E. H. SMITH.

CUTTING TORCH.

APPLICATION FILED JAN. 22, 1914.

1,136,490. Patented Apr. 20, 1915.

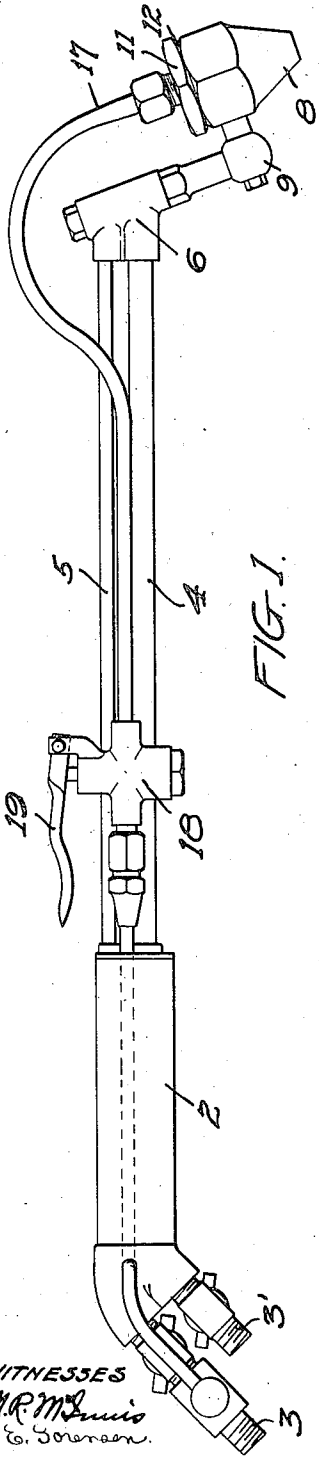


FIG. 1.

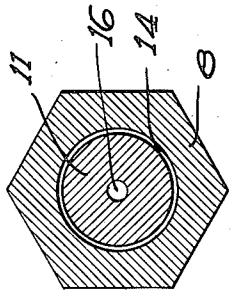


FIG. 3.

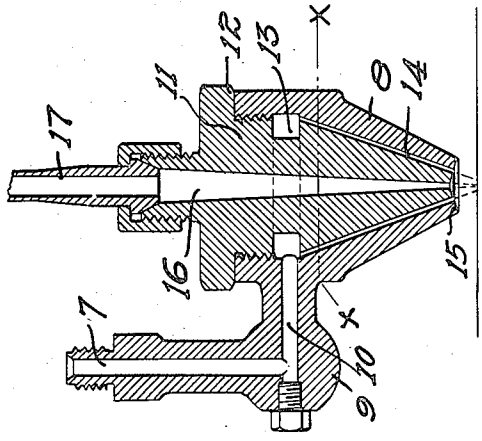


FIG. 2.

WITNESSES

M. R. McInnis

G. E. Sorenson.

INVENTOR

ELMER H. SMITH

BY Paul & Paul

ATTORNEYS

UNITED STATES PATENT OFFICE.

ELMER H. SMITH, OF MINNEAPOLIS, MINNESOTA.

CUTTING-TORCH.

1,136,490. Specification of Letters Patent. Patented Apr. 20, 1915.

Application filed January 22, 1914. Serial No. 813,664.

To all whom it may concern:

Be it known that I, ELMER H. SMITH, citizen of the United States, resident of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Cutting-Torches, of which the following is a specification.

My invention relates to oxy-acetylene torches for cutting metal and the object of the invention is to provide a cutting nozzle by means of which the metal can be severed or a hole cut therein with great accuracy and despatch and without destroying more metal than is actually necessary in performing the operation desired.

A further object is to so concentrate the heat of the preheating flame that considerable time and labor will be saved in the use of the torch.

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 side view of an oxy-acetylene cutting torch embodying my invention, Fig. 2 is a sectional view of the nozzle of the torch, Fig. 3 is a transverse sectional view on the line *x*—*x* of Fig. 2.

In the drawing, 2 represents the handle portion of the torch, having suitable couplings 3 and 3′ for attachment with a source of oxygen and acetylene gas supply, not shown. Pipes 4 and 5 communicate through the handle 2 with the oxygen and acetylene gas supply, and a coupling 6 communicates with the pipes 4 and 5 and has a mixing chamber 7 wherein the oxygen and acetylene gas are mingled on their way to the torch nozzle. The nozzle 8 has a bracket 9 thereon provided with a passage 10 which communicates with the mixing chamber 7 and said nozzle is interiorly threaded to receive a plug 11 having a flange 12 that is seated on the end wall of the nozzle 8 and provided with an annular passage 13 which communicates with the oxygen and acetylene gas duct 10. The nozzle 8 is cone-shaped and a passage 14, conical in form, communicates with the annular passage 13 and extends to the tip of the nozzle, gradually growing smaller in cross sectional area and being substantially circular, the walls of the nozzle and the plug converging and operating to direct the mixture of oxygen and acetylene gas toward the contracted exit of the nozzle to concentrate the pressure or flow of the oxygen and gas at this point. This will be due to the fact that the area of the passage 14 gradually decreases and, consequently, as the gas approaches the outlet of the nozzle, it will flow with a greater degree of velocity and concentrate the flame at the point where the oxygen jet strikes the metal. The tip of the plug and nozzle is preferably made concave, having surfaces 15 at right angles substantially to the walls of the passage 14 and thereby the flow of gas will not be retarded, and there will be no danger of a flare-back into the torch. The flame projected from this nozzle will be circular and will be adapted to pre-heat the metal to be cut or consumed. The plug 11 is provided with a duct 16 that is concentric with the passage 14 and has converging walls which are adapted to concentrate and intensify the force of the gas and deliver it in the form of a circular jet into the space within the circular preheating flame.

The duct 16 is arranged to direct the oxygen into the apex of the cone formed by the acetylene flame. A tube 17 communicates with the duct 16 and is provided with a valve 18 having a lever 19 by means of which the operator can instantly regulate the flow of pure oxygen to the nozzle. The pipe 17 communicates through the hand grip 2 with a source of pure oxygen supply. The torch may be moved easily and quickly over the surface to be cut and at all times will be absolutely within the control of the user, who can easily and quickly regulate the delivery of the oxygen jet by the operation of the lever 19. The oxygen is entirely inclosed by the preheating jet and concentric therewith. There is, therefore, but little opportunity for even an unskilled operator to cut an irregular opening or one that is larger than necessary in the metal through his inability or inexperience in handling the torch. The preheating flame is cone shaped in form and the cutting jet is so arranged that it contacts with the metal at the center of the preheating flame and will rapidly and neatly cut through the metal as the torch is moved thereon.

I claim as my invention:

1. An oxy-acetylene cutting torch comprising a nozzle having a cone-shaped recess therein extending to the tip of the nozzle, a plug fitting within said nozzle and having

an annular passage therein communicating with a source of oxygen-acetylene supply, said plug having a tapered end fitting within the correspondingly shaped recess in said nozzle and spaced from the walls thereof to form a passage leading from said recess to said tip, said plug having a duct therein communicating with a source of pure oxygen supply and extending through the tip end of said plug and encircled by the passage between said plug and nozzle at the tip thereof.

2. A cutting torch comprising a nozzle having a cone-shaped recess therein, a plug fitting within said nozzle and having a tapered end to enter said recess, the tip end of said nozzle and said plug being concentric and in alinement substantially with one another, said plug having an annular passage communicating with a source of oxygen and acetylene supply, a cone-shaped passage being formed between the tapered end of said plug and said nozzle communicating with said annular passage and leading to the tips of said nozzle and plug, said plug also having a passage therein for the pure oxygen supply, the exit end of the oxygen passage in said plug being encircled by the exit of the passage between said plug and nozzle.

3. A cutting torch comprising a nozzle having a tapered end and a correspondingly tapered recess therein, a plug fitting within said nozzle and having a tapered end to enter said recess and spaced from the walls thereof to form a passage encircling the tapered end of said plug, the tip end of said nozzle and said plug being concave and the conical end of said plug having a passage therethrough for the pure oxygen supply, the passage between said plug and nozzle communicating with a source of oxygen-acetylene gas supply to form a circular preheating flame at the tip of said nozzle, the oxygen for the cutting flame being supplied through the duct in said plug.

In witness whereof, I have hereunto set my hand this 14th day of January 1914.

ELMER H. SMITH.

Witnesses:
GENEVIEVE E. SORENSEN,
EDWARD A. PAUL.