(No Model.)

# L. HENKLE.

## ACETYLENE GAS BURNER.

No. 590,223. Patented Sept. 21, 1897.

*Fig. 1*

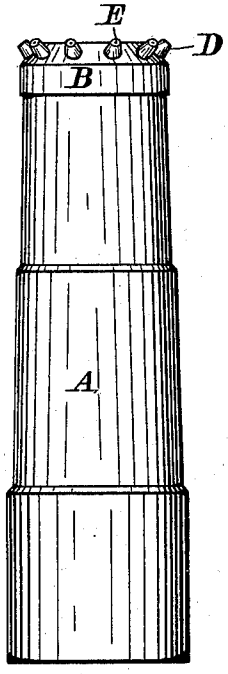



*Fig. 3.*

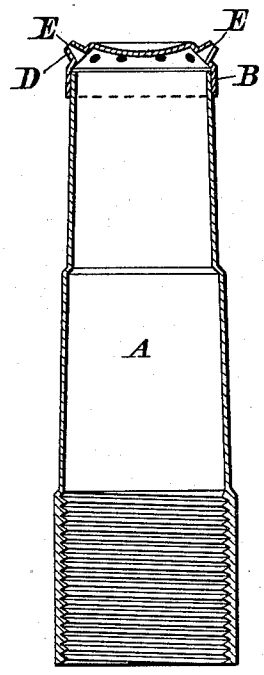



*Fig. 2.*

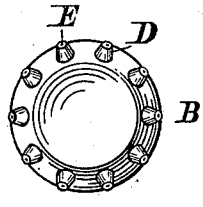
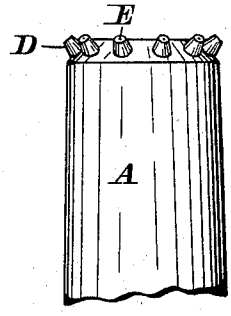



*Fig. 4.*

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# UNITED STATES PATENT OFFICE.

LEONARD HENKLE, OF ROCHESTER, NEW YORK, ASSIGNOR TO HENRY E. SHAFFER, OF SAME PLACE.

## ACETYLENE-GAS BURNER.

SPECIFICATION forming part of Letters Patent No. 590,223, dated September 21, 1897.

Application filed July 2, 1897. Serial No. 643,230. (No model.)

*To all whom it may concern:*

Be it known that I, LEONARD HENKLE, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented an Improved Acetylene-Gas Burner, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to an improved burner for acetylene gas designed to burn the said gas for illuminating or other purposes without smoke or deposit.

My improved burner is fully described and illustrated in the following specification and the accompanying drawings, the novel features thereof being specified in the claims annexed to the said specification.

My improved acetylene-burner is represented in the accompanying drawings, in which—

Figure 1 is a side elevation on an enlarged scale. Fig. 2 is a view as seen from above. Fig. 3 is a central vertical section. Fig. 4 represents a modification.

In the accompanying drawings, A represents the tube or body of my improved acetylene-gas burner, and B the removable cap applied to the upper end of the same. It will be understood that the tube is connected with any suitable pipe through which a supply of acetylene gas is delivered at the requisite pressure. The removable cap is shown as applied to the outside of the upper end of the tube, but it may be fitted inside. The cap closes the tube except as it is provided with a series of gas-delivery passages E around its periphery, which pass through and terminate at the apices or points of a series of jets or projecting portions D, preferably cone-shaped, which operate to cause the discharge of the gas at a distance from the wall and at an angle with the vertical line, so as to allow the air free access to the escaping current of gas all around and thereby to secure complete combustion and freedom from smoke. The gas-passages are small and permit of the escape of but a minute stream of the gas, although collectively they will deliver sufficient gas to produce the requisite amount of light when burned. In practice I have found that the gas-passages are preferably of about the size of a No. 10 sewing-needle, and the projections or cones may be one-sixteenth of an inch or more. As shown, they are inclined or arranged at an angle of about forty-five degrees with the vertical, the result being a tulip-shaped flame composed of a series of burning jets which at a distance appear to be a solid flame, but it will be obvious that the inclination may be varied or that the cones may project horizontally. The number of the jets may also be varied. As the current of gas emerges from each jet in the shape of a fine stream it is entirely surrounded by air, which has free access to the stream on all sides and is therefore mingled with the gas and supplied thereto in sufficient quantity to consume the whole of it. The gas is therefore burned without smoke and without any deposit, as I have demonstrated by a practical trial extending over a considerable period of time. The air to supply the inner surfaces of the burning jets constituting the flame passes inward between the cones and the lower portions of these jets where they are not in contact with each other, in consequence of the arrangement of the cones at an angle with the vertical line, and this current cools the cones and prevents any deposit in them or at their points.

It will be understood that the cones may be formed directly on the tube or body, as indicated in Fig. 4, and that the cap, if employed, may be formed of any suitable material. A sheet-metal cap, as indicated in Figs. 1 and 2, is, however, cheap and serviceable.

The cap or the cones may be formed of any ordinary or preferred material, the form of the cap or the relative arrangement of the gas-passages may be varied, and the supply-pipe may be provided with any suitable cock or regulator.

I am aware that gas-burners comprising so-called "jets" of conical form have been proposed, but none of the burners of the general description have possessed the particular construction and arrangement essential for the purpose of the present improvement, and none have been adapted to burn acetylene without smoke and without an obstructive deposit of carbon at and in the gas-burner exit. A burner comprising a gas-supply

chamber closed at the top and provided with jets or cone-burners situated within the horizontal area of such closed top would smoke with acetylene, owing to the failure of a sufficient air-supply on the interior of the gas-flames above the jets; and, further, a burner of the Argand type supplied with jets or burner-cones arranged on its periphery in vertical planes would be ill suited to burn acetylene, for the reason that the air-currents in such a burner are vertical and parallel with the flames and they do not come fully in contact with them nor supply sufficient air between the separate gas-currents from the cones to burn the gas. Such constructions, however, have never been proposed for burning acetylene. It is characteristic of my improvement that the jets are situated to project the gas out beyond the vertical wall of the burner-tube, and the construction is such that air can ascend between the jets or cones in a direction transverse thereto, and thereby the air reaches the upper and inner side of the individual bent flames, which above the cones coalesce or approximately coalesce and present the appearance of a single tulip-shaped flame.

To project the flames outwardly beyond the vertical lines of the burner-tube, the jets must be near the outer periphery of its top, and they are conveniently situated in an inclined wall intermediate the closed top and vertical wall of the tube. The inclined wall, however, has no practical mechanical or essential significance except as a seat for the bases of the burner-cones, whereby they extend outwardly in manner to permit air-currents to pass inwardly between the cones and transverse to their axes and whereby a tulip-shaped flame is produced, as above stated, and any construction having the same effect and operation will suffice for the improvement.

I claim—

1. The herein-described burner for acetylene gas, comprising a tube having a closed top, and an intermediate inclined wall provided with a series of jets projecting outward therefrom containing gas-passages opening at their points and adapted to project streams of gas outward at angles with the vertical, substantially as described.

2. The combination with the tube of an acetylene-gas burner, of a detachable cap, comprising a cylindrical portion fitting the open end of the tube, a closed top and an intermediate inclined wall having a series of jets projecting therefrom at an angle with the vertical and having gas-passages at their points adapted to project streams of gas outward and upward, substantially as described.

LEONARD HENKLE.

Witnesses:
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