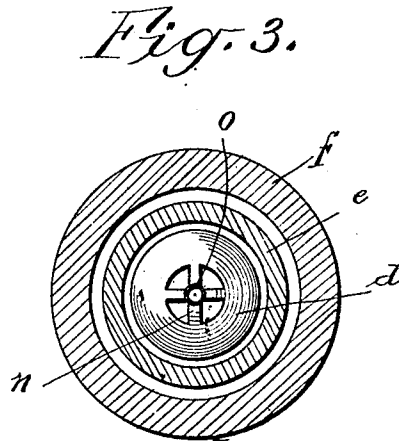
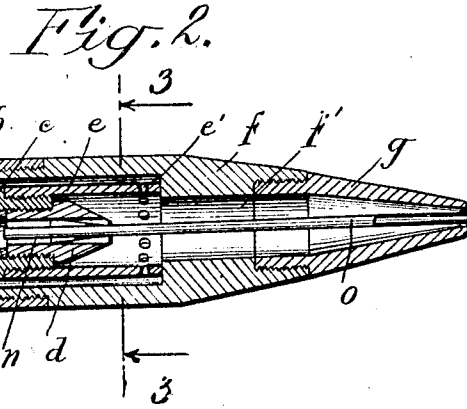
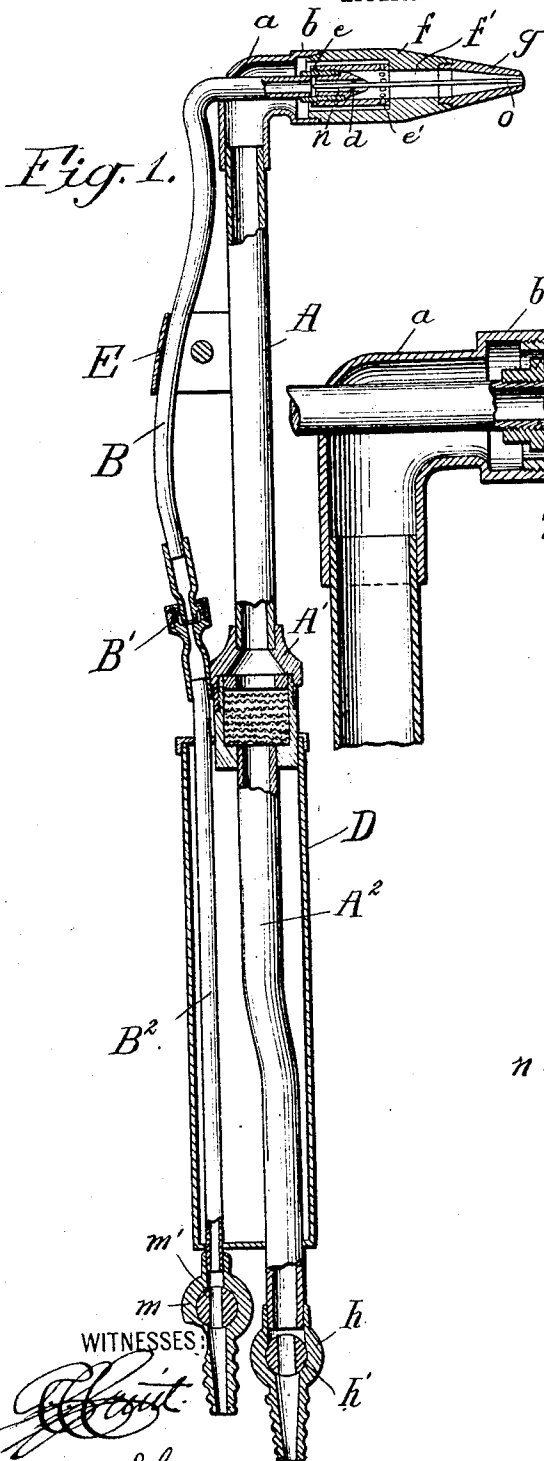


C. DELCAMPE.  
METAL CUTTING BLOWPIPE  
APPLICATION FILED OCT. 9, 1907.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

CYRILLE DELCAMPE, OF BRIDGEPORT, CONNECTICUT.

## METAL-CUTTING BLOWPIPE.

No. 887,467.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed October 9, 1907. Serial No. 396,668.

*To all whom it may concern:*

Be it known that I, CYRILLE DELCAMPE, a subject of the King of Belgium, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Metal-Cutting Blowpipes; and I do hereby 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.

My invention particularly relates to providing an oxygen-acetylene blow pipe of the type described in my Patent No. 874,492, granted December 24, 1907, with a metal cutting attachment, though the improvements may be applied to differing types of blow-pipe.

The nature and mode of operation of my improvements will be understood from the following description and the accompanying drawings.

In the drawings Figure 1 is a view of the complete blow-pipe with cutting attachment parts being shown in section. Fig. 2 is a central section of the blow-pipe head. Fig. 3 is a section on the line 3—3 of Fig. 2, looking in the direction of the arrows.

The blow-pipe proper comprises an acetylene pipe A and an oxygen pipe B, the exit end of the oxygen pipe being arranged within the exit end of the acetylene pipe which forms the blow-pipe head. Secured to the upper end of the pipe A is an elbow *a* terminating in the cylindrical enlargement *b*. The elbow is provided at the turn with an opening through which the upper end of the oxygen pipe B passes. Secured to the end of the pipe B within the cylindrical enlargement of the elbow *a* is a flanged collar *c* screw-threaded on its inside and outside as shown. The screw-threads on the inside are intended to take a screw threaded oxygen injector nozzle *d* and the screw-threads on the outside are intended to take the cylindrical chimney *e* provided with the inlet orifices *e'*. These orifices *e'* are arranged in a circle and are located in the chimney *e* forward of the exit end of the injector nozzle *d* and their direction is at right angles to the direction of flow of gas from the injector nozzle. By this arrangement the jets of gas from the holes *e'* converge directly in the path of the oxygen injector nozzle *d* and an intimate mixture of the gases is secured. The orifices *e* are, moreover, contracted as they approach the

inside of the chimney, as shown more clearly in Fig. 2, for the purpose of giving the desired velocity to the acetylene jets passing through them and preventing the flashing back of the flame into the chamber outside of the chimney. Screwed into the cylindrical enlargement *b* of the elbow *a* is the plug *f* containing a cylindrical gas chamber of somewhat greater diameter than the chimney *e*. The diameter of this cylindrical chamber is reduced near the forward end of the plug to form a shoulder against which the end of the chimney *e* rests, and the chamber is continued beyond the shoulder to form the relatively contracted mixing chamber *f'* into the forward ends of which the main nozzle *g* is screwed.

The acetylene pipe A is connected by suitable detachable couplings A' to the pipe A<sup>2</sup> running through a cylindrical sheathing D. The coupling A' is provided on its inside with a plurality of layers of gauze as shown, to further prevent back firing, and the pipe A<sup>2</sup> terminates inside of the sheathing D in a plug *h* having a turn cock *h'*. The pipe B is connected at the detachable coupling A' to the pipe B<sup>2</sup> which also passes through the sheathing D and terminates at its lower end in the plug *m* having a turn cock *m'*. To detach the pipes A and B from the handle D in order to inspect and repair the wire gauze, etc., the detachable couplings B' and A' are unscrewed, as will be understood. The pipe B is bent away from the pipe A but secured in proximity thereto by the clip E, the pipe being sufficiently resilient to press the front of the end of the chimney *e* into contact with the shoulder within the plug *f*. The cylindrical sheathing D serves as a handle for the blow-pipe.

So much of the blow pipe as has thus far been described is identical with that disclosed in my patent above referred to and is adapted for use with a series of detachable main nozzles and injector nozzles so that when it is desired to change the size of the emitted flame it is only necessary to remove both the main nozzle and the injector nozzle and substitute therefor nozzles of a different size having the necessary relative proportion. For the purpose of transforming such a blow pipe into a blow-pipe for cutting metal I provide the particular construction of injector nozzle illustrated herein, in which the injector nozzle *d* supports centrally, by the vanes *n*, a small oxygen tube *o* which extends

through the mixing chamber and the main nozzle *g* up to the extreme tip of the main nozzle. This tube *o* is of such size that it allows a flow of oxygen through the injector nozzle into the mixing chamber and it also provides for a flow of oxygen directly from the oxygen pipe to the tip of the main nozzle. In the blow-pipes used by me the oxygen is fed through the pipe *B* at a considerable pressure and the acetylene is also under some pressure, this pressure together with the injector effect serving to draw the proper amount of acetylene into the mixing chamber where it is mixed with the oxygen and burned at the mouth of the main nozzle. The effect of the injector nozzle provided with the oxygen tube *o* is to carry a fine jet of oxygen at high pressure from the oxygen pipe directly to the mouth of the main nozzle without interfering with the ordinary operation of the blow-pipe. That is to say, oxygen is still injected into the mixing chamber around the oxygen tube *o* and is there mixed with the acetylene and is discharged at the mouth of the main nozzle *g*, in an annular ring, where it is burned to heat the metal, but the heart of the flame at the main nozzle is formed by a jet of pure oxygen. This jet of pure oxygen has the known effect of rapidly burning out the heated metal in a thin sharply marked line, thereby making the cut. By this construction I produce a blow-pipe for cutting metal which is extremely simple and has many advantages. Thus, the pure oxygen jet coming from the tube *o* is strongly heated by the oxygen acetylene flame and is thus made very active chemically. Since the tube *o* terminates at the center of the main nozzle it is certain that the oxygen jet will strike the metal at the place where it is most highly heated by the blow-pipe flame. Because of the fact that the end of the tube *o* terminates at the mouth of the main nozzle it may be brought extremely close to the metal to be cut. The oxygen jet thus has no opportunity to disburse and will make an extremely neat and regular cut. The blow-pipe for cutting metal may be quickly transformed into a blow-pipe for other purposes, or vice versa, merely by changing the injector nozzles. Furthermore, with my improved blow-pipe a cut may be made in any desired direction without any adjustment of the parts, it being necessary merely to move the blow-pipe nozzle in the direction of the desired cut. It will be understood that the cutting attachment formed by this modified construction of injector nozzle may be attached to my standard blow-pipes, thus

transforming them, for the particular work, into cutting tools. It will further be understood that though I prefer to use acetylene and oxygen in my blow-pipes, any other appropriate combustible gas may be substituted for the acetylene, and any other appropriate gaseous supporter of combustion for the oxygen.

What I claim is:

1. In a blow-pipe for cutting metal, a supply pipe for a combustible gas terminating in a head containing a mixing chamber, a detachable main nozzle in said head forming an outlet from the mixing chamber, a supply pipe for a gaseous supporter of combustion extending into said head and terminating in a nozzle support, a detachable injector nozzle in said support and discharging into the mixing chamber, a tube centrally supported in the injector nozzle and extending to the mouth of the main nozzle for leading an independent jet of the gaseous supporter of combustion to the center of the main nozzle, a chimney surrounding said injector nozzle, and forming a partition between the gas chamber and the mixing chamber, and gas ports in said chimney, substantially as described.

2. A cutting attachment for blow-pipes adapted to mix and burn a combustible gas and a gaseous supporter of combustion, comprising a nozzle attached to the supply pipe for the gaseous supporter of combustion, and a tube centrally supported in said nozzle and extending to the mouth of the main nozzle, for supplying an independent cutting jet of the gaseous supporter of combustion under pressure to the center of the blow-pipe flame, substantially as described.

3. In a blow-pipe for cutting metal, a mixing chamber, a main exit nozzle for said chamber, a supply pipe for a combustible gas and a supply pipe for a gaseous supporter of combustion discharging into the mixing chamber, and a small tube supported in the discharge orifice of the supply pipe for the gaseous supporter of the combustion and extending to the mouth of the main exit nozzle, for conducting an independent jet of the gaseous supporter of combustion under pressure directly to the exit mouth of the main nozzle within the blow-pipe flame; substantially as described.

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

CYRILLE DELCAMPE.

Witnesses:

ANDRÉ BELTZER,  
R. C. SEELEY.