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LUMINOUS FLAME GAS BURNER

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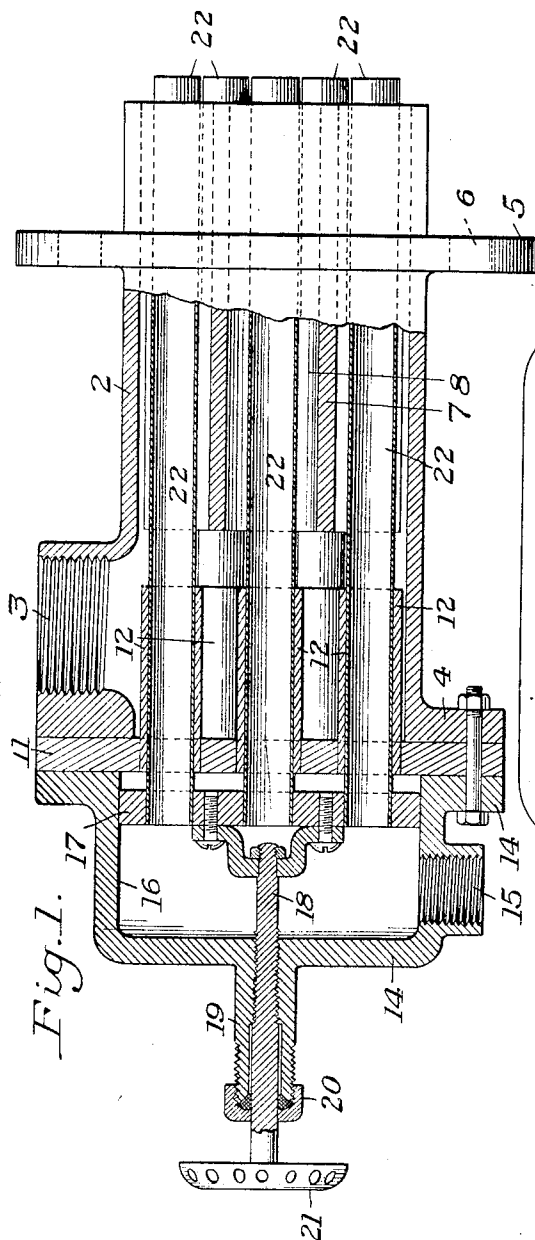


Fig. 1.

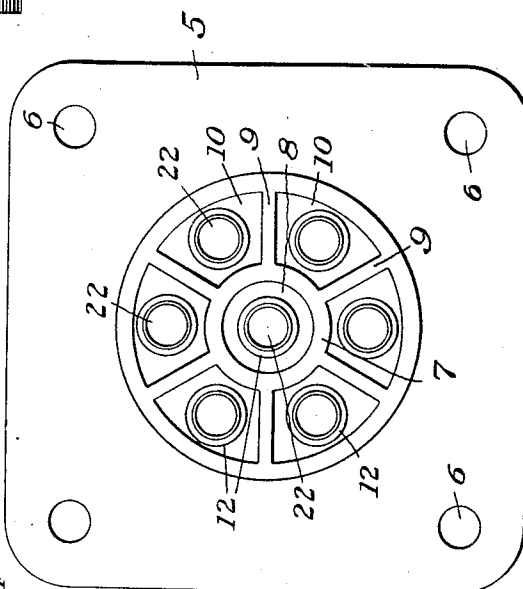


Fig. 2.

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UNITED STATES PATENT OFFICE

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LUMINOUS FLAME GAS BURNER

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6 Claims. (Cl. 158—109)

The present invention relates broadly to the art of gaseous fuel burning, and more particularly to an improved burner structure of the type effective for the production of a luminous flame.

Both luminous and non-luminous flame burners are well known in the art, each having certain desirable features. It has long been known, however, that a luminous flame utilized under many conditions transfers heat at a more rapid rate than a non-luminous flame operating in the same combustion or heating chamber.

The present invention relates to such a luminous flame burner of the type adapted to utilize gas as the combustible medium, and of such construction that adjustments may be easily made to insure the desired luminosity under different conditions existing either in the furnace, in the combustion ingredient or in the combustion supporting ingredient.

In the accompanying drawing I have shown by way of illustration only, a preferred embodiment of the invention. In the drawing:

Figure 1 is a view partly in longitudinal section, of one form of burner constructed in accordance with the present invention; and

Figure 2 is an end elevation of the structure illustrated in Figure 1.

In accordance with the present invention, there is provided a burner comprising a burner body 2, herein shown as being of substantially tubular cross section having adjacent one end an air inlet connection 3. In proximity to the air inlet connection is a flange 4, for assembly purposes, while intermediate the ends of the body is an attaching flange 5. This flange, as illustrated more particularly in Figure 2 of the drawing, is provided with a series of openings 6 by means of which the burner body may be bolted in the desired relation to a combustion chamber.

The burner body is herein illustrated as including a central tube 7 providing a center air space 8, and a plurality of radially extending dividing vanes 9 providing an outer series of air spaces 10. The disposition and arrangement of the center tube and the dividing vanes are preferably such that each of the air spaces will provide substantially the same cross sectional area for the flow of air therethrough as admitted to the burner body by the air connection 3.

Abutting against the flange 4 is a guide tube sheet 11 having suitably secured therein a plurality of guide tubes 12, these tubes projecting into the burner body in proper alinement with the air spaces 8 and 10 respectively.

Bearing against the guide tube sheet 11 is a

gas chamber 14 having a gas inlet connection 15. The inside of the gas chamber preferably has a machined surface 16 adapted to engage and guide a gas tube sheet 17. This gas tube sheet is connected to a stem 18 herein illustrated as being threaded and extending outwardly through an internally threaded boss 19 carrying a packing nut 20. By rotating the stem 18 in one direction or the other through the medium of the hand wheel 21, it will be apparent that the gas tube sheet 17 is moved within the gas chamber 14. The gas tube sheet has secured therein in any desired manner, a number of gas tubes 22 corresponding in number and arrangement to the number and arrangement of the guide tubes 12. The internal diameter of the guide tubes and the external diameter of the gas tubes is such that a tight sliding joint, preferably gas-tight or substantially gas-tight, is provided therebetween. Each of the gas tubes 22 extends into one of the air chambers 8 or 10, as will be clearly apparent from the drawing.

In operation, air from a suitable source and under suitable pressure is delivered to the air connection 3, while gas is delivered to the gas connection 15. The gas passes from the connection 15 into the interior of the gas chamber which acts as a distributing header for the various gas tubes, the gas issuing in substantially equal volumes from the various tubes at a velocity determined by the inlet pressure.

In like manner, the air from the connection 3 is distributed within the burner body to the various air chambers 8 and 10, issuing therefrom in the form of a sheet or film embracing the movable gas tubes so as to afford an intimate contact between the gas and air. The relationship of the pressures utilized is preferably such that the air and gas will issue from the burner nose at equal velocities and in such quantities and velocities as to insure the production, when lighted, of a luminous flame. By adjusting the gas tubes axially, either inwardly or outwardly with respect to the burner body, provision is made for adjusting the burner for different combustion conditions occasioned either by fuel conditions or furnace conditions, thereby providing a burner adaptable to use under widely different conditions.

To those skilled in the art it will be apparent that while it is desirable to provide a burner body having a substantially equal number of air spaces and gas tubes, the number and arrangement of such spaces and tubes may be widely varied to suit the requirements of any particu-

lar installation. In all cases, however, it is desirable that a substantially uniform arrangement be maintained, such as afforded by the use of a burner body of any regular geometric form.

- 5 Other changes in the construction, disposition and arrangement of the parts may be made without departing either from the spirit of the invention or the scope of my broader claims.

I claim:

- 10 1. In a burner, a burner body having an air connection, a series of dividing vanes within said body forming a series of air chambers therein, a guide tube sheet, a plurality of guide tubes carried by said sheet in alinement with said air
15 chambers, a gas chamber having a gas connection, a gas tube sheet within said gas chamber, a series of gas tubes carried by said gas tube sheet and extending through said guide tubes and into said air chambers, and means for adjusting
20 said gas tube sheet.

2. In a burner, a burner body, a gas chamber in alinement with said body, a guide tube sheet intermediate said chamber and body and carrying a series of guide tubes projecting into said
25 body, a burner tube sheet in said chamber carrying a series of burner tubes in alinement with said guide tubes, means for adjusting said burner tubes, and means providing an air chamber within said body for each burner tube.

- 30 3. A burner of the luminous flame type, comprising a series of gas tubes, a gas chamber for supplying gas to said tubes, and a body surrounding said series of tubes for supplying combustion supporting medium at the outlets of said gas
35 tubes, the outlet from said body being divided solely by relatively thin vanes into a series of

passages, each passage enclosing a single gas tube, said series of gas tubes being simultaneously axially adjustable with respect to said body.

4. In a burner, a series of burner tubes, means for guiding said tubes, means for adjusting said
80 tubes axially relative to said guide means, means for supplying a combustible fluid to said burner tubes, and a body surrounding said series of tubes for supplying combustion supporting medium at the outlets of said burner tubes, the outlet from
85 said body being divided solely by relatively thin vanes into a series of passages, each passage enclosing a single tube.

5. In a burner, a series of burner tubes, means for supplying a combustible fluid to said burner
90 tubes, and a burner body surrounding said series of tubes for supplying combustion supporting medium at the outlets of said burner tubes, said body having an air connection, a manifold and an outlet divided solely by relatively thin vanes into
95 a series of passages, each passage enclosing a single burner tube, said burner tubes being axially adjustable with respect to said body.

6. In a burner, a burner tube plate, a series of burner tubes connected to said plate, means for
100 supplying a combustible fluid to said burner tubes, a burner body surrounding said series of tubes for supplying combustion supporting medium at the outlets of said burner tubes, said body having an air connection and an outlet divided solely
105 by relatively thin vanes into a series of passages, each passage enclosing a single burner tube, and means for adjusting said plate together with said burner tubes axially relative to said body.

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