

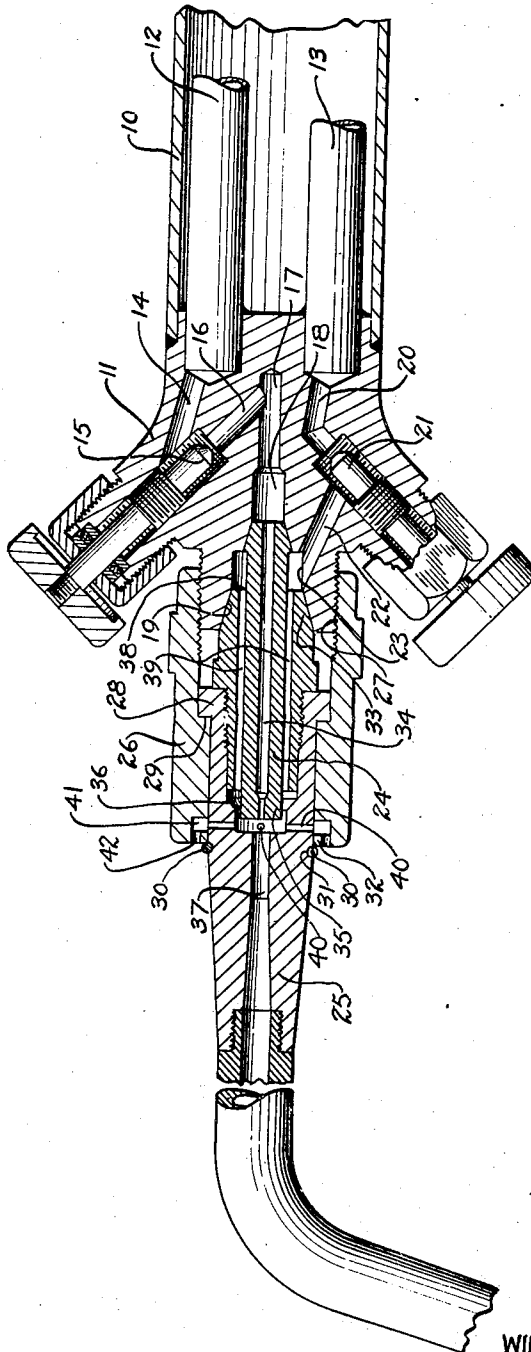
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BLOWPIPE

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BLOWPIPE

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This invention relates to blowpipes and more particularly blowpipes in which a fuel-gas, a combustion-supporting gas, and air are mixed. The invention relates especially to such blow-

5 pipes wherein the proportion of air to one of the other gases with which it is first mixed may be varied in simple manner.

In the operation of blowpipes it is sometimes desirable to reduce the volume of gas consumed. 10 It may also be desired to supply all or a part of the air required for combustion within the blowpipe, so that no air need be available about the burner tip. To this end air may be mixed with either the fuel-gas or the combustion-supporting 15 gas before the final mixture is made and before this mixture reaches the flame. In different classes of service different ratios of fuel-gas, combustion-supporting gas and air are required to give greatest operating efficiency and gas economy. One object of this invention is, therefore, 20 to provide an apparatus wherein these gas ratios may be easily regulated and adjusted. A further object is the provision of such an apparatus in simple, rugged and inexpensive form, and so constructed that the parts may be readily separated, 25 one from the other, for replacement, repair or cleaning. Other objects will be apparent from the present specification.

The invention is illustrated in the accompanying drawing which shows a broken longitudinal 30 mid-section through a blowpipe constructed in accordance with the invention.

According to the invention one gas, which may be either the combustion-supporting gas or the 35 fuel-gas, is projected from a nozzle through a chamber into a mixing throat. Any gas in the chamber will therefore be aspirated into the mixing throat by the stream of gas which is projected through the nozzle. The other gas, that 40 is to say: either the fuel-gas or the combustion-supporting gas, enters the chamber under a pressure which may be varied, and an opening of constant section is provided through which atmospheric air may enter the chamber. Obviously, 45 the greater the pressure at which the other gas enters the chamber, the greater will be the pressure in the chamber; consequently the slower will be the rate of air flow into the chamber; and therefore the richer will be the mixture 50 of gas and air in the chamber. Conversely, the lower the pressure at which this other gas enters the chamber, the lower will be the pressure in the chamber; consequently, the faster will be the air flow into the chamber; and the leaner 55 will be the mixture of gas and air in the cham-

ber. Thus the quality of the mixture may be controlled simply by regulating the pressure of one gas.

In the embodiment of the invention illustrated in the drawing there is shown a blowpipe handle 10, having a forward end 11, in which the end of a combustion-supporting gas conduit 12 and the end of a fuel-gas conduit 13 terminate. As oxygen and acetylene are commonly used as the combustion-supporting gas and the fuel-gas, the 10 conduits 12 and 13 will hereafter be referred to as the "oxygen" and "acetylene" conduits respectively. A duct 14 formed in the forward end 11 of the handle connects the oxygen conduit 12 with an oxygen regulating valve 15 from which 15 ducts 16 and 17 in series lead to a chamber 18 at the base of a concave conical opening 19 in the forward end of the handle. A duct 20 connects the acetylene conduit 13 with an acetylene control valve 21 from which a duct 22 leads to an 20 annular groove 23 in the concave conical opening 19.

A mixing nozzle 24 is secured in operative position between the handle 10 and a stem 25, the handle, the mixing nozzle and the stem all 25 being held together in series relation by a coupling or union 26 which may be screwed upon external threads 27 on the forward end 11 of the handle and which, as shown, engages an annular projection 28 on the stem 25 by means of an 30 internal shoulder 29 on the union 26. A split ring 30 fitting in an annular groove 31 in the stem 25, may bear against a forward shoulder 32 of the union 26 in order that the stem and union may be unscrewed together and held as a unit 35 when detached from the forward end 11 of the handle.

The mixing nozzle 24 has a convex conical rear end 33 which fits tightly into the concave conical opening 19 in the forward end of the handle. An 40 axial bore forms a central passage 34 through the mixing nozzle whose rear end is in open connection with the chamber 18, and whose forward end terminates in a nozzle end 35 of the mixing nozzle. The forward end of the mixing nozzle 24 45 fits into a cavity in the rear end of the stem 25 and the nozzle end 35 of the mixing nozzle is of reduced section, clearing the wall of the cavity at the rear end of the stem and forming therewith a mixing chamber 36. The stem 25 has an 50 axial bore 37 therethrough, which forms an exit opening to the mixing chamber 36 into which a gas passing through the central passage 34 in the mixing nozzle and out at the nozzle end 35 will be projected. The axial bore 37 in the stem 55

also forms adjacent the chamber 36 a mixing throat for any gases which may be projected into the stem.

The mixing nozzle 24 has an annular groove 38 formed in its convex conical rear end which registers with the annular groove 23 in the forward end of the handle when the mixing nozzle is in place, to form an annular chamber between the mixing nozzle and the handle end. Passages 39 extend through the mixing nozzle from the annular groove 38 to the mixing chamber 36, and serve to carry acetylene into the mixing chamber.

The stem 25 has passages 40, here shown as radial passages, extending from its outer surface into the mixing chamber 36; and the union 26 has a passage extending from atmosphere to the outer ends of the passages 40, the passage in the union being illustrated as an annular recess 41 adjacent the outer ends of the radial passages 40, and a plurality of passages 42 connecting the annular recess with atmosphere. The passages 42 extend away from the handle so that any flame or gas issuing from them will be projected away from the operator of the blowpipe.

From what has been said, the operation of the apparatus will be apparent. Oxygen, under control of the oxygen regulating valve 15, passes through the central passage 34 in the mixing nozzle and is projected from the nozzle end 35 through the mixing chamber 36 into the mixing throat 37. In passing through the mixing chamber 36 the oxygen stream will aspirate any gas therein into the mixing throat 37, where the oxygen and the aspirated gas will be thoroughly mixed.

At the same time, acetylene regulated by the acetylene control valve 21 enters the annular chamber formed between the annular groove 23 and the annular groove 38 and passes through the passages 39 to the mixing chamber 36. Atmospheric air also enters the mixing chamber 36 being drawn through the radial passages 40 by the vacuum produced as the oxygen stream passes through the mixing chamber. The size of the radial passages 40 being constant and the atmospheric pressure being constant, it will be

clear that the extent to which air enters the mixing chamber 36 will be governed by the pressure of the acetylene entering this chamber. Thus, the acetylene-air mixture may be regulated as to its composition by varying the position of the acetylene control valve 21.

Clearly, the invention is not limited to the details of construction and operation here described by way of example. Other fuel-gases and other combustion-supporting gases may be used instead of acetylene and oxygen. Furthermore, the fuel-gas may be passed through the central passage in the mixing nozzle and may aspirate the combustion-supporting gas which may enter the mixing chamber in the manner which has been described with respect to the supply of acetylene. Other variations and substitutions may also be made without departing from the principles of the invention and the proper scope of the appended claims.

I claim:

1. A blowpipe, for producing flame of varying intensity, comprising a handle; a chamber at the forward end of said handle having inlets for acetylene, inlets for air, and an outlet constituting a mixing throat, said air inlets being adjacent the entrance to said throat; a nozzle adapted to direct a jet of oxygen through a portion of said chamber and into said mixing throat to aspirate acetylene and air into said throat with the oxygen jet; a valve on said handle for controlling the flow of oxygen to said nozzle; said handle being provided with another valve, manually adjustable and independent of said oxygen valve, for varying the amount of acetylene admitted to said chamber whereby the volume of air admitted automatically varies inversely to the volume of acetylene admitted thereby to maintain constant the volume of mixed gases aspirated by said oxygen stream.

2. A blowpipe as claimed in claim 1 in which the air inlets are directed forwardly ahead, and away from the blowpipe handle, whereby when a flashback occurs, flames issuing from said air inlets will not injure the operator.

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