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GAS BURNER

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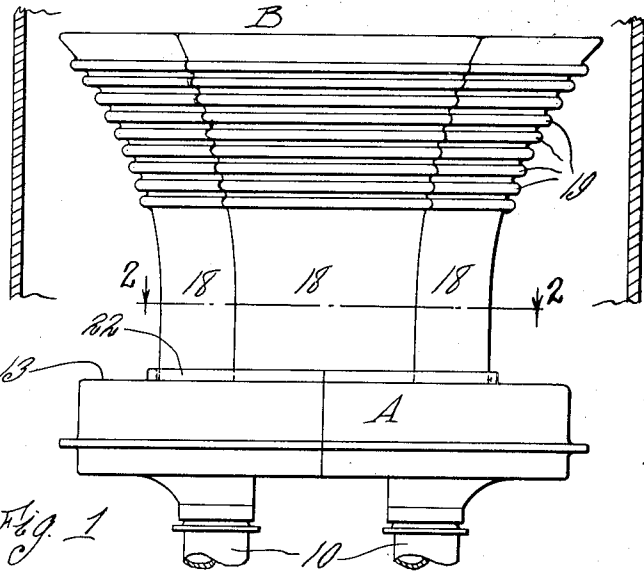


Fig. 1

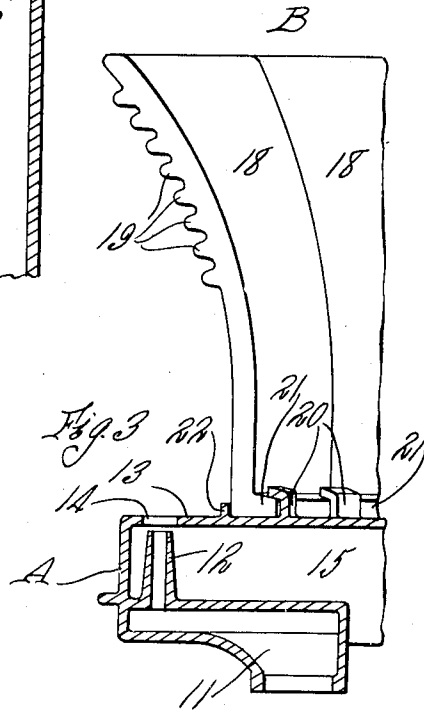


Fig. 3

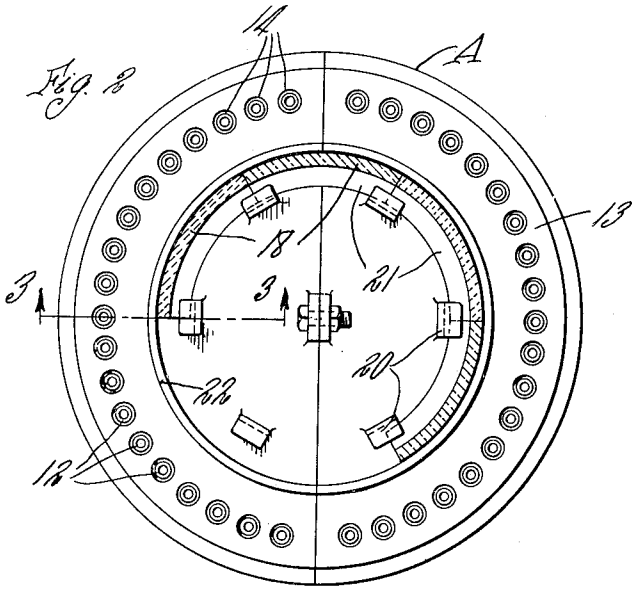


Fig. 2

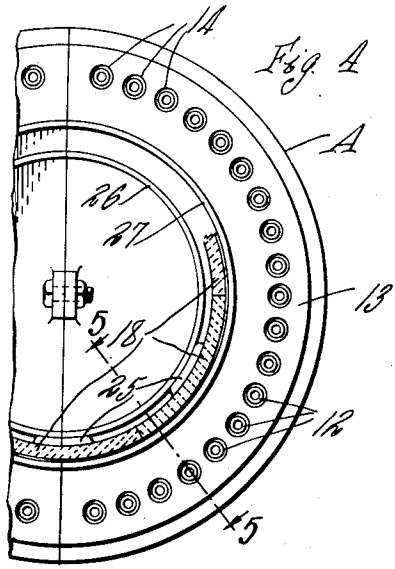


Fig. 4

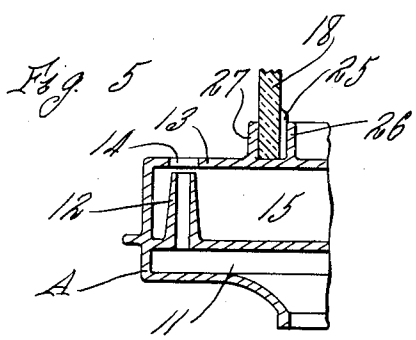


Fig. 5

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UNITED STATES PATENT OFFICE

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GAS BURNER

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7 Claims. (Cl. 153--113)

This invention relates to improvements in gas burners of the conversion type in which a gas burner may be placed into a furnace or heater designed initially for the burning of solid fuel.

5 In gas burners of the conversion type as heretofore made, it has been common practice to provide baffles extending at an inclination across the flame and supported at their lower edges on or near the burner and resting at their upper
10 edges against the furnace wall. Such baffles have the disadvantage that the inclination of the baffles and the distance from the gas discharge orifices to the baffle is different in different installations, depending upon the distance of the furnace
15 wall from the burner. The efficiency of such burners, therefore, varies in different installations. Flame deflecting devices mounted on or near the burner and extending toward the furnace wall, but not contacting therewith, have also heretofore
20 been made, but such devices were not of constructions which permit the use of substances which become luminous when highly heated, and which, therefore, have a high efficiency in the radiation of heat.

25 The objects of this invention are to provide a burner of this kind having a flame deflecting device arranged to deflect the flame outwardly toward the wall of the furnace in which the burner is installed, and in which this gas deflecting
30 vice is made in sections adapted to be supported side by side and held in upright operative position by gripping means engaging the lower ends of the sections; also to provide a flame deflecting
35 device of this kind in which the individual sections or baffles are formed with bases of improved construction for cooperating with gripping means to hold the baffles in correct positions; also to provide a burner which is provided with
40 gripping means of improved construction for cooperating with the base of the baffles; also to provide baffles of this kind having their upper portions curved or flared outwardly at a gradually increasing angle to the vertical to deflect the
45 flame and hot gases toward the furnace wall with a stream-line sweep, to produce more efficient transfer of heat to the furnace wall; also to improve the construction of gas burners of this kind in other respects hereinafter specified.

In the accompanying drawing:

50 Fig. 1 is an elevation of a gas burner having a flame deflecting device embodying this invention;

Fig. 2 is a top plan view thereof, partly in section, on line 2--2, Fig. 1, and showing two of the baffles removed;

55 Fig. 3 is a fragmentary sectional elevation

thereof, on an enlarged scale on line 3--3, Fig. 2;

Fig. 4 is a fragmentary sectional plan view similar to Fig. 2, but showing a slightly modified construction for holding the deflecting device;

Fig. 5 is a fragmentary sectional elevation on
60 line 5--5, Fig. 4.

In the accompanying drawing, A represents a burner of any suitable or usual construction and which may be made in two halves, as indicated in Figs. 1 and 2. Each half of the burner in the
65 construction shown is provided with gas from an inlet pipe 10 communicating with a gas passage 11 formed in the burner and the gas passage supplies gas to a series of upright discharge nozzles or tubes 12 terminating short of the upper wall
70 13 of the burner, and each projecting a current of gas upwardly through an orifice or opening 14 in the upper wall 13 of the burner. Air is free to enter into the space or passage 15 of the burner and surrounds the gas discharge nozzles 12, and
75 thus is ejected with the gas jets through the orifices and thoroughly mixes with the gas. Any other means for supplying a combustible mixture may be provided.

When the combustible mixture is ignited, a
80 flame will be formed above the orifices 14 and preferably this flame impinges upon a flame deflecting device B, which is preferably made of suitable material having high efficiency in radiating heat. A suitable refractory material or
85 clay commonly used in the manufacture of radiant elements or baffles is preferably employed. The flame deflecting device B is formed in a series of individual baffles or units 18 which may be arranged edge to edge in abutting relation
90 so as to form a substantially continuous annular flame deflecting device, the individual baffles being small enough to pass through the feed doors of furnaces in which the burner is to be installed. The flame deflecting device may also be provided
95 on the portion thereof against which the flames impinge with projections of any suitable kind, such as a series of beads or ribs 19 shown on the baffles 18, for the usual purpose of having these
100 projections become heated to high temperatures. It will be understood, however, that projections or recesses of any other form may be employed for this purpose, or the projections may be omitted.

The lower parts of the baffles 18 preferably
105 extend substantially straight upwardly parallel with the flames above the burner orifices 14 and the upper portions of the baffles then flare outwardly at a gradually increasing angle to the vertical. This causes the flame and hot gases to
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be gradually deflected outwardly so as to impinge against the furnace wall, and thus flow upwardly along the furnace wall to heat the same. In this manner, the gases are deflected by the baffles without producing eddy currents or otherwise interfering with the correct deflection of the hot gases outwardly so that they impinge at the desired angle against the furnace wall, Fig. 1, and flow upwardly along the wall to impart heat to the wall.

The lower ends of the baffles are suitably arranged to be gripped for holding the same in their upright or operative positions. In the particular construction shown in Figs. 1 to 3, the gripping devices for the lower ends of the radiant baffles are formed in the top wall 13 of the burner and include upwardly and outwardly extending hooked lugs or projections 20 adapted to engage with an inwardly extending flange or toe portion 21 formed at the lower end of each of the baffles 18. The top wall 13 of the burner is preferably also provided with an annular wall or bead 22 which extends only slightly above the top wall of the burner. In the use of this construction, the baffles are placed into operative relation to the burner by first inclining the upper portions thereof toward the central axis of the burner so as to hook the toe portion 21 of the baffle under the lug 20 of the burner and the baffles are then swung into the position shown in Fig. 3. When in this position, the ring or flange 22 will prevent the movement of the base of the baffle away from the hooked portion 20, so that the baffles will remain in their operative positions unless removed by first swinging the upper portion of each baffle inwardly toward the central vertical axis of the burner. By means of this construction, the parts of the baffle are securely held in their operative positions by the gripping flange or hook member 20 which prevents the baffles from tipping outwardly because of the overhanging or outwardly curved part thereof. The lower ends of the baffles, and the top of the burner are comparatively cool so that there is no tendency of these parts to become deteriorated by heat and the lower parts of the baffles also are not weakened when the upper portions thereof become highly heated.

In the construction shown in Figs. 4 and 5, another form of gripping device for the bottom portions of the baffles is illustrated. In this case, the lower ends of the baffles extend substantially straight down and a portion of the inner face of each baffle may be provided with an inwardly extending lug or rib 25, of materially less width than the lower part of the baffle. The lower ends of the baffles in this case are set vertically downwardly between two upwardly extending flanges 26 and 27. These flanges may be cast integrally with the upper wall 13 of the burner, and in order to avoid the necessity of machining these flanges to provide a tight fit with the lower ends of the baffles, the rearwardly extending lug or projection 25 is provided, the inner face of which may be scraped or cut down in any suitable manner, so that the lower end of the baffle will fit snugly between the flanges 26 and 27. Consequently, the baffles will be held in their operative positions and prevented from tipping because of the outwardly flaring parts of the baffles. The gripping devices for the lower ends of the baffles in the two constructions illustrated are shown as formed on the top wall of the burner, but it will be understood that a sepa-

rate support for the baffles with gripping devices for the lower ends thereof may be employed.

By means of the construction described, the baffles can be made of relatively thin material and can be given the required amount of outward flare to deflect the gases as may be necessary, and can be held in their operative positions by means engaging portions of the baffles not subjected to flame or to high temperatures. Any metal retaining means engaging the upper heated portions of the baffles becomes rapidly corroded by the action of the flame and heat and can, therefore, not be relied upon to hold the baffles. Baffles have also heretofore been made of fire clay or inexpensive materials with bases sufficiently heavy to enable the baffles to stand in their upright positions, but the cost of such construction is prohibitive in connection with baffles made of china clay or similar materials used for producing baffles of high heat radiating properties.

I claim as my invention:

1. A burner structure, including a burner having means for projecting flame upwardly therefrom, a flame deflecting and heat radiating baffle arranged at a side of said flame and having a portion extending outwardly and upwardly over the top of the flame, the lower end of said baffle having a horizontally extending toe portion formed on a face of said baffle, and a gripping device adapted to engage said toe portion to support said baffle in operative position to said flame projecting means.

2. A burner structure, including a burner having means for projecting flame upwardly therefrom, a flame deflecting and heat radiating baffle arranged at a side of said flame and having a portion extending outwardly and upwardly over the top of the flange, the lower end of said baffle having a horizontally extending toe portion formed on a face of said baffle, a gripping device adapted to engage said toe portion to support said baffle in operative position to said flame projecting means, and a projection adapted to engage the other face of the base of said baffle to prevent said toe portion from moving horizontally out of engagement with said gripping portion.

3. A gas burner having means near the peripheral portion thereof for discharging a combustible mixture, a series of baffles of ceramic material extending over said gas discharge means, and a support provided on its upper surface with means for gripping the lower ends of said baffles to support the same against tipping outwardly and having its lower surface forming a wall of a passage for conducting air to said combustible mixture discharge means.

4. A burner structure including a burner having means near the peripheral portion thereof for discharging combustible mixture, a series of baffles of ceramic material extending over said discharge means, and a part on which the lower ends of said baffles are supported, said part including integral baffle engaging means on the upper surface thereof, which support said baffles in their operative positions, the lower surface of said supporting part serving to direct secondary air to said combustible mixture discharging means, and transferring heat received from said baffles to the air.

5. A burner structure including means for discharging a combustible mixture and arranged near the peripheral portion of the burner, a baffle supported on said burner and extending over said discharge means, a pair of spaced upright flanges

between which the lower ends of said baffles extend for supporting said baffles in their operative positions, said flanges being spaced apart a distance greater than the thickness of said baffles, and lugs on said baffles and adapted to enter between said flanges to cause said baffles to be wedged into gripping engagement with said flanges.

6. A burner structure including a burner having discharge orifices for a combustible mixture arranged near the peripheral portions thereof, a flame deflecting and heat radiating baffle of ceramic material arranged at a side of said orifices and supported on said burner at a greater distance from the peripheral portions of said burner than said orifices and extending upwardly and outwardly over said orifices, a pair of flanges on said burner extending upwardly to receive between them the lower part of said baffle, the lower portion of said baffle being of substantially less

thickness than the distance between said flanges and having a lug formed on a portion thereof, said portion having the lug formed therein being of a thickness equal or greater than the distance between said flanges, to enable the lower ends of said baffles to be wedged between said flanges.

7. A burner structure including a discharge orifice for a combustible mixture, a flame deflecting and heat radiating baffle of ceramic material and having portions extending over said orifice, means for supporting said baffle in correct relation to said orifice including a pair of spaced flanges between which the bottom portion of said baffle is positioned, said bottom portion being provided with a thickened portion to fit between said flanges, other portions of said baffle between said flanges being of less thickness than the space between said flanges.

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