May 26, 1931. H. W. LIVINGSTON 1,806,858

GAS BURNER

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Fig. 1.

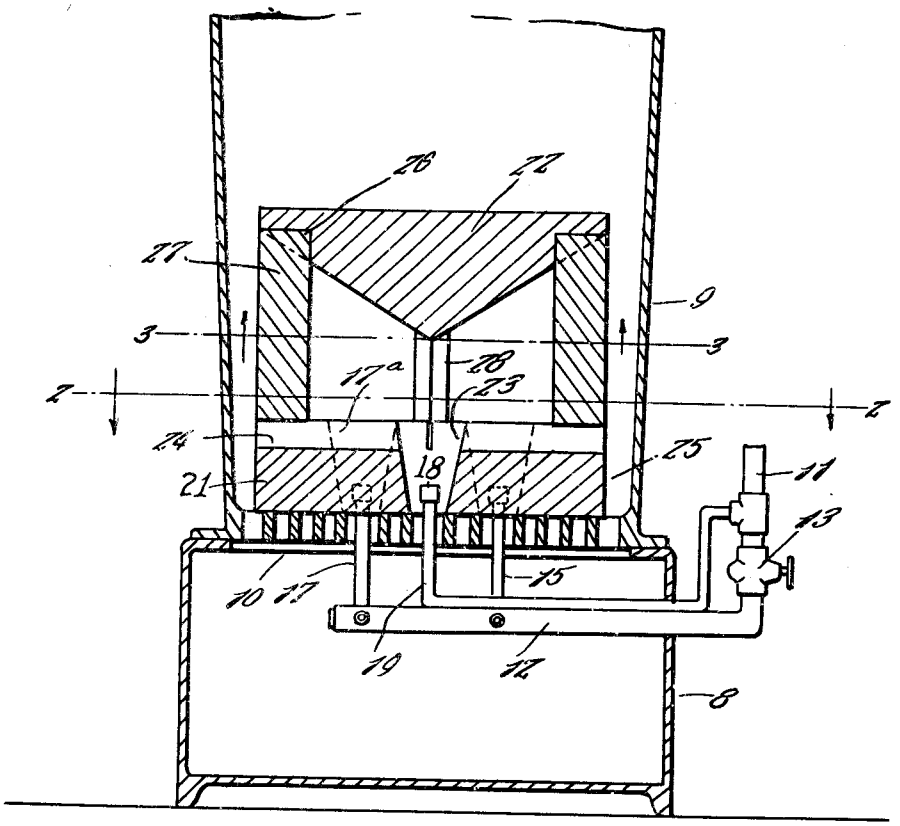
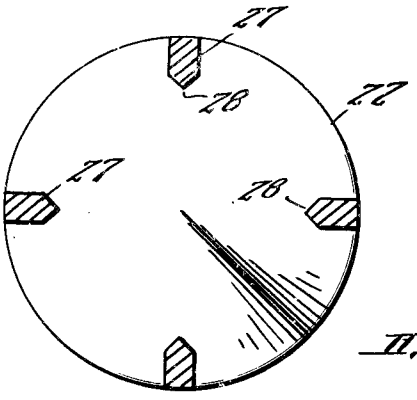


Fig. 3.



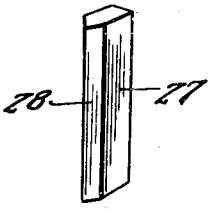


Fig. 7.

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Fig. 2.

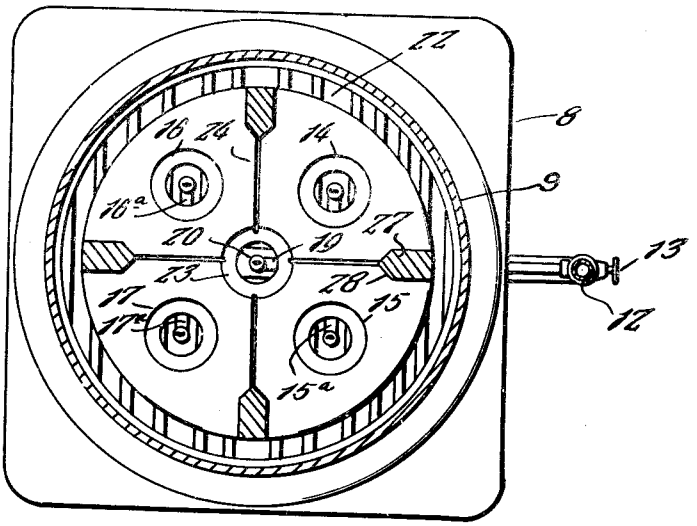


Fig. 4.

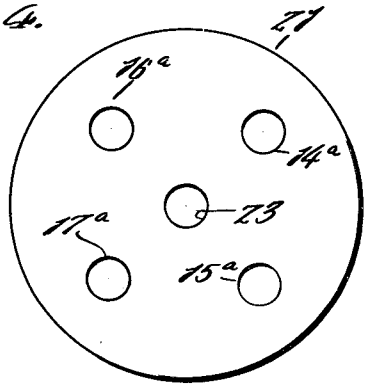
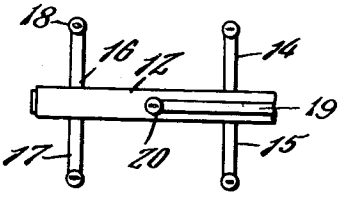


Fig. 5.



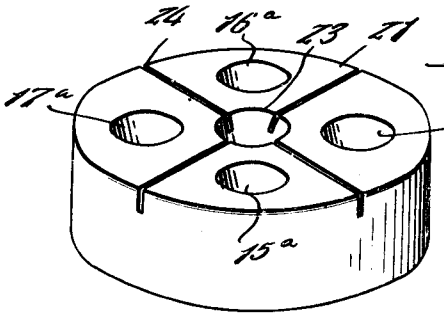


Fig. 6.

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UNITED STATES PATENT OFFICE

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GAS BURNER

Application filed December 14, 1929. Serial No. 414,090.

This invention relates to an improved gas burner constructed for efficient consumption of natural and artificial gas, and expressly designed for use in the combustion chamber of a furnace of the wood and coal burning type.

An object is to provide a burner of this character by means of which a more desirable and uniform combustion of the gas and air is provided, thereby intensifying the heat and at the same time, reducing the expense of operation.

My primary aim, however, is to generally improve upon burners found in this classification by providing a novel structural arrangement of parts characterized by unusual simplicity, susceptible of expeditious and dependable installation, and constructed for coordination of functions and operation to insure practical and efficient results.

Other features and advantages will become more readily apparent from the following description and drawings.

In the drawings:

Figure 1 is a fragmentary vertical sectional view through a furnace equipped with a gas burner constructed in accordance with the present invention.

Figures 2 and 3 are horizontal sections on the lines 2—2 and 3—3 respectively of Figure 1.

Figure 4 is a bottom plan view of the combined base and mixing device.

Figure 5 is a top plan view showing the pipe assembly.

Figure 6 is a perspective view of said mixing device.

Figure 7 is a perspective view of one of the spreader plate supporting posts.

In the drawings, in Figure 1, the reference numeral 8 designates the base of a furnace and 9 the casing. The grate is designated at 10 and is of ordinary construction.

In accordance with the present invention, I provide a gas supply pipe 11 having a main duct 12 depending into the fire box of the furnace and provided with a suitable control valve 13. Leading from this, on opposite sides, are branch pipes 14, 15, 16 and 17 having upwardly extending portions terminating in apertured jet forming caps 18.

The reference character 19 designates a pilot which is disposed centrally with respect to the branches 14 to 17 inclusive and is also provided with a jet forming cap 20. The capped ends of the gas conducting and distributing means, it will be noted, extend upwardly beyond the furnace grates 10 as indicated in Figure 1.

The principal novelty is predicated upon the construction and arrangement of the parts 21 and 22 respectively. The part 21 is in the nature of a circular or disc-like base made either in one piece or several sections as desired. It is composed of fire clay and provided with a multiplicity of frusto-conical holes opening through the bottom and top thereof. There is a central hole at 23 from which feed grooves 24 radiate. These grooves 24 serve to supply the air. The remaining holes 14*a*, 15*a*, 16*a*, and 17*a* provide mixing chambers for the air and gas and constitute the primary combustion means. It will be noted that the capped ends of the branch pipes leading from the main fuel pipe have their capped ends located in the lower reduced end portion of these mixing chambers.

It is obvious that the pilot is constantly illuminated and supplies gas through the channels or grooves 24 to the various mixing chambers for efficient ignition. Thus, the primary air passes upwardly through the grate in the stove into the various mixing chambers and intermingles with the gas as it discharges through the capped ends of the branch pipes forming instantaneous and efficient combustion.

In connection with the details described, I call attention to the fact that the diameter of the base block 21 is less than the diameter of the furnace casing forming a surrounding annular space 25 through which the secondary supply of air flows.

The part 22 is in the nature of a spreader and is constructed from fire clay and is of conical configuration. The apex portion thereof is disposed downwardly and directly above the axis of the pilot mixing chamber or bowl 23. This conical spreader is disposed

in vertically spaced relation above the base plate 21. It is formed at its periphery with sockets 26 receiving the upper end of the circumferentially spaced supporting posts 27. These posts are also of fire clay and I provide a group of four of such posts, the lower ends resting on the top of the base and the upper ends fitting snugly in the sockets 26. The posts are of general rectangular form and have their inner edges 28 of V-shaped configuration to split the flame and to aid in intermingling of air and gas and to enhance combustion.

The following constitutes the new and improved features of the invention:

First: The method of utilizing the two currents of air is new and original; by this method of mixing the primary air with fuel in the mixing hole or chamber in the mixing plate combustion does not take place until it reaches above the top level of the base plate. The secondary air then diffuses the fire throughout the entire bowl of the furnace, producing a hotter fire with less fuel consumption.

Second: The use of the mixing chamber and two currents of air makes it possible to fill the fire bowl with fire by using larger and fewer openings for the gas supply which eliminates the upkeep of the supply pipes and prevents it becoming stopped with dust or dirt.

Third: The use of the spreader plate of this shape and of this material diffuses the fire efficiently and properly and the spreader itself retains heat.

Fourth: The base plate and spreader plates may be made in sections and placed in the firebox without removal of grates. They are inserted through the furnace door and may be put in or removed without affecting the use of the furnace for coal, wood or other fuel in case of failure of gas pressure.

Fifth: Actual experience has shown that with this mixture of primary air and gas diffused by the secondary air the heat from the fire is so diffused as to prevent burning out of either the mechanism itself or the walls of the fire box in the furnace.

A careful consideration of the foregoing in connection with the drawings will enable the reader to obtain a clear understanding of the construction, the arrangement, the operation, and the features and advantages of the improved organization. Therefore, a more lengthy description is regarded unnecessary.

Minor changes in shape, size and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice if desired.

I claim:

1. In a structure of the class described, in combination, a furnace including a firebox, and a grate in said firebox, a gas burner removably supported on said grate and comprising a base of disc-like form embodying air and gas mixing means, a spreader plate superposed and spaced from said base, and a plurality of circumferentially spaced vertically disposed supports resting on said base and serving to maintain said spreader in place.

2. A gas burner of the class described comprising in combination, a grate, a casing surrounding said grate, a disc-like base of fire brick supported on said grate, said base being of a diameter less than the casing and defining an annular surrounding secondary air space, said base being provided with a multiplicity of vertical passages of inverted frustro conical form defining air and gas mixing chambers, a spreader in the form of an inverted cone supported above said base, and gas supply means including branch pipes having upper capped ends projecting into said mixing chambers.

3. In a gas burner of the class described, a substantially disc-like base composed of fire clay having a mutiplicity of circumferentially arranged and spaced tapered passages defining air and gas mixing chambers, a central tapered passage defining a pilot chamber, the upper side of said base being formed with radial grooves communicating at their inner ends with said pilot chamber, and a spreader plate supported from said base.

4. In a gas burner of the class described, a substantially disc-like base composed of fire clay having a multiplicity of tapered vertical passages defining air and gas mixing chambers, a central tapered passage defining a pilot chamber, the upper side of said base being formed with radial grooves communicating at their inner ends with said pilot chamber, and a spreader plate supported from said base, said spreader plate being in the nature of an inverted conical body of disc-like form and formed of fireclay, the apex portion thereof being disposed directly above the axis of said pilot chamber.

5. In a gas burner of the class described, a disc-like base having a central frusto-conical passage vertically therethrough, a plurality of radial grooves formed in the top of the base communicating at their inner ends with said central passage and having their outer ends extending through the peripheral edge of said base, said base being further provided with a plurality of spaced frusto-conical passages arranged about said central passage substantially in a circle and defining a multiplicity of air and gas mixing chambers, an inverted conical spreader plate having its apex portion disposed above said central passage, and provided at the peripheral edge of its under side with a plurality of circumferentially spaced sockets, and supporting posts having their upper ends removably ar-

ranged in said sockets, and having their lower ends resting on the top of said base.

6. In a gas burner of the class described, a disc-like base having a central frusto-conical passage opening through its upper and lower faces, a plurality of radiating grooves formed in the top thereof communicating at their inner ends with said passage and having their outer ends extending through the peripheral edge of said base, said base being further provided with a plurality of spaced frustro-conical passages arranged within the peripheral edge of the base and surrounding said central passage and defining a multiplicity of air and gas mixing chambers, an inverted conical spreader plate having its apex portion disposed above said central passage, and provided at the periphery of its under side with a plurality of circumferentially spaced sockets, and supporting posts having their upper ends removably arranged in said sockets, and having their lower ends resting on the top of said base, the inner edges of said posts being of V-shaped form for the purpose specified.

In testimony whereof I affix my signature.

HARRY W. LIVINGSTON.