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1,607,312

COAL GAS BURNER

Filed July 22, 1925

Fig. 1

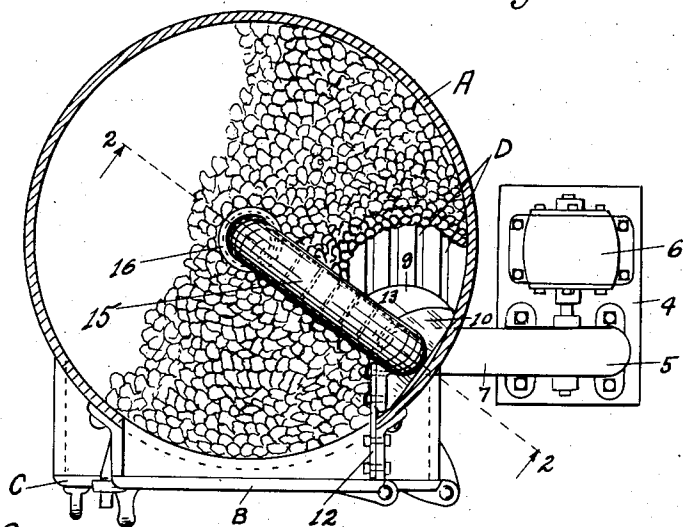


Fig. 2

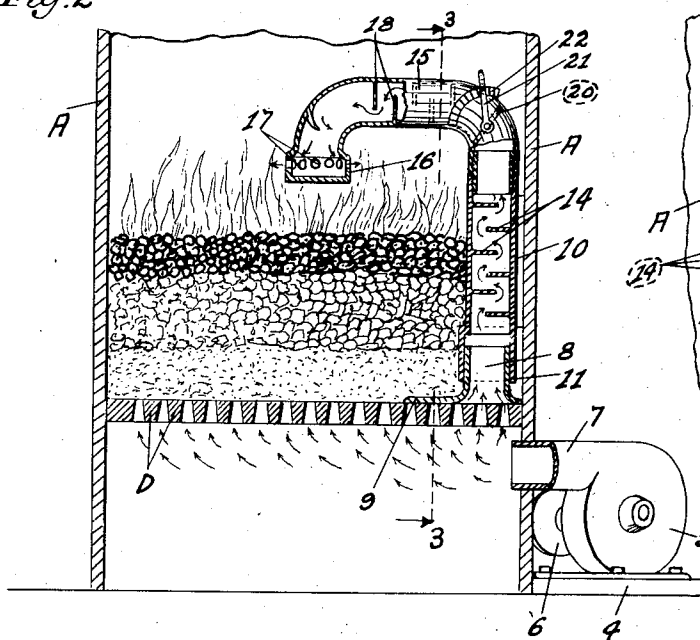
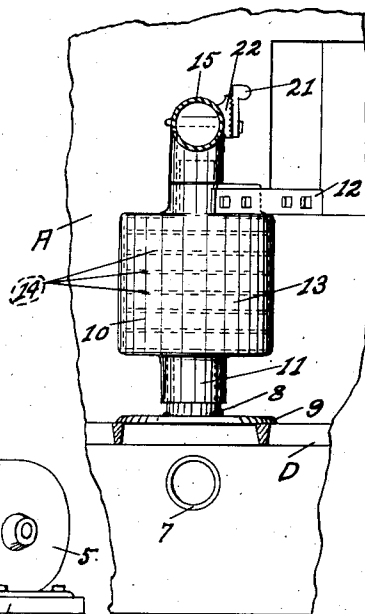


Fig. 3



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UNITED STATES PATENT OFFICE.

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COAL-GAS BURNER.

Application filed July 22, 1925. Serial No. 45,242.

This invention relates to means for oxidizing, or mixing the carbon monoxide gases which arise from coal fires in furnaces, and the like, with preheated air under pressure, so as to form a proper and highly combustible mixture of dioxide gas, which, by burning in the furnace, will both increase the heating efficiency of the coal or other fuel, and, by so doing, will also be carried off without leaving the usual and objectional deposits of soot in the flues and draft chambers. More specifically the present invention is an improvement on the device shown in my co-pending application for Patent, Serial Number 752,148, filed on November 25, 1924 for means for oxidizing fuel gases for furnaces and the like.

As stated in the specification of the above mentioned application, it is a common and well known fact that non-combustible gases are very frequently generated by and over a bed of hot coals in any fire box, and that these gases are not only very objectionable, but are, under some conditions, dangerous, and are usually responsible for the heavy deposits of soot which accumulate in the flues and draft chambers. In order to overcome these objections and to utilize these otherwise non-combustible gases, and thus the full heating efficiency of the fuel, it is necessary to oxidize or oxygenate these gases, and preferably to charge the gases with oxygen of approximately the same temperature as the gases, in order that a proper and complete fusion or blending of the gas and oxygen may result.

The mechanism I employ to accomplish the objects above noted will be more fully described and set forth in the following specification and claims, reference being had to the accompanying drawing, in which:

Figure 1 is a horizontal sectional view of a common type of furnace in which my invention has been incorporated.

Figure 2 is a sectional elevation as seen substantially on the line 2—2 in Figure 1.

Figure 3 is a sectional elevation about as on the line 3—3 in Figure 2.

Referring to the drawing more particularly and by reference characters A designates the cylindrical wall of a furnace, having a fire door B, an ash pit door C, and a series of grate bars D, all of common and well known construction.

Arranged near and preferably at one side of the furnace, is a platform 4, upon which

is mounted a centrifugal blower 5 driven by a motor 6. A discharge flue, or spout, 7 of the blower extends into the ash pit of the furnace, immediately below the grate D. Upon the grate D and preferably above the discharge end of the tube 7 is a hollow base member 8 having a supporting flange 9. A drum 10 is arranged adjacent to the wall of the furnace and has a reduced lower end, or neck, 11 which fits snugly over the base 8. The drum is rigidly held in position by any suitable means, such as a brace or bracket member 12, but the base 8 is vertically slidable in the neck 11 so that the grate bars may be oscillated or "shaken", in the usual manner, yet the base 8 will always retain its proper operating position with respect to the drum neck 11. This drum comprises an air preheating chamber and has a relatively large convex front surface 13 which comes in direct contact with the hot coals of the furnace. The back, or outer, surface of the drum contacts with the wall of the furnace in such a manner as to be cooled thereby and to prevent this surface from coming in contact with the coals, and by so doing, preserves the drum from being burned or melted up by the intense heat of the furnace. In devices of this character, which permit the hot coals to substantially surround it, it is found that there is no metal which will withstand this terrible heat for any length of time, as there is nothing except the inner upward current of air to counteract the effect of the heat. But, by giving a substantially large area to the inner surface 13 and by keeping the outer surface out of contact with the coal, I find that I cannot only preserve the entire structure against the deteriorating effect of the fire, but also absorb sufficient heat to thoroughly and properly preheat the air coming up through the drum for the oxidizing purposes. It may here be noted that although the back face of the drum is shown as being slightly less convex than the adjacent surface of the wall A, so as to form a small air space, it may have the same curvature so that its entire area will contact with and be cooled directly by the wall.

In order to properly oxidize the gas, which is normally suspended over the bed of coals in the furnace, I find it necessary to heat the injected air to a temperature of approximately one-thousand degrees Fahrenheit, and in order to do this properly, and effi-

ciently, and prevent a relatively cool and ineffective air supply from reaching the gas, I provide the drum 10 with a series of baffle plates 14, which are arranged in staggered relation, so as to zig-zag, slightly retard, and lengthen the upcoming air current, and these baffles are made integral with the drum, so as to absorb as much heat as possible, which heat, in turn, is obviously transmitted to the air current much more thoroughly than if the baffles were not present.

Upon the upper end of the drum 10 is secured the outer end of a horizontally arranged pipe 15, which is suspended over the fire at such a distance as to be heated, but not overheated or damaged thereby. The inner end of this pipe 15 has a downwardly suspended spreader, or cap, 16, the periphery of which is perforated as at 17, so as to eject the heated air radially in all directions into the suspended gases. The pipe 15 is provided with staggered vertical baffles 18, which have the same function as, and are auxiliary to, the baffle plates 14. In the elbow connecting the members 13 and 15 is a butterfly damper 20, adjusted by a lever 21 which is retained in adjusted positions by a rack 22. The object of this damper is to regulate, retard, or entirely shut off the air supply when so desired.

It may here be noted that while the bracket 12 rigidly supports the drum 10 within the furnace, the base 8 has a limited vertical movement within the member 11 so as to permit the base to reciprocate up and down when the furnace grate is being shaken.

It is understood that various modifications may be made in the general design and structural details of the invention as herein illustrated and described, providing, however, that such modifications come within the spirit and scope of the appended claims. Having now, therefore, fully shown and described my invention what I claim to be new and desire to protect by Letters Patent is:—

1. A gas burner for a furnace, comprising a drum, arranged within the furnace, adjacent to the wall thereof, and over the grate,

so as to be in contact with and subject to the heat of the fuel at one side and subject to the cooling action of the wall at the other side, a distributor arranged over the fire bed in the furnace and communicating with the drum to receive heated air therefrom, and discharge it over the fire bed, baffles arranged within the drum, and a damper above the baffles for controlling the current of air through the drum.

2. The combination with a furnace, of a hollow drum arranged over the grate of the furnace, a horizontal tubular member extending from the upper end of the drum and inwardly over the fuel level, horizontal baffles in the drum and vertical baffles in the tubular member, said baffles being formed integrally with the drum and tubular member.

3. The combination with a furnace, of a hollow drum, arranged over the grate of the furnace, a horizontal tubular member extending from the upper end of the drum and inwardly over the fuel level, horizontal baffles in the drum, and vertical baffles in the tubular member, said baffles being arranged in staggered relations so as to lengthen the air course and retard the air current through the drum and tubular member.

4. The combination with a furnace, of a hollow air heating member rigidly secured adjacent to the wall of the furnace and above the grate thereof, a distributor communicating with the upper end of the member, and a base member resting on the grate and adjustably associated with the lower end of the air heating member.

5. The combination with a furnace having a grate, of a hollow base member resting on the grate, an air preheating member communicating with the base and slidably associated therewith, means for rigidly suspending the preheating member over the base, and a horizontal tubular member extending from the upper end of the preheating member and over the fuel level of the furnace.

In testimony whereof I affix my signature.
FREDERICK H. SCHIERENBECK.