

Oct. 25, 1927.

E. H. SMITH

1,646,602

OXY-FUEL GAS TIP AND PROCESS OF MAKING

Filed Feb. 4, 1926

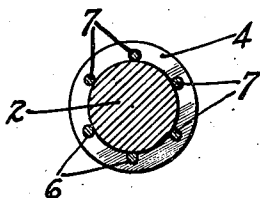
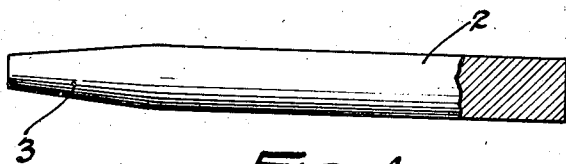
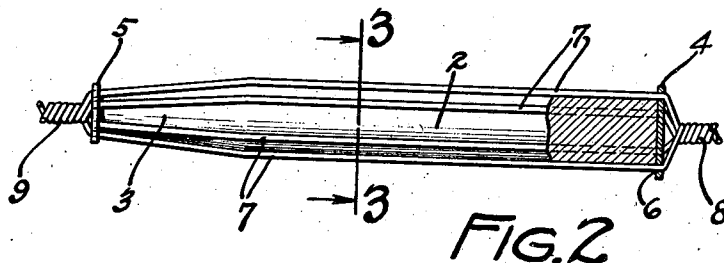


FIG. 3

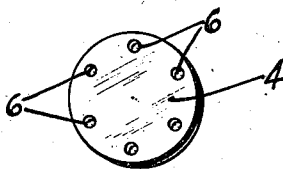


FIG. 4

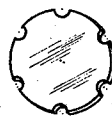


FIG. 5

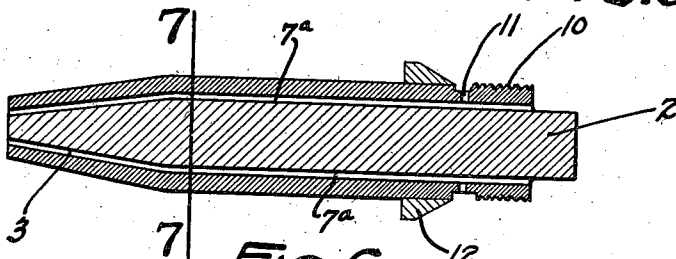


FIG. 6

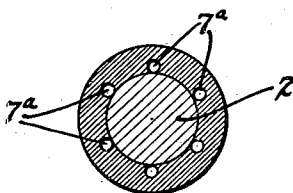


FIG. 7

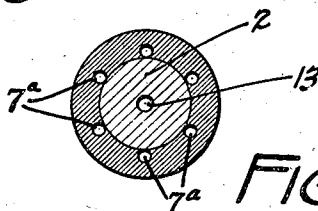


FIG. 8

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Patented Oct. 25, 1927.

1,646,602

UNITED STATES PATENT OFFICE.

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OXY-FUEL GAS TIP AND PROCESS OF MAKING.

Application filed February 4, 1926. Serial No. 86,000.

In the manufacture of tips for fuel gas, particularly those used for cutting and welding purposes, it has been customary to drill the tip from end to end to form the gas ducts therethrough. This has been a difficult expensive operation as the drills frequently break, sometimes when the tip is nearly completed, and it is necessary to do the work all over again. Manufacturers figure a certain percentage of waste in the manufacture of tips in this way.

The object of my present invention is to provide a process of making these tips which will eliminate entirely the drilling operation and enable a manufacturer to produce the article for a cost considerably below the usual manufacturing cost of a tip of this kind.

A further object is to provide a tip process that is a modification of the process shown and described in my pending application for Letters Patent of the United States, Serial Number 82,044, filed Jan. 18, 1926.

The invention consists generally in various constructions and combinations all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification,

Figure 1 is a plan view partially in section of a core of metal from which the fuel gas tip is formed;

Figure 2 is a similar view illustrating the tip ready to be placed in an electro-plating bath to form the jacket or shell thereon;

Figure 3 is a sectional view on the line 3—3 of Figure 2;

Figure 4 is a detail view of one of the plates used at the end of the core in the plating bath;

Figure 5 is a modified form of one of these plates;

Figure 6 is a longitudinal sectional view through a completed core after the shell or jacket has been formed thereon and the core has been machined and is ready for use;

Figure 7 is a sectional view on the line 7—7 of Figure 6;

Figure 8 is a sectional view showing the completed core with a central bore to adapt it for cutting purposes.

In the drawing, 2 represents the core of the tip made preferably of a drawn block of copper having a tapered end 3. This core usually is bored longitudinally with a small drill for the purpose of making gas ducts

therethrough and it is evident to anyone skilled in this work that a drilling operation of this kind must be tedious and expensive. The tips are several inches long, necessarily so for the purpose of removing the flame as far as practicable from the head of the torch and there is a considerable amount of metal to be cut away before these ducts can be completed, and it often happens that drills break in the bore and the piece of metal has to be thrown away and the work done over again.

To eliminate this difficulty in the manufacture of this article, I take plates 4 and 5 having holes 6 therein and set them against the squared ends of the core. Then I pass wires 7 of suitable material that will fuse at a comparatively low temperature through these holes and twist the ends together as indicated at 8 and 9, thereby drawing the plates 4 and 5 firmly against the ends of the core while the wires 7 will extend along the peripheral surface of the core bearing thereon and be spaced apart around the surface of the core a distance corresponding to the distance between the holes in the plates 4 and 5. When this has been done, I place the core in an electro-plating bath and allow it to remain there a suitable time. The metal will collect on the core over the wires forming longitudinal ribs on the peripheral surface of the core and when these ribs have been formed of sufficient thickness I remove the plates and fuse the wires, thereby leaving a series of longitudinal ducts 7^a extending through the core from end to end through which the fuel gas may flow to the end of the tip. The wires at the tapered end of the core following the converging surface thereof will also converge so that when the wires are removed the ends of the ducts will converge directing the gas toward a point adjacent the end of the tip. The jacket or shell will be made of sufficient thickness so that the ducts will all be included in the thickness of this shell instead of being formed in the core itself as in my application above referred to. The principle employed, however, in the formation of these ducts is practically the same in that I utilize the electro-plating bath for accumulating or building up a body of metal over and around the surface of the core so that when the wires are removed a series of longitudinal gas conducting ducts will be provided therein. When the ends of the

core with the shell thereon have been suitably milled, a thread 10 is cut. Ports 11 are provided leading to the longitudinal ducts and a collar 12 corresponding to the one shown in my application above referred to is pressed on the core to form a seat against the head of the burner when the parts are assembled. This tip may be made of any suitable length or shape and while it is only practicable to drill a tip of a certain length, there is no limit to the length of a tip that can be made in this way, or in the manufacture described in my application previously referred to. The ducts need not be straight in a tip of this kind and the shape of the tip may be varied to adapt it for various purposes or for work where an ordinary straight tip could not be conveniently used.

In most of the views in this case I have omitted the central bore adapting the tip for welding purposes, but in Figure 8 I show a central bore 13 adapting the tip for cutting. The encircling ducts, in Figure 8 are all formed in the same manner as described with reference to the previous figures of this drawing.

I claim as my invention:

1. A process of forming an oxy-fuel tip which consists in providing a core, mounting a series of wires on the periphery of said core in spaced relation, immersing the core in an electro-plating bath until a shell or jacket of the desired thickness has been formed over the core and wires and then removing the wires.

2. A process of forming an oxy-fuel gas tip which consists in providing a core, plac-

ing guides against the ends of the core, engaging wires with these guides in spaced relation, and twisting the ends of the wires together to firmly draw the guides against the core, immersing the core in an electro-plating bath until a shell or jacket has been formed over the core, and wires of sufficient thickness to completely cover the wires, then removing the guards and wires.

3. A process of making an oxy-fuel gas tip which consists in providing a core having a tapered end, mounting ribs longitudinally thereon in spaced relation, immersing the core in an electro-plating bath to form an encircling shell or jacket over the ribs and core, then removing the ribs to provide a series of longitudinal gas conducting ducts with their ends converging at one end of the core.

4. A process of making an oxy-fuel gas tip which consists in providing a core of metal having a tapered end, placing disks against said ends, said disks provided with apertures in their peripheral edges, engaging rib members with said apertures and seating said members on the peripheral surface of the core in spaced relation, securing the ends of the ribs to draw the disks firmly against the ends of the core, immersing the core in an electro-plating bath until a shell or jacket of the desired thickness has been formed around the core, then removing the ribs to provide a series of longitudinal gas conducting ducts therethrough.

In witness whereof, I have hereunto set my hand this 30th day of January, 1926.

ELMER H. SMITH.