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1,452,258

E. H. SMITH

WELDING TORCH TIP

Filed May 12, 1919

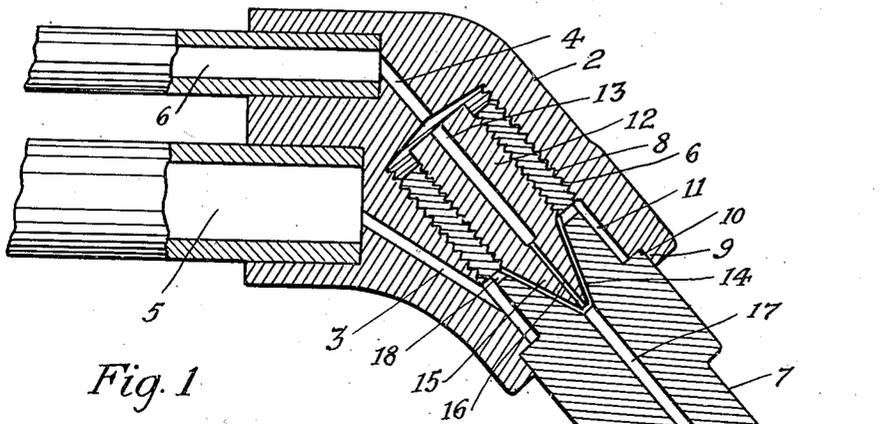


Fig. 1

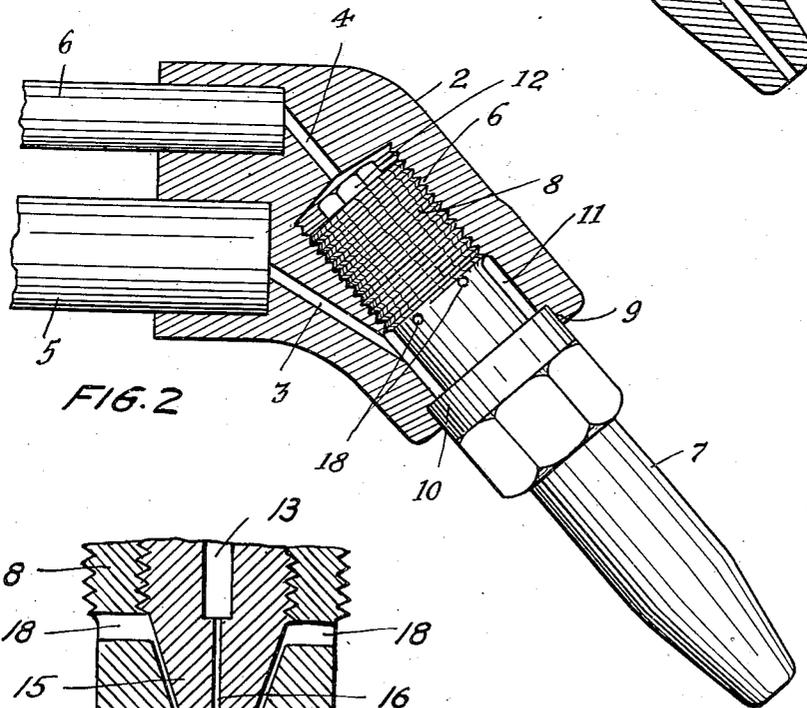


FIG. 2

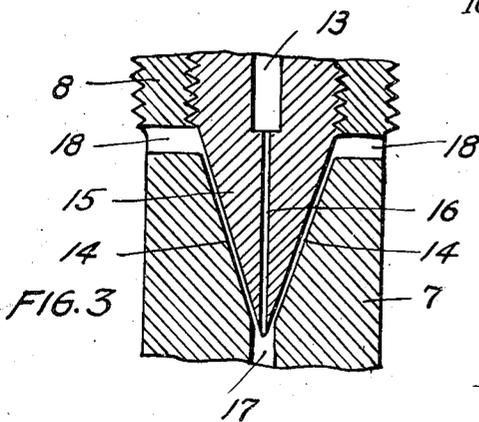


FIG. 3

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UNITED STATES PATENT OFFICE.

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WELDING-TORCH TIP.

Application filed May 12, 1919. Serial No. 296,489.

To all whom it may concern:

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

The object of my invention is to provide a torch tip of such construction that a complete mixture of the oxygen and acetylene gas will take place in the tip without the formation of eddies or whirls of gas which in torches as usually constructed retard the flow and have a tendency to back fire and destroy or damage the tip at the point where the union of the gases takes place.

A further object is to provide a tip of comparatively simple construction and one which is adapted for use with any type of welding 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 sectional view on an enlarged scale of a portion of a torch and welding tip mounted thereon.

Figure 2 is a view showing the head in section, with the tip fitting therein and indicating the position of the ports leading to the oxygen duct.

Figure 3 is a detail sectional view, enlarged, showing the taper of the walls of the mixing nozzle to a thin edge.

In the drawing, 2 represents the head of the torch having an acetylene gas passage 3 and an oxygen passage 4. 5 and 6 are the pipes mounted in said head and communicating respectively with said passages and leading from a source of acetylene and oxygen supply, not shown. The head has a socket 6 therein and a tip 7 and an exteriorly threaded end portion 8 engaging the interiorly threaded walls of said recess at the inner end thereof. An annular recess 9 is formed in the outer end of the head around said socket and a shoulder 10 formed on said tip is seated in said annular recess to form a close gas-tight joint therewith. An annular passage 11 is formed in the surface of the tip and the walls of said socket between the shoulder 10 and the threaded

portion of the tip end and this passage communicates with the acetylene gas passage 3 when the tip is mounted in its place in the head.

The end 8 has a socket therein to receive the exteriorly threaded plug 12 which has a central passage 13 communicating with the oxygen passage 4. The socket in the end 8 has a tapered inner portion 14 and a plug 12 has a tapered mixing nozzle 15 to fit the socket 14 and an extension 16 of the passage 13 preferably similar in cross section communicates with the said passage and extends through the nozzle 15 to a centrally arranged duct 17 formed in the tip 7, a gas passage being formed between the surface of the nozzle 15 and the wall of the socket 14 which communicates through ports 18 with the annular passage 11 and thereby the acetylene gas may flow from the passage 11 through the ports 18 and be discharged into the duct 17 at the apex of the plug 12 or the point where the oxygen is delivered to said duct. The walls of the nozzle 15 taper to a comparatively thin edge and at the point where the acetylene gas mixes with the oxygen the walls of the nozzle are so thin that there will be no opportunity for eddies or whirls of gas to form or collect at this point and retard the velocity of the gas through the tip or burn out or cause damage to the nozzle which frequently does happen when this nozzle is formed with a blunt end or has thick walls between its duct and the outer surface and a flash back occurs. The tip is provided with the usual surface 19 for the application of a wrench thereto. When the tip is removed from the head, the plug 12 will be detached also and may be adjusted back and forth in the end of the tip should any change of its position seem necessary or advisable.

In Figure 3 I have shown an enlarged detail view of the mixing nozzle, illustrating how the walls of this nozzle taper to a comparatively thin edge at the point where the mixture between the oxygen and acetylene gas takes place. I have found by actual test that a mixing nozzle with a blunt end will cause the formation of eddies of gas at the end of the tip and retard the velocity to such an extent that a flashback or ignition of gas at the end of the mixing nozzle will take place. This not only will prevent the use of the torch, but in a short

time will damage or destroy the tip of the mixing nozzle. By bringing this tip down to a thin edge I have eliminated the danger of flashbacks and the delay in the work and the damage to the torch incidental thereto.

I claim as my invention:

1. In combination, a head having at its inner end a socket and oxygen and acetylene passages therein leading to the socket, a tip in said socket, said tip having therein a socket cylindrical in shape at its base and merging into a conical wall, a plug in the tip cylindrical at its base and terminating in a cone within the conical wall of the tip with an annular space between the conical end of the plug and the conical wall of the socket there being also an annular space between the walls of the socket in the head and the tip, and ports through the tip connecting said annular spaces, the conical annular space between the plug and the tip merging into a port incident to the outer end of the tip, said plug having an oxygen passage extending through it and terminating at the inner end of said port.

2. In combination, a head having therein a socket with oxygen and acetylene passages leading to said socket, a tip in said socket and in turn having a socket therein terminating in a conical wall, a plug having a longitudinal passage therethrough and a conical end adjustable in the tip socket to leave an annular space between the conical end of the plug and the conical wall of the tip socket, said tip also having ports leading from said conical space to the head socket and to the outer end of the tip as described.

3. In combination, a head having at its

inner end a screw-threaded socket and oxygen and acetylene passages leading to the socket in the head, a tip screw-threaded in said socket, said tip having therein a socket cylindrical in shape and screw-threaded at its base and merging into a conical wall, a plug in the tip cylindrical and screw-threaded at its base and terminating in a cone within the conical wall of the tip with an annular space between the conical end of the plug and the conical wall of the socket, there being also an annular space between the inner walls of the socket in the head and the tip, and ports through the tip connecting said annular spaces, the conical annular space merging into a port extending to the outer end of the tip and said plug having an oxygen passage extending longitudinally through it to the inner end of said port.

4. In combination a head having therein a screw-threaded socket with oxygen and acetylene passages in the head leading to said socket, a screw-threaded tip in said socket and in turn having a screw-threaded socket therein terminating in a conical wall, a screw threaded plug having a longitudinal passage therethrough and a conical end adjustable in the tip socket to leave an annular space between the conical end of the plug and the interior conical wall of the tip socket, said tip also having ports leading from said conical space to the head socket and to the outer end of the tip as described.

In witness whereof, I have hereunto set my hand this 28th day of April 1919.

ELMER H. SMITH.