the warm air which passes upwardly through passageway 28. At each of the opposite ends of baffle 37 and partially enclosed by it is mounted a blower 38 of the axial intake radial discharge type. Each blower 38 is formed to cooperate with a pair of discharge conduits 39 and 40 at opposite sides thereof through which heated air is discharged into the spaces on opposite sides of the partition 12 (see Figure 3). Motors 41 and 42 are mounted on the end walls 32 and 33 of hood 30 exteriorly thereof for operating the blowers 38.

From the foregoing description, it will be understood that cold air is drawn into the furnace 15 from the spaces on the opposite sides of partition 12 through the lower portion of grills 34 and 35 by gravity; and that warm air is discharged from the furnace into the spaces on opposite sides of the partition 12 through the upper part of grills 34 and 35 by gravity and through the conduits 39 and 40 by the blowers 38.

The scope of the invention is indicated in the appended claim.

I claim:

A furnace comprising a heat exchanger, an open topped outer casing enclosing said heat exchanger and arranged in spaced relation thereto, a pair of vertical baffles arranged on opposite sides of the heat exchanger in spaced relation with the side walls of the outer casing and in spaced relation with the side walls of the heat exchanger, said baffles terminating short of the bottom wall of said outer casing and extending above the top of the said casing whereby said baffles cooperate with the casing and heat exchanger to provide cold air passageways between the side walls of the casing and the said baffles and warm air passageways between the heat exchanger and the baffles, the cold air entering said cold air passageway through the openings between the upper portions of said baffles and the top of the casing and passing downwardly to adjacent the bottom of the casing and then upwardly through the warm air passageway, a hood mounted on the upper edge of the casing provided with cold air inlets which communicate with the upper ends of said cold air passageways, said hood having a pair of warm air outlet openings positioned above the cold air inlets, the upper ends of said vertical baffles extending to points closely adjacent the inner surfaces of the side walls of said hood thereby dividing the cold air inlets from the warm air outlets, the warm air passageways communicating at their upper ends with that portion of the interior of the hood in which the above warm air outlets are formed whereby said warm air passageways communicate with said warm air outlets, said hood having a second pair of warm air outlet openings located in the side walls of said hood above the first mentioned pair of warm air outlet openings, and a fan mounted in said hood for withdrawing heated air from within the hood and for discharging the same through said second pair of warm air outlets, whereby the air flows by gravity and forced draft through said inlet openings, cold air passageways and then upwardly through the warm air passageways into the hood, a baffle within the hood for dividing the warm air into two streams whereby the one stream of arm air flows out of the first pair of warm air outlets and the other stream of warm air is forced by said fan through the second pair of warm air outlets whereby the velocity of the discharge of air from the second pair of warm air outlets induces the warm air flowing through the first pair of gravity outlet openings to be distributed with the air from the fan.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,536,891	Langlois	May 5, 1925
1,660,690	Terry	Feb. 28, 1928
1,984,933	Kuenhold	Dec. 18, 1934
1,996,927	Lake	Apr. 9, 1935
2,055,926	Fraser	Sept. 29, 1936
2,252,064	Cornell	Aug. 12, 1941
2,258,682	Kent	Oct. 14, 1941
2,360,087	Tuck	Oct. 10, 1944