

C. L. ESTERLY & B. A. HORWITZ.
HOT AIR FURNACE.

APPLICATION FILED APR. 24, 1912.

1,051,320.

Patented Jan. 21, 1913.

2 SHEETS—SHEET 1.

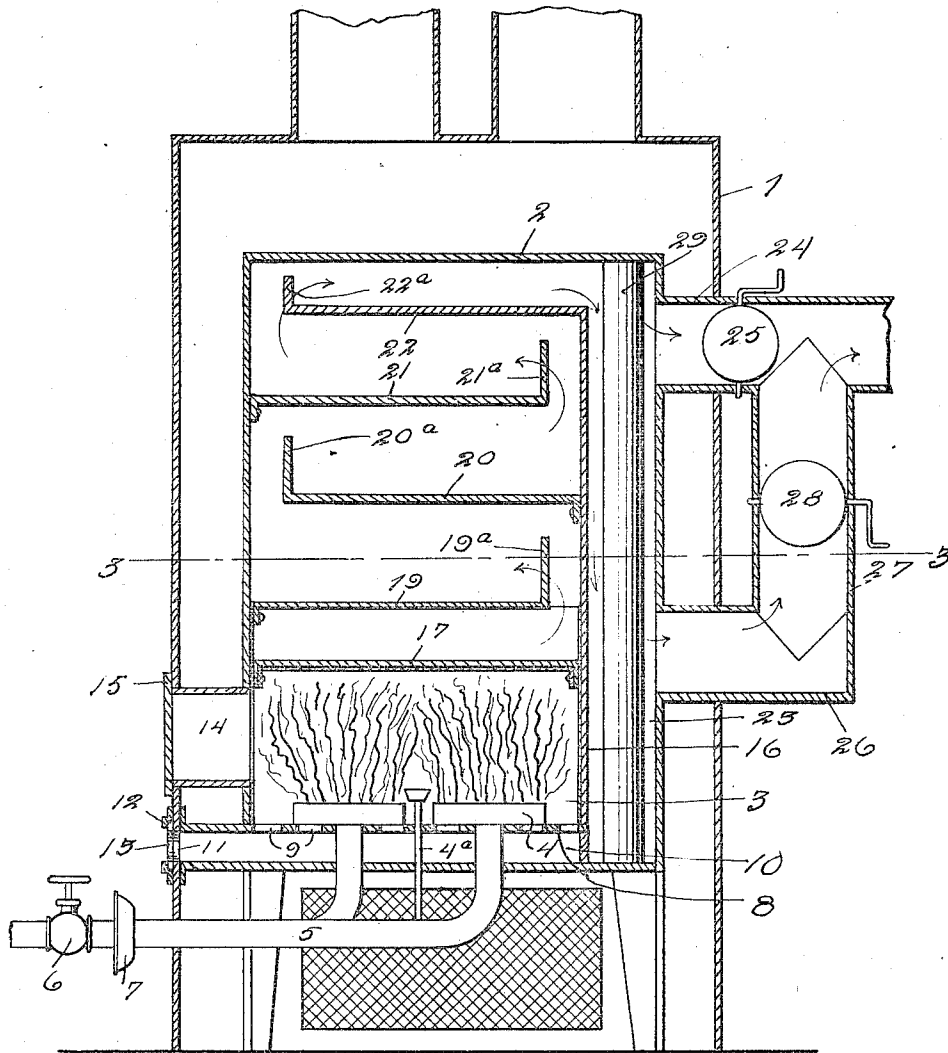


Fig. 1.

Witnesses

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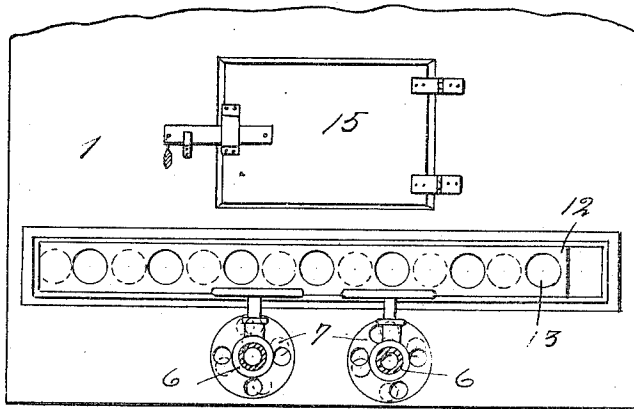


Fig. 2.

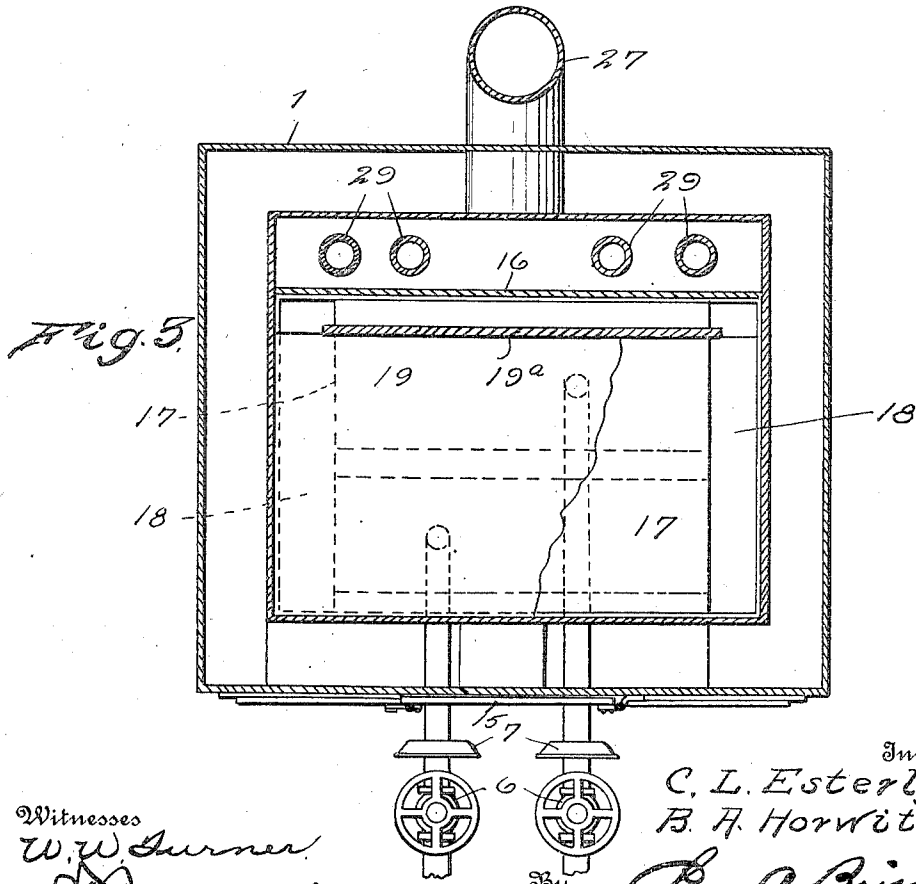


Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES L. ESTERLY AND BENJAMIN A. HORWITZ, OF CLEVELAND, OHIO.

HOT-AIR FURNACE.

1,051,320.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed April 24, 1912. Serial No. 692,867.

To all whom it may concern:

Be it known that we, CHARLES L. ESTERLY, a citizen of the United States, and BENJAMIN A. HORWITZ, a subject of the Czar of Russia, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

Our invention relates to hot air furnaces and particularly to furnaces employing hydro-carbon vapor for heating the furnace and has for its object the provision of a furnace that will produce the maximum quantity of heat compared to the amount of hydro-carbon consumed.

Our invention relates particularly to the provision of baffle plates contained within the combustion chamber, so constructed that the casing of the combustion chamber is thoroughly heated by the flames arising from the burners, said baffle plates being arranged with staggered openings and having upstanding flanges on the free edges thereof to compel the products of combustion to engage the sides of the combustion chamber for the purpose stated.

Our invention will be described in detail hereinafter and illustrated in the accompanying drawings, in which,

Figure 1 is a vertical sectional view taken through the middle of the furnace; Fig. 2, a fragmentary front elevation of the furnace; and Fig. 3, a cross section on the line 3-3 of Fig. 1.

In the drawings, similar reference characters will be used to designate corresponding parts throughout the several views.

1 indicates the outer casing of a furnace having inclosed therein, the heating drum 2, containing the combustion chamber 3 in its lower portion, in which is mounted the burners 4 connected by means of pipes 5 with any suitable supply of gas or hydro-carbon, (not shown).

6 indicates valves in the pipes 5 to control the passage of the gas or hydro-carbon therethrough, and 7 the mixing chamber for mixing air with the gas in the usual manner employed in such burners.

8 indicates the base plate of the furnace below the burner and provided with openings 9 for the passage of air from the air space 10 to the combustion chamber, said air space 10 being connected with the outside of the furnace by means of an opening

11 having a slide door 12 provided with openings 13 to register with openings in the front of the air chamber.

14 indicates another opening connecting the outside of the furnace with the combustion chamber and closed by a door 15 to permit the burners 4 to be ignited.

4^a indicates a pilot light to ignite the burners.

16 indicates a vertical wall spaced apart from the rear wall of the heating chamber 2 and inclosing the rear side of the combustion chamber 3 heretofore described. Secured to the front wall of the drum 2 and to the plate 16, is a horizontal plate 17 above the burners 4 and spaced apart from the side walls of the drum 2 to form passageways 18 for the passage of the products of combustion from said burners 4 into the upper part of the heating drum.

19, 20, 21 and 22 indicate baffle plates secured to the side walls and to the front wall of the drum 2 and plate 16 alternately, forming staggered openings to compel the products of combustion to pursue a zigzag course through the heating drum, and each of said baffle plates is provided with an upstanding flange on its free edge indicated at 19^a, 20^a, 21^a and 22^a respectively, and shorter than the width of said baffle plates to direct the products of combustion upwardly along the ends of the heating drum. The passages provided at the ends of said flanges by making the flanges shorter than the width of the furnace, provide for directing the products of combustion along the side walls of the heating drum.

By this construction, it will be understood that the products of combustion are compelled to take a circuitous course through the heating drum and engaging the walls thereof, so that substantially all of the heat from the burners is extracted by contact of the products of combustion with said walls of the drum to more thoroughly heat the interior of the furnace proper.

The upper side of the baffle plate 22 communicates with the space 23 formed by the wall plate 16 and the rear wall of the heating drum 2 and the products of combustion are directed into said space 23 after passing along the dome of said heating drum. 24 indicates a flue secured in the upper portion of the rear wall of the heating drum 2 and having a suitable damper 25 mounted therein, while 26 indicates another flue se-

cured to the rear wall of the heating drum below the flue 24 and having a pipe 27 connecting with the flue 24 outside of the damper 25.

- 5 28 indicates a damper in the pipe 27 to control the passage of the products of combustion therethrough.

It will be understood from this description that the products of combustion after
10 pursuing the circuitous course in the heating drum as described, pass into the chamber 23 and from thence are directed through either flue 24 if the chamber 23 is open to permit passage therethrough, or if the damper 25 is closed, the products of combustion
15 pass downwardly through said chamber 23 and pass out through the flue 26 and pipe 27 into the flue 24, the damper 28 being open for this purpose. This construction of
20 flues provides for taking advantage of the heated air from the heating drum so that in severe weather, the products of combustion are directed through the chamber 23 to more thoroughly extract the heat therefrom,
25 while in milder weather, the products of combustion may be permitted to pass out directly through the flue 24.

- In order that the heated air in the chamber 23 may be more thoroughly heated, we
30 provide vertical tubes 29 secured to the bottom and top of the heating drum and forming passages for the air from the lower por-

tion of the furnace to the dome to heat the air passing through said pipes.

Having thus described our invention, 35 what we claim is:—

1. In a hot air furnace, a heating drum, parallel baffle plates horizontally disposed therein, the free end of each of said baffle plates being provided with a vertical flange 40 of less width than the baffle plate to cause the products of combustion to engage the sides of the drum.

2. In a hot air furnace, a heating drum, a combustion chamber beneath the said drum, 45 a plate secured to two sides of said drum and spaced apart from the other two sides, parallel baffle plates attached on three sides to the drum, the free end of each of said baffle plates being spaced from the adjacent 50 side of the drum and provided with an upturned vertical flange offset from the adjacent sides of the plate to provide openings adjacent to the ends of said flanges to direct the products of combustion against the sides 55 of the drum.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES L. ESTERLY.
BENJAMIN A. HORWITZ.

Witnesses:

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