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BLOWPIPE

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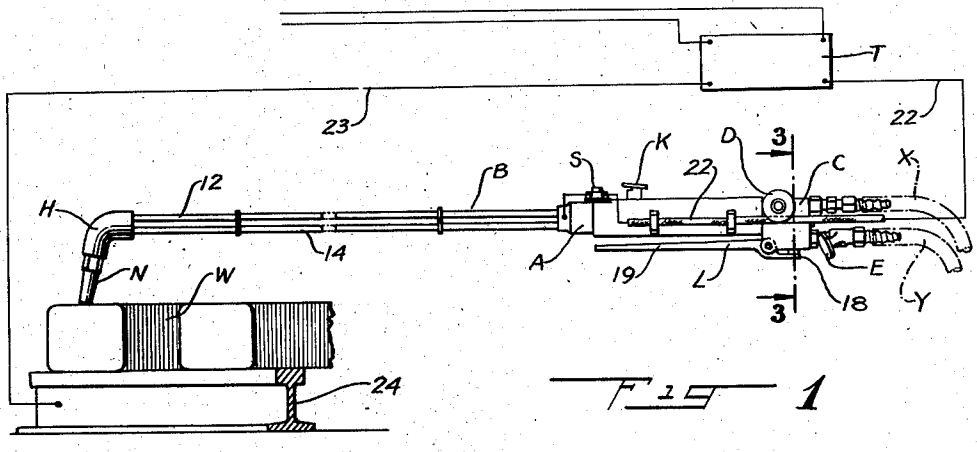



Fig 1

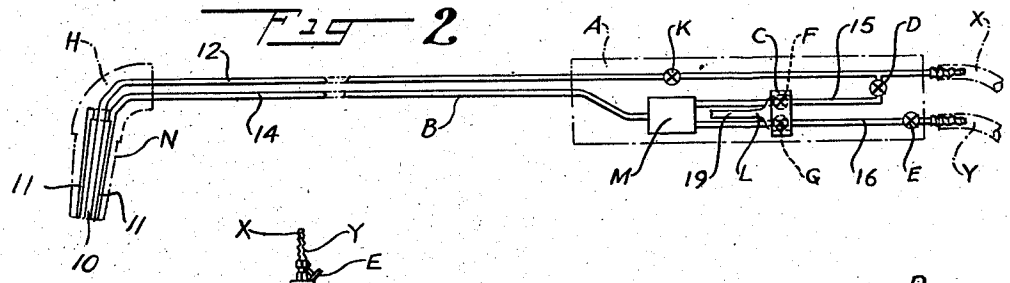



Fig 2

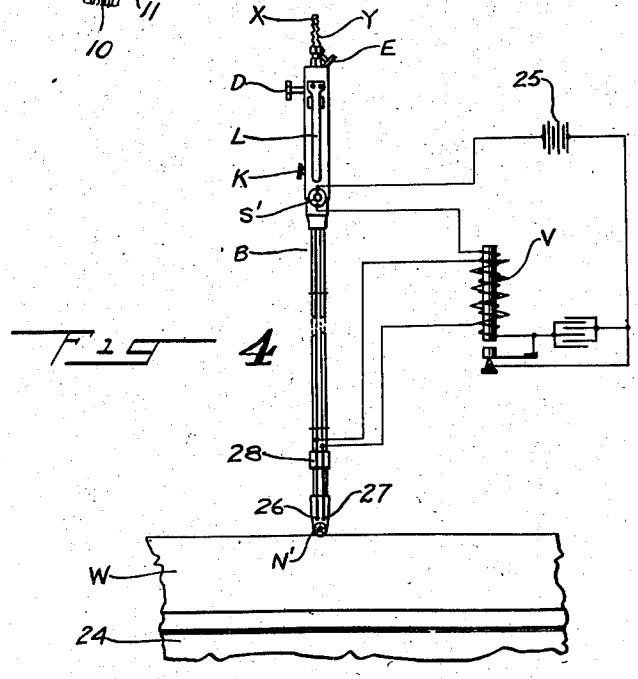



Fig 4

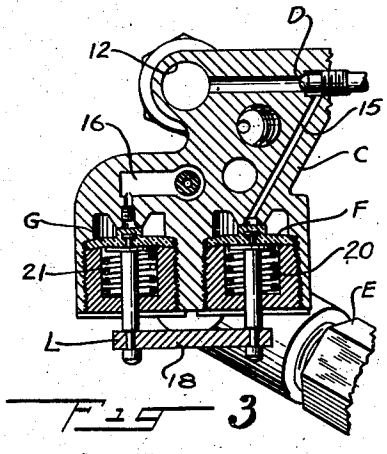



Fig 3

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## BLOWPIPE

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2 Claims. (Cl. 158—27.4)

This invention relates to blowpipes for heating, welding, cutting or deseaming metal work; and more particularly to an improved mechanism or system for quickly and easily opening the heating gas control valves and igniting the combustible heating gas delivered by such blowpipes.

After finishing an operation with a conventional blowpipe, the operator usually turns off the valves controlling the supply of heating gas which is a mixture of oxygen and a fuel gas such as acetylene, thus extinguishing the blowpipe flame and avoiding the fire hazard and a useless waste of the gases. When the next operation is started it has been necessary to open and re-adjust the valves and re-light the gas. To adjust the blowpipe for an operation, it has been the usual practice to first slightly open the fuel gas valve; then to use an open flame or handlighter to ignite the gas issuing from the blowpipe nozzle; next, to slightly open the oxygen valve; and finally, to adjust each of these valves until the proper heating flame is obtained. When extinguishing the blowpipe, the oxygen valve should first be closed, after which the fuel gas valve is closed. Obviously, aside from the possible confusion in manipulating these valves and the resulting danger to the operator and the equipment due to backfire, this procedure involves considerable loss of time and waste of gas,—especially where, as in some plants and factories, it is repeated many times in a working day; and where, as in blowpipes for deseaming steel billets, blooms, ingots, etc., large gas passages are provided to deliver large volumes of gas.

Accordingly, the main object of this invention is to provide a blowpipe having a valve mechanism and a gas ignition system whereby such dangers, losses, and waste may be greatly reduced.

Another object of the invention is to provide a blowpipe equipped with a valve mechanism and a gas ignition system which is simple in construction and convenient to operate.

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

Fig. 1 is a view of a blowpipe embodying this invention, the work and parts of the blowpipe being shown diagrammatically;

Fig. 2 is a view diagrammatically illustrating the passages and valves of the blowpipe shown in Fig. 1;

Fig. 3 is a sectional view of the auxiliary gas control valves, taken on the line 3—3 of Fig. 1; and

Fig. 4 is a view of another blowpipe embodying this invention, illustrating an alternative ignition system.

Generally speaking, this invention comprises a blowpipe for heating, welding, cutting or deseaming metals which is equipped with a heating-gas control mechanism and an electrical ignition system, both quickly and conveniently operable to deliver a properly proportioned combustible mixture and to ignite the same without substantial delay or waste of gas and without danger to the operator or the equipment. In the preferred embodiment of the invention, as illustrated in Fig. 1, the nozzle and other parts of the blowpipe, as well as the work, are conductive portions of an electric current supply circuit which is provided with a normally open switch that is adapted to be closed when the blowpipe is to be lighted. The blowpipe is provided with main gas shut-off valves which, after their initial setting, may remain in a properly adjusted and open position; and also has auxiliary valves between these shut-off valves and the nozzle to either temporarily interrupt the flow of the gases to the nozzle or to permit the flow of the gases to deliver a properly proportioned combustible mixture, thus eliminating the necessity of repeatedly opening, closing, and adjusting the main shut-off valves. The switch of the ignition circuit desirably is so located on the blowpipe that it may be conveniently operated concurrently with the auxiliary valves and by the operator's hand which grasps the handle of the blowpipe.

As shown in Figs. 1 and 2 of the drawing, the invention may be embodied in a blowpipe B adapted for use in deseaming ingots, billets, blooms, etc., designated as the work W. The blowpipe nozzle N has one or more outlet passages 11 for a combustible gas (such as a mixture of oxygen and acetylene) for preheating portions of the work, and also has an outlet passage 10 for oxidizing gas (such as oxygen) which is applied to the highly heated portions of the work and melts or gouges out defective portions, such as seams or fissures. The outlet passages 10 and 11 in the nozzle N are respectively connected through a head H to pipes 12 and 14 which respectively convey cutting or deseaming oxygen and a mixture of acetylene and preheating oxygen to the passages 10 and 11. The pipes 12 and 14 extend into and are secured to a handle A which carries a valve casing C at its rear end. The casing C has nipples adapted to be connected to oxygen and acetylene supply conduits X and Y; and is equipped with adjustable shut-off valves

and E, the valve D controlling the flow of oxygen from the conduit X to a conduit 15 and the valve E controlling the flow of acetylene from the conduit Y to a conduit 16. A readily-operable, automatically-closing valve K may be provided to control the supply of deseaming oxygen to the pipe 12 from the conduit X.

Auxiliary valve mechanism is located in the casing C to eliminate the necessity of repeatedly opening, closing and adjusting the valves D and E in a course of a day while transferring operations from one to another of a number of pieces of work. As best shown in Fig. 3, this valve mechanism may consist of a pair of spring-actuated automatically-closing valves F and G, respectively controlling the flow of oxygen and acetylene from the outlet sides of valves D and E through the conduits 15 and 16 to the usual gas mixer M. From the mixer M the gas is delivered, as a combustible mixture, to the conduit 14, from which it discharges through the outlet passages 11 in the nozzle N. The valves F and G may be opened simultaneously by suitable means, as by a pivoted lever L having an arm 18 which is connected to the stems of both valves and an arm 19 which extends forwardly alongside the blowpipe handle A. In this position, the hand holding the blowpipe may also press the arm 19 toward the handle A to open these valves during operations; and when the arm 19 is released, as by an operator removing his hand therefrom between operations, the valve springs 20 and 21 will automatically close these valves, thus interrupting the flow of heating oxygen and acetylene and extinguishing the flame at the nozzle N. Waste of gas between successive operations is thus avoided; and a properly proportioned heating mixture is assured when the arm 19 is depressed to start the next operation because the main valves D and E may remain in their initial open setting that provides the correct volumes of oxygen and acetylene for the desired heating mixture. Therefore, it is unnecessary to adjust the valves D and E, except at times when the gas supply pressures change and at the beginning and end of a day or a series of operations.

To further reduce the loss of time and gas in re-lighting the heating flame, an electrical ignition system is so combined with the blowpipe that the combustible mixture, issuing from the nozzle N when the lever arm 19 is depressed, may be conveniently and immediately ignited. This may be accomplished by producing one or a number of sparks at or near the mixture outlets of the nozzle and at about the same moment or immediately after the lever arm 16 is depressed. To this end, the normally open switch S, which controls an appropriate electric current supply, is located adjacent to the lever arm 19 and preferably on but insulated from the blowpipe handle A near its forward end, so that the hand which operates the lever L may at the same time close the switch of the ignition system as by pressing the button of the switch S toward the handle A. The switch S may be connected by a cable 22 to a suitable source of current such as the secondary winding of an electric transformer T, the primary winding of which may be connected to a suitable light or power supply circuit; and the other lead 23 of the secondary winding is preferably connected to a suitable metal support, such as one of the steel rails 24, upon which the work W rests while it is being operated upon.

The nozzle N, the head H, and the conduits 12 and 14 are of metal and are conductively connected to the metal handle A, and thus provide a link in the electrical circuit of the ignition system. Then, assuming that the main valves D and E have been adjusted to deliver the correctly proportioned combustible gas mixture, the work is in place, and the current supply connections have been made, the blowpipe may be lighted to provide a heating flame by depressing lever arm 19 and, as the latter reaches its full open position, closing the switch S while at the same time contacting the nozzle N with the work W and either producing a spark by then withdrawing the blowpipe from contact with the work or by rubbing the blowpipe nozzle along the surface of the work while the ignition circuit is closed, thereby producing a shower of sparks about the end of the nozzle and igniting the gas.

While the ignition circuit shown in Fig. 1 is advantageous because of its simplicity other systems may be employed to produce the spark required to ignite the gas. For example, in the system shown in Fig. 4, the switch S' may control the circuit of an electric battery 25 which supplies current through the primary coil of a high tension make-and-break vibrator V, the terminals of the secondary coil of which are connected to terminals of jump spark points 26, 27 located near the outlets of the nozzle N' and mounted on an insulating block 28 secured to the blowpipe. Here, gas-igniting sparks across the gap between points 26 and 27 may be produced by closing the switch S' as soon as the lever arm L is depressed, and no engagement of the blowpipe nozzle with the work surface is necessary.

As soon as a small part of the defective area of the work has been heated to a kindling temperature by the heating flame, the oxygen stream may be applied through the outlet 10 by opening the valve K, which is also conveniently accessible to the hand grasping the blowpipe handle A.

It will be evident that the invention is applicable as well to other types of blowpipes, such as those used for heat treating, welding or cutting metals; and various changes may be made in the details of the blowpipes herein disclosed without departing from the essential principles of the invention.

We claim:

1. A blowpipe for welding, cutting or deseaming metal work comprising a handle; oxygen and fuel-gas supply conduits connected to said handle; adjustable valves controlling said conduits; a metal nozzle secured to said handle by electrically-conductive conduits adapted to communicate with said oxygen and fuel-gas conduits; additional valves between said nozzle and said adjustable valves, operable to interrupt gas flow to said nozzle when said adjustable valves are in open position; and mechanism for simultaneously operating said additional valves; in combination with means for igniting gas delivered by said nozzle, such igniting means comprising an electric current supply circuit including the work and a switch positioned adjacent said valve-operating mechanism manually operable concurrently with said valves to simultaneously admit gas to said nozzle and to close said circuit temporarily to produce a spark when said nozzle is contacted with and withdrawn from the work.

2. A blowpipe for welding, cutting or deseaming metal work comprising a metal handle; oxygen and fuel-gas supply conduits connected to said handle; individually adjustable shut-off valves controlling said conduits; a metal nozzle secured to said handle by electrically-conductive

conduits adapted to communicate with said oxygen and fuel-gas conduits; and additional valve mechanism controlling said oxygen and fuel-gas conduits between said nozzle and said shut-off valves, said mechanism comprising a pair of automatically-closing valves provided with a single lever adjacent said handle for simultaneously opening these valves manually; in combination with means for igniting gas delivered by said nozzle comprising an electric current supply circuit including the work, said nozzle, said conductive conduits, said handle and a normally-open switch mounted on said handle adjacent said lever, said lever and said switch being manually operable concurrently to supply gas to said nozzle and to temporarily close said circuit to produce a spark when said nozzle is contacted with and withdrawn from the work.

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