Oct. 12, 1937. H. W. COWIN 2,095,795

BLOWPIPE

Filed Jan. 10, 1935

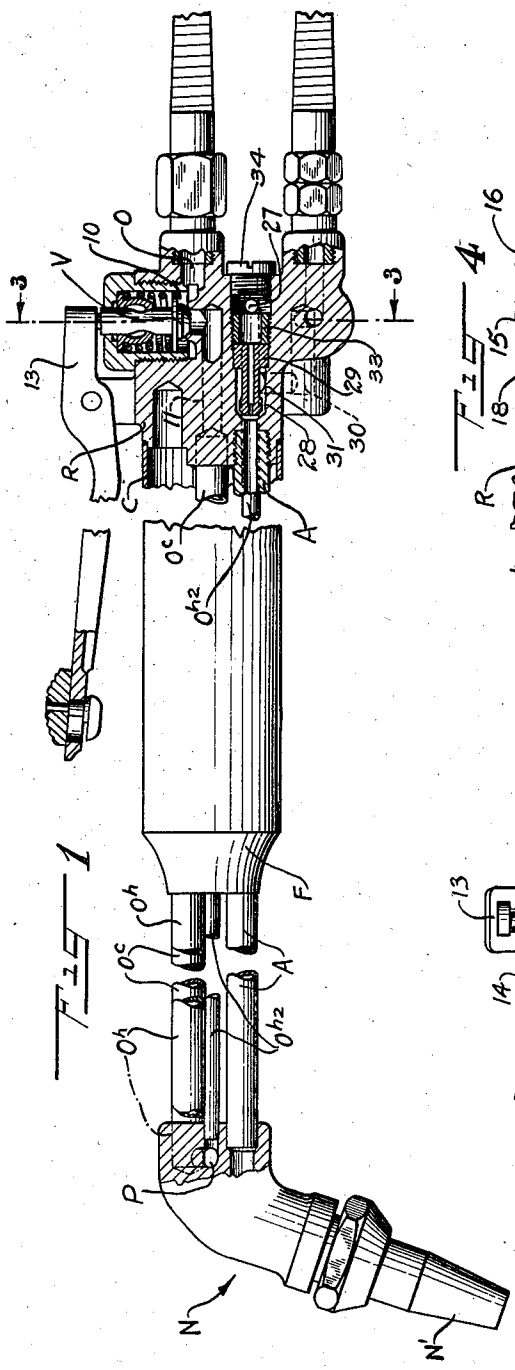


FIG 1

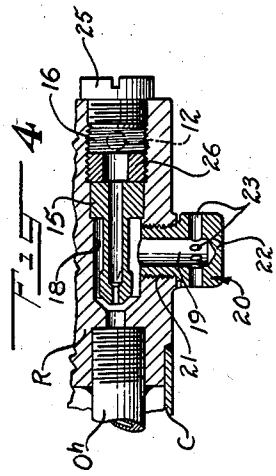


FIG 4

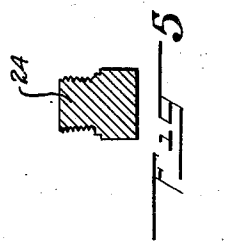


FIG 5

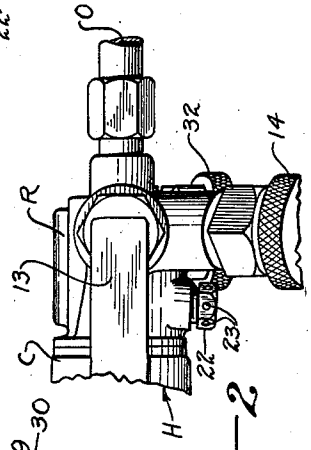


FIG 2

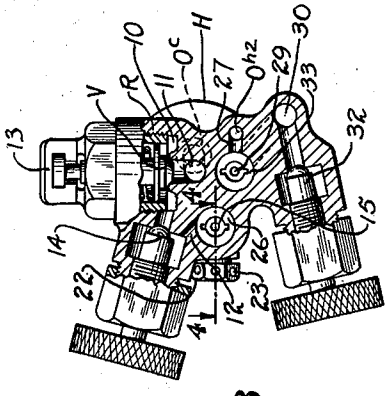


FIG 3

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BLOWPIPE

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5 Claims. (Cl. 158—27.4)

This invention relates to blowpipes for use in welding, cutting and similar operations where a heating flame is to be used either alone or in connection with a gaseous cutting jet. The invention has particular application to blowpipes for use in general light duty diversified hand operations.

It is desirable that blowpipes of this character be so constructed that they may conveniently and economically perform a variety of operations. In certain operations, as in cutting through thick steel or cast iron, a hot preheating flame is desirable and, for best results, combustion of the fuel gas is preferably supported by commercially pure oxygen. In other operations, less intense heat may be more satisfactory and more economical, as in cutting through comparatively thin steel, in deseaming, and in low velocity rivet cutting; and, for such purposes, atmospheric air may be mixed to advantage with one of the components of the combustible mixture prior to mixing such components together.

It is also desirable that adaptation of the apparatus to the various operations presented should not be dependent on the variable judgments of the several individuals who use the apparatus from time to time, and that the apparatus be as nearly proof as possible against accidental closing of the air intake under conditions where induction of air into the gaseous heating mixture is desired.

It is an object of the invention, therefore, to provide an improvement in blowpipe construction whereby a single blowpipe may be adaptable interchangeably to a variety of operations and which has incorporated therein the desirable features enumerated above.

Other objects and novel features of the invention will be apparent from the following description taken with the accompanying drawing, in which:

Fig. 1 is a view in elevation of a cutting blowpipe embodying this invention, showing parts in section;

Fig. 2 is a fragmentary detail view, in plan, showing the relation of the air induction plug to the valve body;

Fig. 3 is a sectional view on line 3—3 of Fig. 1;

Fig. 4 is a fragmentary sectional view on line 4—4 of Fig. 3 but on an enlarged scale, showing the relation of the air induction plug to the air injector; and

Fig. 5 is a detail sectional view of a plug which may be substituted for the air induction plug shown in Fig. 4.

The blowpipe shown in the drawing comprises a head N having a cutting nozzle N' attached thereto, the head being connected with a handle H by a plurality of gas-conducting pipes.

Pipes A and O^c respectively conduct the combustible mixture and the cutting gas to the head N and the nozzle N'; and a branch pipe O^h, a cross passage P, and a return branch pipe O^{h2} together provide a long conduit to conduct the preheating oxygen or combustion-supporting gas to the head N and back to the point where this gas and the fuel gas are mixed.

The handle H comprises a front block F and a rear or valve block R connected by a tubular casing C; the front and rear blocks or bodies constituting spaced supports for the several pipes just described. Within the rear block R is formed an oxygen inlet passage O leading to a chamber 10 from which passages 11 and 12 branch and respectively connect with pipes O^c and O^h, see Figs. 1 and 3. Flow of oxygen from chamber 10 into passage 11 is under control of a valve V operable through a control lever 13, and flow of oxygen from chamber 10 into passage 12 is under control of a throttle valve 14.

Atmospheric air may be mixed with one of the components of the combustible mixture, in the present case with the oxygen, before such air-diluted mixture is admixed with the other component, e. g., a fuel gas such as acetylene. To this end an injector nozzle 15 is secured within a chamber 16 in the block R and forming a part of passage O^h, see Figs. 3 and 4. When the apparatus is in operation, oxygen discharges from the forward end of the nozzle 15 so as to draw in air from the atmosphere through an annular distributing chamber 18 surrounding the forward end of the nozzle. Air is admitted to chamber 18 through a bore 19 formed in a threaded plug 20 removably secured in an aperture 21 in the wall of chamber 18. The plug 20 has a hexagonal head 22 which is preferably provided with a plurality of radial air inlet passages 23 connecting with bore 19, as clearly shown in Fig. 4.

The plug 20 may be replaced, for certain work, by a solid, imperforate plug 24, see Fig. 5, whereby the chamber 18 is closed to the atmosphere and only commercially pure oxygen from passage 12 is mixed with the fuel gas. At such times nozzle 15 may be removed, if desired, by removing a plug 25 which closes the rear end of chamber 16 in which the nozzle 15 is located, and removing the annular retainer 26 threaded into the chamber 16.

After passing through chamber 18, the oxygen-

air mixture passes through pipe O^h to the cross passage P in the head N, and then returns to the rear block R through pipe O^{h2}. The rear end of pipe O^{h2} leads to a passage **27** which discharges into the rear of a mixing chamber **28** in which is positioned an injector nozzle **29** for mixing the oxygen-air mixture with fuel gas. The oxygen-air mixture passes through the bore of the injector nozzle **29** and discharges into the bore of pipe A, thereby drawing in fuel gas from a chamber **31** which surrounds the front end of the nozzle **29** and is connected to a fuel-gas inlet passage **30**. See Figs. 1 and 3.

A valve **32** controls the flow of fuel gas through passage **30**. Nozzle **29** may be removably held in chamber **28**, in a manner similar to nozzle **15**, by a ring screw **33** threaded into the bore of the chamber **31**; and the rear end of this chamber may be closed by a removable plug **34** threaded into the bore.

It will be understood that the invention may be embodied in other types of blowpipes, and that numerous changes may be made in the structural details here illustrated without departing from the principles of the invention.

I claim:

1. In a blowpipe, the combination of a body having a fuel gas passage therethrough; a combustion-supporting gas passage leading to and discharging into the fuel gas passage; an air intake leading to said combustion-supporting gas passage; and a removable plug in said air intake having an axial passage and a plurality of passages disposed radially of said axial passage forming communication between the latter and the atmosphere.

2. In a blowpipe, the combination of a fuel gas conduit; an injector nozzle in said conduit; a combustion-supporting gas conduit communicating with the fuel gas conduit through said nozzle; a second injector nozzle located in the combustion-supporting gas conduit; and a plug in the wall of the last-named conduit and having a passage therethrough forming communication between the atmosphere and said last-named conduit.

3. In a blowpipe, the combination of a body having a fuel gas conduit therethrough; an injector nozzle in said passage; a combustion-supporting gas conduit communicating with the fuel gas passage through said nozzle; a second injector nozzle located in the combustion-supporting gas conduit; and a plug in the wall of the last-named conduit having an axial passage terminating adjacent the discharge end of said second injector nozzle, said plug having radial passages communicating with said axial passage and with the atmosphere.

4. In a blowpipe, the combination of a body having two chambers, a fuel gas inlet, and an oxygen inlet; a removable injector nozzle in one of said chambers and communicating with said oxygen inlet; a perforate plug removably secured to said body and having the passage thereof opening into said chamber containing said nozzle, to admit air to be mixed with oxygen passing through said nozzle; and means, including an injector device in the other of said chambers, for drawing fuel gas through said fuel gas inlet into said other chamber and for delivering the oxygen-air mixture to be mixed with such inducted fuel gas.

5. In a blowpipe, the combination of a head; a nozzle carried by said head for delivering a combustible gas mixture; a body having separate inlets for oxygen and a fuel gas; an injector in said body communicating with said nozzle; a handle between said head and said body; a conduit having two portions, the first portion extending from the oxygen inlet through said handle to said head, the second portion extending from said head through said handle back to said body and communicating with said injector, and the head ends of said conduit portions communicating with one another; a passage in said body between the fuel gas inlet and said injector; means whereby air may be admitted to the first portion of said conduit, said means comprising a perforate plug removably secured to said body; and an injector in said body in said first conduit portion adjacent said plug to draw in air from the atmosphere and mix such incoming air with oxygen admitted through said oxygen inlet.

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