

Jan. 1, 1935.

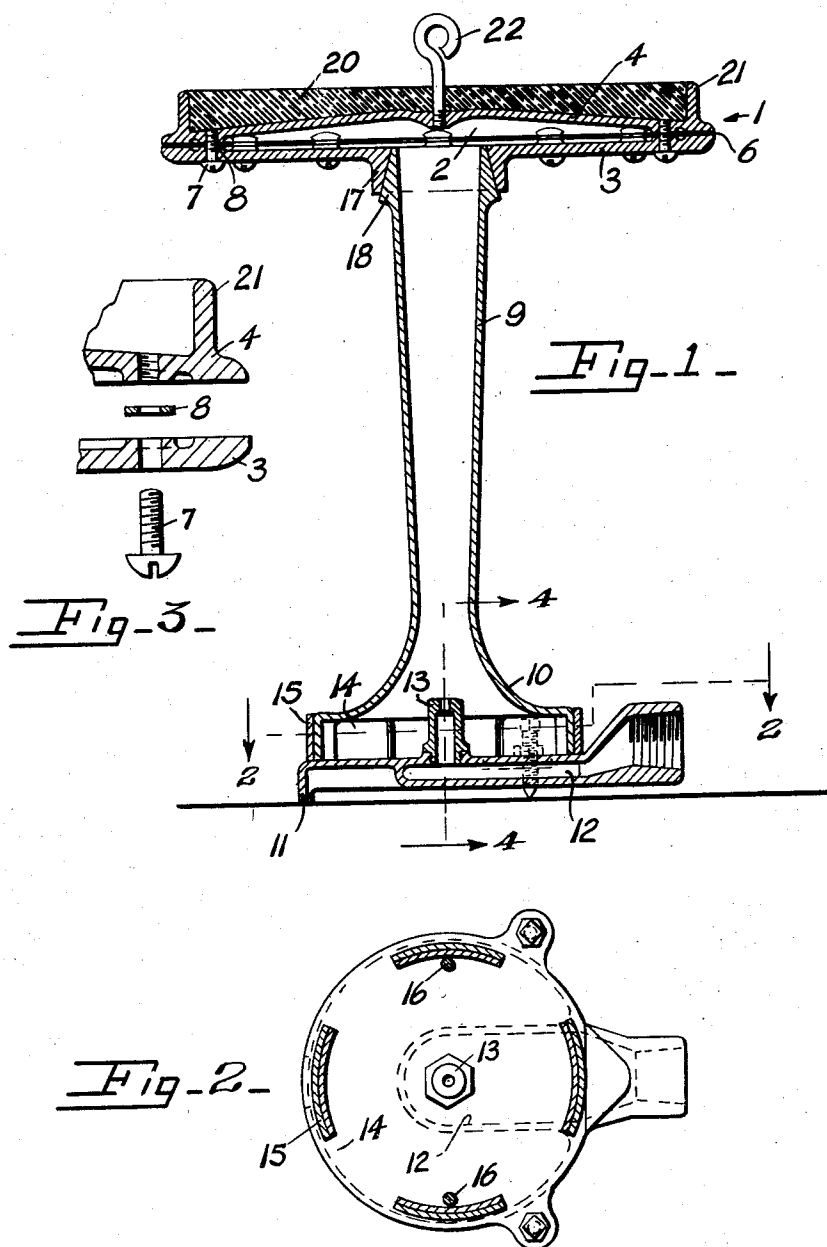
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1,986,311

GAS BURNER

Filed June 20, 1932

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig-5-

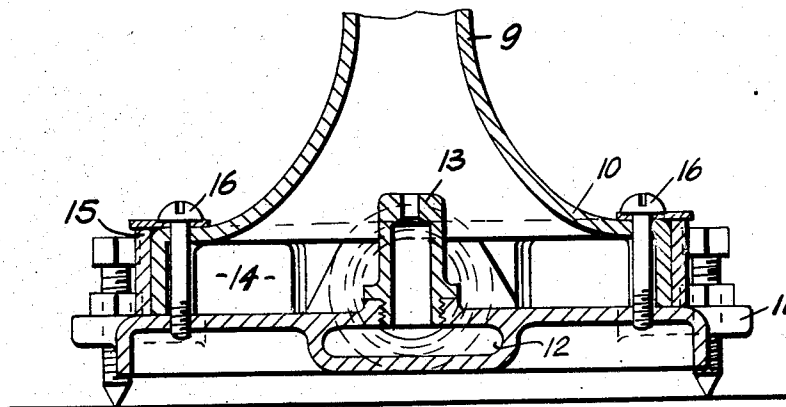
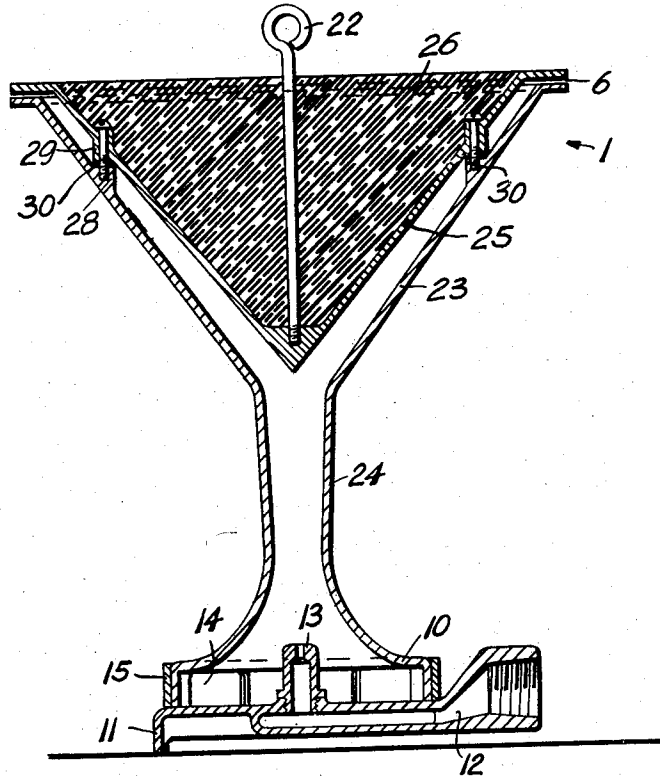


Fig-4-

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## UNITED STATES PATENT OFFICE

1,986,311

## GAS BURNER

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Application June 20, 1932, Serial No. 618,157

## 1 Claim. (Cl. 158—116)

This invention relates to gas burners, and particularly burners to be used in heating plants for using gas instead of other fuel, and has for its object a particularly simple and efficient construction which can be manufactured, assembled, and installed, at a minimum expense and with a minimum outlay of time and labor.

A further object of the invention consists of means for efficiently preventing carbonizing of the gas within the burner.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a vertical, sectional view of the burner embodying this invention.

Figure 2 is a sectional view on line 2—2, Figure 1.

Figure 3 is an enlarged fragmentary detail view of the marginal portion of the burner heads, the parts being shown as separated.

Figure 4 is a sectional view on line 4—4, Figure 1.

Figure 5 is a sectional view, similar to Figure 1, of a modified form.

This burner is particularly adapted for use in converting a heating unit, such as a furnace, steam, or hot water boiler, to burn gas in place of coal, oil, or other fuels. This burner is so constructed that it is only necessary to remove the grates of the furnace, or boiler, and mount the burner upon the bottom, or floor of the ash pit.

Heretofore, conversion from other fuels to gas has met an appreciable resistance due to the comparatively high cost of the burner and of installing the burner. Attempts have heretofore been made to construct a gas burner embodying a simple structure, but these burners have proven to be inefficient and serious trouble has been encountered due to the carbonizing of the gas within the burner, thus plugging the burner up and causing, in addition to the loss of heat, a most dangerous situation on account of the escape of unburned gas.

The burner of this invention will operate efficiently on manufactured or artificial gas, or natural gas, or a combination of both.

Referring to Figure 1, the head of the burner is indicated generally by the numeral 1. The head is hollow, in order to provide an internal chamber 2, the head having circumferential jets

or outlets for the gas, and a central intake passage through its bottom wall.

As here illustrated, the head 1 comprises a bottom wall 3 which is discoidal or flat, and a top wall 4 which is slightly convex forming a shallow chamber 2. The margins of the top and bottom walls adjacent the peripheries thereof are opposed to each other providing a circumferential slot, or jet opening 6.

As here shown, the margins of the top and bottom walls are secured together by the screws 7 extending transversely through one of the walls and threading into the other. The walls are held separated by spacers 8 interposed between said margins and around the screws. The thickness, or the number of the spacers thus determine the width of the slot 6, or the size of the jet opening.

The head 1 is supported upon a mixing tube 9 having an enlarged base or lower portion 10 which in turn is mounted upon a base 11 having an inlet passage or conduit 12 for connection to the gas supply. The conduit 12 connects with a nozzle or jet 13 which is arranged at the center of the base 11, and has an opening arranged axially of the mixing tube 9. The mixing tube is in the form of a venturi.

The base or enlarged portion 10 of the mixing tube 9 is formed with air inlet openings 14, which may be opened or closed, more or less, by means of a rotary register 15. These openings are adjusted for maximum efficiency at the time the burner is installed, and they generally do not have to be adjusted thereafter. The head 1 is formed with a hub 17 provided with a substantially conical passage for seating on a frusto conical head 18 of the tube 9.

In operation, the gas passes from the supply conduit 12 through the nozzle or jet 13 and into the Venturi tube 9 drawing air in through the openings 14 which mixes with the gas to form a combustible medium which passes out through the head 1 and the slot 6.

As previously stated, these burners are designed so that the base 11 rests upon the floor of the ash pit of the furnace. A three point suspension is provided on the base 11, two points of which comprise set screws that are adjustable for leveling the burner. With the base 11 resting upon the floor of the ash pit, the head 1 of the burner is positioned about where the grates of the furnace were formerly located, or slightly above.

Accordingly, the head of the burner, particularly the upper wall 4 thereof, tends to heat

considerably due to the fact that it is confined within the fire box of the heating unit, and a great amount of heat is redirected from the side walls and top of the fire box against the head of the burner. The gas mixture passing up through the mixing tube 9 is comparatively cool, and I have found through experience that on account of the high temperature of the head and the low temperature of the gas, the gas carbonizes very quickly within the head of the burner, thus shutting off the passage through the slot 6, and also forming a deposit which closes the passage at the upper end of the mixing tube 9. When sufficient carbonization has taken place, the flame becomes extinguished, and there is then a leakage of unburned gas through the burner head, and particularly through the openings 14 in the base.

In order to prevent the heating of the burner head, and the carbonizing of the gas, I provide the upper wall of the burner head with heat insulation here shown as in the form of a layer 20 of heat insulating material overlying the top wall 4, this being here shown as contained in a shallow receptacle or recess on the upper side of the top wall by an annular flange 21. The heat insulating material may be of any well known substance, as for instance an asbestos preparation. The top wall 4 is provided with a suitable means for handling the burner during installation, as the eye screw 22.

It is to be noted that this burner comprises a minimum number of parts, and the construction is such that no difficulties are encountered in the manufacture and machining, and assembling and yet the burner operates at a high degree of efficiency and will not become carbonized, or otherwise rendered defective through use.

In Figure 5, the burner head is in the general form of an inverted cone 23 formed with a stem 24 which acts in the same manner as the Venturi tube 9, Figure 1, the gas inlet of the head being at the apex of the cone. In this structure, the upper wall of the head is formed by the inverted conical wall 25 which is filled with heat insulating material 26. The cones of the top and bottom walls are arranged concentrically, but the

incline of the inner cone is such that the space between the cones contracts in width from the lower ends towards the upper end of the head, that is, toward the jet openings between the margins and the cones.

In general, the passage formed between the walls 23, 25 forms an extension of the Venturi form of the stem 24. The wall 23 of the head is formed with shoulders 28, and the wall 25 with complementary shoulders 29. The wall 25 is secured to the wall 23 by means of screws 30 threading into the shoulders 28. Suitable spacers are inserted between the shoulders 28, 29 about the screws 30 to provide the proper jet opening at 6. It has been found that this construction provides a more efficient mixture for certain gases than does the longer Venturi tube and head construction shown in Figure 1. In many furnaces, the ash pit is shallow and accordingly, a burner of the type shown in Figure 1 would be too high for proper efficiency. The efficiency could not be maintained by reducing the length of the mixing tube 9. Accordingly, in the construction shown in Figure 5, the venturi is of comparatively short length. However, the conical walls of the head provide the additional mixing chamber so that while the burner is short, the gases are well mixed before passing through the jet 6.

What I claim is:

A gas burner for use in a substantially enclosed fire box comprising a base having a central gas opening, a passage extending from said opening to the periphery of the base, a mixing tube seated upon the base and being formed at its lower end with an annular flange having spaced apart openings therein, a flat ring member surrounding the flange of the tube and having complementary openings and being rotatably adjustable relatively to the mixing tube, a head mounted on the upper end of the mixing tube comprising upper and lower spaced apart members to form a peripheral outlet, and means for heat insulating the upper member from becoming heated by the heat generated by the burner.

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