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HEATER

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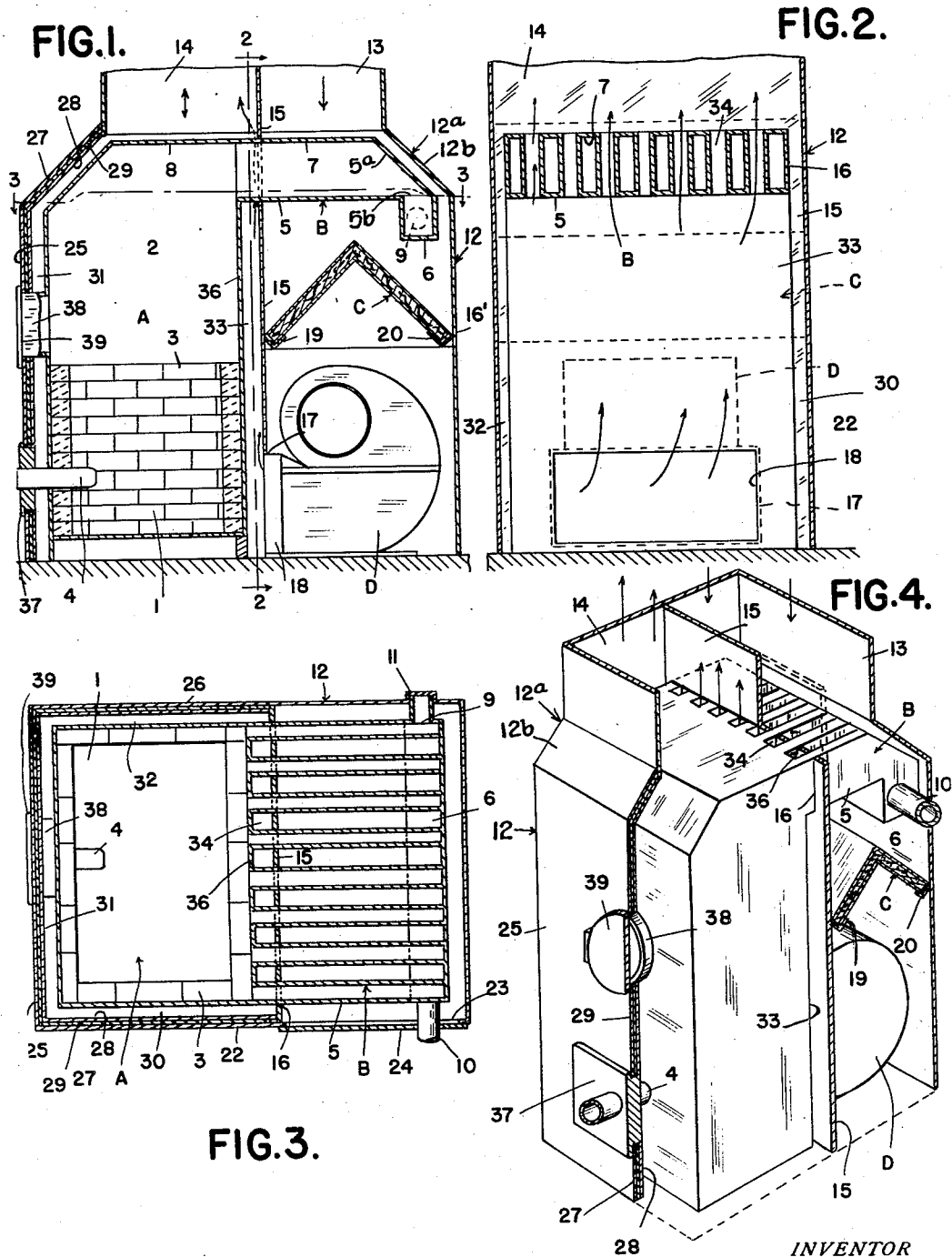


FIG. 3.

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HEATER

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3 Claims. (Cl. 126—99)

This invention relates generally to heating apparatus and refers more particularly to air heaters of the self-contained conversion type adapted for use with warm air and return ducts of a domestic or commercial heating system.

One of the essential objects of this invention is to provide a heater of this type that is compact, comparatively simple in construction, efficient and durable, and that can be manufactured at a comparatively low cost in several different sizes.

Another object is to provide a heater in which all of the space is used to best advantage.

A further object of the invention is to provide a heater having a pre-heater chamber across which the products of combustion are led in substantially horizontal tubes, the tubes being provided with restrictions at their ends and opening downwardly into a header in order to retard the flow of products of combustion.

Another object is to provide a heater wherein the air from the return ducts or other source is drawn by a blower around portions of a pre-heater and through a filter or vice versa and is then forced by the blower around the combustion chamber constituting the main heater to the warm air ducts.

Another object is to provide a heater wherein provision is made for the ready removal and replacement of the filter.

Other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing, wherein:

Figure 1 is a vertical sectional view through a heater embodying my invention;

Figure 2 is a vertical sectional view taken substantially on the line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view taken substantially on the line 3—3 of Figure 1;

Figure 4 is a perspective view of the heater with parts broken away and in section.

Referring now to the drawing, A is the combustion chamber, B is the preheater, C is the filter, and D is the blower of a heater embodying my invention. As shown, the combustion chamber A has a fire box 1 and an upper combustion space 2. Preferably the fire box 1 has a lining 3 of fire brick and receives the nozzle 4 of an oil burner, however it is apparent that such fire box may be provided with grates and be hand fired or may be equipped with a stoker or be gas fired, as desired. The preheater B constitutes a lateral extension or projection of the combustion space 2 of the combustion chamber and comprises a

series of spaced tubes 5 of substantially rectangular cross section and a header 6. The tubes 5 project at substantially right angles from the dome 2 at the upper end thereof with their upper edges 7 substantially in alignment with the top wall 8 of said combustion space, while the header 6 is located below and substantially at right angles to said tubes. Preferably the header 6 is substantially square shape in cross section and is provided at opposite ends thereof with openings 9 which may serve as outlets for the products of combustion. Depending upon which one of the openings 9 is used as an outlet to a flue such as 10, the other opening 9 is provided with a suitable closure 11. Thus, the products of combustion from the fire box 1 will flow from the combustion space 2 through the tubes 5 and header 6 to the flue 10.

As seen in Fig. 1, the tubes 5 open downwardly into header 6, and in addition are somewhat restricted at their discharge end, as at 5b. This arrangement acts to retard the flow of hot products of combustion and increases the transfer of heat.

The filter C and blower D are preferably located in the order named below the preheater B. However, the filter C may be located above the preheater if desired. Preferably the filter C, blower D and combustion chamber A are enclosed within a suitable casing 12 having openings 13 and 14 for air at the top thereof. A vertical partition 15 between these openings 13 and 14 extends downwardly into the casing in spaced relation to the combustion chamber A and separates said chamber A from the filter C and blower D. As shown, this partition 15 has openings 16 receiving the tubes 5 of the preheater and has an opening 17 receiving the outlet 18 of the blower D.

The filter C is preferably inverted V in configuration and is slidably mounted in channels 19 and 20 respectively carried by the partition 15 and wall 16' of the casing 12. Any suitable material such as hemp or spun glass or steel wool may be used in the filter as the filtering medium. Preferably the side 22 of the casing between the partition 15 and wall 16 is provided with an opening 23 through which the filter C may be readily inserted or removed for engagement with or disengagement from the channels 19 and 20, and said opening 23 is normally closed by a door 24.

The blower D may be any conventional design and may be operated electrically from any suitable source.

The casing 12 comprises a lower rectangular portion which is interconnected to the air openings 13 and 14 by a dome portion 12a having tapered front and back walls 12b. In order to employ the space provided to its fullest extent, and to provide the maximum height to the combustion space, the combustion space 2 is provided at its top with a dome portion 2a having a front wall inclined conformably with the inclined wall 12b.

In like manner the header 6 is located under the inclined wall 12b of the preheater space. The tubes 5 have inclined ends 5a which conform to the wall 12b, and provide restrictions at 5b.

In the present instance the front wall 25 and opposite side walls 22 and 26 of the casing from said front wall 25 to the partition 15 comprise spaced sheets 27 and 28 of metal with insulating material 29 such as rock wool therebetween. Thus, the walls about the combustion chamber A are insulated, while the walls around the filter C and blower D are without such insulation. In this connection it should be noted that the combustion chamber A is spaced from the front and side walls 25, 22 and 26 of the casing and from the partition 15, hence air from the blower D is free to pass around the combustion chamber A in the spaces 30, 31, 32 and 33, respectively, and in the spaces 34 provided by the tubes 5, partition 15, and adjacent wall 36 of the combustion chamber.

If desired, the nozzle 4 may be provided upon the outer side of the front wall 25 with a mounting plate 37, and a tubular portion 38 of the combustion chamber may be provided upon the outer side of the front wall with a door 39.

In use, air from the return ducts (not shown) of a warm air heating system is drawn by the blower D through the opening 13 between and around the tubes 5 where it is preheated by the products of combustion from the combustion chamber A and thence through the filter C where it is cleansed. The clean preheated air is then forced by the blower about the combustion chamber A where it is heated and thence out the opening 14 to the warm air ducts (not shown) of the heating system.

What I claim as my invention is:

1. In a hot air furnace, a casing having a dome portion provided with inwardly and upwardly inclined front and rear walls; and provided at the inner upper edges of said walls with openings for air, a firebox and combustion chamber in superposed relation in said casing at the front thereof and spaced therefrom, said combustion chamber having a dome portion extending within the dome portion of said casing and having a front wall spaced from and inclined conformably with the inclined front wall of said casing dome portion, said combustion chamber dome portion having a top wall substantially in vertical alignment with one of said air openings; substantially horizontal rearwardly extending tubes projecting

from said combustion chamber dome portion at the top thereof substantially in the horizontal plane of said inclined walls of said casing dome portion; and a substantially horizontal header within said casing at the rear thereof beneath said casing dome portion, said tubes having end portions inclined conformably to the inclined rear wall of said casing dome portion, and opening downwardly into said header.

2. In a hot air furnace, a casing having a dome portion provided with inwardly and upwardly inclined front and rear walls; and provided at the inner upper edges of said walls with openings for air, a firebox and combustion chamber in superposed relation in said casing at the front thereof and spaced therefrom, said combustion chamber having a dome portion extending within the dome portion of said casing and having a front wall spaced from and inclined front conformably with the inclined wall of said casing dome portion, said combustion chamber dome having a top wall substantially in vertical alignment with one of said air openings; horizontal rearwardly extending tubes projecting from said combustion chamber dome at the top thereof substantially in the horizontal plane of said inclined walls of said casing dome portion; a horizontal header within said casing at the rear thereof beneath said casing dome portion, said tubes having end portions inclined conformably to the inclined rear wall of said casing dome portion, and opening downwardly into said headers, said inclined ends of said tubes providing a substantial restriction for the openings between said tubes and said header.

3. In a hot air furnace, a casing having a dome portion provided with opposed inwardly and upwardly inclined walls and provided at the inner upper edges of said walls with openings for air, one being an inlet opening and one being an outlet opening, a firebox and combustion chamber in superposed relation in said casing in spaced relation thereto beneath one of said inclined walls, said combustion chamber having a dome portion extending within the dome portion of said casing and having a wall spaced from and inclined conformably with the adjacent inclined wall of the casing dome portion, said combustion chamber dome portion having a top wall substantially in vertical alignment with the outlet opening for air, substantially horizontal rearwardly extending tubes projecting from said combustion chamber dome portion at the top thereof substantially in the horizontal plane of said inclined walls of said casing dome portion, and a substantially horizontal header within said casing in spaced relation thereto beneath the other of said inclined walls, said tubes having end portions inclined conformably to the adjacent inclined wall of said casing dome portion and opening downwardly into said header.

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