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AIR HEATING APPARATUS

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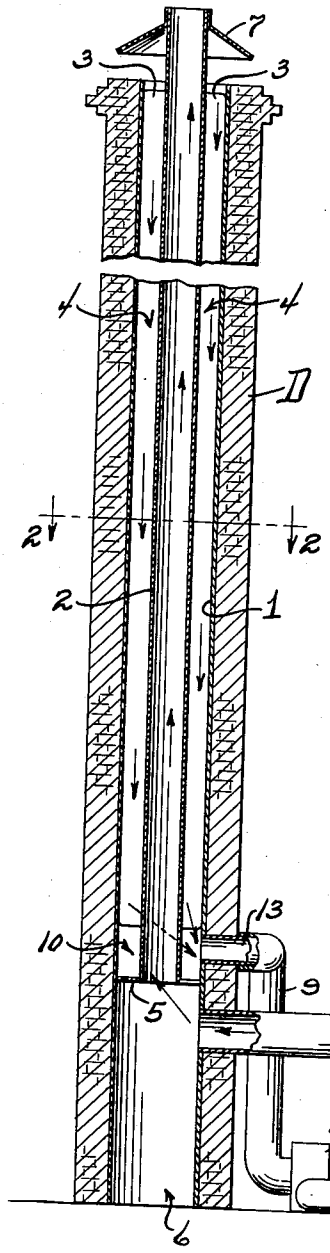


Fig. 2.

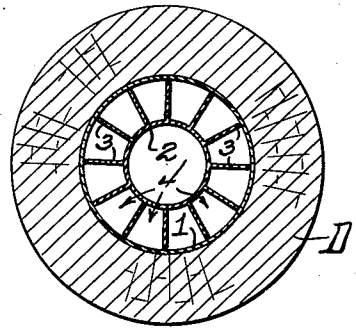


Fig. 1.

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AIR HEATING APPARATUS

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2 Claims. (Cl. 237—55)

This invention relates to air heating apparatus, and its general object is to provide an apparatus for use with exhaust conduits, such as chimney or smoke stacks of heating and power plants, as well as exhaust pipes of engines, or any conduit or the like through which hot gases are exhausted to the atmosphere, and the apparatus utilizes the heat from the gases, that is otherwise wasted, to heat incoming air for any desired purpose, for example, when the apparatus is used with a hot air furnace, as shown, the incoming air is preheated by the exhaust gases from the products of combustion, as the gases pass up the chimney, and the preheated air is directed to the furnace to be further heated in the usual manner before being distributed by the hot air ducts, with the result it will be seen that my apparatus materially increases the efficiency of the furnace, with a decrease of fuel consumption.

A further object is to provide an air heating apparatus of the heat exchange type, that is simple in construction, easy and inexpensive to install, and extremely efficient in use and service.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawing and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawing wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a view partly in section, illustrating my apparatus installed for use with a hot air furnace.

Figure 2 is a sectional view taken approximately on line 2—2 of Figure 1, looking in the direction of the arrows.

While I have illustrated my apparatus as being used with a hot air furnace, it is to be understood that it can be used with any type of furnace or heating plant, as well as power plants, and fuel burning engines, to utilize the heat of the exhaust gases therefrom for the purpose set forth.

Referring to the drawing in detail, the letter A indicates a hot air furnace of the multiple duct type and which includes the usual hot air outlets B for the ducts, not shown, and a flue pipe C leading from the furnace to the usual brick chimney D, all of which form no part of the present invention, but are shown merely to illustrate one of the uses of my apparatus.

My apparatus in the form shown includes a casing structure made up of an outer casing 1 and an inner casing 2 concentrically arranged within the outer casing to provide an annular chamber, the casings being suitably secured within the chimney flue and while the outer casing is shown as being shaped and of a size to snugly fit the flue, it may be spaced therefrom by any suitable insulating material. However, the use of insulating material between the outer casing and the flue of the chimney, is not so important, if the chimney is made from brick or other temperature resisting or non-conducting material, but it is very important if the casing structure is mounted within a metal stack or conduit, in order to prevent the escape of heat therethrough by radiation.

The inner casing 2 is made from heat conducting metal or other like suitable material, and extending radially from the casing 2, as well as formed on or otherwise secured thereto and to the casing 1, is a plurality of equi-distantly arranged vanes in the form of partitions 3 extending longitudinally of the casings to divide the chamber into passageways or ducts 4 for the incoming air, as shown by the arrows in Figure 1, and the vanes 3 are likewise made from heat conducting metal, to assure free radiation of the heat from the outgoing gases through the inner casing 2, as shown by the arrows in Figure 1.

The casing structure may of course be made into sections, of any desired length to facilitate the installation within the flue and the ends of the sections may be connected together by overlapping or otherwise secured to each other. The outer casing is preferably longer than the inner casing and in the form shown, is of a length coextensive with that of the chimney flue, while the inner casing terminates a considerable distance above the lower end of the flue with an annular flange 5 secured thereto for closing the lower end of the passageways 4 and to provide a cinder chamber 6.

The upper end of the outer casing terminates flush with the upper end of the flue, but the inner casing extends a considerable distance above the flue and has a substantially conical shaped shield cap 7 secured thereto, to overlie the passageways 4 in order to prevent the passage of rain and snow therein, as will be apparent upon inspection of Figure 1.

The flue pipe C of course extends from the smoke chamber of the furnace and through the chimney to open within the cinder chamber 6 for directing the hot gases for disposal through the inner casing 2, to the atmosphere, it being

obvious that the gases will be drawn outwardly through the inner casing by natural draft, but in order to increase the flow of the incoming fresh air through the passageways or ducts 4 I provide suction structure which includes a fan 8, with a pipe 9 between the fan casing and the lower end of the chamber about the inner casing 2, as clearly shown in Figure 1, which likewise illustrates that the partitions 3 terminate at their lower ends a considerable distance above the closure flange 5 to provide an inlet portion 10, with the pipe 9 in communication therewith. Between the air inlet chamber of the furnace and the fan casing, is a pipe 11 which may have a branch pipe 12 connected thereto for directing the preheated air therefrom, for any purpose desired.

From the above description and the disclosure in the drawing, it will be obvious that the exhaust and burnt gases from the products of combustion within the furnace, will pass through the flue pipe C, and thence upwardly through the inner casing 2. The passage of the hot gases through the inner casing 2 will naturally heat the same, due to the fact that it is made from high heat conducting material and the heat will be radiated therefrom and through the partitions or vanes 3, so that the latter will preheat the incoming air before it reaches the furnace, through the suction structure, which is amply insulated as at 13 to prevent escape of heat from the air as it passes through the suction structure, for disposal within the furnace, where the air will be further heated in the usual manner and thence distributed through ducts, not shown, but which are to be secured to the air outlets B, as will be apparent upon inspection of Figure 1.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:

1. An air heating apparatus for use with a furnace and its chimney, comprising means to be arranged within the chimney and including an inner casing of heat conducting material, an outer casing of non-heat conducting material and surrounding the inner casing to provide a chamber opening through the top of the chimney, vanes of heat conducting material disposed radially within the chamber to provide longitudinal ducts for receiving air for passage of the latter therethrough to be heated by heat radiating from the inner casing and through the vanes, said inner casing having its lower end terminating above the bottom of the chimney, an annular flange extending outwardly from the lower end of the inner casing for closing the chamber and providing a cinder chamber having the inner casing opening therein, said cinder chamber having the flue pipe of the furnace communicating therewith for the communication of the inner casing with the furnace, and means of communication between the ducts and the furnace for directing heated air to the latter.

2. An air heating apparatus for use with a furnace and its chimney, comprising means to be arranged within the chimney and including an inner casing of heat conducting material, an outer casing of non-heat conducting material and surrounding the inner casing to provide a chamber opening through the top of the chimney, vanes of heat conducting material disposed radially within the chamber to provide longitudinal ducts for receiving air for passage of the latter therethrough to be heated by heat radiating from the inner casing and through the vanes, said inner casing having its lower end terminating above the bottom of the chimney, an annular flange extending outwardly from the lower end of the inner casing for closing the chamber and providing a cinder chamber having the inner casing opening therein, said cinder chamber having the flue pipe of the furnace communicating therewith for the communication of the inner casing with the furnace, said inner casing being of a length to extend above the top of the chimney, a substantially conical shield cap secured to the upper end of the inner casing and overlying the ducts, means of communication between the ducts and the furnace for directing heated air to the latter, suction means within the said means of communication for drawing the air therethrough, and means between the ends of the said means of communication for directing air therefrom.

HENRY J. FRENETTE.