No. 640,888. Patented Jan. 9, 1900.

E. J. DOLAN.

ACETYLENE GAS BURNER.

(Application filed Feb. 23, 1899. Renewed Nov. 22, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

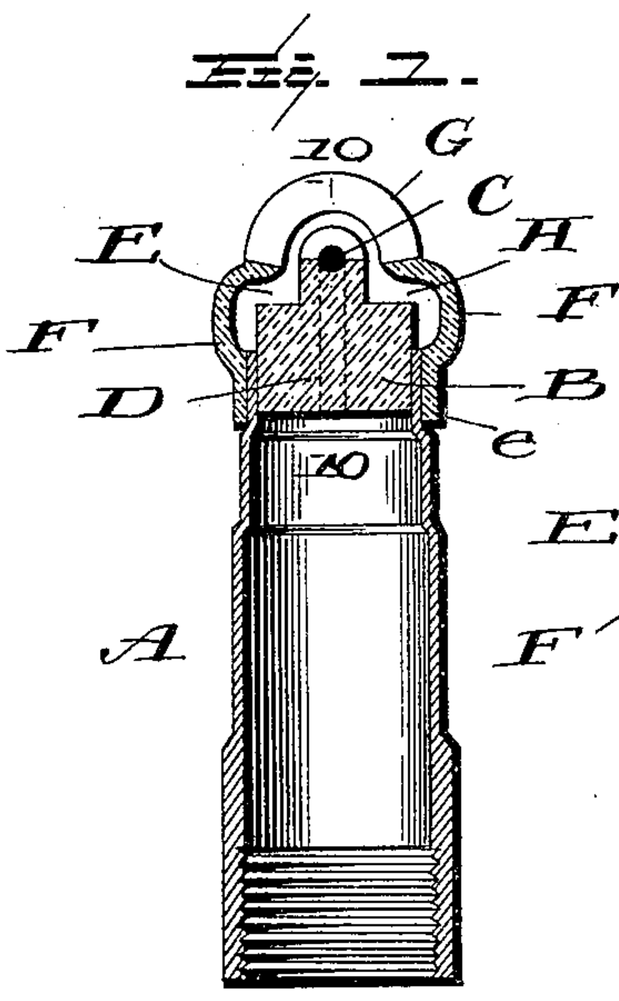


Fig. 2.

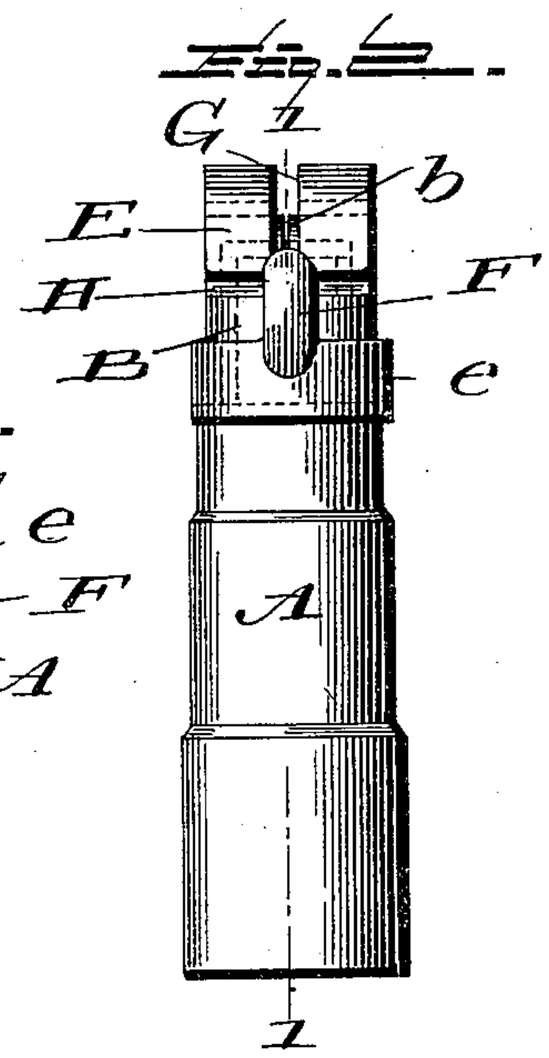


Fig. 3.

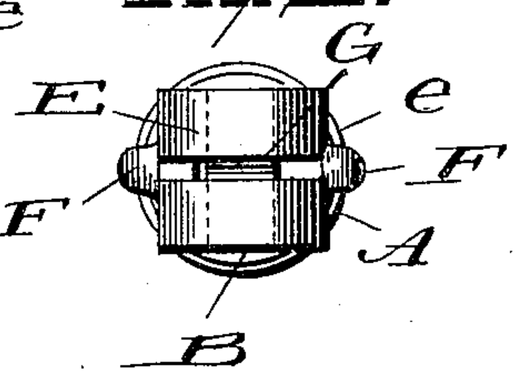


Fig. 4.

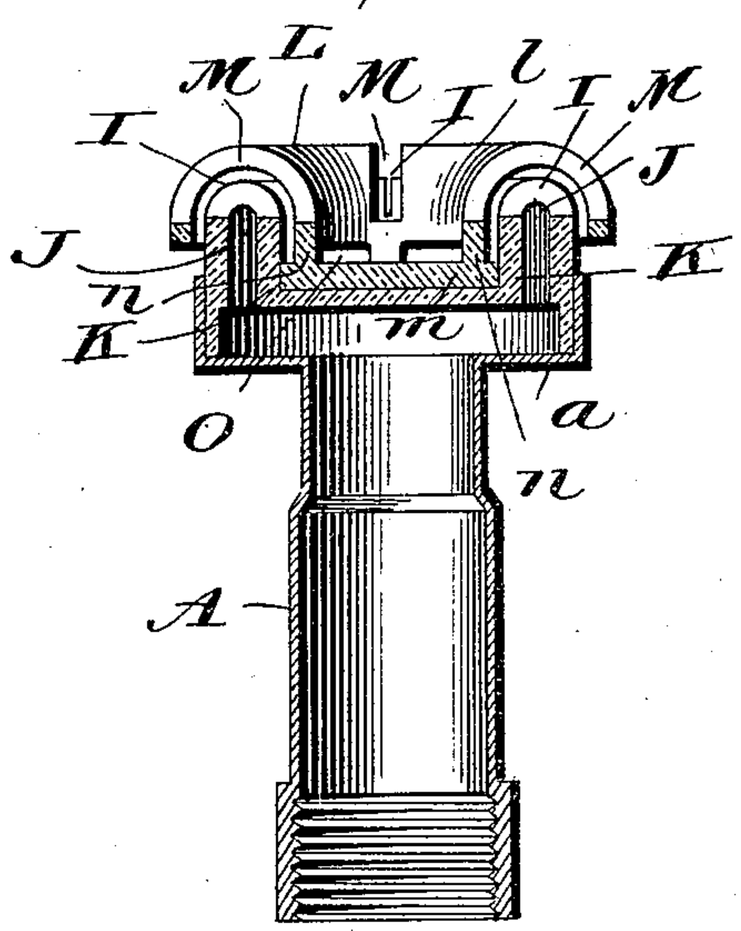


Fig. 5.

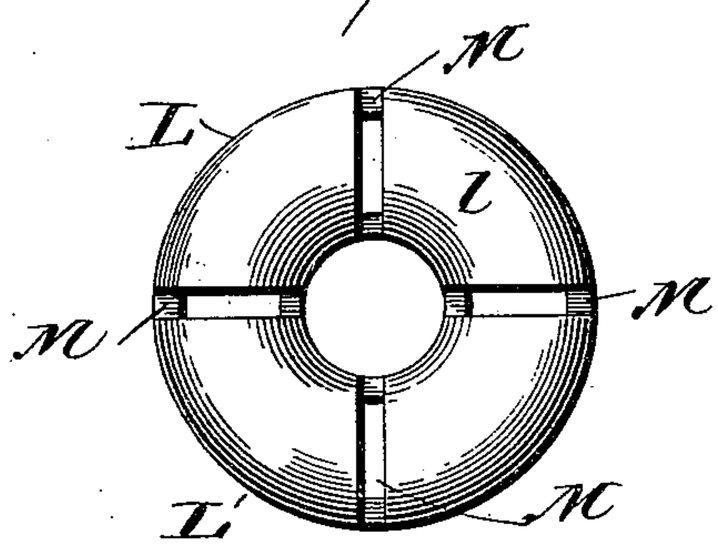
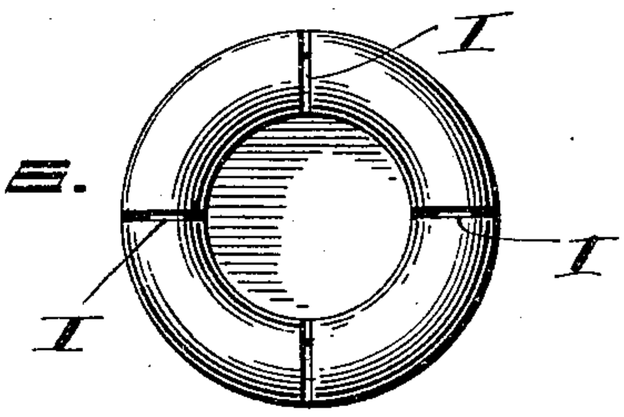


Fig. 6.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

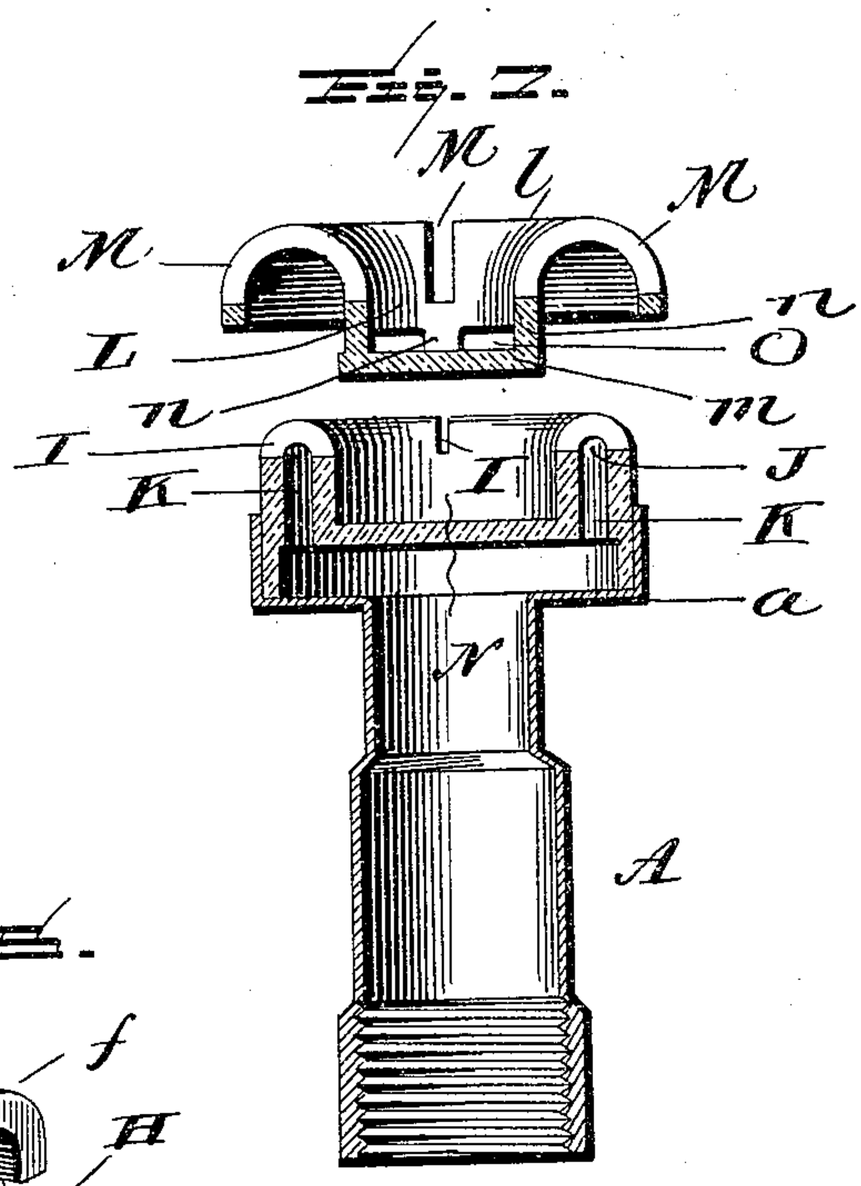


Fig. 4.

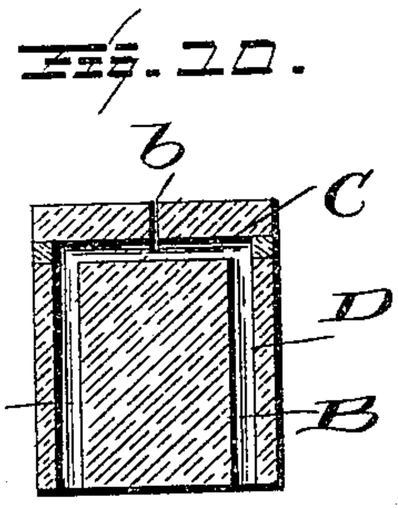


Fig. 1.

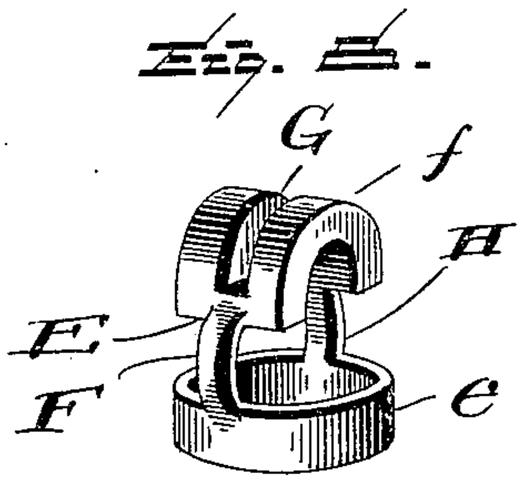
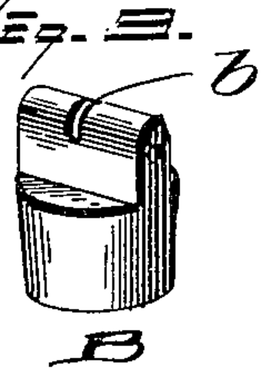


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWARD J. DOLAN, OF PHILADELPHIA, PENNSYLVANIA.

ACETYLENE-GAS BURNER.

SPECIFICATION forming part of Letters Patent No. 640,888, dated January 9, 1900.

Application filed February 23, 1899. Renewed November 22, 1899. Serial No. 737,964. (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 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 certain new and useful improvements in burners for acetylene gas.

The present invention has for its objects, among others, to produce a burner by which I can produce a smokeless flat flame having great illuminating power.

Another object of the invention is to provide for the mixing with the gas of a sufficient quantity of air to insure perfect combustion and to also cool the lower gas-tip and prevent combustion taking place thereon. I employ a tip having a slot preferably of peculiar construction as to its dimensions, and above this I arrange a cap having a combustion-slot of greater area than that of the lower tip with provision for the introduction of air at a point intermediate the two slots. The invention is as applicable to a burner with a plurality of slots as to a burner having but a single slot.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by 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, and in which—

Figure 1 is a central vertical section through the line 1 1 of Fig. 2. Fig. 2 is an elevation of one of my improved burners. Fig. 3 is a plan. Fig. 4 is a vertical section through a slightly-modified form of burner. Fig. 5 is a plan of the cap removed. Fig. 6 is a plan of the burner shown in Fig. 4, of which the cap seen in Fig. 5 is a part. Fig. 7 is a central vertical section through the burner seen in Fig. 4 with the cap elevated from the lower tip. Fig. 8 is a perspective view of the form of cap shown in Figs. 1, 2, and 3 detached. Fig. 9 is a perspective view of the form of lower tip shown in Figs. 1, 2, and 3 removed. Fig. 10 is a central vertical section through the lower tip shown in Fig. 9 on the line 9 9 thereof.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the usual metal barrel or body of the burner.

B in Fig. 1 is the lower tip, formed, preferably, of lava, such as is usually employed in the construction of burner-tips. This tip is by preference of the following peculiar construction: The slot *b* thereof should be of not more than fourteen one-thousandths of an inch, the depth of the said slot must be less than thirty one-thousandths of an inch, and the radius of the slot must in no case exceed three-sixteenths of an inch. It will be understood that the slot is arc-shaped and that the term "radius of the slot" defines the distance from the center from which the arc is struck to the circumference of said arc. This slot communicates with a chamber C, with which the passages D communicate, as seen clearly in Fig. 10. This tip, which I term the "gas-tip" and the slot thereof the "gas-slot," is placed within the outer end of the part A in the usual manner.

E is the cap or seat for the flame. Its construction will be best understood from Fig. 8. It comprises a ring portion *e*, which is designed to embrace the tip B, as shown clearly in Figs. 1 and 2, and the arms or connections F, which join the ring to the top portion *f*, which is preferably of the form shown and which is provided with the arc-shaped slot G, which is in line with the slot of the lower tip, but is considerably larger, as seen clearly in Figs. 2 and 3. By means of the arms F the top of the cap is raised or elevated a short distance above the top of the lower tip, and thus an air chamber or space H is provided between the upper end of the slot of the lower tip and the under side of the slot of the cap, so that air may be fed or introduced at a point intermediate the two slots. This serves not only to produce a perfect smokeless flat flame,

but also to keep the lower tip cool and prevent combustion taking place thereon.

It may be well to here mention that in constructing the tip shown in Fig. 10 in section it is only necessary to bore the hole transversely through the tip to form the chamber and the vertical passages bored from the underside or base of the tip to unite with the said chamber, as shown. The end or ends of the transverse opening are afterward plugged, as indicated in said Fig. 10. It is evident, however, that the invention is in no wise restricted to this particular form of lower tip and that other forms may be employed.

In Figs. 4, 5, 6, and 7 I have shown how the invention may be applied to a burner so as to increase the illuminating power of the flame by increasing the number of flames on one tip or burner. Here the same principle is involved. The slots in the lower tip are of the same character, only instead of the tip being constructed with a single slot it is in this instance shown as having four, all of which are lettered I. These all communicate with the chamber J, from which lead the vertical passages K. As the base of the tip is necessarily increased in size, the upper end of the metal barrel or body A is provided with a horizontal extension *a* to receive it, as seen in Figs. 4 and 7.

The cap L is of a shape conforming to that of the lower tip and is designed to embrace the same, as shown in Fig. 4, being provided with the arched portion, in which are the arc-shaped slots M, corresponding in number and position to the slots I of the lower tip. The base *m* of the cap fits within the depression N of the lower tip, as seen in Fig. 4, and the said base is joined to the upper portion of the cap by the arms or connections *n*, as seen best in Figs. 4 and 7, thus leaving the air chamber or space O for the introduction of air to the space between the slots of the lower tip and the cap, as will be readily understood.

It is evident that more or less slots may be provided in the lower tip and the cap, so as to provide more or less flames on the one tip, as may be desired. It is also evident that the form of tip and cap shown in Figs. 4, 5, 6, and 7 may be made of such a size as not to require any extension on the upper end of the barrel or body, the tip being made to fit within the upper end of the ordinary barrel or body. These and other modifications in detail I should consider within the scope of my invention, and they could be made without departing from the spirit of the invention or sacrificing any of its advantages.

What is claimed as new is—

1. The combination with a burner-tip having a gas-chamber and a plurality of contracted slots leading therefrom, of a cap conforming in shape to the lower tip and having an annular arched portion with slots corresponding to those of the burner-tip and disposed with its base fitting a depression of the burner-tip, as shown and described.

2. The combination with a burner-tip having a gas-chamber and a plurality of contracted slots, of a cap with an arched portion with slots in vertical line with the slots in the burner-tip, a base portion fitted in a depression of the burner-tip and arms joining the base and arched portion to leave an air-space for the introduction of air between the slots of the tip and cap, substantially as specified.

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

EDWARD J. DOLAN.

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