June 24, 1930. E. G. MILLER 1,765,439

HOT AIR FURNACE

Filed Sept. 9, 1929

Fig. 1

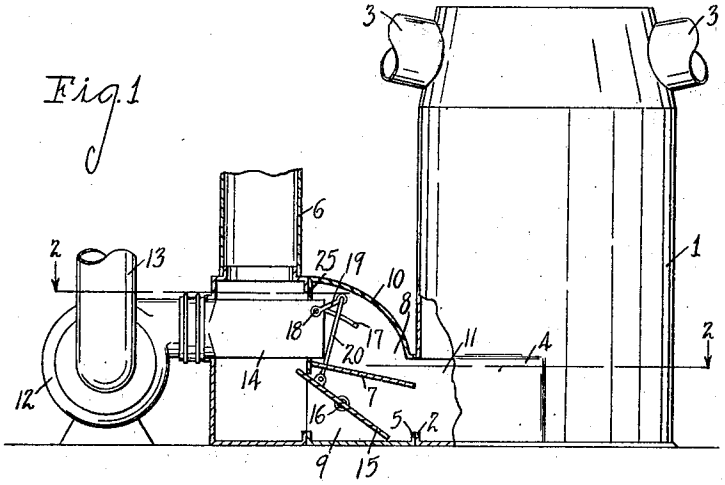


Fig. 2

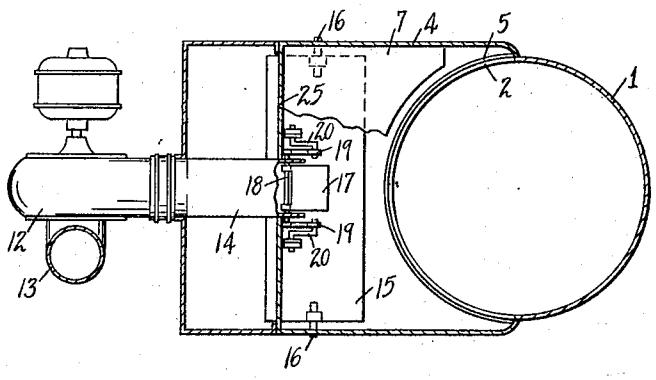
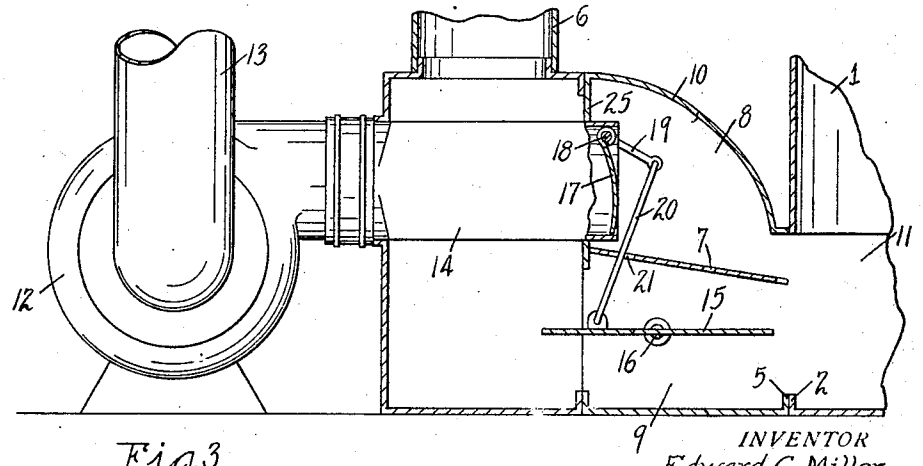


Fig. 3



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HOT-AIR FURNACE

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The main object of this invention is to provide in a hot air furnace a combined gravity and forced air feed in which the air is very effectively delivered to the heating unit within the furnace and one in which the forced air is entirely independent from and in no wise interferes with the effectiveness of the gravity feed.

A further object is to provide a structure which is quiet in operation; that is, the noise resulting from the use of the blower is minimized.

A further object is to provide a structure having these advantages which is very compact, easily installed and is economical in its parts.

Objects pertaining to details and economies of my invention will appear from the description to follow. The invention is defined in the claims.

A structure which embodies the features of my invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary view of a hot air heating apparatus embodying the features of my invention.

Fig. 2 is a fragmentary view mainly in section on line 2—2 of Fig. 1.

Fig. 3 is a fragmentary view mainly in vertical section with the parts in position to permit gravity feed of air to the heating chamber.

In the accompanying drawing, 1 represents the casing or heating chamber of a hot air furnace which is provided with a side opening 2 embracing one side thereof. The heating unit is not illustrated but it will be understood that any suitable heating unit may be employed and is disposed centrally within the hot air chamber so that the incoming air is discharged upon and flows upwardly around the heating unit to the hot air conduits 3.

At the side of the heating chamber I arrange an air inlet box or chamber 4 having an opening 5 at its front and registering with the inlet opening 2 of the heating chamber. It will be observed by a reference to Fig. 2 that this air inlet chamber extends substantially one-half way around the heating chamber.

The chamber 4 is provided with a vertical partition wall 25 disposed in front of the cold air conduit 6 by means of which air is conducted to the chamber 4 from some portion of the building to be heated or some outside source as may be desired. The lower edge of this wall 25 is spaced from the bottom of the inlet chamber providing an opening for the passage of air to the hot air casing.

The horizontal partition 7 extends forwardly from the vertical wall 25 providing a forced air passage 8 above the partition 7 and a gravity passage 9 below.

A portion of the top wall 10 of the inlet chamber adjacent the hot air chamber is curved downwardly to the upper edge of the opening 2 of the heating chamber.

The forward end of the partition 7 is disposed adjacent to but sufficiently spaced from the lower edge of the wall 10 to provide a relatively narrow discharge 11 for the forced air passage.

The blower 12 is arranged at the rear of the inlet chamber and is provided with an air inlet conduit 13 connected to a suitable source of supply. The blower discharge pipe 14 is arranged centrally through the upper portion of the air inlet chamber and through the vertical wall 25 to deliver centrally to the forced air passage 8. The air from this blower is spread out in the forced air passage and discharged through the restricted portion 11 thereof against the heating unit within the heating chamber and well around the same so that the forced air is carried around substantially all parts of the heating unit.

The gravity passage also has a relatively wide delivery opening extending substantially half-way around the heating chamber and is of large capacity so that the air passing by gravity flows freely to the heating chamber and is well distributed around the heating unit therein.

The plate-like damper 15 is pivoted at 16 in the side walls of the air inlet chamber so that it may be swung to an approximately horizontal position as shown in Fig. 3 thus

minimizing obstruction to the flow of air by gravity to the heating chamber or it may be swung to a forwardly inclined position as shown in Fig. 1 with its rear end coacting with the lower edge of the vertical wall 25 and its forward end resting upon the bottom of the inlet chamber as shown in Fig. 1, thus cutting off the gravity passage.

The vane 17 is mounted on a rockshaft or pivot 18 so as to receive the blast of air when the blower is in operation and to be swung outwardly thereby. This rock-shaft is provided with arms 19 which are connected by the links 20 to the damper 15 so that the damper is opened and closed through the action of the vane. The link being arranged through the opening 21 in the partition 7 provides for a direct connection.

The damper 15 is substantially balanced; that is, its pivots are centrally arranged so that little power is required to open and close the same.

By arranging the motor on the outside of the air inlet chamber, the motor is at all times accessible and a minimum of noise of operation is conveyed through the heating chamber and conduits.

The apparatus is very compact and may be readily installed with numerous types of furnaces now widely used. Both the forced air and the gravity feed are highly efficient, the air being well distributed about the heating unit.

I have not attempted to illustrate or describe various embodiments or adaptations which I contemplate as it is believed that this disclosure will enable those skilled in the art to embody or adapt the same as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination with a heating chamber of a hot air furnace having a side opening embracing a substantial portion thereof, of an air inlet chamber disposed at the side of the heating chamber and communicating therewith through said side opening, said inlet chamber having a vertical transverse wall disposed with its lower edge in spaced relation to the bottom of the chamber and a horizontally disposed partition extending forwardly from said vertical wall to the inlet opening of said heating chamber providing a gravity passage below and a forced air passage above, the top wall of the inlet chamber being curved downwardly to the upper edge of the heating chamber opening, the front end of the horizontal partition being disposed in such relation to the upper edge of the opening of the heating chamber as to constitute a restricted discharge for the forced air passage, a blower disposed at the rear of said chamber and provided with a discharge pipe disposed centrally through said vertical wall of the chamber to deliver to said forced air passage, a horizontally pivoted damper for said gravity passage disposed below said horizontal partition so that when closed its rear end coacts with the lower edge of the vertical wall and its front end with the bottom of the chamber, a pivoted vane arranged at the end of the blower discharge pipe and provided with an arm, and a link arranged through said horizontal partition connecting said arm to said damper.

2. The combination with a heating chamber of a hot air furnace having a side opening embracing a substantial portion thereof, of an air inlet chamber disposed at the side of the heating chamber and communicating therewith through said side opening, said inlet chamber having a vertical transverse wall disposed with its lower edge in spaced relation to the bottom of the chamber and a horizontally disposed partition extending forwardly from said vertical wall to the inlet opening of said heating chamber providing a gravity passage below and a forced air passage above, the top wall of the inlet chamber being curved downwardly to the upper edge of the heating chamber opening, the front end of the horizontal partition being disposed in such relation to the upper edge of the opening of the heating chamber as to constitute a restricted discharge for the forced air passage, a blower disposed at the rear of said chamber and provided with a discharge pipe disposed centrally through said vertical wall of the chamber to deliver to said forced air passage, a horizontally pivoted damper for said gravity passage disposed below said horizontal partition so that when closed its rear end coacts with the lower edge of the vertical wall and its front end with the bottom of the chamber, a pivoted vane arranged at the end of the blower discharge pipe and provided with an arm, and a link arranged through said horizontal partition connecting said arm to said damper.

3. The combination with a heating chamber of a hot air furnace having a side opening, of an air inlet chamber disposed at the side of the heating chamber and communicating therewith through said side opening, said inlet chamber having a vertical transverse wall disposed with its lower edge in spaced relation to the bottom of the chamber and a horizontally disposed partition extending forwardly from said vertical wall providing a gravity passage below and a forced air passage above, the front end of the horizontal partition being disposed in such relation to the upper edge of the opening of the heating chamber as to constitute a restricted discharge for the forced air passage, a blower disposed at the rear of said chamber and provided with a discharge pipe disposed centrally through said vertical wall of the chamber to deliver to said forced air passage, a horizontally pivoted damper for said gravity passage disposed below said horizontal partition so that when closed its rear end coacts with the lower edge of the vertical wall

and its front end with the bottom of the chamber, a pivoted vane arranged at the end of the blower discharge pipe and provided with an arm, and a link arranged through said horizontal partition connecting said arm to said damper.

4. The combination with a heating chamber of a hot air furnace having a side opening, of an air inlet chamber disposed at the side of the heating chamber and communicating therewith through said side opening, said inlet chamber having a vertical transverse wall disposed with its lower edge in spaced relation to the bottom of the chamber and a horizontally disposed partition extending forwardly from said vertical wall providing a gravity passage below and a forced air passage above, the front end of the horizontal partition being disposed in such relation to the upper edge of the opening of the heating chamber as to constitute a restricted discharge for the forced air passage, a blower disposed at the rear of said chamber and provided with a discharge pipe disposed centrally through said vertical wall of the chamber to deliver to said forced air passage, a damper for said gravity passage disposed below said horizontal partition, a pivoted vane operatively associated with the blower discharge pipe, and a link operatively connected to said damper.

5. The combination with the heating chamber of a hot air furnace having a side opening embracing a substantial portion thereof, an air inlet chamber disposed at the side of the heating chamber and communicating therewith through said side opening, said inlet chamber being provided with a vertical wall having its lower edge spaced from its bottom and with a horizontally disposed partition extending forwardly from said vertical wall to the inlet opening of said heating chamber providing a gravity passage below the partition and a forced air passage above the partition, the top wall of the inlet chamber being curved downwardly to the upper edge of the heating chamber opening and the front end of the partition being disposed in such relation to the upper edge of the opening in said heating chamber as to constitute a restricted discharge for the forced air passage, a blower provided with a discharge disposed through the vertical wall of said inlet chamber to deliver centrally to said forced air passage, a damper for said gravity passage, and a pivoted vane operatively associated with the blower to receive the blast therefrom and operatively connected to said damper.

6. The combination with the heating chamber of a hot air furnace, an inlet chamber delivering thereto, said inlet chamber being provided with a vertical wall having its lower edge spaced from the bottom of the chamber and with a horizontally disposed partition extending forwardly from said vertical wall to the inlet opening of said heating chamber providing a gravity passage below the partition and a forced air passage above the partition, a blower provided with a discharge pipe disposed through the vertical wall of said inlet chamber to deliver to said forced air passage, a horizontally pivoted damper for said gravity passage disposed so that when closed its rear end coacts with the lower edge of the vertical wall of the inlet chamber and its front end with the bottom thereof, a pivoted vane arranged in the discharge of the blower and provided with an arm, and a link arranged through said partition connecting said arm to said damper.

7. The combination with the heating chamber of a hot air furnace, an air inlet chamber delivering thereto, said inlet chamber being provided with a vertical partition having its lower edge spaced from the bottom of the chamber and with a horizontally disposed partition extending forwardly from said vertical partition to the inlet opening of said heating chamber providing a gravity passage below the horizontal partition and a forced air passage above, a blower provided with a discharge disposed through the vertical partition to deliver to said forced air passage, a damper for said gravity passage, and a pivoted vane operatively associated with the blower to receive the blast therefrom and operatively connected to said damper.

8. The combination with the heating chamber of a hot air furnace having a side opening embracing a substantial portion thereof, an air inlet chamber having a partition disposed to provide a gravity passage below the partition and a forced air passage above the partition, a blower delivering to said forced air passage, said partition being arranged so that it constitutes a distributing member for the forced air delivered to the heating chamber, a damper for the gravity passage, and a vane operatively associated with said blower and operatively connected to said damper.

9. The combination with the heating chamber of a hot air furnace, an air inlet chamber delivering thereto and provided with a horizontally disposed partition providing a gravity air feed passage below the partition and an independent forced air passage above the partition, a blower delivering to said forced air passage above said partition, a pivoted vane associated with the discharge of the blower, a damper for said gravity air passage, and operating connections for said damper to said vane.

In witness whereof I have hereunto set my hand.

EDWARD G. MILLER.