Dec. 25, 1928. 1,696,840

H. E. DICKINSON

GAS BURNER

Filed Aug. 2, 1926

Fig. 1.

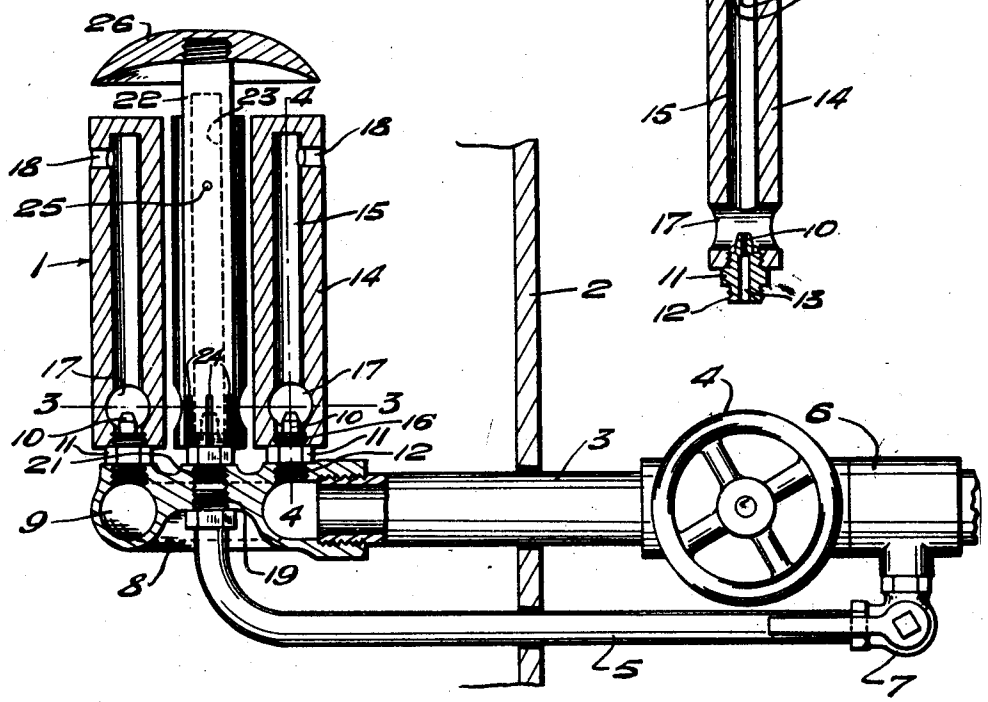


Fig. 4.

Fig. 2.

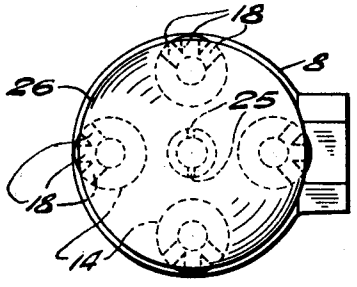
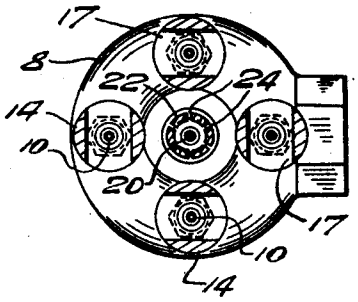


Fig. 3.



Inventor

Harry E. Dickinson

By

Attorney

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UNITED STATES PATENT OFFICE.

HARRY E. DICKINSON, OF HOUSTON, TEXAS.

GAS BURNER.

Application filed August 2, 1926. Serial No. 126,533.

The present invention relates to improvements in gas burners and more especially to those of the class adapted to be used for heating and similar purposes, and the primary object of the invention is to provide a novel and improved burner of this class whereby substantially complete combustion of the gas and uniform distribution of the heat produced are attained, the burner being so constructed that it may be manufactured inexpensively and may be installed with facility.

The invention provides a burner embodying a suitable number of air and gas mixing burner tubes or units each of which is provided with divergent orifices from which the combustible air and gas mixture issues and burns to produce a flame of substantially fan-like form, the burner tubes or units being so grouped as to arrange the flames in a continuous or substantially continuous annular series although impingement of the flames, one against another, is prevented, high efficiency of combustion and effective distribution of the heat being thereby attained.

The present invention also provides a burner construction which is relatively simple and is capable of being readily and inexpensively manufactured, and which can be installed with facility in stoves, furnaces and other heating appliances, it comprising a gas manifold into the top of which are fitted the gas jets or nozzles, and burner tubes are connected to said jets to receive gas therefrom and are provided with means for mixing air with the gas to produce the combustible mixture, the upper portions of the tubes being provided with orifices for the emission of the mixture for combustion.

Another object of the invention is to provide the center of the gas manifold with a gas jet for supplying gas to a pilot burner, a pilot burner tube being connected to this jet to receive gas therefrom and to mix air therewith and having orifices in its upper portion for the discharge of the combustible mixture which supplies the pilot light or lights.

A further object of the invention is to provide a canopy which may be threaded on or otherwise fixed to the top of the pilot burner tube and overlies it and the surrounding burner tubes, the canopy serving to prevent extinguishing of the pilot light by down drafts or excessive flue drafts.

To these and other ends, the invention consists in certain improvements and combinations and arrangements of parts, all as will be hereinafter more fully described, the features of novelty being pointed out particularly in the claims at the end of the specification.

In the accompanying drawings:—

Figure 1 is a side elevation partly in central vertical section through a gas burner constructed in accordance with the preferred embodiment of the invention;

Figure 2 is a top plan view of the burner as shown in Figure 1;

Figure 3 represents a cross-section through the burner taken on the line 3—3 of Figure 1; and

Figure 4 is a vertical section through one of the burner tubes taken on the line 4—4 of Figure 1.

Similar parts are designated by the same reference characters in the different views.

Gas burners embodying the present invention are adapted for use in connection with gas floor furnaces, gas heating plants, stoves and various other heating appliances. The preferred construction of burner is shown in the accompanying drawing and will be hereinafter described in detail, but it is to be understood that the invention is not restricted to the precise construction shown, as variations in construction to adapt the burner to various uses and constructions equivalent to that shown are contemplated, and such will be included within the scope of the claims.

In the present instance, 1 represents the burner generally, 2 represents a part of the furnace, stove or other heating appliance in which it is installed, 3 designates the main gas supply pipe having a regulating or controlling valve 4, 5 designates a branch pipe which leads from the fitting 6 on the main gas supply pipe, preferably in advance of the control valve 4 therein, this branch pipe serving to supply gas to the pilot light, and 7 designates a valve or cock in this branch pipe which regulates or controls the flow of gas to the pilot light. The burner may be installed in various ways, as will be understood by those skilled in the art, as, for example, in the combustion chamber of a furnace, stove, heater or other heating plant or appliance.

The burner comprises a manifold 8 which may be cast of iron or other suitable metal,

it being preferably annular in form and containing within it an annular gas supply passage 9. The main gas supply pipe 3 is suitably connected to supply gas to this passage, the pipe 3 being shown in the present instance threaded into a side of the manifold so that it communicates with the passage 9. A suitable number of gas jets or nozzles 10 are fitted into the top of the manifold, these jets, as shown, being formed as nipples, the intermediate portion of each of which is preferably hexagonal or otherwise angular in form, as at 11, to receive a wrench, and the lower end of each nipple is threaded, as at 12, to fit a correspondingly threaded hole in the top of the manifold, each nipple having a central or axial bore 13 which is in communication with and receives gas from the passage 9, the gas thus received discharging at the tip of the jet which is nozzle-like in form, so that the gas will be directed in a stream upwardly. Four gas jets or nozzles are shown in the present instance, but it will be understood that a greater or less number thereof may be used. Preferably, the jets or nozzles are spaced symmetrically or equidistantly around the circumference of the manifold, as is shown in Figures 2 and 3, the passage 9 within the manifold being sufficiently large in cross-section to insure uniform flow of gas to all of the jets.

A burner tube 14 is provided for each of these jets. These burner tubes may be formed of castings of iron or other suitable material, they each being formed with a vertical bore or chamber 15 which leads from the bottom to a point near the top of the respective burner tube, the top of the tube, however, being closed, and the lower end of each burner tube is formed to receive the respective gas jet 10. Preferably, the lower end of the tube is threaded to receive the upper thread 16 on the gas jet. The gas jet thus projects upwardly into the tube and the tube is provided with a transverse passageway 17 or is otherwise formed with openings leading to the jet 10 and communicating with the bore 15 of the tube whereby air will be mixed with the gas discharging from the jet and the resulting air and gas mixture will flow upwardly into the bore 16 of the burner tube. Each burner tube is provided near its top with orifices 18 for the discharge of the combustible air and gas mixture. According to the present invention, a plurality of these orifices is provided in the outer side of each burner tube, these orifices leading from the burner tube at relatively divergent angles, as will be clear from Figs. 2 and 4, whereby the flame produced by the burning of the combustible mixture at the outer ends of these orifices will be spread laterally or horizontally into a substantially fan-like form. The burner tubes are so set on the manifold that the central orifice of each tube will be directed radially outwardly from the center of the manifold, as will be clear from Fig. 2, and, in consequence, the fan-like flames from the different burner tubes will be distributed around the burner, so that they form a continuous or substantially continuous flame encircling the burner, but the flames do not impinge against one another and, hence, high efficiency in combustion is attained.

The burner embodies, in addition to the heating tubes above described, a pilot burner which provides a pilot light which serves for the ignition of the heating burner tubes. Preferably, the branch pipe 5 which supplies gas for the pilot burner is threaded or otherwise connected to the bottom of the manifold at the center thereof, as indicated at 19, thus avoiding interference with the surrounding passage 9 which supplies the gas for the heating burner tubes. The pilot burner jet 20 which may be similar in construction to that of the nipples forming the jets for the heating burner tubes is threaded as at 21 into the top of the manifold at the center thereof, so that its central axial orifice will receive gas from the pipe 5. The pilot burner tube 22 which may be cast or otherwise formed of metal is provided with an interior bore 23 which extends from the bottom of this tube to a point near the top thereof at which point it is closed, and this tube which may be threaded upon the nipple forming the jet 20 is provided with a suitable number of slots 24 which communicate with the interior bore 23 around the jet 20 and serve to admit air which mixes with the gas introduced into the bore 23 by the jet. The air and gas mixture which is forced upwardly in the chamber 23 under the pressure of the inflowing gas discharges from this bore through the orifices 25 which lead from the bore 23 outwardly to the exterior of this tube, the combustible mixture discharging from these orifices maintaining the pilot light or lights. The pilot lights may be regulated by appropriate setting of the valve 7.

The pilot burner tube 22 is preferably made longer than the heating burner tubes 14 so that it projects above the top of the latter tubes, and the upper end of the pilot burner tubes is threaded or otherwise adapted to receive a canopy 26 which surrounds the upper end of the pilot 22 and preferably overhangs or overlies the heating burner tubes. This canopy may be formed of a substantially disk-like casting of metal preferably concavo-convex in form with its concave side facing downwardly, as shown, and the canopy serves to protect the pilot light or lights from the effects of down drafts or excessive flue drafts tending to extinguish

the pilot lights. It will be understood that when the burner is not in use as a heating burner, the valve 4 which controls the supply of gas thereto will be closed, but the pilot lights will continue to burn. The heating burner tubes are brought into operation by opening the valve 4, the combustible mixture issuing from the orifices of these tubes being ignited by the pilot light or lights.

I claim as my invention:—

1. A gas burner comprising an annular gas manifold having a plurality of gas jets upstanding therefrom, a group of tubes one to each gas jet mounted upon the manifold and extending upwardly therefrom, a pilot light burner mounted concentrically of and on the manifold within said group of burners and projecting upwardly and terminating above the latter, and a canopy mounted on the upper end of the pilot light burner and extending above and over said group of burners.

2. A gas burner comprising a gas manifold, an annular series of upright burner tubes mounted on its upper side and having air and gas mixing means and relatively divergent orifices extending outwardly from the center of the respective tubes for the discharge of the combustible mixture, the relatively divergent orifices of each tube being operative to produce a substantially fan-like flame from the burning mixture discharged therefrom, and the tubes being arranged on the manifold so that the orifices extend outwardly whereby the fan-like flames from the series of tubes will produce a substantially continuous annular flame.

3. A gas burner, including a disk-shaped member having an annular gas chamber with a gas-admitting port and with a plurality of gas outlet ports, said latter ports being in the upper face of the member, a plurality of gas jets one mounted in each port and projecting above the member, a plurality of tubes, each tube being attached to the member through the instrumentality of the jet and having a chamber into which the jet opens, said chamber being closed at the top and provided with lower air-admitting ports and with upper gas burning jets, an upstanding pilot burner disposed in the center of the disk and terminating at a point above the upper ends of the tubes, and a concavo-convex disk attached to the upper end of the pilot tube and extending above and over the upper ends of the burner tubes.

In testimony whereof I have hereunto set my hand.

HARRY E. DICKINSON.