

(No Model.)

E. J. DOLAN.
TIP FOR ACETYLENE GAS BURNERS.

No. 589,342.

Patented Aug. 31, 1897.

Fig. 1.

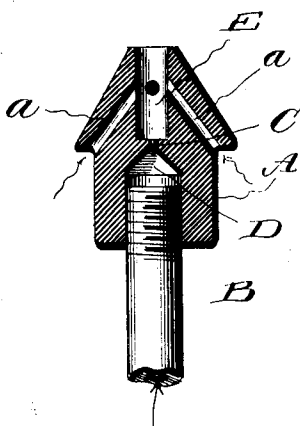


Fig. 2.

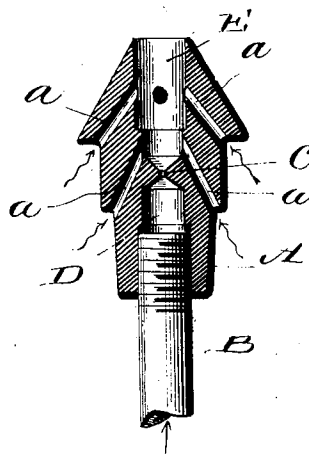


Fig. 3.

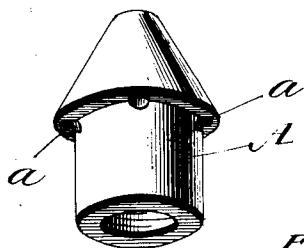


Fig. 4.

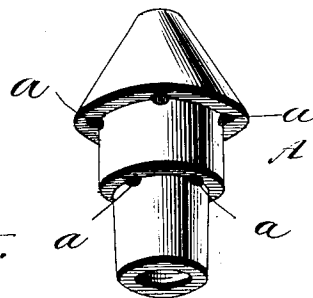
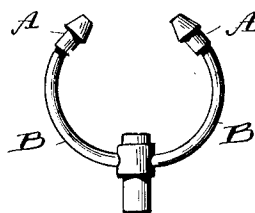


Fig. 5.



Witnesses:

L. E. Wills.
A. L. Hough.

Inventor:

Edward J. Dolan,
by Franklin D. Hough
Atty.

UNITED STATES PATENT OFFICE.

EDWARD J. DOLAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY
MESNE ASSIGNMENTS, TO THE ACETYLENE HOUSE LIGHTING COM-
PANY, OF WEST VIRGINIA.

TIP FOR ACETYLENE-GAS BURNERS.

SPECIFICATION forming part of Letters Patent No. 589,342, dated August 31, 1897.

Application filed February 18, 1897. Serial No. 624,039. (No model.)

To all whom it may concern:

Be it known that I, EDWARD J. DOLAN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Tips for Acetylene-Gas Burners; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a new and useful process for burning rich gases, particularly acetylene gas, and to a new and useful improvement in burners for carrying the same into effect.

It is well known that great difficulties have been experienced in the making of a suitable burner for acetylene gas. The difficulties have largely been due to the fact that after a certain time of burning a deposit has been formed at the point of exit of the gas from the burner, which has gradually choked the outlet and distorted the flame. This difficulty is not cured by merely mingling air with the gas before it is burned. The difficulty seems to be due to the fact that acetylene decomposes at about a red heat, forming benzol, carbon, hydrogen, and other compounds. If at this point of decomposition a receptive surface is present, the carbon is likely to deposit upon such surface, producing the difficulty above described. It is obvious that if a substantial separation can be made between the burner-surface and the acetylene as it issues from the burner this deposit is less likely to occur. This deposit has also been found in practice to be less when acetylene mingled with air is burned than when pure acetylene is burned.

The burner which is the subject-matter of this application, avoids the difficulties herein referred to, and by combining two independent gas-jets at a proper angle produces a flat flame. These gas-jets issue from two circular orifices, pass through a chamber, where

they are surrounded by the indrawn air, and finally meet in space to produce a flat flame. I generally mount these jets upon two separate arms having a proper inclination toward each other. This, however, is not essential, since they might be mounted in the same standard.

The object of my present invention is to provide a gas-burner of the character described, the construction of the burner being such as to effectually overcome the objections to former burners, hereinbefore noted, and to provide a burner the use of which will result in perfect combustion of the gas.

To these ends and to such others as the invention may pertain the same consists in the peculiar construction of the burner, and in the combination, arrangement, and adaptation of parts, all as more fully hereinafter described, shown in the accompanying drawings, and then specifically defined in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, like letters of reference indicating the same parts throughout the several views, and in which drawings—

Figure 1 is a central longitudinal section of a gas-burner embodying my improvements. Fig. 2 is a like view of a modified form of the burner. Fig. 3 is a perspective view of the preferred form of burner shown in Fig. 1. Fig. 4 is a like view of the burner shown in section in Fig. 2, and Fig. 5 is a side elevation of a duplex burner.

Reference now being had to the details of the drawings by letter, A designates a gas-burner tip which is preferably made of lava or other material of a like character adapted to the purpose. This tip is preferably made in a single piece and may be provided with the usual screw-threads which serve to permit the ready attachment of the tip to the body portion of the burner.

The tip A is at a point at or near its longitudinal center provided with a contracted passage or opening C, which connects the two larger chambers or gas-passages B and E, the

said cylindrical passage E terminating at the extreme end of the burner-tip, thus affording an enlarged passage for the gas.

In order to prevent the deposit of carbon within the burner or at the burner-top and thereby insure a perfect combustion and a smokeless flame at the point where the same is formed, I provide a series of inclined air-passages *a a*, which lead into the enlarged passage E above the point at which the contracted opening C is provided. Ordinarily a single row or series of these air-passages will be found to be sufficient, as is shown in Figs. 1 and 3 of the drawings, though, if for any reason it should be preferred, two or more may be provided, as shown in Figs. 2 and 4 of the drawings.

In order to produce the best possible results in the use of the burner which I have described, I find it advisable to use the burner in duplex form or in pairs, as shown in Fig. 5 of the drawings. It will be observed that when thus employed the outlets or points of the burner-tips are inclined toward each other. The flames from the burner-tips unite at a point between and slightly above the plane of the burner-tips, where a flat flame is formed. The gas being forced through the contracted openings within the burner under pressure serves to produce a flame circular in section, and the uniting of these two flames produces a broad and uniform flame having great illuminating power.

The operation of this device seems to be that the gas under pressure escaping in a cylindrical jet through the opening C draws in on all sides an envelop of air through the openings *a*. This is due to the fact that the chamber E is larger than the outlet C, and to the fact that the air-inlets *a* substantially surround the issuing gas-jet. The result of this arrangement seems to be to so cool the outside of the flame as to prevent any deposit of carbon at the point of egress. It is of course essential that the gas have sufficient pressure—say, from three to four inches of water—to draw in the necessary amount of air.

The result here accomplished would not be accomplished by an ordinary air-mixing burner in which the air was mingled generally with the body of the gas—as, for instance, a burner of the type patented to Thomas Holliday on April 20, 1897, No. 581,117. In that type of burner there is an intermediate chamber provided for the special purpose of mingling the air and gas before they escape from the burner.

In my burner an absolutely unobstructed passage is provided for the escape of the original jet of gas formed by the constricted opening C. By reason of this fact it is substantially necessary to have two jets if a flame of considerable candle-power is desired.

The structure of my burner is such that if all of the burner were cut off in a horizontal

plane immediately above the outlet C the general shape and condition of the flame would not be modified, but in this case an immediate combustion would occur at the outlet. Under the conditions of this burner the point where the gas reaches its kindling temperature is carried upward, but the general shape of the escaping-gas body is not materially modified.

Of course the shape of the body of escaping gas, though cylindrical as it issues from the round hole, increases somewhat in diameter, approximating in some degree to the form of an inverted cone.

Though I use the word "cylinder" in this specification, I do not necessarily limit the shape of the escaping gas to exactly a true cylinder, but intend to include any other form which would be substantially equivalent in its operation.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The process of burning acetylene gas, which consists in projecting a small cylinder of gas, in surrounding the same with an envelop of air sufficient to cause combustion of all the gas, and in finally supplying the gas with an additional amount of oxygen by allowing the stream of gas to expand above the burner-tip into contact with the air, thereby burning the same, substantially as described.

2. The process of burning acetylene gas, which consists in projecting toward each other two cylinders of acetylene gas, in surrounding the same with envelops of air sufficient to produce combustion of all the gas, and in finally causing the cylinders of gas to impinge upon each other and produce a flat flame, substantially as described.

3. The combination in an acetylene-burner of the block A having the minute opening C, the cylindrical opening E, opening without obstruction to the atmosphere, and the air-passages *a*, substantially as described.

4. The combination in an acetylene-burner of two air-mixing burners mounted upon a suitable support and inclined toward each other, the said burners being each provided with an air-ejecting apparatus within the burner itself, substantially as described.

5. The combination of the burners A, A, mounted upon a suitable support and inclined toward each other, each having within the single block constituting the burner the central minute cylindrical orifice C, the large unobstructed cylindrical opening E, and the inclined air-passages *a*, substantially as described.

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

EDWARD J. DOLAN.

Witnesses:

K. A. DOLAN,
B. M. PIERSON.

It is hereby certified that in Letters Patent No. 589,342, granted August 31, 1897, upon the application of Edward J. Dolan, of Philadelphia, Pennsylvania, for an improvement in "Tips for Acetylene-Gas Burners," errors appear in the printed specification requiring correction, as follows: On page 2, lines 91 and 101, the word "sufficient" should read *insufficient*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 19th day of October, A. D., 1897.

[SEAL.]

WEBSTER DAVIS,
Assistant Secretary of the Interior.

Countersigned:

BENJ. BUTTERWORTH,
Commissioner of Patents.

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