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BLOWPIPE

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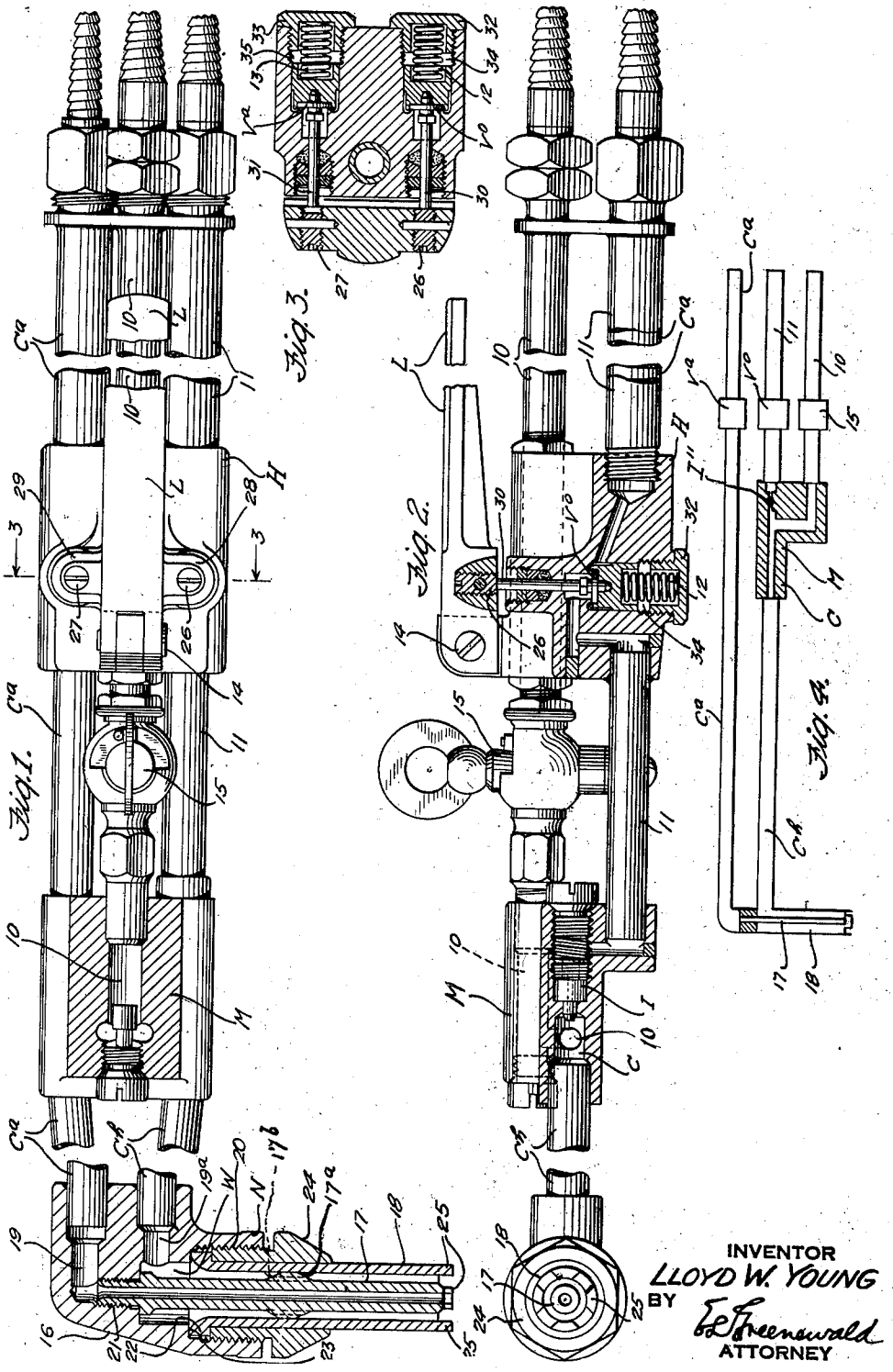


Fig. 1.

Fig. 3.

Fig. 2.

Fig. 4.

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BLOWPIPE

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4 Claims. (Cl. 158—27.4)

This invention relates to torches for use in heating metallic or other non-inflammable surfaces and more particularly to torches of this character designed for use in cleaning moulds for storage battery grids, rubber articles, etc., by removing coating substances therefrom by melting or burning and in other similar operations.

Heretofore, such torches have been constructed for producing a hydrogen flame as a heating means, combustion of the hydrogen being supported by oxygen mixed therewith prior to burning; and this flame is ordinarily supplemented, in the cleaning operation, by an air blast for dislodging the products of combustion from the surface and interstices of the moulds. It is desirable that such torches should be always ready for immediate use at substantially maximum efficiency. To this end, the flame provided should be such that it can be kept burning at a low temperature throughout the work day and can be raised instantaneously to the desired working temperature, by a simple and practically subconscious movement on the part of the operator. The use of a hydrogen flame in this manner is unfeasible on account of its high temperature and the relatively high cost of hydrogen gas.

It is therefore an important object of this invention to provide an improved torch construction of the above character capable of burning a cheap fuel with a low temperature flame when not in use and which is capable, by a single, simple, manipulatory movement thereof on the part of an operator, of effecting an instantaneous rise in the heat intensity of the flame to the working temperature.

Accordingly, a torch may be provided constructed for burning ordinary city gas which is less expensive and is usually conveniently available. This gas will burn in air with a low temperature flame if unmixed previously with oxygen and can be raised to a suitable temperature for the above type of operations by mixing oxygen therewith prior to burning.

In order to properly regulate the gases, the apparatus may be provided with a plurality of valves respectively controlling the fuel gas, oxygen and air blast passages. The fuel gas passage is controlled by a valve that may be operated independently of the other valves so that the fuel gas may be turned on to burn continuously at a low temperature thus eliminating the necessity of a pilot flame.

It is essential for satisfactory operation of the apparatus, that the oxygen for supporting combustion should be turned on before the air blast when bringing the torch into action for cleaning objects or for similar purposes in order that a steady flame may be established before the force of the blast is brought to play thereon. It is desirable that this sequence of operations should not be left to chance and it is therefore a further object of the invention to provide in a torch of the above character improved means, manipulation of which will automatically effect the opening of the control valves for the oxygen and air passage in the desired sequence.

It is also desirable that the torch be proof against accidental or inadvertent extinguishing of the flame in operation by undue restriction of the outlet orifices of the nozzle tip and that the air blast should be discharged from the nozzle concentrically of and within the flame. It is therefore an object of the invention to provide an improved nozzle construction whereby such restriction of the outlet orifices is made impossible and whereby the fuel gas and air blast will be discharged in concentric relation the one to the other with the fuel gas in dependable enveloping relation to the air blast.

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

Fig. 1 is a view in side elevation of a torch embodying this invention; parts being broken away for purposes of illustration.

Fig. 2 is a plan view of the torch, with parts broken away to show details of construction.

Fig. 3 is a cross sectional view on line 3—3 Fig. 1 showing the relation of the air and oxygen valve stems to the operating lever.

Fig. 4 is a schematic view of the torch.

The torch comprises in its main features a handle H and a nozzle member N which are connected by conduits C^h and C^a respectively for conducting a combustible mixture and compressed air to the nozzle member.

The conduit C^h is supplied with fuel gas and oxygen through mixing apparatus M, including a mixing chamber C and an injector nozzle I, by conduits 10 and 11 which discharge into the mixer M which in turn discharges into the conduit C^h. The air in conduit C^a and oxygen in conduit 11 are under control respectively of valves V^a and V^o adapted to be opened respectively against the force of springs 13 and 12 by simply pressing down of the lever L pivoted at 14 to the handle H of the torch. The flow of fuel gas through conduit 10, on the other hand, is under control of a valve 15 operable separately from valves V^o and

V^a so that the fuel gas may be turned on independently of the oxygen and air. The fuel gas can, therefore, be turned on and lit prior to admission of oxygen to the mixer and prior to the admission of air to conduit C^a.

The nozzle member N comprises a head 16 having an axial bore 20 and to which are detachably secured inner and outer nozzles 17 and 18, the former connecting by threads 21 with the outlet of passage 19 leading from the air conduit C^a and the latter connecting with the passage 19^a leading from combustible mixture conduit C^h. The nozzle 18 is provided with a flange 22 which is held against a shoulder 23 in the bore 20 by means of a nut 24 threaded into the end of the bore and suitably spaced enlargements 17^a are provided on the nozzle 17 to maintain it properly centered in the bore of nozzle 18, passages 17^b being provided between the several enlargements to insure free passage of gas through the bore of nozzle 18. The nozzles are concentrically arranged and by this arrangement there is provided a central bore for the air blast surrounded by a tubular passage for fuel gas such that these gases will be discharged at their lower ends in this relationship the one to the other. The lower end of nozzle 18 may be provided with one or more lugs 25 for preventing the nozzles from contacting with the work in such manner as to extinguish the flame issuing therefrom or to cause a reversal of the flow of gas through one or both of the nozzles. As shown in the drawing, there are four of such lugs equally spaced circumferentially of the outlet end of the nozzle 18.

Valves V^o and V^a, respectively in control of the oxygen and air conduits, are normally held closed by springs 12 and 13 as indicated above but, upon gripping the handle, the lever L will be pressed down and the oxygen passage will be first opened and then the air passage owing to the difference in adjustment of screws 26 and 27 threaded into arms 28 and 29 extending laterally from the lever L and coacting respectively with stems 30 and 31 connected with valves V^o and V^a. Pressure of the springs 12 and 13 on the valves V^o and V^a may be adjusted through caps 32 and 33 respectively in which the springs rest and which are threaded into the valve chambers 34 and 35.

The relation of the various passages C^a, C^h, 10, and 11 to each other, to the mixer M, and to the valves V^o, V^a and 15 is schematically shown in Fig. 4. The oxygen conduit 11 discharges into the mixing chamber C through the restricted passage I' provided in practice through injector nozzle I thereby drawing in fuel gas from conduit 10 in increased quantity when the oxygen control valve V^o is open. From the mixing chamber the combustible mixture is conducted by conduit C^h to nozzle 18, from the lower end of which it discharges around the lower end of nozzle 17; the nozzle 17 serving to discharge a blast of air conducted thereto by conduit C^a for blowing away the products of combustion.

The nozzles are removable from the head as indicated above and by this arrangement may be interchangeably used with other similar nozzles of different bores adapted for different classes of work.

In operation, fuel gas is supplied to the mixing chamber C under its own pressure through conduit 10 when the valve 15 is opened and thence to the nozzle 18 through conduit C^h. The gas may remain lit throughout the work day since the flame from ordinary city gas unsupported by commercially pure oxygen is not very hot and since the gas is comparatively inexpensive. When it is desired to use the torch on a job, the operator grips the handle in his hand thereby pressing the lever L down sufficiently to open the oxygen valve V^o, admitting oxygen to the mixing chamber C through conduit 11 and the injector nozzle I. The flow of oxygen draws the fuel gas into the mixing chamber in increased quantity; the parts being so constructed that a sufficient increase is effected to provide the proper gas mixture for the desired flame with this same movement, and the air blast is brought into operation shortly after the oxygen is admitted to the mixing chamber by further pressing down the lever L. Upon releasing the grip on the handle on the torch, the air blast and oxygen will be automatically cut off and the torch flame will again burn at a low temperature.

I claim:

1. In a torch, the combination of a heating nozzle; an air blast nozzle; a mixer for mixing fuel gas and oxygen; means for supplying the mixture to the heating nozzle; a conduit for conducting compressed air to the air blast nozzle; means for connecting said compressed air conduit to a source of compressed air; conduits for conducting fuel gas and oxygen to the mixer; and means controlling the flow of air and oxygen through the air and oxygen conduits; said means being constructed and arranged for operation automatically in sequence by a single operating movement on the part of the operator and including valves in said conduits and adjustable elements for timing the opening of the respective valves upon operation of said controlling means.

2. In a torch, the combination of a heating and air blast nozzle; a gas mixer for mixing oxygen with fuel gas; a conduit for conducting air to the air blast nozzle; means for connecting said compressed air conduit to a source of compressed air; a conduit for conducting the combustible mixture to the heating nozzle; conduits for conducting oxygen and fuel to the mixer; valves controlling the flow of gas through the oxygen and air conduits; a common means for operating the oxygen and air control valves; said means being related to the valves so as to open the oxygen control valve prior to opening of the air control valve; and a valve operable for controlling the flow of fuel gas to the mixer, said valve being uninfluenced by the operation of the common means for operating the oxygen and air controlling valves in operation of the latter and having means independent of said common means for operation thereof.

3. In a torch, the combination of a heating nozzle and a blast nozzle coaxially arranged; a conduit for conducting a gas to the blast nozzle; a conduit for conducting a mixture of fuel gas and oxygen to the heating nozzle; a mixer for supplying said last-named conduit with the fuel gas-oxygen mixture; conduits conveying respectively fuel gas and oxygen to the mixer; means for supplying said blast conduit with a third gas under pressure; a common means for controlling the flow of gas through the blast and oxygen conduits; and separate means for controlling the flow of gas through said fuel gas conduit.

4. In a blowpipe, the combination of a heating nozzle; a blast nozzle; said nozzles having adjoining outlets; a supply conduit for fuel gas; a supply conduit for combustion-supporting gas; a mixer having inlets severally connected to said supply conduits and an outlet connected to said

heating nozzle to supply to the latter either a combustible mixture or only fuel gas; a third conduit for supplying a gas under pressure to said blast nozzle; valves severally controlling the flow of gas through the three conduits; a common means for concurrently operating and opening the valves controlling said third conduit and said conduit for combustion-supporting gas; and means, independent of said common means, for operating the valve controlling said conduit for fuel gas, the construction and arrangement being such that flow of fuel gas to said heating nozzle may be maintained uninterrupted during periods when said combustion-supporting gas and said gas under pressure are shut off.

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