Feb. 20, 1934. J. T. McCOURT 1,947,866

GAS BURNER

Filed Dec. 26, 1929

Fig. 1.

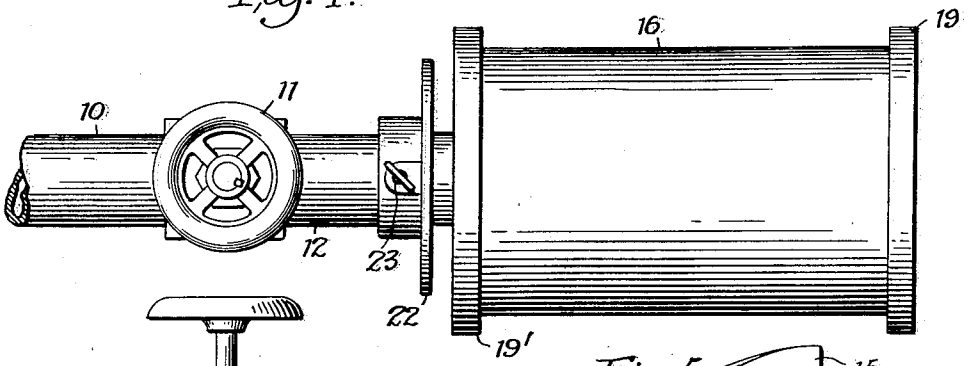


Fig. 2.

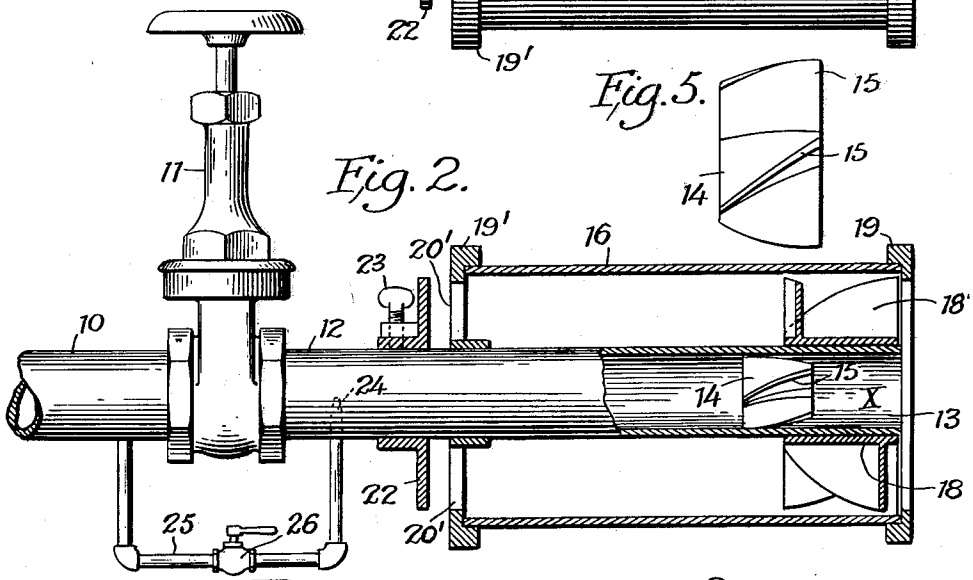


Fig. 5.

Fig. 3.

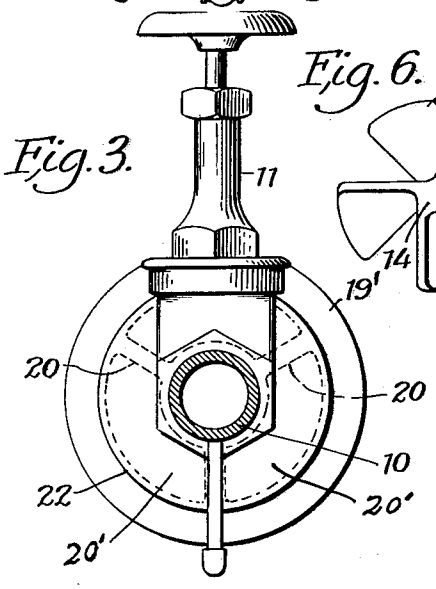


Fig. 6.

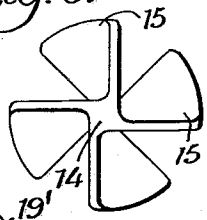
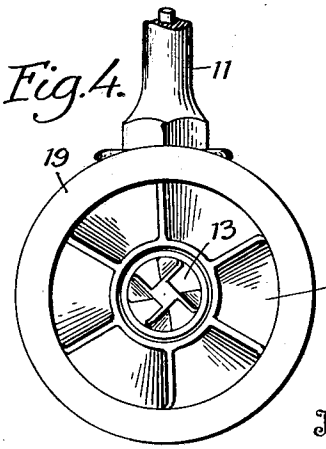


Fig. 4.



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UNITED STATES PATENT OFFICE

1,947,866

GAS BURNER

John T. McCourt, Memphis, Tenn.

Application December 26, 1929. Serial No. 416,432

1 Claim. (Cl. 158—110)

It is an object of my invention to provide means whereby either natural gas or manufactured gas can be burned while not under pressure, i. e., substantially at atmospheric pressure.

Another object of the invention is to provide for very thorough mixing of the gas and air before the point of ignition is reached and thereby insure complete combustion.

Referring to the drawing, which is made a part hereof and in which similar reference characters indicate similar parts,

Fig. 1 is a plan of my device,

Fig. 2, a vertical longitudinal section, partly in elevation,

Fig. 3, a rear end view,

Fig. 4, a front end view, the valve being partly broken away,

Fig. 5, a side elevation on an enlarged scale of a set of vanes forming a part of my device, and

Fig. 6, an end view of the same.

In the drawing, reference character 10 indicates a gas pipe for conducting gas under pressure to a point adjacent the burner and from which it passes under control of a valve 11 to a pipe 12. The exit opening through the valve 11 is of such a size as to permit the gas to expand materially in the pipe 12, which serves as an expansion chamber, so that the gas passes through the chamber 12 substantially at atmospheric pressure to the exit opening 13. Adjacent said exit opening and preferably at some distance back of the same I provide a vane member 14 having helicoidal vanes 15 whereby the current of gas is given a whirling motion in one direction.

A pipe or drum 16 surrounds the expansion chamber 12 and it will be evident that this pipe or drum may be of any convenient form so long as it is so made as to provide an exit opening substantially concentric with the exit opening 13 of the expansion chamber. A support 18 is shown in the form of a sleeve located on the wall of the expansion chamber 12 said sleeve having vanes 18' thereon directed oppositely to those of the member 14, so as to impart to the air current passing through part 16 a whirling motion in a direction opposite to that given to the current of gas. It will be evident that this motion may differ in degree from that imposed on the current of gas and that it may even be in the same direction but slower or more rapid. I prefer, however, that it should be in the opposite direction, as affording the most desirable results.

A ring 19 strengthens the front end of drum 16 and defines the exit opening thereof. The rear end of the drum 16 is supported from the pipe 12 by a spider 19' having radial members 20 as illustrated in Fig. 3 and thereby leaving openings at 20' for access of air which will be drawn through the passage by the suction created by the flame at the front end of the burner as will also the gas in the expansion chamber. For varying the richness of the mixture I provide an air valve or damper in the form of a disk 22 slidably supported on pipe 12 and held in adjusted position relatively to the openings 20' by means of a set screw 23.

It is desirable to provide a pilot light for the burner and in a preferred form I have done this by locating a small nozzle 24 in the expansion chamber adjacent the valve 11 this being connected by a pipe line 25 to the gas line 10 back of the valve 11. In this way a small amount of gas may pass into the expansion chamber when the valve 11 is closed so as to maintain a pilot light at the front end of the device, i. e., at the ignition point a little to the right of the outer end of vane member 14 approximately at the point marked X which will ignite the burner in usual manner when the full flow of gas is turned on as for heating a furnace or the like. The supply of gas to the nozzle 24 can be cut off when desired by means of a gas cock 26. The pilot light burns gas not under pressure with the point of ignition surrounded by a protecting member; that is, the ignition is in the mixing chamber which is shielded from any currents of air and is large enough to permit the gas to expand so that there will be no pressure on the gas.

If the gas pipe 25 is a quarter of an inch pipe and the pipe that constitutes the expansion chamber 12 is a two inch pipe, there would be an expansion of this gas on a ratio nearly as 30 is to 1. This may be proven as follows. The actual inside diameter of a one quarter inch pipe is 0.364 inch and that of a 2 inch pipe is 2,067 inches. Inasmuch as the areas of circles are proportional to the squares of their diameters, the ratio of the areas of cross section of these two pipes is

$$\left(\frac{2.067}{0.364}\right)^2$$

which is approximately 30, as stated. By releasing this small amount of gas in the expansion chamber 12 near the valve 11 by the time this gas moves out of the expansion chamber 12 in the direction of the vanes 15, it will be at substantially atmospheric pressure when it is ignited at X. This ignition point is at the outer end of the vanes 15 where it will come in contact with

air not under pressure. The ignition will be inside the opening 13.

By having a sufficient mixture of a small amount of gas with air at atmospheric pressure that ignites at a point where it will not be subjected to any currents of air, the pilot light will not be liable to be extinguished by air currents. One of the troubles with other gas burners now in use is that the pilot lights frequently blow out. One reason for this is that the gas is under pressure and this gas under pressure meets currents of air of varying velocity that cause the flame to be blown out. By releasing a small and constant flow of gas through the by-pass pipe 25 around the valve 11 into the expansion chamber 12, the expansion chamber 12 is filled with gas not under pressure that will ignite only after it has passed through the vanes 15 and mixed with the air that has moved back through the member 19 into the chamber 12.

It will be obvious to those skilled in the art that various other modifications may be made in my device without departing from the spirit of my invention and therefore I do not limit myself to what is shown in the drawing and described in the specification but only as set forth in the appended claim.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent is:

In a gas burner, a tube, a member having spiral vanes arranged in the tube to divide it into a long rear chamber and a short front chamber of similar internal diameter, said front chamber being fully open at its front end, a valve in said tube for admitting gas to the rear end of said rear chamber, an air pipe surrounding the tube in spaced relation thereto and extending from the front end of the tube to a point near the rear end thereof, said air pipe having at its front end a discharge opening surrounding the open front end of said front chamber, said air pipe having at its rear end an intake open to the atmosphere, a member having spiral vanes directed oppositely to the vanes of said first member, said second member being slightly longer than said front chamber and arranged in the air pipe in surrounding relation to said front chamber, and a by-pass for gas around said valve having an inner diameter smaller than that of said rear chamber and entering said chamber near the rear end thereof in advance of the valve, said by-pass being adapted to supply said rear chamber with a small amount of gas which expands in said chamber and then flows at substantially atmospheric pressure to said front chamber to maintain a pilot flame within said front chamber, and the wall of said front chamber shielding the flame from air currents.

JOHN T. McCOURT.