No. 796,302. PATENTED AUG. 1, 1905.

E. J. DOLAN & M. J. TRACY.

PROCESS OR METHOD OF BURNING ACETYLENE GAS.

APPLICATION FILED MAY 2, 1905.

Fig. 1.

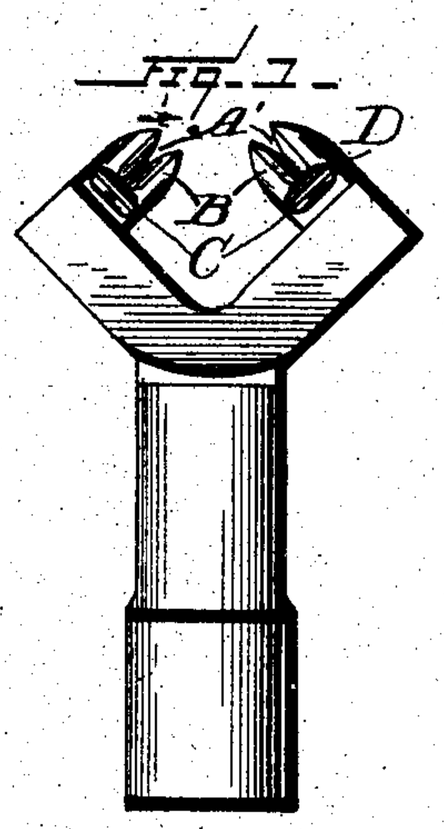


Fig. 2.

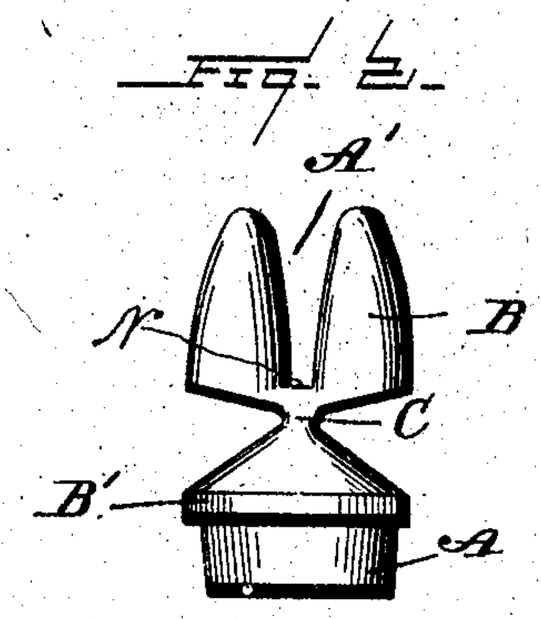


Fig. 3.

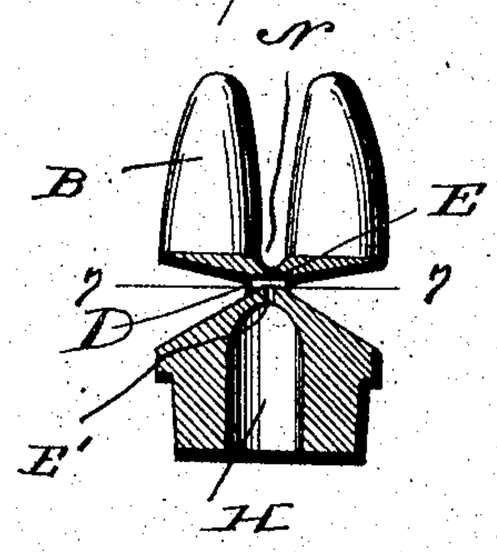


Fig. 4.

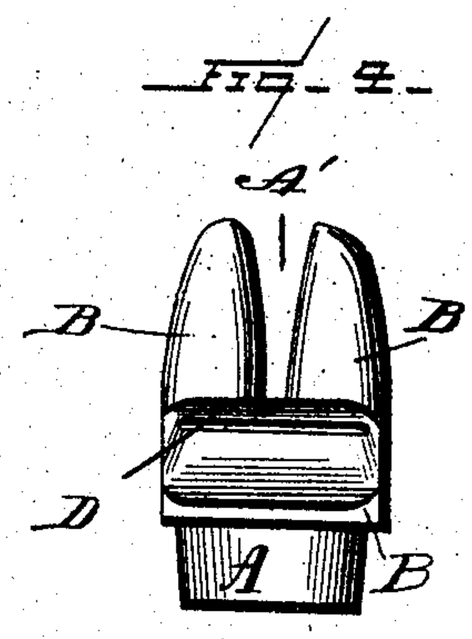


Fig. 5.

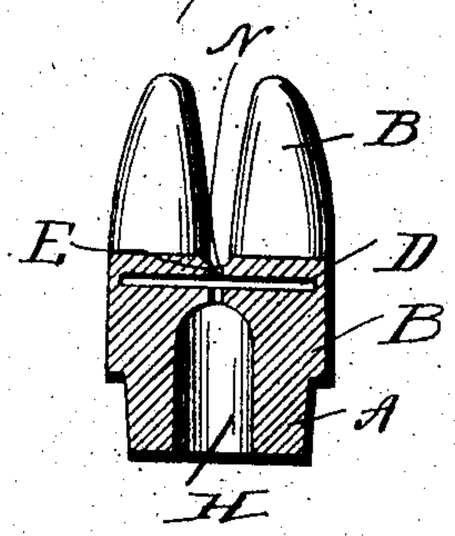


Fig. 6.

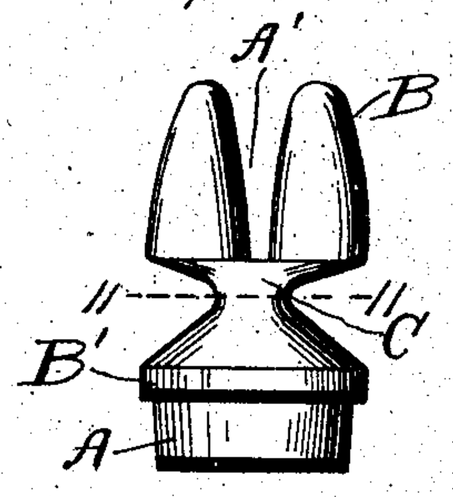


Fig. 7.

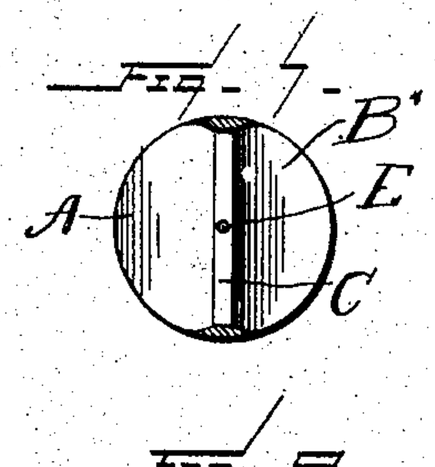


Fig. 8.

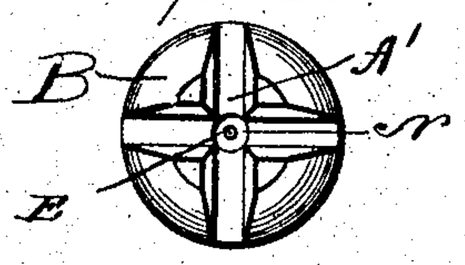


Fig. 9.

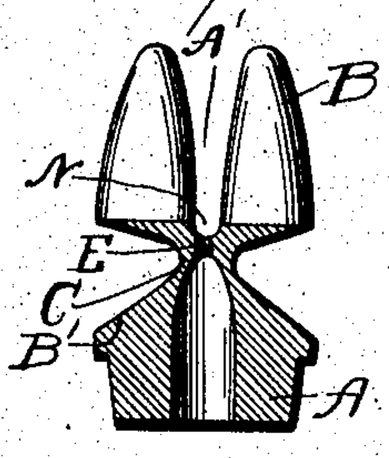


Fig. 10.

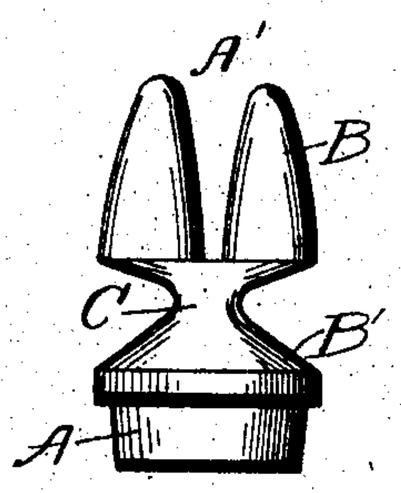
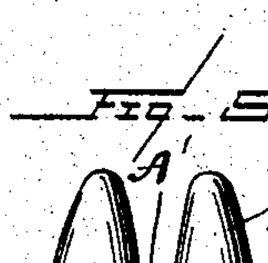


Fig. 11.



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UNITED STATES PATENT OFFICE.

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PROCESS OR METHOD OF BURNING ACETYLENE GAS.

No. 796,302. Specification of Letters Patent. Patented Aug. 1, 1905.

Application filed May 2, 1905. Serial No. 258,547.

To all whom it may concern:

Be it known that we, EDWARD J. DOLAN and MICHAEL J. TRACY, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Processes or Methods of Burning Acetylene Gas; and we 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 new and useful improvements in methods of burning acetylene gas; and the object sought is to raise the temperature of the burner-tip to a non-corrosive temperature without mixing or surrounding the gas with air before combustion.

In carrying out our method we propose to cause a stream of gas to be projected through registering ducts of substantially equal diameter, which are spaced apart, affording a cooling medium intermediate two portions of a jet, through one of which the gas at a comparatively low temperature is projected through the space into the other duct, where it immediately is raised to a non-corrosive temperature and by the burning flame heating projecting parts of the tip.

Acetylene-burners which are now commonly used are of the air type, in which air surrounds or mixes with the gas before ignition takes place, which method completely differentiates from our process forming the subject-matter of the present invention, in which air is entirely dispensed with until the gas reaches the combustion-point. In our experiments we have found that if the combustion-point and its immediate vicinity, including the upper gas-exit, are highly heated to a degree above corroding temperature the gas can be successfully burned without clogging the gas-exits. In order to bring the temperature of the combustion-point above the corroding-point, it is necessary to have projections reaching beyond the exit end of the upper duct of the tip and affording contact-surface for the flame. By this arrangement the temperature of the upper portion of the tip is retained above the corroding-point while the slot or space intervening between the combustion-point and the lower or body portion of the tip will serve to retain the temperature in the latter below the corroding-point. We have also found that the space intervening between the upper and lower ducts in the tip is of limited width to effectually cause a stream of gas to pass from one section of the duct to the other through the space, and to accomplish successfully the result sought for in our method it is necessary that the upper duct, through which the gas is projected, should be exceedingly short for the purpose of reducing the frictional contact with the gas.

An apparatus whereby the various steps of our method may be carried out is illustrated in the accompanying drawings, in which similar letters of reference indicate like parts in the different views, in which—

Figure 1 is a side elevation showing our improved tips mounted in a suitable standard so that the flames will impinge against each other and form a flat flame. Fig. 2 is a side elevation of one of the tips. Fig. 3 is a sectional view through the tip shown in Fig. 2. Fig. 4 is a side elevation of a tip taken at right angles from the elevation shown in Fig. 2. Fig. 5 is a sectional view through the tip at right angles to the section shown in Fig. 3. Fig. 6 is a top plan view of the tip. Fig. 7 is a sectional view on line 7 7 of Fig. 3. Fig. 8 is a side elevation of a slightly-modified form of our tip. Fig. 9 is a sectional view through the form shown in Fig. 8. Fig. 10 is a rear elevation of the form shown in Fig. 8, and Fig. 11 is a sectional view on line 11 11 of Fig. 8.

Reference now being had to the details of the drawings by letter, A designates a tip, which may be made of steatite or any suitable material and is provided with intersecting slots or depressions A′. Said tip is divided by a contracted neck portion into two sections, (designated in the drawings by letters B and B′,) said sections being connected at the point C. (Shown clearly in Fig. 2 of the drawings.) The contracted portion is provided with a transverse elongated slot D, which slot forms an air-space of equal capacity to the gas-duct and intersects it to form the two ducts E and E′, which are of equal diameters. The duct E′ leads centrally from the chambered portion H of the lower section or body portion of the tip into the space intermediate the two sections of the tip and in alinement

with the duct E, which leads centrally through the upper section of the tip and terminates in a countersunk recess N intermediate the projections forming the extreme upper end of the tip. By the formation of the countersunk recess N the duct E is made of such a length as to reduce to a minimum the friction between the marginal wall of the duct and the stream of gas passing through the same.

In Figs. 8 to 11, inclusive, we have shown a slight modification in the form of our tip in which we have dispensed with the communicating space intervening between the two ducts, but in place thereof form a constricted neck dividing the tip essentially into two sections, the purpose of the reduced size of the neck being to form a heat-reducing medium and offer as little conducting-surface as possible from the upper highly-heated combustion end of the tip to the lower or body portion.

In carrying out our process the acetylene gas is projected through the lower duct across the space intervening between the two sections of the tip and in its passage across the space comes in contact with the atmosphere and passes through the registering duct E in the upper section of the tip, the length of which is such as to reduce the friction of the passing gas to a minimum, and ignition takes place in the countersunk recess immediately at the end. As the flame burns, the adjacent surfaces of extended portions of the tip which are divided by the intersecting slots will be heated beyond the corroding-point, which will effectually prevent the upper duct from becoming clogged.

In the modified forms covered by Figs. 8 to 11, inclusive, we accomplish essentially the same object by practically dividing the tip into two sections with a constricted neck portion between, dispensing with the air-space, but reducing by the constricted neck the conduction-surface between the upper highly-heated portion of the tip and the lower or body portion.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The method of burning acetylene gas, which consists in projecting a minute stream of gas from a duct across a thin air-space and through a second duct of the same diameter as the first duct, igniting the stream at the outlet of said last-named duct, keeping the frame seated upon the outlet and maintaining a high temperature adjacent thereto, substantially as described.

2. A gas-burner having extensions substantially parallel with the direction of the jet, a contracted neck portion intermediate with the ends of the upper and lower portions of the burner, a thin air-space extending transversely through said neck portion, and a minute duct extending longitudinally through the burner and across the transverse air-space, substantially as shown and described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

EDWARD J. DOLAN.
MICHAEL J. TRACY.

Witnesses:
E. R. McCleese,
Fredk. C. Eberhardt.