

Oct. 23, 1928.

1,689,067

L. A. BENNER

AIR HEATER

Filed May 24, 1926

2 Sheets-Sheet 1

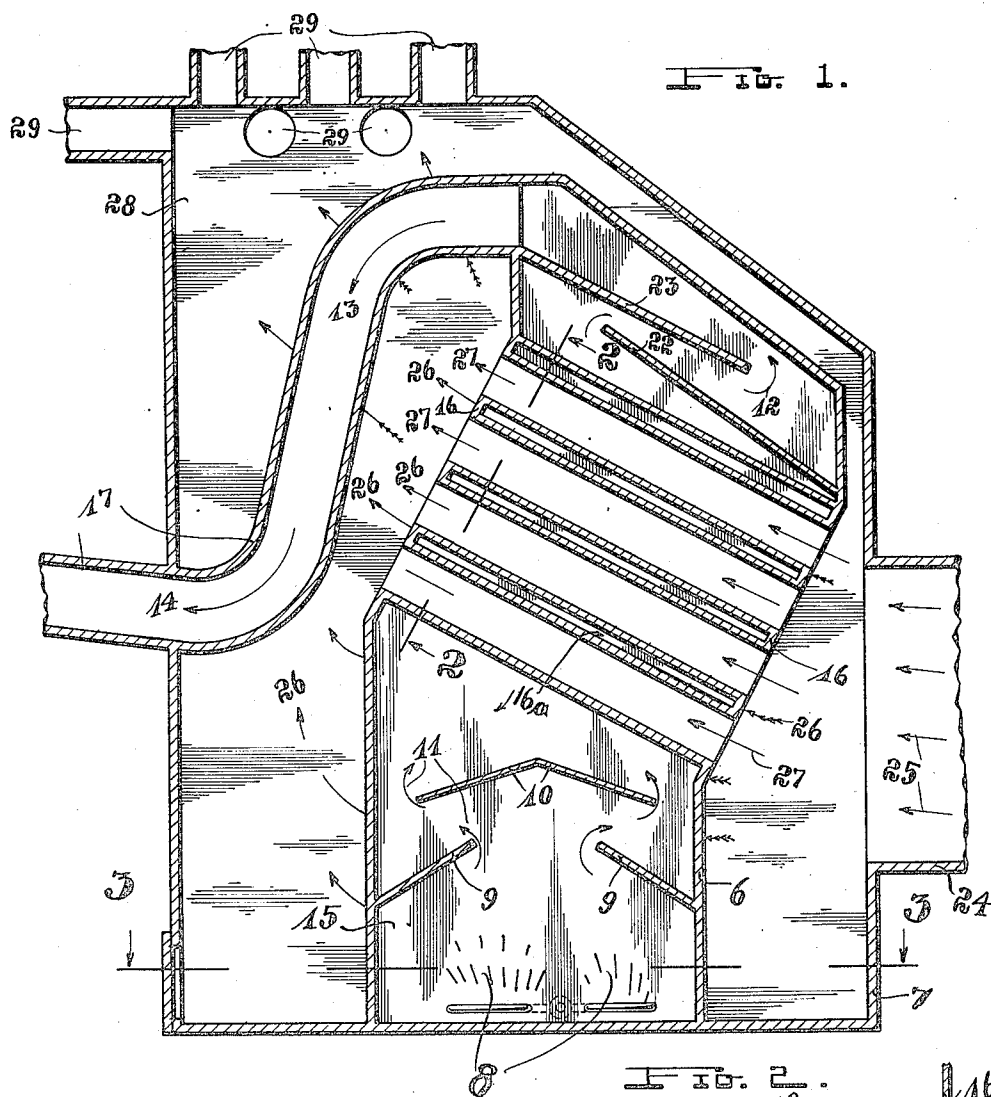


FIG. 3.

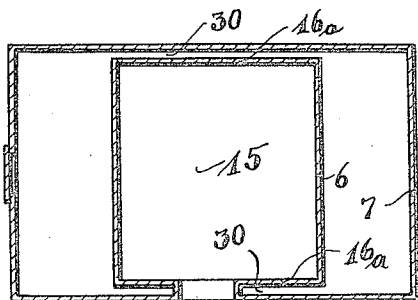
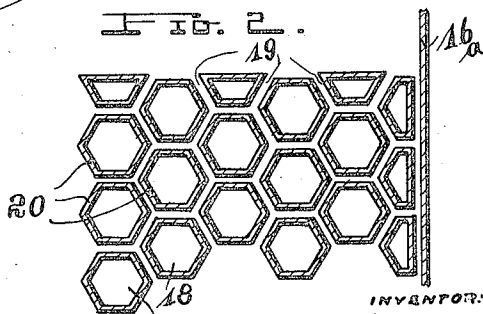


FIG. 2.



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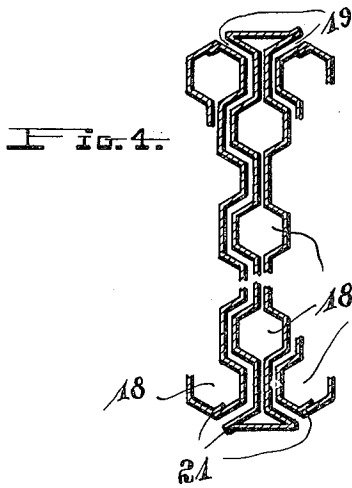
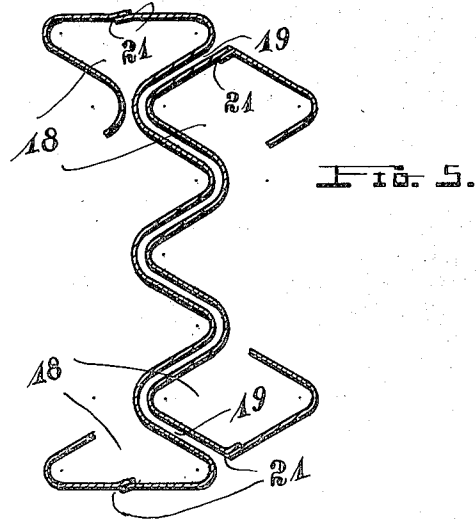
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AIR HEATER

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UNITED STATES PATENT OFFICE.

LOUIS A. BENNER, OF ANAHEIM, CALIFORNIA.

AIR HEATER.

Application filed May 24, 1926. Serial No. 111,304.

This invention relates to devices used for household heating purposes by which air is heated through heating bodies or elements.

One of the objects of this invention is to provide a simple furnace by which air is carried through a heating body in such a manner as to assure an efficient heating of the air and so as to avoid or eliminate an undesired checking or choking of the air by the heating body.

Another object is to provide a heating body through which the air as well as the heat passes in an upward and inclined direction.

Another object is to provide a device by which the heat, as products of combustion, is surrounded by the air holding chambers and passages.

Other objects will appear from the following description and appended claim as well as from the accompanying drawing, in which—

Fig. 1 is a vertical midsectional view of a furnace of a simple form, with an air-heating body designed in agreement with this invention.

Fig. 2 is a fragmentary cross section through the heating body of Fig. 1, on line 2—2.

Fig. 3 is a horizontal cross section on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary cross section through a preferred form of heating bodies or elements, slightly modified over the form of the heating body in Fig. 1.

Fig. 5 is a fragmentary cross section of another slightly modified form of heating body, similar to the preferred form of Fig. 4.

When an air furnace of this type is overheated there is the possibility that air will not pass through or into such a furnace, and, on the other hand, when only little heat is applied or used, heat may be used in poorly designed furnaces up to excessive amounts.

As illustrated, the apparatus may be divided principally into the central heating body 6 and the surrounding body 7. In the lower portion of the heating body suitable heating means are provided, preferably at or near the point indicated at 8, in form of burners for gaseous or liquid fuel or in form of a grate for burning more solid fuel as wood or coal.

The baffles 9 and 10 serve to spread the products of combustion, to evenly pass through the proportionally small and nar-

row passages of the radiator and in the indirection of the arrows 11, 12, 13, and 14. While the lower combustion chamber 15, and the housing 16 of the radiator are of a comparatively large and rectangular form, the outlet or stack 17 is preferably proportionally small and narrow.

The radiator embodies a system of comparatively large passages for air, as indicated at 18 in Figs. 2, 4, and 5, and other passages for the products of combustion indicated by the arrows 19, whereby it is not very material whether tubular members 20 are used or the preferred forms of Figs. 4 and 5.

In a general way it may be considered that the various forms of heating elements as illustrated in Figs. 1, 2, 4 and 5, are equally well manufactured and assembled, but upon more careful consideration, keeping in mind that the air passages are comparatively large, and that the heating elements are preferably made of thin sheet metal, such heating elements if made in tubular form require a seam for each tube, while in the preferred forms of Figs. 4 and 5 a sheet of material may be bent to include several large passages in the finished form by having only one seam at one end or a seam at each end as indicated at 21. No seams have been shown or indicated in Fig. 2, but there are naturally seams in the tubes if made of sheet metal.

The ends of the heating elements, whether made in tubular form as illustrated in Fig. 2, or corrugated form as illustrated in Figs. 4 and 5, are secured in the end plates 16 of the central housing, while similar spaces or spacing is provided between the side walls 16a, of the housing on the one side and the heating elements on the other sides, and also between the several heating elements, in order to assure an even distributing of the products of combustion around the heating elements.

The products of combustion pass from the lower combustion chamber 15 upwardly around and over the heating elements and between the end walls 16 and side walls 16a, on rising further, being deflected by the baffles 22 and 23, to finally escape through the outlet or stack 17.

Air passes in at 24, as indicated by the arrows at 25, continuing around the central body 6 as indicated by the arrows 26, and through the tubes or heating elements as indicated by the arrows 27. A reaction cham-

ber 28 is formed within the outer housing 7 in its upper part, whereby the heated air is accumulated to be discharged in an even stream through the several discharges 29.

5 The space between the central body 6, including the radiator and the outer housing 7 is maintained so narrow that air is evenly discharged through the heating elements and the spaces around the central body, such
10 narrow spaces between the two main bodies being indicated at 30 in Fig. 3.

Having thus described my invention, I claim:

15 In an air-heater, a housing having an air inlet connection near the bottom at one side and air outlet connections in and near the top near the opposite side of the housing, and a radiator having a combustion chamber sub-
20 stantially in a vertical position and having an inclined portion continuing from the combustion chamber upwardly and transversely across the path from the inlet to the outlet connections in the said housing, the radiator being provided with air conduits in the said

inclined portion transversely to the inclined 25 portion and substantially in the direction of the path from the said inlet to the outlet connections and the outside of the radiator being laterally spaced from the inside of the said housing forming comparatively narrow 30 additional air passages between the said inlet and outlet connections, the radiator having an extension end substantially in a vertical position above the inclined portion adapted to collect and condense the products 35 of combustion after passing around the said air conduits and having a comparatively small outlet in one side near the top, the said radiator having a discharge pipe continuing from the said comparatively small outlet in 40 the extension end and extending downwardly within the said housing passing through the rearside of the housing for discharging products of combustion from the radiator.

In testimony that I claim the foregoing 45 as my invention I have signed my name.

LOUIS A. BENNER.