M. E. WINANS & P. A. ROSE.

METAL WORKING BLOWPIPE.

APPLICATION FILED OCT. 1, 1914.

1,162,199.

Patented Nov. 30, 1915.

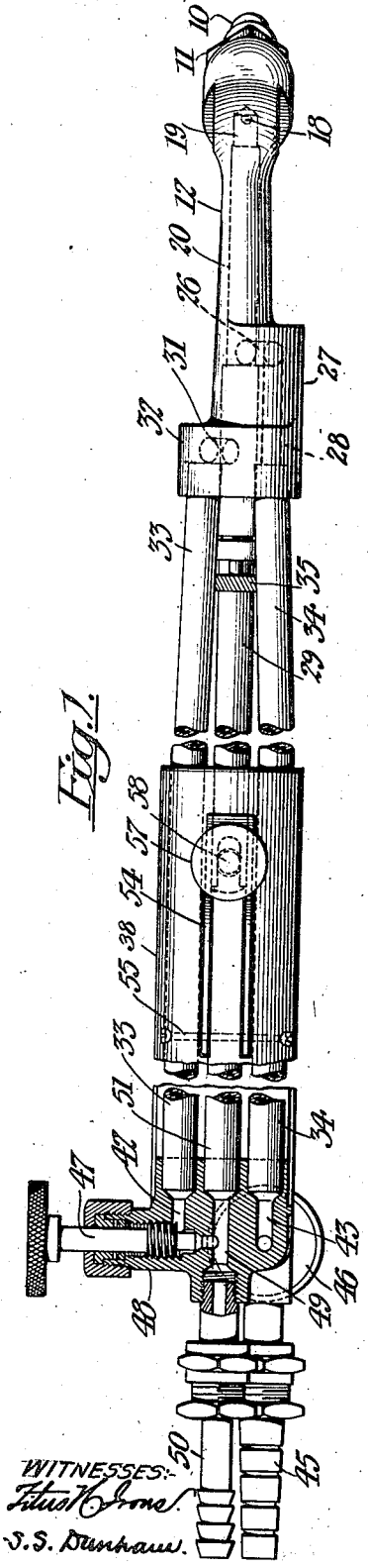


Fig. 1.

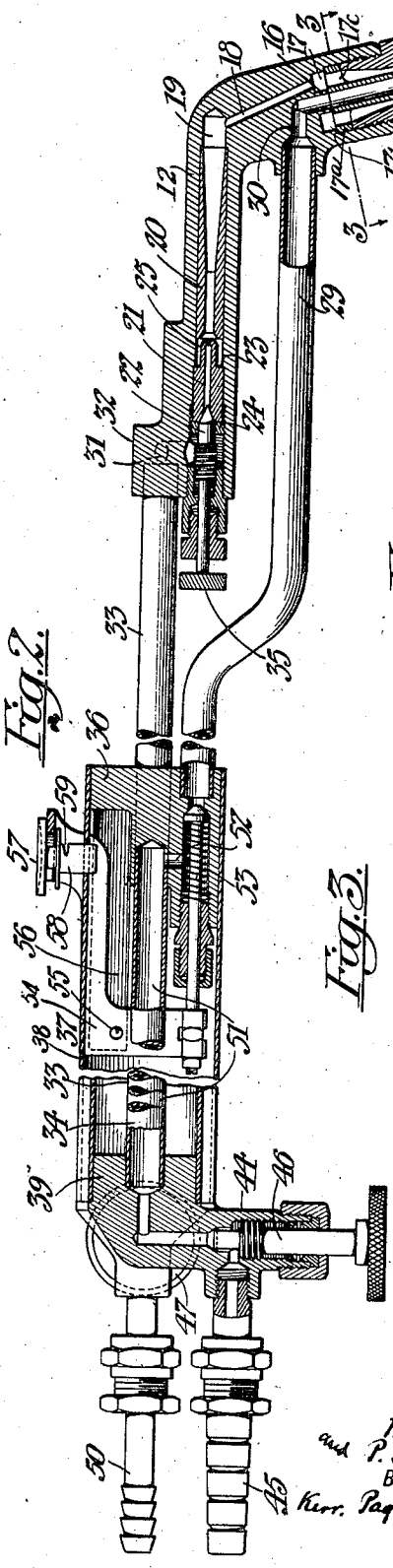


Fig. 2.

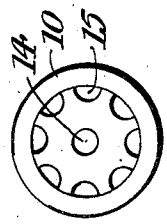


Fig. 4.

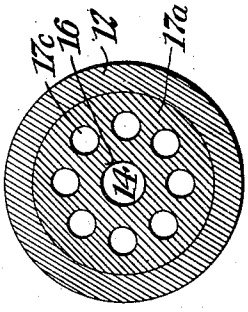


Fig. 3.

WITNESSES:

Fitch Howe.

S. S. Dunham.

INVENTORS

M. E. Winans

and P. A. Rose

BY

Kerr, Page, Cooper & Hayward

their ATTORNEYS

UNITED STATES PATENT OFFICE.

MILTON E. WINANS AND PAUL A. ROSE, OF NEWARK, NEW JERSEY, ASSIGNORS TO OXWELD ACETYLENE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF WEST VIRGINIA.

METAL-WORKING BLOWPIPE.

1,162,199. Specification of Letters Patent. Patented Nov. 30, 1915.

Application filed October 1, 1914. Serial No. 864,424.

To all whom it may concern:

Be it known that we, MILTON E. WINANS and PAUL A. ROSE, both citizens of the United States, both residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Metal-Working Blowpipes, of which the following is a full, clear, and exact description.

This invention relates to blowpipes for working metal with the oxyacetylene or similar flame, and its object is to improve the construction and operation of the device, particularly in the direction of durability and in convenience and efficiency.

To this and other ends the invention consists in the novel features of construction and combinations of elements hereinafter described.

One form of the invention is illustrated in the accompanying drawing, in which—

Figure 1 is a plan view, partly in horizontal section, and Fig. 2 is a longitudinal section in a plane at right angles to the plane of Fig. 1. Fig. 3 is a section on line 3—3 of Fig. 2, and Fig. 4 is an end view from line 4—4 of Fig. 2.

The external cutting nozzle is made in two parts. The lower part or outer nozzle member, 10, in the form of a short cylindrical shell tapered at its outer end, is made of copper, which possesses the necessary heat-resistant properties. The upper part or inner nozzle member, 11, threaded into the nozzle-head or casting 12 and having a hexagonal outer contour, is made of brass for the sake of hardness and durability, being far enough from the flame and the highly heated metal against which the flame is projected in use to be protected from injury by the heat. The two parts are "dovetailed" together, as it were, the lower end of the brass part 11 being internally rabbeted and the metal rim (around the rabbet) being swaged in and over the flaring upper end of the copper tip 10, as shown at 13. Through both parts extends a central tube 14 which at its lower end terminates flush with the end of the shell 10. The inner surfaces of the two nozzle members are flush with each other, as shown, and the outer diameter of the jet tube 14 is uniform. The annular passage 10^a thus provided is, at most, of non-increasing cross-section. Hence there is no decrease in the velocity of the combustible mixture flowing through such passage and consequently no increase in possibility of "back-firing". Longitudinal grooves 15 are milled in the outside of the tube to provide a series of outer openings constituting in effect an annular orifice for the oxygen-acetylene mixture. At its upper end the tube 14, which, it may be stated, carries the high-pressure oxygen cutting jet, abuts tightly against a short neck 16, integral with the head-casting 12 and providing an annular chamber 17 at the inner end of the part 11. Around the upper end of the tube 14 is a flange 17^a integral therewith and held between the inner end of the member 11 and the shoulder 17^b. From the chamber 17 the oxygen-acetylene mixture is through apertures 17^c in the flange 17^a supplied to the passage or passages around the central oxygen-tube 14. The chamber 17 receives the oxygen-acetylene mixture through a passage 18 in the substantially L-shaped head-casting, which passage opens into the longitudinal bore 19 containing a mixing tube 20. At the rear of the mixing tube is an injector nozzle 21 controlled by a needle valve 22 at its rear end. The nozzle 21 is seated against a shoulder 23 formed in the bore 19 and is held in place by a screw-collar or nut 24. At its forward end the injector nozzle is formed with a nipple providing an annular space 25 communicating with a lateral passage 26 in the lateral extension 27 of the head-casting 12. This lateral passage communicates with the longitudinal bore 28 in said extension, which latter bore supplies acetylene from tube 34 to the transverse passage 26. The acetylene thus supplied to the annular space or chamber 25 is entrained into the mixing tube by the oxygen issuing from the nozzle 21 and the mixed gases then flow through the passage 18 to the nozzle 10—11 and are burned at the orifice 15. The oxygen is supplied to the injector nozzle 21 through a passage 31 in a lateral extension 32 of the head-casting 12, and is conveyed to said passage by a tube 33 fitted into the extension 32. The acetylene, supplied to the chamber 25 by the passage 26 and 28, is conveyed to the latter passage by a tube 34 fitted into the extension 27. The bore of the tube 14, and the annular space 10^a surrounding the same, constitute independent passages for oxygen and a combustible mixture, respectively, and

are adapted to direct a heating flame and a jet of oxygen upon the same spot on the metal to be worked.

The provision of an injector nozzle and valve, as for example those shown at 21 and 22, are important features. They afford regulation of both the oxygen and the acetylene of the pre-heating flame by means of a single thumb piece, as the knob 35; for although the valve controls directly only the oxygen, the fact that the acetylene is carried into the mixing tube by entrainment, or injector-action, gives an indirect control of the acetylene. Moreover, once the valve 22 is properly set, the pre-heating flame may be extinguished by cutting off the supply of oxygen and acetylene through the tubes 33, 34, at the rear, and upon re-opening the tubes the gases may be relighted at the orifice 15 without it being necessary to re-adjust the valve 22 for the work in hand. The location of the cutting-jet supply-tube 29 between the nozzle and the longitudinal portion of the head-casting is also an important feature, for two reasons. First, it masks the rear portion of the head-casting from reflected heat to a not inconsiderable extent and thus keeps the preheating oxygen-acetylene mixture cooler; and second, it is itself exposed directly to the reflected heat, thereby heating the oxygen supplied for the cutting jet which should be at the highest permissible temperature so as to combine most rapidly with the metal upon which the preheating flame is projected.

In rear of the thumb piece 35 the high-pressure oxygen tube 29 is bent upwardly into proximity to the tubes 33, 34, and the three then enter the front casting 36 of the hollow handle 37. This latter comprises the front casting just mentioned, a sleeve or hollow cylinder 38 into which the front casting is fitted, and a rear casting 39 fitted into the cylinder. Inside the handle the tubes 33, 34 extend into connection with the passages 42, 43. The passage 43, through which the acetylene is supplied, extends down into a boss 44 on the rear-handle casting 39 into communication with a nipple 45 for connection with a hose leading from the acetylene tank or generator, and is controlled by a needle valve 46. The passage 42, controlled by a needle valve 47 working in a lateral boss 48 on the rear handle-casting, runs into the passage 49 which is itself connected by means of a nipple 50, with a hose leading from a supply of oxygen under pressure. At the forward end the passage 49 opens into a tube 51 seated at its front end in the casting or handle-closure 36 and communicating through a passage 52 with the cutting-jet supply-tube 29. The flow of oxygen to the tube 29 and thence to the tube 14 is governed by a spring-pressed valve 53 working in the member 36. It will be observed that the head of the valve is in front of the passage 52. This is an important feature, as the pressure of the oxygen helps to close the valve, thereby permitting the use of a lighter spring. Experience with the blowpipe illustrated has shown that less manual effort is required to open the valve 53 than is required with valves which are closed by spring-pressure only and which therefore need a stronger spring than that required in the present construction. Where much effort is required, to open the valve, it usually results in movement of the blowpipe, thereby throwing the jet away from the exact point on which the jet should strike. Arranging the valve in the forward end of the handle is also advantageous in that it simplifies and lightens the rear casting and gives a better balance to the blowpipe as a whole.

The three valves 46, 47, 52, are made of the alloy known in the market as "Monel" metal, instead of brass as heretofore. Monel metal is not affected by oxygen (as steel is), and is not corroded by other gases or substance which may come in contact with it in the blowpipe. It also gives a thread that will stand long and severe use without showing wear, whereas brass thread would wear out in a much shorter time. The valve seats, however, are brass, which is softer than the Monel-metal valve stems, so that after long use the fit of the valve in the seat is even better than at the start.

The valve 53, which controls the supply of oxygen to the cutting jet, is retracted against the tension of its spring to open the passage into the tube 29 by a bell-crank lever 54 composed of two parallel plates working in slots in the handle-sleeve 38 and fulcrumed at 55 on a bar 56 extending rearwardly from the front handle-head 36. Outside of the handle the bell-crank is provided with a thumb-button 57 by which it is rocked to retract the valve 53. The bell-crank and its thumb-piece 57 move in the central plane of the blowpipe, so that in depressing the thumb-piece there is no tendency to turn the blow pipe on its axis and thereby throw the flame out of the line of cut, as is the case with blowpipes in which the thumb-piece is offset laterally from the axis of the blowpipe. In the present construction the thumbpiece is slidable on the projecting arm of the bell-crank lever, and has a finger 58 depending between the two plates forming the bell-crank. This finger projects through a slot in the sleeve 38 and is formed with a notch 59. When the thumb-piece is depressed to open the valve the operator can push the thumb-piece forward, so that the notch engages the end of the slot in the sleeve 38, thereby locking the valve in open position. To close the valve, it is only necessary to retract the thumb-piece, where-

upon the valve-spring closes the valve and raises the bell-crank.

It is to be understood that the invention is not limited to the construction herein specifically illustrated and described, but can be embodied in other forms without departure from its proper spirit and scope.

We claim:

1. In a metal-working blowpipe, in combination, a nozzle-head having a socket in its end provided with an annular shoulder near the bottom of the socket, and having an oxygen bore or passage opening into the socket, a neck encircling the orifice of the oxygen passage to provide an annular space at the bottom of the socket, and a combustible-mixture bore or passage opening into said annular space; an oxygen jet-tube extending outwardly from the socket, having its inner end seated on the said neck and having an apertured flange seated on said shoulder; a nozzle member having a central bore of greater diameter than said oxygen tube, encircling the latter and screw-threaded in said socket to bind the apertured flange of the oxygen tube tightly upon said shoulder; and a tip of greater diameter than the oxygen tube, surrounding the latter and fixed in the end of said nozzle-head.

2. In a metal-working blowpipe, in combination, a nozzle-head having a socket in its outer end, an oxygen passage opening centrally into the socket, a neck surrounding the orifice of the passage to provide an annular space around the same, a passage opening into the annular space, and a shoulder around the annular space; an oxygen jet tube projecting from the socket, having its inner end seated on said neck and provided with an apertured flange seated on said shoulder; an inner nozzle member of brass having a central bore of greater diameter than the oxygen jet tube, removably threaded into the socket in the nozzle head and binding the apertured flange of the oxygen jet tube tightly upon the said shoulder; and an outer nozzle member of copper permanently fixed in the outer end of the inner nozzle member, surrounding the portion of the oxygen jet tube projecting from the inner nozzle member and providing an annular passage around the same.

3. In a metal-working blowpipe, in combination, a tubular inner nozzle member of brass adapted at one end to be fitted into a nozzle-head and its other or outer end having an annular recess, and an outer tubular nozzle member of copper having one end flared and fitted into the recess in the inner nozzle member, the metal around the recess in the latter being swaged in and over the flared end of the other member to produce a permanent dovetail joint between the two.

4. In a metal-working blow-pipe, in combination, an inner tubular nozzle member of brass, adapted at one end to be fitted into a socket in a nozzle-head and provided at its other end with an internal rabbet; an outer tubular nozzle member of copper having one end flared and fitted in the rabbet, the metal of the brass inner nozzle member, around said flared end, being swaged in and over the latter to produce a permanent dovetail joint between the two members; and a jet tube extending centrally through the two nozzle members and providing in the latter an annular passage of non-increasing cross-sectional area.

5. As a new article of manufacture, a metal-working blowpipe comprising a handle, an outer nozzle having an oxygen passage for oxygen and an independent passage for a mixture of oxygen and a combustible gas, a head carrying the outer nozzle and having a bore opening into the said mixture-passage, an injector nozzle arranged in said bore and discharging into the bore toward the outer nozzle, an oxygen conduit for supplying oxygen to the injector nozzle, a manual valve for controlling the flow of oxygen through the oxygen-conduit to the injector nozzle, a manually operable valve coöperating directly with the injector nozzle to regulate the flow of oxygen through the same, a conduit for supplying a combustible gas to said bore whereby the gas is entrained in the bore by the jet of oxygen issuing from the injector nozzle, and a conduit connected with the aforesaid oxygen-passage for supplying oxygen thereto.

6. As a new article of manufacture, a metal-working blowpipe comprising a handle, a nozzle having an end provided with orifices for directing a pre-heating flame and a cutting jet of oxygen upon the metal to be worked, a tubular head carrying the nozzle and having a gas passage for supplying oxygen and a combustible gas to the nozzle for the pre-heating flame, a conduit parallel with the tubular head and connected with the head between the gas-passage therein and the nozzle to supply oxygen to the latter for the cutting jet, whereby the said conduit serves to mask the head against reflected heat, and means for supplying oxygen and combustible gas to the tubular head.

7. In a metal-working blowpipe, in combination, a handle comprising a hollow sleeve, a head fitted in the front end of the handle and having an oxygen passage in its lower portion, an oxygen tube connected with said passage above the same, a spring-pressed plunger-valve movable longitudinal in said passage below the oxygen tube and controlling the outflow of oxygen from the passage, a bell-crank valve-actuating lever inside the handle having a longitudinal arm extending out of the handle and an arm connected to said plunger valve, a thumb-piece carried by the bell-crank lever outside

of the handle, and means carried by the thumb-piece to lock the lever at will with the said valve in open position.

8. In a metal-working blowpipe, in combination, a hollow tubular handle having a gas passage and a slot, a lever having an extension passing through the slot in the handle, a thumb button on said extension and having a stem provided with a notch to engage with and be disengaged from the end of said slot to lock and unlock the lever, and a valve actuated by the lever to control the flow through said gas passage.

9. In a metal-working blowpipe, in combination, a handle having a gas passage, a spring-actuated valve controlling the passage, a manual lever to open the valve against the tension of the spring, and manually actuated means carried by the lever to lock the same with the valve in open position.

10. In a metal-working blowpipe, an L-shaped nozzle head 12 having: the end of one arm adapted to carry a nozzle, a longitudinal passage extending through both arms, a transverse passage 30 extending in the nozzle-carrying end, a lateral extension 32 having a passage 31 opening into the rear of the longitudinal passage, and a lateral extension 27 having a passage 26 opening into the longitudinal passage at a point in advance of said passage 31; an injector-nozzle in the longitudinal passage, between the said passages 26 and 31; a manually operable valve controlling the injector-nozzle; a tube connected with the passage 26 to convey a combustible gas thereto; a tube connected with the passage 31 to convey oxygen thereto; a tube connected with said transverse passage to carry oxygen thereto; and a nozzle carried by the nozzle-head, having a passage connected with said longitudinal passage to receive a mixture of oxygen and the combustible gas therefrom to supply a heating flame, and a passage connected with the transverse passage to receive oxygen therefrom to supply a cutting jet.

In testimony whereof we affix our signatures in the presence of two subscribing witnesses.

MILTON E. WINANS.
PAUL A. ROSE.

Witnesses:
DRURY W. COOPER,
STURGES S. DUNHAM.