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W. E. MacKENZIE ET AL

1,995,003

GAS BURNER

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FIG. 1.

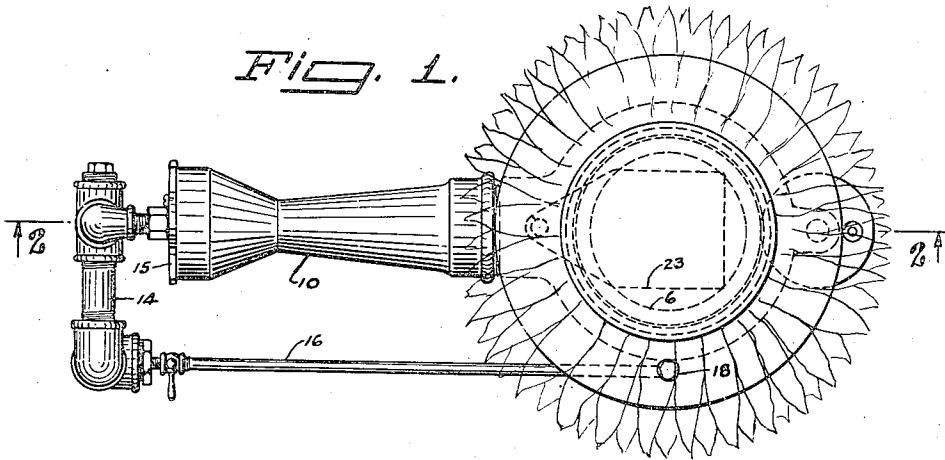


FIG. 2.

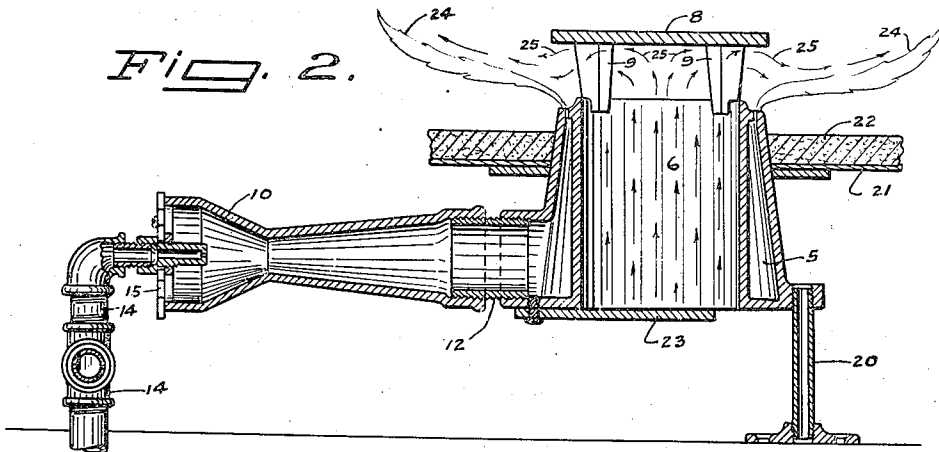
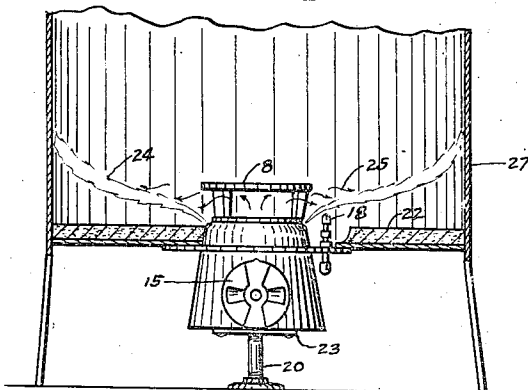


FIG. 3.



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GAS BURNER

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2 Claims. (Cl. 158—110)

This invention relates to a new and especially constructed gas burner that is particularly adapted to be used in coal fired furnaces that are converted into automatic gas fired heating plants. The burner, however, will also operate to good advantage in a gas furnace or boiler that is provided with a vent to procure a draft for proper burner operation.

It is one of the objects of the invention to provide a burner of the character described with means for producing a flame on a horizontal plane instead of a vertical plane and thus eliminate the necessity of providing a fire brick baffle plate or spreader above the flame.

It is another object of the invention to spread the flames from a vertical to a horizontal plane by providing a baffle plate on top of the burner and to bring secondary air through the device and against the bottom of the baffle plate in such a manner that the secondary air will be deflected on top of the flame and will spread the flame to a horizontal plane and will prevent the flame from touching the baffle plate or any part of the burner, thus assuring long life to castings.

It is another object of the invention to provide a plurality of chambers for mixing the air and gas and to construct and arrange the said chambers and convey the air and gas therethrough in such a manner as to cause the air and gas to be more thoroughly mixed and thus produce more complete combustion.

The invention further consists in the particular combination, construction and association of the different parts, such as described in the following specification, and possesses various other objects and features of advantage, some of which, with the foregoing, will be made manifest in the following description of the preferred form of the invention that is illustrated in the drawing accompanying and forming part of the specification.

It is to be understood that it is not intended to limit the invention to the embodiment shown by said drawing and description, as variations may be adapted within the scope of the invention as set forth in the claims.

In the accompanying drawing:

Figure 1 is a top plan view of one type of device involving the invention.

Figure 2 is a longitudinal sectional view taken on line 2—2 of Figure 1, looking in direction of the arrows and illustrates the fundamental principle of the invention, and is shown with a portion of a furnace combustion chamber thereto attached.

Figure 3 is an end view of the burner and illus-

trates the method of scaling same in the ash pit of a furnace.

Referring in detail to the drawing wherein like reference numerals designate like parts throughout the several views the numeral 5 designates a chamber into which the primary mixture of air and gas is conveyed and the numeral 6 designates another chamber for conveying secondary air. The numeral 8 designates a baffle plate that is horizontally mounted on top of the chambers as shown in Figure 2. The baffle plate is provided with suitable legs 9 that are supported on the top of the walls of the chamber 6 and are made of a length sufficient to provide the necessary space between the bottom of the baffle plate and the top of the chamber to enable the secondary air to be properly deflected on top of the flame to spread the flame and hold same away from the castings. The numeral 10 designates a standard Venturi tube that is attached to the inlet of the chamber 5 by means of the nipple 12. The numeral 14 designates pipes that form the gas supply line for conveying gas into the Venturi tube and the numeral 15 a shutter for enabling air to be drawn into the Venturi tube. The numeral 16 designates the pilot line and 18 the pilot. A suitable support 20 is provided to properly hold the burner in position. A metal plate 21 is mounted around the outer wall of the chamber 5 and is adapted to fit close to the wall of the furnace as shown in Figure 3. Cement 22 is then provided on the plate 21 and is sealed tightly against the walls of the furnace.

From the foregoing it will be seen that all air that enters the furnace must first pass through the chambers of the burner. It will be particularly noted that the secondary air that passes through the chamber 6 will strike the bottom of the baffle plate which will deflect the air and cause it to be brought down on top of the flame as illustrated by the arrows in Figures 2 and 3. The flame is thus spread by the secondary air which forces the flame on a horizontal plane and prevents it from coming into contact with the baffle plate or any part of the burner. This feature positively prevents the parts from cracking or burning out due to the flame coming into direct contact with the metal which is a common fault with other burners. By bringing secondary air down on top of the flame only, prevents cold air from getting in between the furnace wall and flame and thereby enables the metal in the furnace wall to absorb all of the heat from the flame, thus enabling the furnace to give a better heating efficiency. Another feature of the invention is to

burn the gas with radiant ends on the flame without producing any soot in the furnace. This is accomplished also by introducing heated air on top of the flame. By being able to burn the gas with radiant ends, the necessity for using refractory material commonly used to radiate heat to the furnace walls can be eliminated without any possibility of producing carbon monoxide gas. Important in contributing to the application of a downward and outward stream of air against the gas and flame, is the extension, as clearly shown in Figure 2 of the drawing, of the secondary air passage above the top of the mixing chamber.

Another feature of the invention is the provision made to vary the volume of secondary air that is conveyed to and against the flame. This provision consists in providing a valve or damper over the bottom of the passage-way 6, the preferred method being to provide a plate 23 and to pivotally mount same to the bottom of the housing as shown in Figures 1 and 2. Figure 1 shows the plate in dotted lines and illustrates it in its furthest closed position over the inlet of the air passage-way 6. It will readily be seen that the plate can be swung to a position where it will leave the inlet of the passage-way 6 entirely open or can be moved to other positions which will vary the area of the inlet. The numeral 24 designates the flame and the arrows 25 illustrate the direction of travel that the secondary air takes in passing through the tube 6 and after it strikes the baffle plate 8 and is deflected against the top of the flame, changing the flame from a vertical to a horizontal plane. The numeral 27 designates a furnace in which the burner is mounted. It will readily be seen that the less the inlet of the passage-way 6 is restricted, the greater will be the volume of air that will pass through the passage-way and out of the space provided between the bottom of the baffle plate and the top end walls of the chambers. It will further be seen that the more volume of air that strikes the baffle plate, the greater the force will be that is applied against the flame, and will thus cause a flatter flame to be produced. In other words the damper 23 can be adjusted to allow a vertical flame or to give a partial or complete horizontal flame. Also the secondary air can be varied and kept in correct proportions to different volumes of the primary mixture that is supplied to the mixing chamber 5 and thus produce more perfect combustion.

Having thus illustrated and described a certain form of construction and arrangement of parts pertaining to the invention, it is to be understood that the device can be built up in any suitable form or manner, as it is desired to include in this application for Letters Patent of the United States of America, any and all patentable novelty that exists in the invention disclosed and all that comes within the fundamental principle of the invention as set forth in the claims hereinafter mentioned.

What is claimed is:

1. A gas burner comprising a casing having a pair of concentric, substantially cylindrical walls and providing between said walls an annular mixing chamber for gas and primary air having an opening at the top of said chamber to afford escape of the gas and air for burning, the inner of said walls defining a cylindrical secondary air chamber extending axially vertically for the passage therethrough of secondary air and being open at the lower and upper ends thereof to the atmosphere for entrance and escape of secondary air, and a transversely disposed baffle plate positioned over and spaced from the upper ends of said chambers for deflecting said secondary air radially outward and into contact with the gas and primary air, said chamber opening being disposed directly under the outermost portion of said plate and formed to provide a direct vertical ascent of the gas and primary air.

2. A gas burner comprising a casing having a pair of annular walls positioned one within the other and providing therebetween an annular mixing chamber for gas and primary air and having an opening at the top of said chamber to afford escape of the gas and air for burning, the inner of said walls defining a secondary air passage and being open at the top of said inner wall for escape of secondary air for mixing with said gas and primary air, and a transversely disposed baffle plate positioned over and spaced from the upper ends of said mixing chamber and secondary air passage for deflecting said secondary air radially outward and into contact with the gas and primary air, said chamber opening being disposed directly under the outermost portion of said plate and formed to provide a direct vertical ascent of the gas and primary air.

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