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CIRCULATING GAS HEATER

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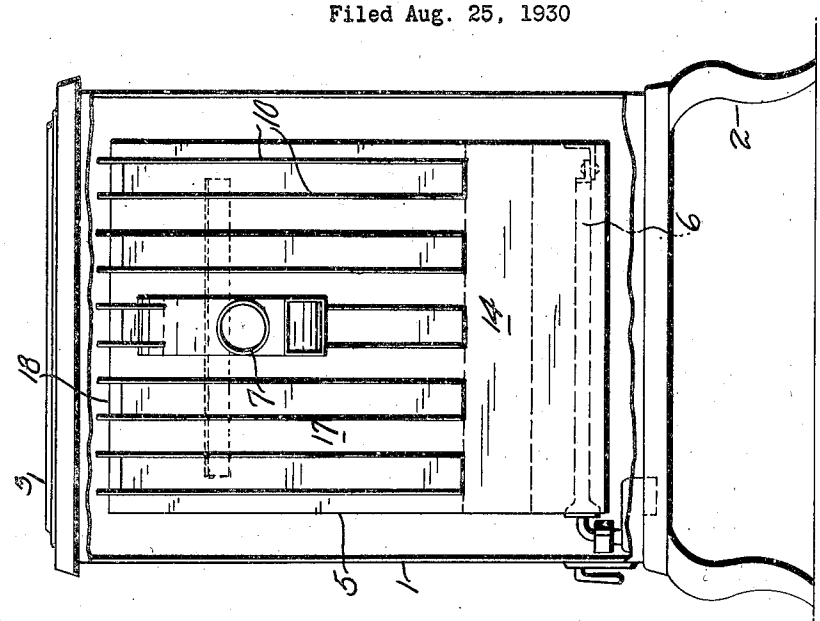


FIG. 2.

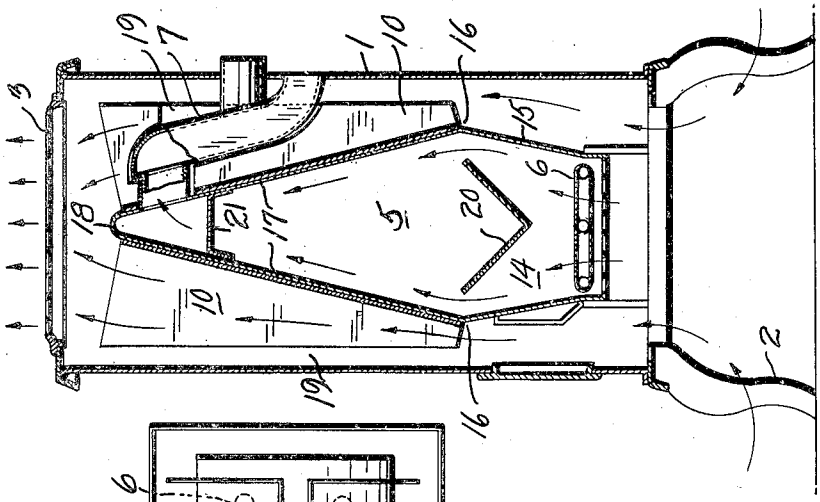


FIG. 1.

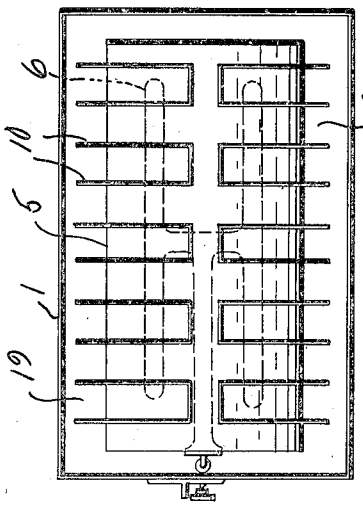


FIG. 3.

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CIRCULATING GAS HEATER

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3 Claims. (Cl. 126—90)

This invention relates to improvements in circulating heaters and more particularly to a heater of this type which is constructed and arranged to be operated in a most efficient manner with a gaseous fuel.

An object of the invention is to provide a heater of the character described which with a comparatively low fuel consumption and without danger of giving off gases of combustion from the burner, will quickly and thoroughly heat and discharge therefrom a comparatively great volume of air permitted to circulate therethrough.

Another object is to provide a heater of the character described which may be made in comparatively small sizes yet have a maximum of heating surface and air circulating and heating capacity owing to the construction and arrangement of the combustion and heating chamber and its associated parts and the fact that the gaseous fuel burner takes up but little of the space which is advantageously used to increase the heating capacity and efficiency of the heater as aforementioned.

A further object is to provide a heater of the character described in which a novel form of combustion chamber has the threefold purpose of positively excluding the gases of combustion, providing a comparatively large directly heated surface exposed to the air circulation past the chamber, and defines an air circulating passage of a form and arrangement to insure a quick and thorough heating of a comparatively large volume of air circulating therethrough.

The invention posseses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawing,

Figure 1 represents a vertical sectional view of a heater constructed in accordance with my invention.

Figure 2 is a side view of the heater with one side of the casing therefor removed.

Figure 3 is a plan view of the heater with the top wall removed.

In its present embodiment the heater of my invention is seen to comprise a casing 1 supported on legs 2, and having imperforate sides but being open at its upper and lower ends whereby a free circulation of air therethrough is provided for. At the top of the casing a perforated register plate or wall 3 is arranged in the usual manner.

Arranged within and extending for substantially the full length and width of the heater casing is a combustion and heating chamber 5 which is gas tight throughout save at the lower open end thereof. This open end is disposed substantially at the plane of the lower open end of the casing and provides for secondary air to support combustion of gaseous fuel issuing from a burner 6 disposed in the lower part of said chamber. The gases of combustion are vented through a flue 7 connected with the chamber 5 at a point near the top thereof and extended outward therefrom for connection with a flue or chimney in the usual manner.

The heating and combustion chamber, although relatively large and nearly equal to the length, height and width of the casing, is however spaced at its sides and top from the sides and top of the casing so as to provide therearound a free passage for upward circulation of air through the casing. Owing to the size of said chamber there is provided a large heated area past and in contact with which the air moves when circulating through the heater, this air being free from contamination by the gases of combustion due to the venting of the chamber as aforementioned. With this arrangement it is seen that a large volume of air is permitted to circulate between the casing and chamber 6 and is thoroughly and quickly heated by contact with and the heat radiating from said chamber.

To increase the heating capacity of the combustion and heating chamber 6, vertically disposed fins or vanes 10 are fixed on the side walls of the chamber and extend downward from the top thereof to points about two thirds of the vertical height of said chamber. The outer edges of these vanes are spaced from the side walls of the casing and the upper edges are spaced from the register plate 6 whereby the maximum air circulating and heating space is provided.

To increase the effectiveness of the chamber 6 as an air heating means and at the same time improve the air circulating and general heating qualities of the heater, said chamber has the lowermost portions 14 of its opposed side walls inclined outward as at 15 to the point 16 located about one third of the way up the chamber. From this point the said side walls converge as at 17 to a narrow rounded upper wall 18 forming the top of the chamber. This formation of the

side walls of the chamber provides passages 19 which from their lower enlarged ends are gradually reduced to the point 16 then gradually enlarged towards their upper ends. It is to be noted that by this arrangement a venturi effect is provided in each of said passages, whereby the velocity of the air is increased adjacent the reduced portions of the passageway.

The upwardly converging wall portions 17 present surfaces interiorly of the chamber 5, which are directly impinged upon by the heated gases flowing upward in said chamber and are thereby more quickly and thoroughly heated. This direct heating of said wall portions is enhanced by a baffle 20 so arranged above the burner as to spread out the flames and heated gases and cause them to pass upward along said wall portion rather than up through the mid-space between said wall portions. Preferably a deflecting plate 21 is positioned across the chamber immediately below the flue opening so as to prevent the escape of the gases directly into the flue before their heat is dissipated along the walls of the chamber, the end edges of the plate being spaced from side ends of the chamber whereby the gases may pass to the flue opening after having transversed the desired course in the chamber.

It should be noted that the vanes or fins increase in width towards their upper ends and therefore present a greater heated area at the upper and larger portions of the passage 19. This insures the heating of the greater volume of air passing through said portions of said passages.

Of considerable importance is the feature of my invention which insures the quick and free discharge of the heated air from the upper end of the casing. By referring to Figure 1 it will be seen that the heated air discharges from the passages 19 almost straight upward and that practically little or no surface of the chamber separates the passages at their point of discharge. In this manner there is practically entirely eliminated the curling or deflection of the heated air between the discharging streams as the latter are emitted from the heater. With this arrangement, therefore, all of the air discharged from the passages will move straight upward without restriction, and the circulation of a maximum volume of air through the heater will be assured.

I claim:

1. An air-circulating heater comprising an outer casing open adjacent the top and bottom, an inner casing spaced from and lying within the outer casing and having opposing side walls with upper portions extending convergently upward for the greater vertical length of said first casing, and a lower portion forming a burner chamber, and a burner located within said burner chamber below said convergent side wall portions, the space defined between the inner and outer casing forming a passageway having a restriction adjacent the lower end of said convergent wall portions, and means at the lower end of said convergent wall portions against which the heated products on leaving the burner will initially impinge for deflection outwardly of their normal upward course.

2. An air-circulating heater comprising an outer casing with upper and lower openings, an inner casing spaced from and lying within the outer casing and having opposing side walls with upper portions extending convergently upward for the greater height of said first casing, a burner within the lower part of the inner casing position below the convergent wall portions and above the lower end of the casing, the space defined between the inner and outer casing forming a passageway having a restriction adjacent the lower end of said convergent wall portions, and means at the lower end of said convergent wall portions and immediately over the burner arranged to deflect outwardly the ascending products from the burner and serving to define with the lower portion of the casing below said convergent wall portions, a chamber for the burner and a constricted outlet for said products from the chamber to the space in the casing between said wall portions.

3. An air-circulating heater comprising an outer casing with upper and lower openings, an inner casing spaced from and lying entirely within the outer casing and having opposing side walls with upper portions extending convergently upward for the greater height of the outer casing, and lower portions extending convergently downward from the upper portions to define a venturi air passage between the inner and outer casings, a deflecting member in the inner casing extending adjacent the juncture of said upper and lower portions and defining a constricted passage therebetween, and a burner in the portion of the inner casing between the downwardly converging side wall portions and immediately under said deflecting member.

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