

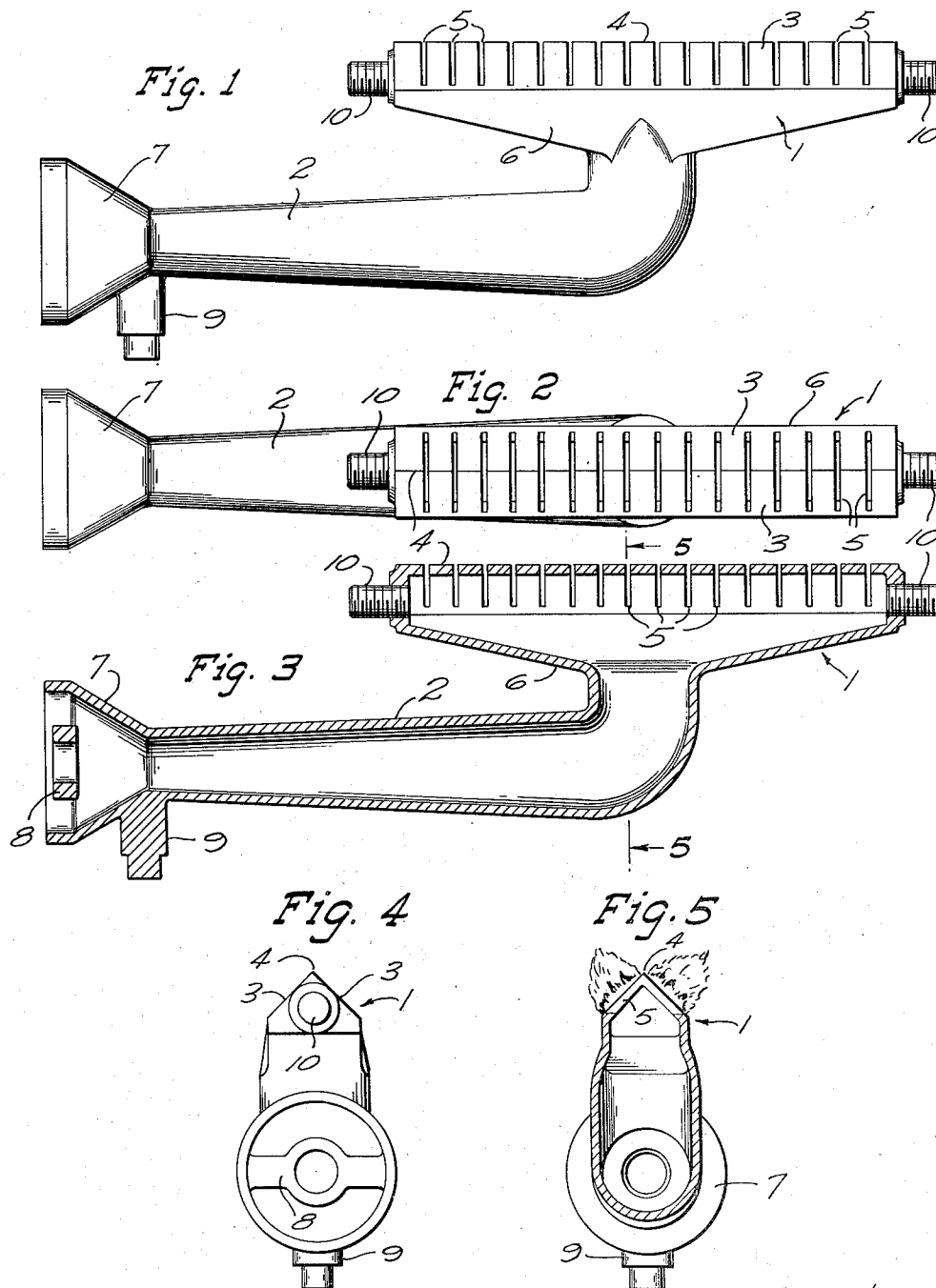
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SLOTTED OUTLET GAS BURNER HEAD

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SLOTTED OUTLET GAS BURNER HEAD

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This invention relates to a gas burner.

One of the principal objects of the invention is to provide a burner of substantially increased capacity for its size.

Another object of the invention is to provide a burner of substantially greater efficiency over a wide range of gas pressures and with which there is substantially complete combustion of the gas near to the burner.

Another object is to provide a burner in which the secondary air for combustion is more readily and uniformly mixed with the gas to effect complete combustion.

Another object is to provide a burner which is capable of operating at very low gas pressure without flash back.

Another object is to provide a burner which requires less primary air.

Another object is to provide a burner in which the distribution of gas to the burner jets is more uniform.

Another object is to provide a burner employing slot type jets and in which the gas is uniformly distributed thereto throughout the length of each jet.

Another object is to provide a burner employing slot type jets and in which the jets are spaced and disposed in a manner effecting a sweep to secondary air longitudinally therebetween for the entire length of each jet.

Another object is to provide a burner employing slot type jets and in which the jets are disposed to effect a predetermined rise of the flame and combustion gases from the jet at an angle in the general direction of movement of the secondary air.

Other objects and advantages are set forth in the description of a burner embodying the invention and illustrated in the accompanying drawing.

In the drawing:

Figure 1 is a side elevation of the burner;

Fig. 2 is a top plan view of the burner;

Fig. 3 is a longitudinal vertical central section of the burner;

Fig. 4 is an end elevation of the burner; and

Fig. 5 is a transverse vertical section taken on line 5—5 of Fig. 3 near the center of the burner head.

The burner comprises, in general, the hollow burner head 1 and the Venturi inlet tube 2 cast integrally therewith.

The burner head 1 has a top burner surface formed of two opposed substantially flat side sections 3 disposed at an angle to each other and meeting at a peak 4 along the longitudinal center line of the burner head like a gable roof.

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The burner surface has a plurality of slot type jets 5 milled therein for the emission of gas in operation of the burner. The jets 5 are preferably vertical and extend continuously across the peak 4 from side-to-side of the burner. The jets 5 may extend only part way down the sides 3, but preferably they extend down to the lower edge of the sides.

The jets 5 may vary from about $\frac{1}{64}$ inch to about $\frac{1}{8}$ inch in width depending upon the density of the gas, and are preferably spaced apart from about four to eight times the width. The jets employed in the burner illustrated were about $\frac{1}{16}$ inch wide and were spaced on $\frac{1}{2}$ inch centers.

The height of each side wall 3 should be at least $\frac{1}{2}$ inch and need not be over about $1\frac{1}{2}$ inches, depending upon the angle of slant for the side wall. Preferably the angle of the side wall is about 45° with the perpendicular, and this may vary from about 30° to about 50° . The burner surface should not be so steep that the included angle between the side walls 3 restricts the even flow of gas to the peak 4, nor should the burner surface be so flat that the secondary air does not receive sufficient sweeping impulsion along the side wall from the burner action to supply the necessary air at the peak 4 for complete combustion of the gas.

The burner head 1 is preferably straight with the inlet entrance from venturi 2 merging vertically into the bottom of the burner body 6 midway between the ends of the burner. The bottom wall of the burner body 6 slants upwardly from the inlet towards the opposite outer ends of the burner to provide a gradually varying cross-section for the burner 1 corresponding to the flow of gas to the jets 5.

If the burner body 6 is too shallow the flow of gas towards the end jets is apt to be restricted by insufficient body capacity. If the bottom wall is constructed horizontally from the inlet with a large cross-section extending for the full length of the burner body, the flow of gas towards the ends of the burner is apt to be disturbed by turbulence tending to cause flash back. Therefore, the walls of the burner body should provide a varying cross-sectional capacity substantially corresponding with that necessary for the flow of gas at a uniform pressure and rate to the several jets.

The Venturi tube 2 is of substantial length and cross section to adequately mix the primary air and gas as they pass therethrough to the burner head 1.

The forward end 7 of the Venturi tube 2 is funnel-shaped and has a central cross member

8 through which the gas supply conduit extends centrally of the tube.

A supporting lug 9 extends downwardly from tube 2 near funnel 7. Additional support for the burner is provided by lugs 10 at the ends of the burner head 1.

The burner constructed as described has a capacity substantially twice that of burners of the same size employing circular jet holes distributed throughout the burner surface. It is capable of efficiently burning gases of different densities under pressures going as low as .15 of an inch of water without flash back. It will effect complete combustion of gas at pressures as high as six inches of water and has a B. t. u. capacity exceeding 60,000 for an 8 inch long burner.

These advantages may be accounted for by the avoidance of turbulence in the flow of secondary air to the jets as distinguished from the performance of burners of other shapes and having different types of jets. Furthermore, the arrangement and spacing of the jets effects a vertical sweeping action for secondary air upwardly along the burner surfaces between the jets which prevents turbulence or interference between the currents of air produced by adjacent jets.

The flame of each jet fans outwardly as illustrated in Fig. 5 when the burner is operating near capacity showing a constant uniform supply of fresh secondary air flowing laterally to each jet throughout its length. The fresh secondary air, as it comes in contact with the outwardly flowing gas at the side of the jet, is lifted away from the burner surface to mix with the gas and effect complete combustion. The currents of air thus resulting from the burner action of each jet are constant and free from turbulence and from interference with those of the adjacent jets. This results in efficient and complete combustion of the gas at all sections of the burner.

By providing a peak 4 for the burner, the sweeping action of the secondary air is inwardly and upwardly along the sides and is in constant contact with the burner surface to mix with the gas at the edge of each jet all of the way up the sides. The peak 4 may be slightly rounded or flattened at the top, but if it is flattened off too much the secondary air passing upwardly along the slanting sides will not stay in contact with the burner surface and the gas passing upwardly through the central peak will not be burned properly. The secondary air should contact and mix with the gas at the edge opening of each jet throughout the length of the latter, including the peak 4.

The sides 3 of the burner surface may be somewhat convex or concave, but the straight planular surface is preferred. Too rounded a surface may cause inadequate supply of secondary air to the jets.

The secondary air sweeping upwardly along the burner surfaces tends to cool the burner and prevent overheating which might cause warpage and the like.

The invention may have various embodiments within the scope of the accompanying claims.

I claim:

1. In a gas burner of the class described, a hollow burner body constituting a gas chamber adapted to receive a supply of gas and primary air mixture and to transmit the same to jets in the body, said body comprising a pair of oppositely disposed upwardly and inwardly inclined sides of substantial height and breadth and substantially uniform thickness meeting centrally in a ridge and constituting the burner surface, and said sides having a substantially uniform pitch between an angle of about 30° and an angle of about 50° to the perpendicular and having a plurality of transverse substantially vertical slot jets extending continuously across the ridge from side to side of the burner surface and spaced longitudinally thereof, whereby the upward and inwardly sweeping secondary air along the sides of the jets tends to effect a more complete concentrated combustion of the gas and primary air mixture and to merge the flame of each jet from the opposite sides of the burner at the ridge, and the draft provided by the secondary air sweep adjacent and between the jets tends to prevent flash back at low pressures of gas.

2. In a gas burner of the class described, a hollow burner body constituting a gas chamber adapted to receive a supply of gas and primary air mixture and to transmit the same to jets in the body, said body comprising a pair of oppositely disposed upwardly and inwardly inclined substantially plane walls of substantially uniform thickness and having sides of at least one-half an inch in height meeting centrally in a peak ridge and constituting the burner surface, said sides having a substantially uniform pitch between an angle of about 30° and an angle of about 50° to the perpendicular, and a plurality of transverse substantially vertical slot jets extending perpendicularly through said sides and continuously across said ridge from side to side of said burner surface with said jets spaced longitudinally of the burner body a distance of from four to eight times the width of the adjacent slots, whereby a more complete combustion of the gas is obtained under high operating pressures and flash back at low operating pressures is substantially reduced.

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