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OXY-GAS BLOWPIPE

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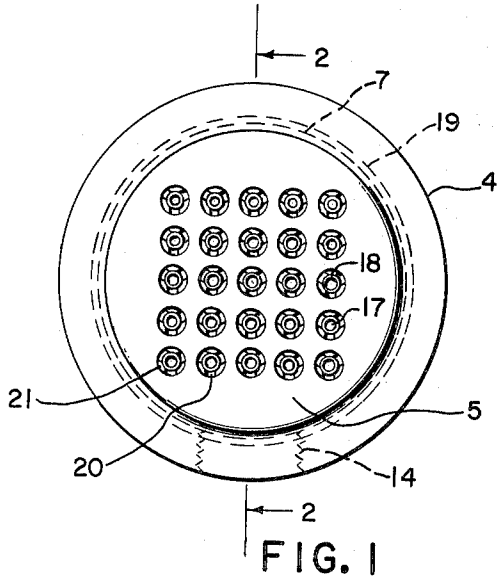


FIG. 1

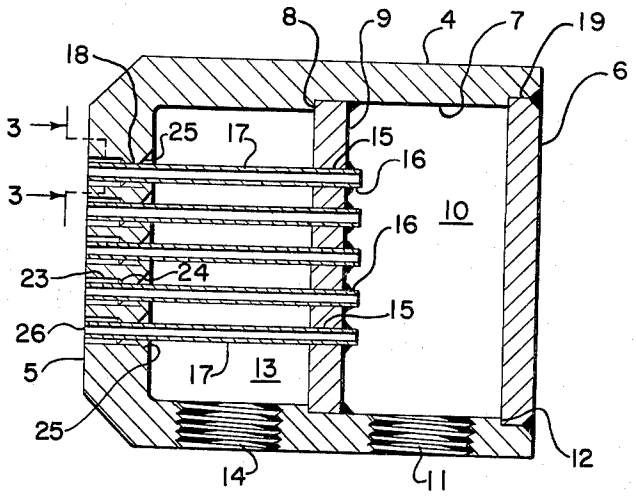


FIG. 2

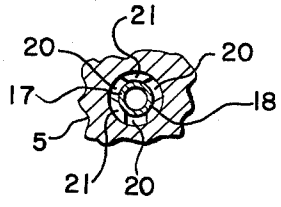


FIG. 3

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OXY-GAS BLOWPIPE

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1 Claim. (Cl. 158—27.4)

This invention relates to a blowpipe for use with oxygen-hydrogen or other oxygen-gas fuel systems. More specifically, it deals with an oxygen-fuel gas blowpipe employing a multiplicity of fuel gas jets for feeding the flame.

When pre-mixed oxygen and hydrogen, for example, are burned in a torch, the mixture tends to burn very rapidly, in fact, so rapidly as to cause a flash-back of the flame to the point of mixture. To avoid this difficulty, the art has developed a torch wherein the hydrogen fuel, for example, is led separately through a nozzle in a chamber wherein the oxygen is fed around the nozzle, so that mixing is accomplished within the immediate vicinity of the flame. Also, to obtain greater heat output, the art has developed a torch using a bundle of fuel gas tubes fed through a single opening or through multiple openings through which the oxygen is simutaneously discharged. However, it has been found that such torches give an irregular flame, or a flame in which the heat output is not evenly distributed therein, without necessitating an exceptionally high heat throughput.

According to the present invention, an oxy-fuel gas blowpipe is provided wherein an exceptionally stable flame is produced giving a very even output of heat throughout the flame even at relatively low heat throughputs. The invention comprises a tip having separate fuel and oxygen chambers, with a multiplicity of small tubes leading fuel gas from the rearward chamber through the oxygen forward chamber and through chamfered holes in the front of the tip, the holes being provided with spaced guides for the tubes, which insure proper mixing of the fuel with the oxygen.

The invention will be more readily understood by reference to the accompanying drawing in which a preferred embodiment is described, and in which FIGURE 1 illustrates a front view of a blowpipe of the present invention. A cross-sectional side view, taken along line 2—2 of FIGURE 1, is depicted in FIGURE 2, while an enlarged fragmental cross-sectional view, taken along line 3—3 of FIGURE 2, and showing details of one fuel jet assembly, is presented in FIGURE 3. Similar numerals refer to similar parts in the various figures.

Referring again to the drawing, numeral 4 represents the side wall of a tubular metal blowpipe tip having a forward flame end 5 and a back plate 6 sealing off the rear of the tip. The interior portion of side wall 4 is drilled out to a larger diameter inner wall 7, leaving a shoulder 8 against which is welded or soldered plate 9, in sealing relation therewith. Thus, plates 9 and 6 form a sealed rear fuel chamber 10, into which fuel access is provided through threaded opening 11. It will be noted that tip wall 4 is drilled to a still larger diameter 19 to provide shoulder 12 against which abuts outer wall 6 which is soldered or welded in the same manner as plate 9. Plate 9, with forward flame end 5, form forward

oxygen chamber 13 having an oxygen inlet through threaded opening 14.

Plate 9 is drilled with a multiplicity of holes 15 into which are welded or soldered inner ends 16 of small-diameter tubing 17 serving as the fuel jet supply. Tubes 17 extend through oxygen chamber 13 and penetrate forward flame end 5 through holes 18 drilled in juxtaposition with holes 15 in plate 9. It will be noted that holes 18 are drilled just large enough to permit passage therethrough of tubes 17. As can be seen from FIGURE 3, thereafter, holes 18 are broached, providing spaced annular passages 20 through which a controlled amount of oxygen may pass to intermix evenly with fuel gas from tubes 17. It is preferred thus to provide three shoulders 21 to serve as guides around and for tubes 17 in each hole, although a larger number may be employed, if desired. It also is preferred to drill a larger hole 23 in end 5, around each tube 17, about halfway through the thickness of end 5, and to shouder 24, for example (FIGURE 2). Also, it has been found very useful to provide countersinks or chamfers 25 at the rear of holes 18 to facilitate positioning of the tubes 17 in their respective holes 18.

As an example of a suitable oxy-hydrogen blowtorch having a 1½" O.D. and 1⅛" I.D., with a front flame end of ¼" thickness, plate 9 may be of ⅛" thickness and 1$\frac{3}{16}$" diameter, while plate 6 would be of the same thickness and 1¼" diameter. Plate 9 carries 25 stainless steel tubes of $\frac{1}{16}$" O.D. and 0.009" wall thickness, silver soldered therein, with ends 16 protruding rearwardly about $\frac{1}{16}$" from plate 9. Chambers 10 and 13 would each be ⅝" wide. Holes 18 in end 5 would be $\frac{1}{16}$" diameter drilled on $\frac{5}{32}$" centers. Hole 23 is drilled half-way through end 5 with a No. 42 drill, while countersink 25 is $\frac{1}{16}$" deep. Holes 18 are broached with a multiple-spline broach tap giving shoulders 21 a depth of 0.0155 inch, and it is desirable that the outer end, 26, of tubes, 17, be flush with the face of flame end 5.

We claim:

An oxy-fuel gas blowpipe having an oxygen inlet and a fuel gas inlet, comprising, in combination,

a tubular tip having a side wall and a substantially flat flame end wall,

a forward wall mounted in sealed relation transverse to the tubular side wall and in spaced relation to said flame end wall, wherein an oxygen chamber is provided, said oxygen inlet being in communication with said oxygen chamber,

a rear wall means mounted in sealed relation transverse the tubular side wall and in spaced relation to said forward wall so as to provide an enclosed fuel gas chamber substantially equal in volume to said oxygen chamber, said fuel gas inlet being in communication with said fuel gas chamber,

a multiplicity of spaced small holes disposed in said forward wall,

a multiplicity of spaced holes disposed in said flame end wall in alignment with the holes in said forward wall,

a multiplicity of forwardly-projecting small fuel discharge tubes, their rearward ends projecting into into said fuel gas chamber and in sealing relation to said holes in said forward wall and having their

forward ends disposed in their respective holes in said flame end wall and in flush relation with the outer face of said flame end wall, the size of said holes in the flame end wall being just enough to permit passage therethrough of the forward ends of the fuel discharge tubes, and

a series of at least three spaced groove means cut in the peripheries of each of said multiple holes in said flame end wall and communicating with said oxygen chamber and of a size adequate to permit the flow of enough oxygen therethrough for combustion of fuel gas discharged through said fuel discharge tubes and facilitating rapid mixing of oxygen with fuel gas issuing through said tubes.

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