No. 853,634. PATENTED MAY 14, 1907.

J. HARRIS.

ACETYLENE BLOWPIPE.

APPLICATION FILED OCT. 27, 1905.

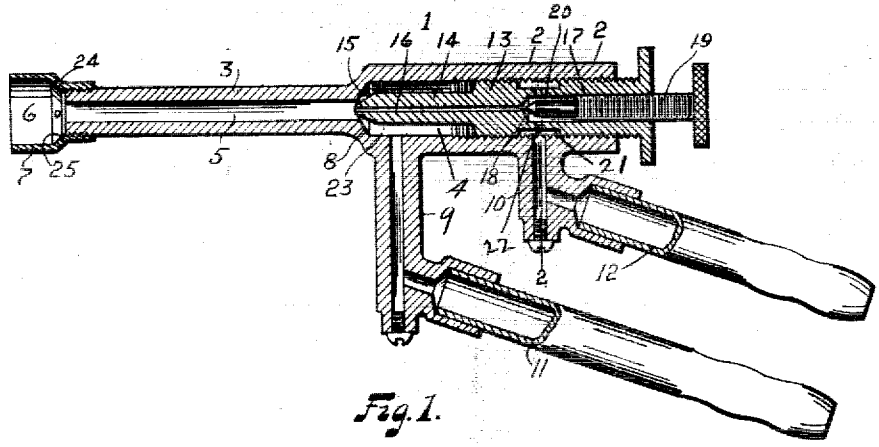


Fig. 1.

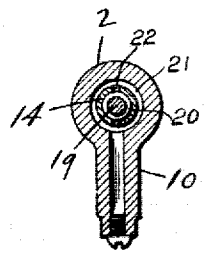


Fig. 2.

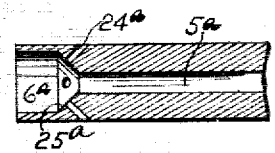


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN HARRIS, OF CLEVELAND, OHIO, ASSIGNOR TO THE HARRIS CALORIFIC COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

ACETYLENE-BLOWPIPE.

No. 853,634. Specification of Letters Patent. Patented May 14, 1907.

Application filed October 27, 1905. Serial No. 284,596.

To all whom it may concern:

Be it known that I, JOHN HARRIS, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Acetylene-Blow-pipes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to blow pipes, and particularly to such as are constructed to burn acetylene. The burning of this gas with a smokeless flame is very difficult of accomplishment. Owing to its richness in carbon, a relatively large proportion of air must be supplied thereto in order to avoid the production of a smoky flame, and the liability to produce such flame is enhanced by the fact that the gas is polymerized at a low red heat. For these reasons and for the further reason that it is difficult to produce and maintain a satisfactory blow-pipe flame, even after a mixture of acetylene and air has been ignited, the only acetylene blow-pipes hitherto constructed have been designed for use with oxygen, as distinguished from air, and have not been satisfactorily operative if supplied with air instead of oxygen. By the construction of blow-pipe shown and described herein, I am enabled to obtain results hitherto obtainable only in blow-pipes which use oxygen with acetylene.

In the drawings, Figure 1 represents a longitudinal sectional view through a blow pipe constructed in accordance with my invention; Fig. 2 represents a cross-sectional view taken on the line 2—2 of Fig. 1; and Fig. 3 represents a sectional detail of a modification of the discharge nozzle of the blow pipe shown in Fig. 1.

Describing the parts by reference numerals, 1 represents a blow pipe, consisting of a tubular body having an enlarged rear portion 2 and a smaller or contracted front portion 3. The enlarged rear portion is provided with a corresponding enlarged bore or chamber 4 and the contracted portion is provided with a bore 5. The discharge end of the reduced portion 3 is provided with an enlarged chamber 6. This chamber may be provided within a separate hood 7 attached to the end of the portion 3 as shown in Fig. 1, or be formed within the body of the tube, by reaming the same out, as shown at 6^a, Fig. 3. The bores 4 and 5 communicate with each other by means of the inclined frusto-conical surface 8.

Projecting from the rear portion 2 are the branches 9 and 10, said branches being provided with connections 11 and 12 respectively, the former for gas and the latter for air under pressure.

The rear portion of the chamber 4 is threaded interiorly for engagement by the exterior threaded portion 13 of a valve 14. This valve is provided with a conical nozzle 15 which controls and cuts off the supply of gas into the bore 5. The valve 14 is provided with two bores, the front bore 16 and the rear bore 17, a valve seat 18 being formed between said bores. Within the rear and larger bore is threaded the valve 19, the front end of which is considerably reduced, whereby an annular space 20 is provided around the front of said valve, said space being opposite the connection 10. The exterior of the valve 14 is cut away, forming an annular chamber 21 into which the connection 10 may discharge, said chamber communicating with the space 20 by means of a suitable number of openings 22. The chamber 21 is of sufficient length to permit the adjustment of the valve 14 without affecting the flow of air thereinto through the connection 10.

With the parts arranged and constructed as above described, the operation is as follows:—Gas is supplied through the connection 9 into the annular chamber 23 formed around the front of the valve 14. Thence it passes, between the point of the valve and the seat 15, in a thin converging sheet, into the bore 5. Air under pressure is supplied through the connection 10, chamber 21, passages 22, space 20, and bore 16 into the bore 5, axially thereof and centrally of the gas supplied thereto. The size of the duct 16 permits sufficient air to enter the mixing duct 5 to produce a blue flame, while the latter duct is of such diameter and length as to accommodate and thoroughly intermingle the acteylene and air introduced thereinto. Entering the chamber 6, the mixture expands, being protected from the atmosphere by the hood 7. The mixture may now be ignited and will burn with a blue flame, but, when the air pressure is increased for the purpose of pointing the flame, the flame is apt to die or blow out. The provi-

sion of the hood 7 prevents this dying or blowing out of the flame and, by turning on the air pressure, a long, blue oxidizing flame is provided which will not "light back" within the duct 5 and which will remain permanent, extending into the hood 7 and adhering closely to the end of the duct 5. This adherence of the flame to the end of the duct 5 is secured by the use of the hood and, in the case of small blow-pipes, the pointing of the flame as well as the adherence thereof to the end of the duct 5 is augmented by the provision of several passages 24 extending through the hood 7, adjacent the point of connection of the tubular body 3 therewith, and preferably through the inclined surface 25 within said hood. In Fig. 3, these passages, designated as 24^a, extend through the inclined surface 25^a formed by the end of the tool by which the chamber 6^a is reamed into the end of the blow pipe.

Owing to the size of the duct 16, a relatively large supply of air to the blow-pipe is secured. This not only admits enough air to obtain a proper mixture of the same with the acetylene, but prevents "lighting back" by supplying the air under sufficient pressure to prevent such action. It will be observed that the outlet of the duct 5 is unrestricted. I have found that this appears to be necessary in using air with an acetylene blow pipe, as obstructing the duct prevents the production of an effective flame.

The chambered hood provides means whereby the base of the flame is retained in proximity to the end of the blow pipe. It is believed that this result is due largely to the shielding of the base of the flame from the impingement thereagainst of air currents which flow along the blow pipe from rear to front thereof, being entrained by the rapidly flowing mixture which issues from the outlet end of the mixing duct.

I am enabled to produce, with acetylene gas and atmospheric air under pressure, a flame of the character produced by air and ordinary gas in other blow pipes. This result has been attempted before, but so far as I am aware, without success, as, when air is supplied in sufficient quantity to obtain a blue flame, the flame will be extinguished. Furthermore, there has always been a tendency for the flame to "light back" or explode within the burner body, resulting, when a mixer is employed in the gas tank, in the propagation of the flame into such tank, causing the latter to explode. These defects are cured by my blow pipe and the manner in which the gas and air are supplied thereto and mingled therein.

Where there is a diminution in the diameter of the mixing duct, such as is sometimes used to prevent "lighting back," where oxygen is employed, as distinguished from air, insufficient air can be admitted to the mixing duct to produce proper combustion of the acetylene. Where, in the claims, the term "unobstructed" or "uncontracted" is employed, I mean a duct free from obstructions or contractions of this kind. Moreover, the duct must be of sufficient length to permit thorough mixing of the acetylene and air to produce a blue flame. By the term "elongated," which is used in the claims in connection with this duct, I mean a duct of sufficient length to accomplish this thorough mixing.

Having thus described my invention what I claim as new and desire to secure by Letters-Patent is:—

1. An acetylene blow pipe comprising a body having an elongated mixing duct terminating in an enlarged outlet chamber, means for supplying acetylene to said duct, and means for supplying air under pressure to said duct, substantially as specified.

2. An acetylene blow pipe comprising an elongated mixing duct terminating in an enlarged outlet chamber, means for supplying acetylene to the inlet end of said duct, means for supplying air under pressure to said duct, and valves for controlling the supply of such fluids to the duct, substantially as specified.

3. An acetylene blow pipe comprising an elongated unobstructed mixing duct terminating in an enlarged outlet chamber, and means for supplying acetylene and air to said duct, substantially as specified.

4. An acetylene blow pipe comprising an elongated unobstructed mixing duct terminating in an enlarged outlet chamber, means for supplying acetylene and air to said duct, and means for admitting air to said chamber, substantially as specified.

5. An acetylene blow pipe comprising an elongated mixing duct terminating in an enlarged outlet chamber, means for supplying acetylene and air to said duct, one or more passage-ways for air being provided in said chamber at a point adjacent the junction of said duct and chamber, substantially as described.

6. An acetylene blow pipe comprising an elongated mixing duct terminating in an enlarged outlet chamber, means for supplying acetylene and air to said duct, one or more passage-ways being provided in said chamber for an additional supply of air, said passage ways being inclined toward the axis of said chamber, substantially as specified.

7. An acetylene blow pipe comprising an elongated mixing duct terminating in an enlarged outlet chamber, and means for supplying air under pressure and acetylene to said duct, substantially as specified.

8. The combination in a burner tube with an inner air inlet tube, and an outer commingling burner tube into which said air inlet tube is adapted to discharge, of an enlarged integral tubular extremity for said

burner tube, and a shoulder connecting said enlarged extremity and tube, and air inlet perforations in the said shoulder.

9. A blowpipe for acetylene or similar gases rich in carbon comprising in combination a mixing duct, means for supplying gas to said duct, means for supplying air under pressure to said duct, and means for retaining in juxtaposition to the outlet end of the blowpipe the base of the flame produced by the ignition of the mixture of gas and air issuing from said duct, substantially as specified.

10. A blowpipe for acetylene or similar gases rich in carbon comprising in combination an elongated mixing duct, means for supplying gas to said duct, means for supplying air under pressure to said duct, valves for controlling the flow of gas and air to said duct, and means for retaining in juxtaposition to the outlet end of the blowpipe the base of the flame produced by the ignition of the mixture of gas and air issuing from said duct, substantially as specified.

11. A blowpipe for acetylene or similar gases rich in carbon comprising in combination an elongated, unobstructed mixing duct, means for supplying gas to said duct, means for supplying air under pressure to said duct, and means for shielding the portion of the mixture adjacent to the outlet end of said duct from impingement by currents of air entrained by the issuing mixture and flowing generally longitudinally of said blowpipe, substantially as specified.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN HARRIS.

Witnesses:
G. W. HOPKINS,
B. W. BROCKETT.