



# UNITED STATES PATENT OFFICE

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## GAS BURNER

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My invention relates to gas burners. The principal object of the invention is to provide means for a pilot-light that will not be blown out by gas pressure passing through the burner, and which will continue to burn and re-ignite the main supply of gas, if the flame thereof is blown out.

Another object of the invention is to provide means to retard the velocity of gas in a passage that supplies gas to the pilot-light. In other words, to retard the velocity to such an extent that it is within the limits of the rate of flame propagation of the gas.

A further object is to provide a nozzle of simple and practical construction that will carry out the foregoing objects.

Still other objects reside in details of construction and in novel combinations and arrangements of parts, which will appear in the course of the following description.

In the drawing, like reference characters designate similar parts in the several views. Figure 1 is a broken plan of an embodiment of my invention, partly in section.

Figure 2 is a section taken on the line 2—2 of Figure 1.

Figure 3 is a section taken on the line 3—3 of Figure 1.

Figure 4 is a broken, sectional view of a modified construction.

Referring more in detail to the drawing, the reference character 5 designates a threaded gas supply pipe connected with a source of combustible gas. The tip of the pipe tapers, as shown at 6, to provide a jet 7. A mixing chamber for the gas and air is generally designated by the numeral 8. The chamber has a restricted throat portion 9, and flares outwardly at 10 and 11 at either side of the throat. A spider 12 at the mouth 13 of the mixing chamber concentrically supports an internally threaded collar 14. The supply pipe 5 is screwed through this collar.

A rotary shutter plate 15 is mounted upon the pipe 5. In practice, the shutter is spaced from the mouth 13 of the mixing chamber to admit air to the mixing chamber. The shutter plate has lugs 16 for manipulation thereof.

Screwed on a threaded end 17 of the flaring

portion 11 of the mixing chamber is a nozzle 18. The nozzle provides a conduit comprising chambers 19 and 20 separated by an enlarged internal rib 21 providing a restricted passage 24 therethrough. The rib has non-parallel faces 22 and 23. The face 22 is substantially at right angles to the interior of the chamber 19, and the face 23 converges toward the other face. A lip 25 projects over the face 23 and thereby provides a recess.

The pilot-light passage, mentioned in the foregoing objects, preferably has two sections 26 and 27, the latter section being larger in diameter. The passage tapers at 28 to connect the two sections. The smaller section is nearer the chamber 19 and hence nearer the source of gas supply. The section 27 is adjacent the burning chamber 20 for the pilot lights.

There is a plurality of such pilot-light passages or by-passes, which are preferably, though not necessarily, at quadrant points, as shown in Figure 3. The passages converge toward the axis of the chamber 20. In practice, these passages are drilled at right angles to the face 23.

The chamber 20 is defined by the rib 21 and an inwardly curved flange 29 having a beveled edge 30 substantially parallel with the axis of the pilot-light passages. The edge is so positioned that drills for the passages are allowed to pass by said edge unhindered. The burning point of the nozzle is at 31.

Figure 4 shows a pilot-light passage of somewhat different shape. In this modified construction, the passage tapers from a smaller port 33 in the chamber 19 to a larger port 34 in the chamber 20. Otherwise, the construction and arrangement of parts in the modification are substantially the same as already described.

In the use of the present invention, the pipe 5 is connected with a suitable source of gas supply. The air supply, to be mixed with the gas supply, is regulated by the rotary shutter 15. The chamber 8, as suggested heretofore, is provided for mixing the air and gas. The shape of the chamber 8, which has been described hereinbefore, produces a

Venturi effect by the inrush of gas, thereby drawing in the air supply through the mouth 13.

5 When the mixed air and gas reach the chamber 19, the mixture is separated. By far the greater proportion of the mixture passes through the slightly restricted passage 24. The remainder of the mixture passes through the pilot-light passages. The enlarged sections of the passages provide means for retarding the velocity of the gas mixture traversing the passages. This retardation causes the velocity to be within the rate of flame propagation.

15 The burning point of each pilot-light is within the recess under the lip 25, if the pressure of gas in the burner is low, otherwise this point is within the chamber 20. The pressure coming through the pilot-light passages projects the flame of the pilot-light into the chamber 20 and toward the main gas supply. The curved flange 29 and lip 25 provide a protected space therebetween for eddies of gas from the main supply. Gas in this chamber 20 is comparatively quiet, which furnishes a supply for the pilot-lights to ignite, which in turn ignites the main supply when the flame of the latter is extinguished.

30 It is believed clear that the modification shown in Figure 4 operates in a similar manner. The velocity of the gas that enters the passage 32 is progressively retarded as the passage continuously enlarges. Otherwise the operation is as described.

35 It is to be understood that changes may be made in the construction and arrangement of the parts of the invention, without departing from the spirit and scope of the invention.

40 What I claim and desire to secure by Letters Patent is:

1. A gas burner comprising a mixing chamber and a nozzle having a restricted passage provided with a lip projecting in the direction of the travel of gas through the burner, the lip providing a recess thereunder, and an open-ended pilot-light by-pass around the restricted passage, having a protected outlet port in said recess.

50 2. A gas burner comprising a nozzle having a restricted conduit, a pilot light chamber beyond the restricted portion of the conduit in the direction of the travel of gas through the burner, the burner having a pilot light passage provided with an inlet and an outlet connecting directly with the conduit at opposite sides of the restriction, the outlet of the pilot light passage being appreciably larger than its inlet, and the passage being progressively larger than the inlet to the outlet, permitting reduction of velocity and expansion of the gases as they pass through the pilot light passage, said outlet emptying directly into said chamber.

3. A gas burner comprising a nozzle having an internal rib, which, together with a wall of the nozzle, defines a pilot light chamber for the burner, a lip on the rib forming another wall for said chamber, the burner having a pilot light passage, extending through the rib and having an outlet in said chamber, said outlet being on the opposite side of the lip from the main supply of gas passing through the burner, whereby to protect a pilot light at said outlet.

4. A gas burner comprising a nozzle having an internal rib, which, together with a wall of the nozzle, defines a pilot light chamber for the burner, a lip on the rib forming another wall for said chamber, the burner having a pilot light passage, extending through the rib and having an outlet in said chamber, said outlet being protected by the lip and being larger than the inlet of the passage, to reduce the velocity of gas by the time it reaches the chamber.

5. A gas burner comprising a nozzle having a restricted conduit, a pilot light chamber beyond the restricted portion of the conduit in the direction of the travel of gas through the burner, the burner having a pilot light passage provided with an inlet and an outlet connecting directly with the conduit at opposite sides of the restriction, the passage continuously tapering from its inlet to a comparatively larger outlet, whereby to permit reduction of velocity and expansion of the gases as they pass through the pilot light passage, said outlet emptying directly into said chamber.

6. A gas burner comprising a nozzle having an internal rib providing a restriction within the nozzle, a lip on the rib extending longitudinal of the burner in the direction of the flow of gas therethrough, the burner having a pilot light passage extending through the rib, the outlet of the passage being behind the lip with regard to the main flow of gas through the burner and being set back from that end of the lip nearest the burning point of the nozzle.

7. A gas burner comprising a nozzle having a restricted conduit, a pilot light chamber beyond the restricted portion of the conduit in the direction of the travel of gas through the burner, the burner having a pilot light passage provided with an inlet and an outlet connecting with the conduit at opposite sides of the restriction, the passage having successively larger sections from its inlet to its outlet, whereby to permit reduction of velocity and expansion of the gases as they pass through the pilot light passage, said outlet emptying into said chamber.

8. A gas burner according to claim 6, in which the pilot light passage is substantially at right angles to a surface behind and set back from the end of the lip mentioned in said former claim, said surface being at

other than right angles to the axis of the burner.

5 9. A gas burner comprising a conduit providing a nozzle, and a pilot light passage having an outlet and an inlet connecting directly with the conduit, the passage by-passing a portion of the conduit, converging toward the axis of the conduit and having a larger outlet than inlet.

10 In testimony whereof I hereunto affix my signature.

CHARLES H. BUTZ.

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