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J. R. PATTINSON ET AL
DEFLECTOR TYPE GAS BURNER

2,497,321

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FIG. 1.

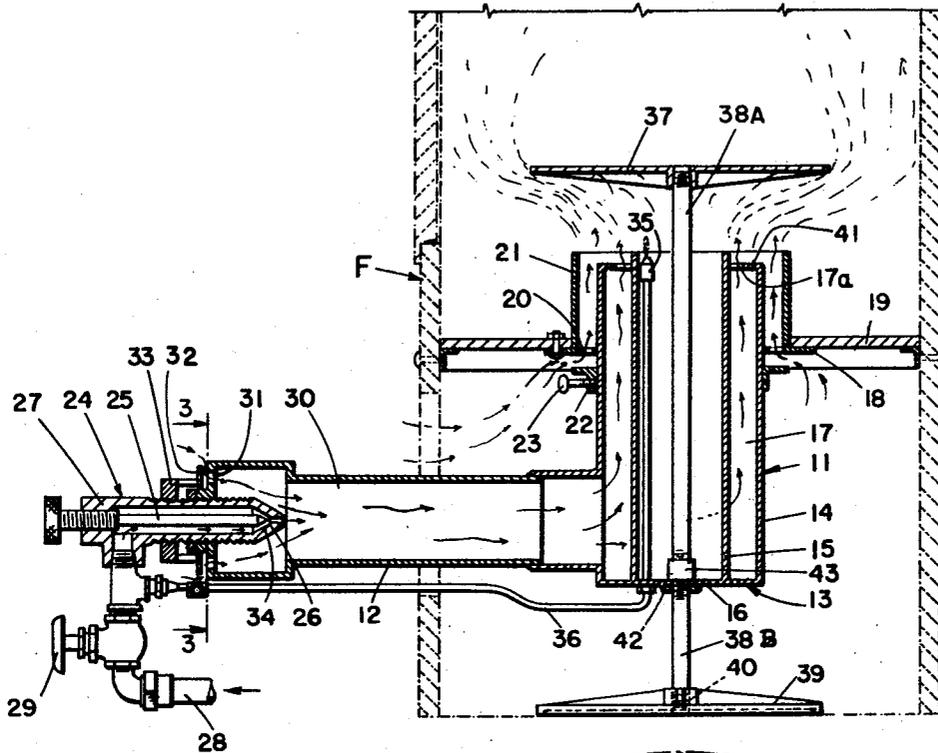


FIG. 2.

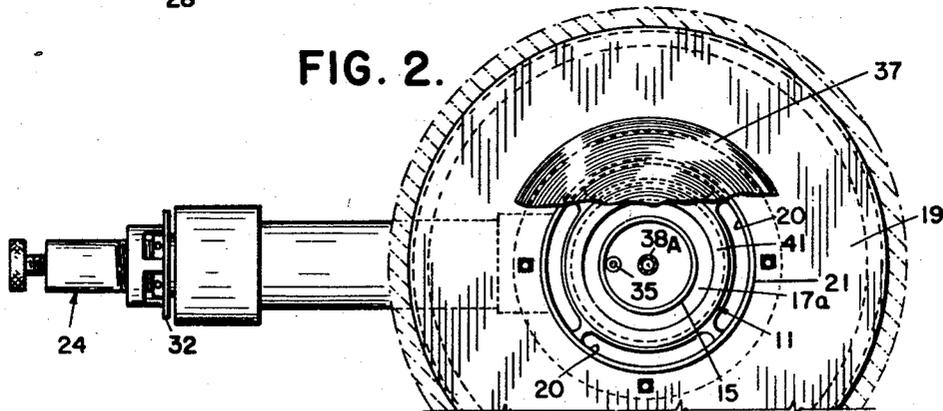
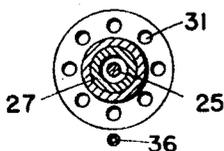


FIG. 3.



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DEFLECTOR TYPE GAS BURNER

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3 Claims. (Cl. 158—113)

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This invention relates to a gas burner.

One object of the invention is to provide a gas burner unit which may be readily installed in household furnaces originally adapted for burning gas or other types of fuel. Another object is to provide a burner which may be used in water heaters, floor furnaces, and various types of house-heating units. Another object is to provide a burner unit which is adaptable for use with various kinds of gas fuels including natural gas, manufactured gas, or liquified fuel gases. Another object is to provide a burner in which the combustible mixture is thoroughly mixed and preheated before ignition. A further object is to provide a gas burning unit which may be readily adjusted for heat outputs varying over a wide range. A still further object is to provide a gas burner which operates with a minimum amount of noise. These and other objects are attained by our invention which will be understood from the following description, reference being made to the accompanying drawings in which:

Fig. 1 is a cross-sectional view of our burner unit as applied to the fire-box of a house-heating furnace;

Fig. 2 is a top elevational view of the burner with parts broken away to better show the construction;

Fig. 3 is a cross-sectional view taken on the line 3—3 of Fig. 1.

Referring to the drawings, our burner consists of a vertically disposed body member 11 and a horizontally disposed mixing tube 12. The body member consists generally of an annular member 13 having an outer wall 14 and an inner wall 15, these being preferably cylindrical in shape and closed by a bottom plate 16. The annular space 17 serves as a preheating and mixing chamber for the gas and primary air which is introduced into this space through the mixing tube 12 which is connected through the outer wall 14. The annular opening 17A is restricted by an annular disk 41 on the top of the annular member 13 to better direct the flow of premixed gas and air. The outer wall 14 is provided in its upper portion with an outside flange 18 by which the body member 11 is supported inside the fire-box F on an annular horizontal partition member 19 attached to the inside wall of the fire-box and extending inwardly to the flange 18. The flange 18 is provided with openings 20 disposed around the body member outer wall 14 and these openings serve for the entrance of secondary air, there being a coaxial cylindrical collar 21 attached to the upper side of the flange 18 and extending

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upwardly to the top of the annular member 13, the space between the collar 21 and the outer wall 14 serving as a conduit to carry the secondary air to the outside of the burning mass of combustible mixture as it leaves the mouth of the annular space 17. The volume of secondary air which may enter this conduit is controlled by means of the movable flange 22 adjustably positioned on the outer wall 14 by thumb screws 23, the distance between the movable flange 22 and the openings 20 in the flange 18 determining the amount of secondary air.

The mixing tube 12 which adjoins the body member for delivery of the primary air and gas to the annular space 17 consists of a needle valve 24 having an adjustable needle 25 acting in an apertured tapered seat 26 within the valve body 27. The valve body 27 is connected to the gas pipe line 28 which is supplied with a hand-actuated valve 29. The valve body 27 extends into a primary mixing chamber 30 which is provided with openings 31 for the entrance of air, the control of the amount of air being effected by a disk 32 conveniently mounted on the hub 33 which is threadedly engaged on the outside of the valve body 27 so that the distance between the disk 32 and the openings 31 for the admission of primary air may be regulated by turning the hub 33 on the threads of the valve body. The gas from the nozzle 34 of the needle valve 24 mixes with the aspirated air brought in through the openings 31 and is further mixed in the mixing tube 12 and carried therein to the annular space 17 of the body member. A pilot burner 35 is provided inside the inner wall of the annular member 13, and is positioned adjacent the top of the main burner, the pilot being connected by a pipe line 36 to the source of gas fuel.

A baffle disk 37 is mounted on a supporting rod or pipe which is affixed to a foot-piece 39 placed upon the floor beneath the burner, the supporting rod 38 conveniently consisting of a lower portion 38B joined to an upper portion 38A by means of a pipe coupling 43 whose lower end rests on the wall 16, a lock nut 42 being provided below the wall 16 on the rod or pipe 38B for securing it to the body member 11. The height of the baffle disk 37 may be varied by substituting a rod or pipe of the desired length through the threaded connection with the coupling 43.

The burner is adapted to use any type of gaseous fuel and the amount of primary and secondary air relative to the amount of gas may be adjusted by means of the adjustable controls or

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shutters arranged in front of the air openings. An important feature of our improved gas burner is the introduction of the secondary air at the outside of the flame as it leaves the burner. This arrangement is advantageous in producing complete and uniform combustion and in providing an outer blanket of air in the zone immediately about and above the burner which provides protection to the fire-box and gives better distribution of heat. This also gives a flame which is free from noise which is a feature of some importance in household furnaces. The height of the baffle disk may be varied to provide the distribution of the flame for the most effective heating dependent upon the size of the fire-box, the chimney draft, etc. The amount of gas which enters the burner may be controlled by well known thermostat valve controls and because of the arrangement for introducing secondary air, the quantity of gas which may be completely burned with maximum efficiency may be varied over a wide range without further adjustment of the air intake ports.

We claim:

1. A gas burner comprising a partition plate adapted to divide a furnace fire-box into upper and lower zones, a burner body extending above and below said partition having inner and outer coaxial walls providing between said walls an annular mixing chamber for gas and primary air, and having a closure across the bottom of said chamber and across the inner wall thereof and having a constricted top discharge outlet; a coaxial collar mounted around the portion of said burner body extending through and above said partition; a movable flange adjustably positioned on the outer wall of said burner body below said partition adapted to admit a variable amount of secondary air from said lower zone to said upper zone for discharge adjacent the combustible gas mixture nozzle at the top discharge outlet of said burner body; a mixing tube connected to said annular mixing chamber below said partition; means for introducing regulated amounts of gas and of air into said mixing tube; and a horizontally disposed baffle disk positioned above said burner body.

2. A gas burner comprising a partition plate adapted to divide a furnace fire-box into upper and lower zones, a burner body extending above and below said partition having inner and outer coaxial walls providing between said walls an annular mixing chamber for gas and primary air, and having a closure across the bottom of said chamber and across the inner wall thereof and having a constricted top discharge outlet; a coaxial collar mounted around the portion of said

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burner body extending through and above said partition; a movable flange adjustably positioned on the outer wall of said burner body below said partition adapted to admit a variable amount of secondary air from said lower zone to said upper zone for discharge adjacent the combustible gas mixture nozzle at the top discharge outlet of said burner body; a mixing tube connected to said annular mixing chamber below said partition; means for introducing regulated amounts of gas and of air into said mixing tube; a horizontally disposed baffle disk positioned above said burner body; and a pilot burner positioned within and near the top of said inner coaxial wall.

3. A gas burner comprising a burner body having inner and outer coaxial walls providing between said walls an annular mixing chamber for gas and primary air, and having a closure across the bottom of said chamber and across the inner wall thereof and having a constricted top discharge outlet; a collar mounted coaxially around said burner body; a movable flange adjustably positioned on the outer wall of said burner body; adapted to admit a selected amount of secondary air discharged adjacent the combustible gas nozzle at the top discharge outlet of said burner body; a mixing tube connected to said annular mixing chamber; means for introducing regulated amounts of gas and of air into said mixing tube; and a flat horizontally disposed baffle disk positioned above said burner body and extending over said collar.

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