

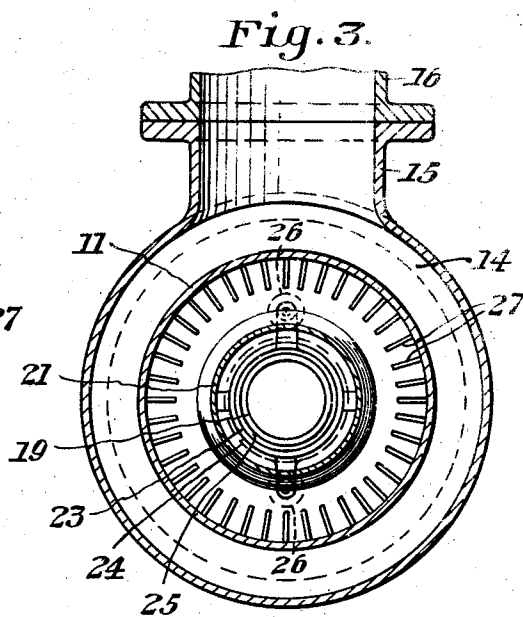
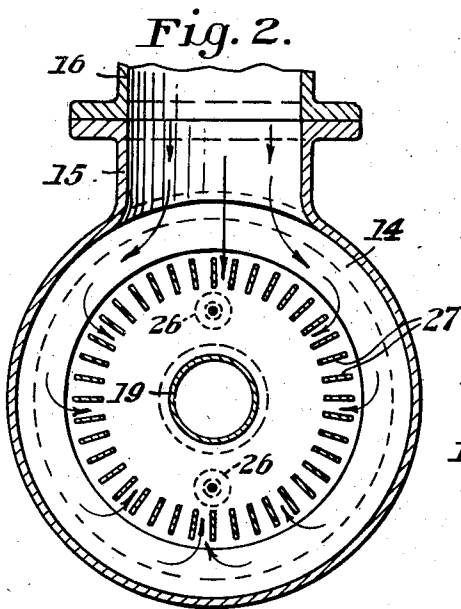
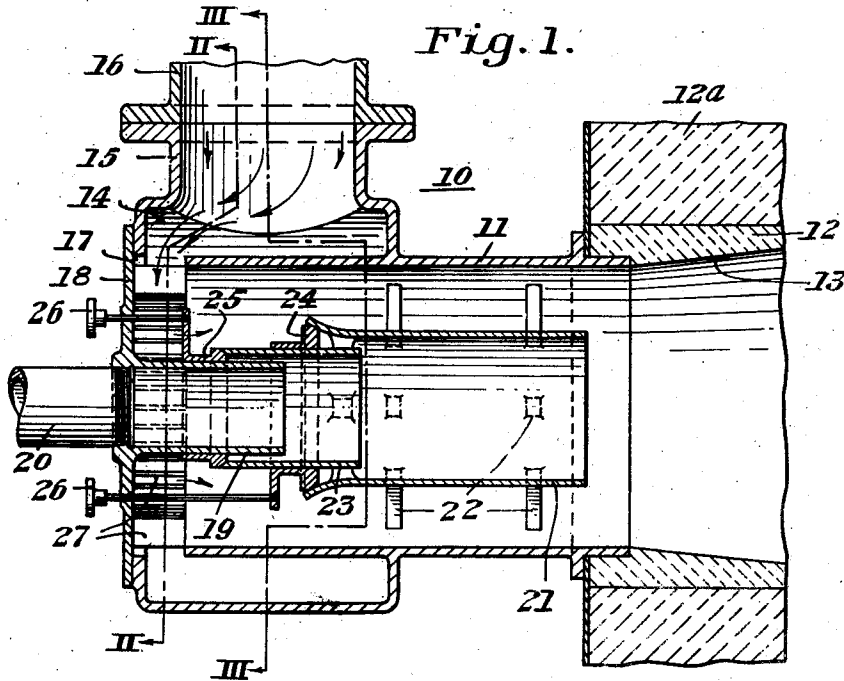
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FUEL BURNER

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FUEL BURNER

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3 Claims. (Cl. 158—110)

This invention relates generally to combustion apparatus and, in particular, to a burner for the combustion of a fluid fuel such as hydrocarbon gas.

In many heating applications, it is desirable that a fuel burner discharge combustion products in a generally horizontal direction. In some such applications, however, it is most convenient to supply the air for combustion with the fuel through a generally vertical pipe or duct. This involves the necessity of a sharp bend in the path of the air adjacent the burner and results in non-uniform distribution of the air within the burner. For uniform combustion conditions and a high combustion efficiency, it is desirable that the distribution of the air within the burner be as uniform as possible and various expedients have been adopted to achieve this end.

One such expedient was the provision of an annular air chamber surrounding the outer end of a horizontal tubular burner body and communicating therewith, air being supplied to the chamber through a vertical connection. On testing this type of burner in operation, however, it was discovered that the air entering the tubular body portion of the burner was not uniformly distributed but had a higher velocity on the side of the burner body opposite that at which the air entered the air chamber than on the other side. This made it impossible to surround a central jet of fuel with a uniform amount of air at all points therearound.

I have invented a novel burner which achieves the desired uniform distribution of air around a central fuel jet. In a preferred embodiment, I provide means guiding the air entering a substantially horizontal tubular burner body, along generally radial paths. By this construction, a uniform distribution is obtained, despite the fact that air is supplied to the air chamber at only one side thereof. The novel features and advantages of the invention will be described more fully and explained in detail with reference to the accompanying drawing illustrating the preferred embodiment. In the drawing,

Fig. 1 is a vertical longitudinal section through a burner according to the invention, installed in a heating apparatus such as a furnace;

Fig. 2 is a transverse sectional view taken along the plane of line II—II of Fig. 1; and

Fig. 3 is a view similar to Fig. 2 taken along the plane of line III—III of Fig. 1.

Referring now in detail to the drawing, the burner of my invention indicated generally at 10 comprises principally a tubular body portion

11, the forward end of which is adapted to be inserted in a burner block 12 having a port 13 therein, and an air chamber 14 preferably of annular shape, extending around the rear end of the body portion 11. The burner block 12 may, for example, be incorporated in a furnace wall or the like 12a. As shown in the drawing, the body portion 11 and the air chamber 14 are integral but they may also be composed of separately fabricated parts suitably assembled. It will be observed that the rear end of the tubular body portion 11 terminates short of the adjacent or rear wall of the chamber 14, leaving an annular space therebetween through which air may flow from the chamber into the body portion 11, as indicated by the arrows.

The chamber 14 is provided with a radial connection 15 to which an air supply duct 16 extending generally vertically, is adapted to be connected.

The rear wall of the chamber 14 has an opening 17 therein which is normally closed by a cover plate 18 detachably secured thereto. The plate 18 has a fuel nozzle 19 extending therefrom into the rear end of the tubular body portion 11 and is also adapted to have a fuel-supply pipe 20 connected thereto.

An induction tube 21 is mounted centrally in the tubular body portion 11 on radial spacers 22. A second induction tube 23 is mounted on the tube 21. The tubes 23 and 21 form with the nozzle 19 a passage of increasing cross sectional area for the fuel supplied through the pipe 20. Air is induced into the fuel stream through the annular spaces between the nozzle 19 and the tube 23 and between the tubes 23 and 21. The amount of air induced is controlled by the adjustment of annular valves 24 and 25 slidable respectively on the tube 23 and the nozzle 19. Knobs 26 are mounted on push rods extending through the cover plate 18 and secured to projections extending radially from the valves, whereby to manipulate the latter.

Plane guide vanes or baffles 27 are disposed radially in the space between the outer end of the tubular body portion 11 of the burner and the cover plate 18 through which the entering air flows. These vanes may be mounted in any suitable manner but may conveniently be formed integral with the cover plate 18. The vanes 27 serve to preclude the air passing around the outer end of the tubular body portion 11 from flowing circumferentially thereof. Instead, the baffles confine the air to radial paths as illustrated in Fig. 2. This causes the air to be substantially

uniformly distributed in the annular space between the tubular body portion 11 and the tubes 21 and 23. In other words, the velocity of the air is substantially the same at all points around the discharge end of the induction tube 21 whereby a uniform mixture of fuel and air is produced in the burner port 13 and a high combustion efficiency obtained.

The number, size and arrangement of the vanes 27 may be varied considerably but should be such as to prevent the air flowing around the rear end of the tubular body portion 11 from having any substantial component of velocity circumferentially of the body portion, as it enters the latter.

It will be apparent from the foregoing description and explanation that the invention is characterized by an important advantage over burner constructions previously known in that more uniform combustion conditions are obtained and a higher combustion efficiency. As an indication of the latter, I have found that in a specific application, the invention permits a reduction of 15% in fuel consumption necessary to deliver a given amount of heat. In addition to the operating advantages, the invention is of relatively simple construction so that it can be manufactured at relatively low cost. There is practically no problem of maintenance, furthermore, since the burner when once assembled and installed, is a substantially permanent fixture.

Although I have illustrated and described a preferred embodiment only herein, it will be recognized that changes in the construction and arrangement of parts may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a burner, a tubular body portion, com-

municating with a port in a burner block, an air chamber extending around the outer end of the body portion having a wall spaced axially from said end, a fuel nozzle extending into said end of the body portion, and plane radial baffles between said wall and said end, said baffles having a substantial width radially and being relatively closely spaced, so as substantially to prevent the flow of air from said chamber into said body except by radial paths.

2. In a burner, an air chamber, a tubular body portion communicating with a port in a burner block and having its outer end extending through one wall of said chamber but terminating short of the opposite wall of said chamber, leaving an annular space for the admission of air from the chamber into said body portion, a fuel-supply tube extending into said end of the body portion, and plane radial baffles in said space, said baffles having a substantial radial width and being relatively closely spaced so as substantially to prevent the flow of air from said chamber into said body except by radial paths.

3. In a burner, a tubular body portion, communicating with a port in a burner block, an annular air chamber surrounding the outer end of the body portion and including a wall spaced axially from said end leaving an annular air-admission space therebetween, a fuel-supply pipe extending into said body portion from said wall, and radial baffles substantially filling said space, said baffles having a substantial radial width and being relatively closely spaced so as substantially to prevent the flow of air from said chamber into said body except by radial paths.

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