

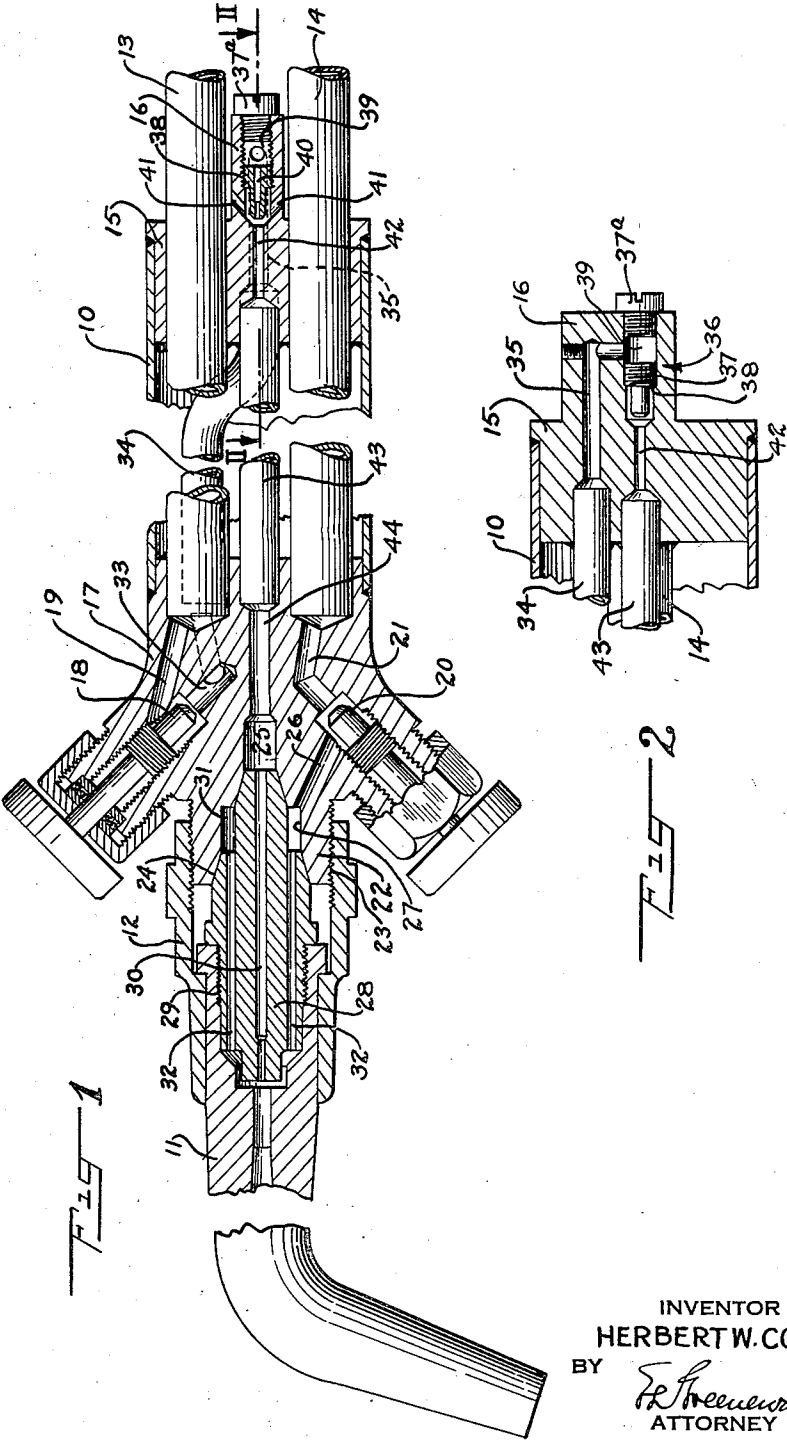
Sept. 1, 1936.

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2,052,871

BLOWPIPE

Filed Aug. 1, 1934



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UNITED STATES PATENT OFFICE

2,052,871

BLOWPIPE

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Application August 1, 1934, Serial No. 737,894

11 Claims. (Cl. 158—27.4)

This invention relates to blowpipes and more particularly blowpipes in which fuel-gas and a combustion supporting gas are mixed. The invention relates especially to such blowpipes where-
in a diluting gas is first mixed with either the
fuel-gas or the combustion supporting gas before
making the final mixture.

One object of the invention is economy in the quantity of one of the gases used. Another object is the provision of a blowpipe construction wherein the amount of popping or back flashing will be reduced. Still another object is the provision of a blowpipe in which air is mixed with the combustion supporting gas at such a distance from the point of mixture with the fuel gas that there can be no burning at the point at which the air is admitted to the blowpipe. A further object is the provision of such an apparatus in a simple, rugged and inexpensive form. Other objects will be apparent upon consideration of the present specification. The invention is shown by way of illustration in the accompanying drawing, in which:

Fig. 1 is a broken mid-section through a blowpipe constructed in accordance with the invention; and

Fig. 2 is a partial longitudinal mid-section taken on the line II—II of Fig. 1.

In the operation of blowpipes, economy in gas consumption frequently becomes an important factor. Blowpipe constructions have therefore been devised wherein the fuel-gas, or the combustion supporting gas, or both are diluted with another gas such as atmospheric air. The danger of popping or flashbacks in such constructions is well known, such action being due to the fact that the addition of air makes possible the existence of a combustible mixture in such volume in the tubes and passages of the pipe that appreciable explosions occur therein. This is not the case where the tubes and passages of the blowpipe are substantially full of a more concentrated gas (either the fuel-gas or the combustion supporting gas) which will smother incipient explosions. For the reasons given it is desirable to design with especial care blowpipe constructions wherein the gases are to be diluted.

A further consideration is the different service required of any blowpipe and the desirability of changing the proportions of fuel-gas, combustion supporting gas, and diluting gas in the mixture to meet different service requirements.

In the drawing there is shown a blowpipe comprising a handle 10, a stem 11, and a coupling 12 joining the handle and the stem. An oxygen sup-

ply conduit 13 extends longitudinally of the handle 10 and a parallel fuel-gas supply conduit 14 is disposed in similar position within the handle.

Both conduits in entering the handle pass through a block 15 having a projecting end 16 at the rear of the handle 10. Both the oxygen supply conduit and the fuel-gas supply conduit are fitted into a block 17 forming the forward end of the handle.

An oxygen regulating valve 18 is constructed in the forward end of the handle, and a duct 19 connects the oxygen supply conduit 13 with the intake side of the oxygen regulating valve 18. Similarly a fuel-gas regulating valve 20 is constructed in the forward end of the handle and a duct 21 connects the forward end of the fuel-gas supply conduit with the intake end of the fuel-gas regulating valve. As here shown the ducts 19 and 21 are indicated as being bored through the block 17 which forms the forward end of the handle.

The block 17 has a projection 22 thereon extending in a forwardly direction between the oxygen and fuel-gas regulating valves. The projection 22 is externally threaded as at 23 to receive the coupling 12, and has a concave conical opening 24 concentric with the external threads 23, with a chamber 25 at the base of the concave conical opening. A duct 26 extends through the block 17 forming the forward end of the handle 10 from the fuel-gas regulating valve 20 to an annular groove 27 in the wall of the concave conical opening 24. Thus, by opening the fuel-gas regulating valve, fuel-gas may enter the groove 27 through the duct 26.

An oxygen-air-fuel-gas mixer 28 having a convex conical rear end adapted to fit tightly against the walls of the concave conical opening 24 is threaded as at 29 for fitting into the stem 11, which has a cavity at its rear ends internally threaded to receive the mixer 28. The mixer has an axial bore 30 therethrough, the rear end of which opens into the chamber 25 in the forward end of the handle, and the forward end of which opens into a chamber formed between the cavity in the stem 11 and the forward end of the mixer. Furthermore, the forward end of the mixer is shaped somewhat like a nozzle being contracted about the end of the axial bore and thereby clearing the sides of the stem cavity at the forward part thereof to form a chamber. The mixer has an annular groove 31 which is formed in its convex conical rear end to register with the annular groove 27 in the forward

end of the handle 10 and therewith form an annular chamber. Longitudinal passages 32 formed in the mixer extend parallel to the axial bore 30 from the annular groove 31 to the opening between the forward end of the mixer and the walls of the cavity at the rear end of the stem 11 and serve to carry fuel-gas to the forward end of the mixer. It is thus possible for fuel-gas reaching the chamber formed by the annular grooves at the rear of the mixer to pass through the longitudinal passages 32 to its forward end.

A duct 33 here shown as formed by two intersecting bores in the block 17 connects the outlet side of the oxygen regulating valve with an oxygen tube 34 which extends the length of the handle to the block 15 forming the rear end of the handle, and a duct 35 comprising two intersecting bores in the block 15 joins the oxygen tube 34 with the intake side of an oxygen-air injector 36. The oxygen-air injector is formed by screwing an externally threaded nozzle 37 into an internally threaded cavity 38 at the rear end of the block 15. A plug 37^a is screwed into the end of the cavity 38 closing the same but leaving a chamber 39 between the plug and the nozzle for receiving oxygen from the duct 35. An axial bore 40 extends through the nozzle 37 from the chamber 39 to the forward end of the nozzle, which is of reduced section and clears the walls of the cavity 38 so as to form a chamber between the nozzle end and the walls of the cavity. Ports 41 extend into this cavity from atmosphere and a bore 42 of reduced section but of greater diameter than the bore 40 in the nozzle 37 connects the injector 36 with an oxygen-air delivery tube 43 having one end secured in the block 15 and the other end secured in the block 17. A bore 44 in the block 17 joins the forward end of the oxygen-air delivery tube 43 with the rear end of the chamber 25 thus providing means for the oxygen-air mixture to reach the mixer 28.

From what has been said, the operation of the apparatus will be clear. Fuel-gas, for instance, acetylene, entering the blowpipe through the fuel-gas supply conduit 14 passes through the duct 21 to the intake side of the fuel-gas control valve 20. When this valve is opened the fuel-gas passes through the duct 26 into the chamber formed by the annular groove 27 in the forward end of a handle and the annular groove 31 formed in the convex conical rear end of the mixer 28. Thence, the fuel-gas is free to pass through the longitudinal passages 32 in the mixer to the chamber at its forward end. Oxygen reaches the blowpipe through the oxygen supply conduit 13, passes thence through the duct 19 to the intake side of the oxygen regulating valve 18. This valve being open, the oxygen passes through the duct 33 into the oxygen tube 34, thence through the duct 35 to the intake side of the oxygen-air injector 36. In passing through the injector 36 air is aspirated through the ports 41 and projected into the bore 42 and thence into the oxygen-air delivery tube 43, through the bore 44 in the forward end of the handle, into the chamber 25. From the chamber 25 the oxygen-air mixture flows through the axial bore 30 in the mixer 28.

The oxygen is supplied to the blowpipe under greater pressure than the fuel-gas and this pressure is such that even after traversing long passages in the handle it issues from the end of the mixer together with the air at considerably higher pressure than that of the acetylene in the surrounding chamber. Consequently, the oxy-

gen-air mixture aspirates fuel-gas at the forward end of the mixer and carries it along into the stem where oxygen, air and fuel-gas are thoroughly mixed.

Clearly fuel-gas may be supplied to the conduit 13 and oxygen under lower pressure to the conduit 14, and air may be mixed with the fuel-gas instead of the oxygen. In either case the gas under higher pressure cannot back up in the longitudinal passages 32 of the mixer itself and should popping or flashbacks occur between the mixer and the injector they will be smothered in the long oxygen-air delivery tube 43 before reaching and issuing from the air ports 41.

In accordance with the invention therefore, an economical and safe blowpipe is provided which is simple and easy to manufacture and maintain, and which will use the gases employed with economy. The apparatus here described and illustrated in the drawing is presented merely to indicate how the invention may be applied. Other embodiments differing in detail but not in principle from the example here given will readily suggest themselves to those skilled in the art.

I claim:

1. In a blowpipe, a handle; an oxygen-air injector in the rear end of said handle, said injector having an air inlet; an oxygen tube extending from the forward end of said handle to the intake side of said injector; a gas mixer in the forward end of said handle; means for supplying fuel gas to said mixer; and an oxygen-air delivery tube connecting the outlet side of said injector with the intake side of said mixer.

2. In a blowpipe, a handle; an oxygen regulating valve in the forward end of said handle; an oxygen-air injector in the rear end of said handle, said injector having an air inlet; and an oxygen tube extending substantially the entire length of said handle from said oxygen regulating valve to the intake side of said injector.

3. In a blowpipe, a handle; an oxygen regulating valve in the forward end of said handle; a block having a projecting end at the rear end of said handle; an oxygen-air injector in the projecting end of said block, said injector having an air inlet therein extending through the projecting end of said block; and an oxygen tube having one end fitted into said block, said tube connecting said valve with the intake side of said injector.

4. In a blowpipe, a handle; an oxygen regulating valve in the forward end of said handle, an oxygen-air injector in the rear end of said handle, said injector having an air inlet, an oxygen-air-acetylene mixer at the forward end of said handle, and means for supplying fuel gas to said mixer, in combination with an oxygen supply conduit in said handle for carrying oxygen to the intake side of said valve, an oxygen tube connecting the outlet side of said valve with the intake side of said injector, and an oxygen-air delivery tube connecting the outlet side of said injector with the intake side of said mixer.

5. In a blowpipe, a handle; an oxygen-air-injector in the rear end of said handle, said handle having a port therein connecting said injector with the atmosphere, a gas mixer in the forward end of said handle, an oxygen regulating valve and an acetylene regulating valve both in the forward end of said handle, means for supplying oxygen to said oxygen regulating valve, means for supplying acetylene to said acetylene regulating valve, an oxygen tube connecting said oxygen regulating valve and the intake side of said in-

jector, an acetylene delivery duct connecting said acetylene valve with said mixer, and an oxygen-air delivery tube connecting the discharge end of said injector with the intake side of said mixer.

5 6. In a blowpipe, a handle; an oxygen supply conduit in said handle; an oxygen regulating valve in the forward end of said handle, said handle having therein a duct connecting said oxygen supply conduit with said oxygen regulating valve; 10 an oxygen tube lying substantially parallel to said oxygen supply conduit in said handle, said handle having therein a duct leading from the outlet side of said oxygen regulating valve to said oxygen tube; and an oxygen-air injector disposed in the 15 rear end of said handle, said oxygen tube being connected to the intake side of said injector, and said handle having a port therein connecting said injector with the atmosphere.

7. In a blowpipe, a handle; an oxygen supply 20 conduit and a substantially parallel acetylene supply conduit in said handle; an oxygen regulating valve and an acetylene regulating valve both in the forward end of said handle; an oxygen tube lying substantially parallel to said oxygen 25 supply conduit in said handle; said handle having therein a duct connecting said oxygen supply conduit with the intake side of said oxygen regulating valve, a duct connecting said acetylene supply conduit with the intake side of said acetylene regulating valve, and a duct leading from 30 the outlet side of said oxygen regulating valve to said oxygen tube; an oxygen-air injector disposed in the rear end of said handle, said oxygen tube being connected to the intake side of said injector; a gas mixer in the forward part of said 35 handle; an acetylene delivery duct connecting said acetylene valve with said mixer; and an oxygen-air tube connecting the delivery end of said injector to said mixer, said handle having a port 40 therein connecting said injector with the atmosphere.

8. In a blowpipe, a handle; an oxygen regulating valve, an acetylene regulating valve, and a gas mixer, all in the forward end of said handle; 45 means for supplying oxygen to said oxygen regulating valve; means for supplying acetylene to said acetylene regulating valve; an acetylene delivery

duct connecting said acetylene valve with said mixer; a block having a projecting end at the rear end of said handle; an oxygen-air injector in said block, said block having a port therein connecting 5 said injector with the atmosphere; an oxygen tube extending from said oxygen regulating valve to the intake side of said injector; and an oxygen-air delivery tube connecting the outlet side of said injector with the intake side of said mixer.

9. In a blowpipe, a handle portion and a stem 10 portion; mixing means between the handle portion and the stem portion, means for diluting a gas at the end of the handle remote from said mixing means, a conduit leading from said diluting means to said mixing means and a second 15 conduit for supplying a gas to said mixing means.

10. In a blowpipe the combination of a handle; an injector adjacent the rear end of said handle; means for admitting air to said injector; means 20 for supplying a combustion-supporting gas to said injector; a gas mixer communicating with the outlet of said injector and located adjacent the forward end of said handle; means for supplying a combustible gas to said mixer; valves 25 carried by said handle and severally controlling the supply of the combustion-supporting gas to said injector and the supply of the combustible gas to said mixer; and a burner nozzle communicating with the outlet of said mixer.

11. In a blowpipe the combination of a handle; 30 an injector adjacent the rear end of said handle; means for admitting air to said injector; means for supplying a combustion supporting gas to said injector; a gas mixer communicating with the outlet of said injector and located adjacent the forward 35 end of said handle, coaxial therewith, a part of said mixer being seated in the forward end of said handle; means for supplying a combustible gas to said mixer; valves carried by said handle adjacent the forward end thereof, and 40 severally controlling the supply of the combustion-supporting gas to said injector, and the supply of combustible gas to said mixer; and a burner nozzle communicating with the outlet of said mixer. 45

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