J. C. THEBERATH.

WELDING TORCH.

APPLICATION FILED MAR. 29, 1919.

1,418,688. Patented June 6, 1922.

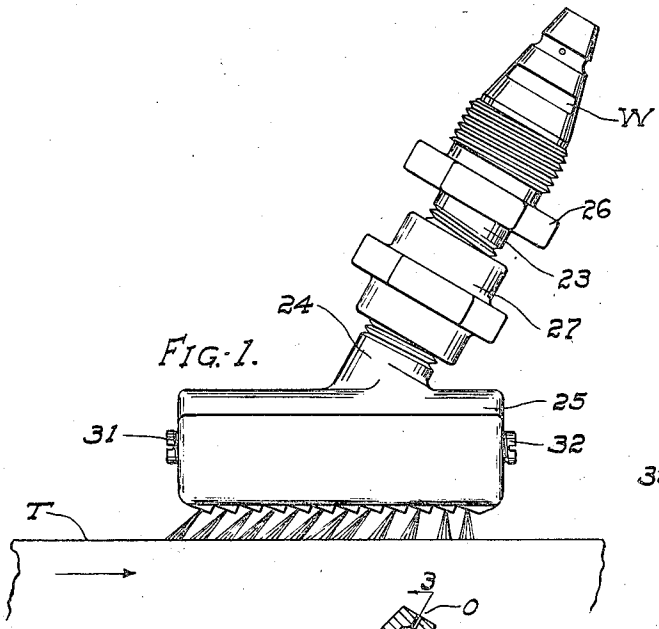


FIG. 1.

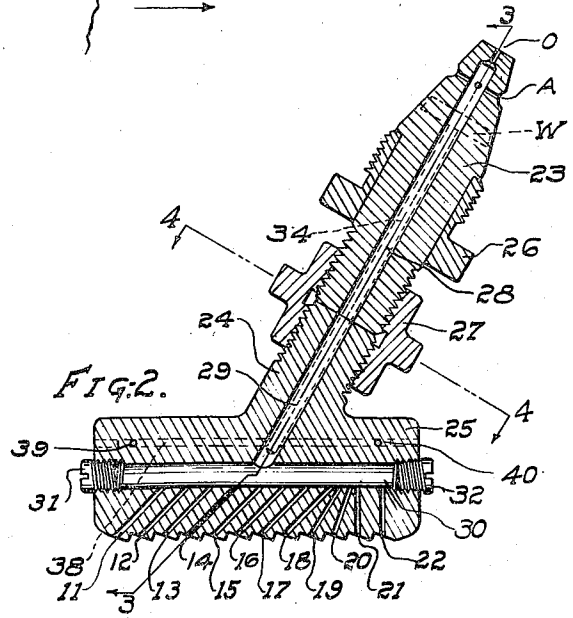


FIG. 2.

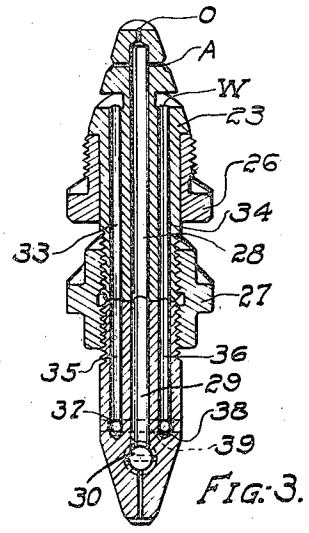


FIG. 3.

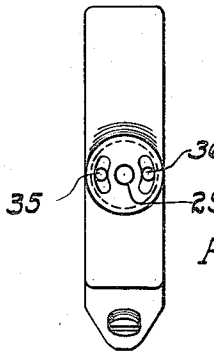


FIG. 4.

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WELDING TORCH.

1,418,688. Specification of Letters Patent. Patented June 6, 1922.

Application filed March 29, 1919. Serial No. 286,189.

To all whom it may concern:

Be it known that I, JOSEPH C. THEBERATH, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Welding Torches, of which the following is a specification.

The present improvements relate to torches of the so-called oxy-acetylene type, for welding, and especially to the tips for the same. These torches are adapted to fit in a socket of standard form, and to mix and conduct the gases to the point of flame, and to conduct water or other cooling fluid to a point as near as possible to the flame, in order to maintain a low temperature of the torch structure and gases, and thus prevent backfire. It is desirable to make such torches with the tip removably attached to a holder, so that a relatively small structure need be removed when it is necessary to clean the openings or change the structure of the flame, and so that it is possible to avoid the troublesome fitting together of the conical end of the holder in its socket in order to secure proper alignment of the various passages and a tight fit between the parts.

In this type of tip, as at present constructed, the length of the flame is limited by the diameter of the holder, as the tips are made of generally cylindrical form for attachment thereto.

One object of the present invention is to provide a tip extended along the line of the weld, so that sufficient jets of flame may be arranged to properly pre-heat the work before it arrives at the point of welding; and to provide a structure which can be formed with an unlimited number of discharge orifices, which may be inclined to vary the heating effect, or made perpendicular to the work to obtain a puddling effect, as desired. Another object is the provision of a longitudinal passage or bore, whereby the pressure at the various jets is equalized and through which access may be had to the ends of the discharge orifices, for cleaning.

A further object is to provide means for cooling said tip, by providing passages therein for conducting a cooling fluid; and a still further object is to provide a holder so constructed that it will have the conical end for attachment to a socket member of standard form, and will be adapted to make similar connections at the other end to a tip, and conduct mixed gases to said tip and water or some other cooling fluid to and from said tip, but will be so constructed that the tip may be rigidly connected to it and readily and quickly detached therefrom.

Other objects and features of novelty will be apparent from the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of the tip and its holder;

Figure 2 is a central longitudinal section thereof;

Figure 3 is a section on the line 3—3 of Figure 2 and

Figure 4 is a perspective view of the tip looking from the line 4—4 of Figure 2.

The torch and tip herein described are especially adapted for welding a longitudinal seam as, for instance, in tubing which is preliminarily formed and passed under the torch. The strip metal ordinarily passes from a roll through several dies or rolls, which shape it into a tube, the seam edges of the tube being presented along a line at the top of the tube, and means being provided for exerting a lateral pressure to weld these edges when the metal is properly heated. It is desirable to pre-heat the work, so as to gradually bring it to the required temperature, especially when welding a thick seam, to make sure that the metal is thoroughly heated through, and to increase the speed of the work. It is necessary at times to use only a few jets, but to have them relatively widely spaced along the seam, when the speed of the work may be greatly increased and thorough heating assumed. It is further desirable to incline certain of the jets relatively to the work for pre-heating, so that the flame will be projected along the seam and a larger heating surface obtained, the jets near the point of welding being perpendicular to the work, to obtain a heating effect more extensive in depth and a stirring or puddling of the molten metal. To obtain these ends, the torch tip is extended along the seam, as shown in Figure 1, the work, indicated at T, moving in the direction of the arrow from the toe to the heel of the tip. The discharge orifices 11 to 18 are inclined toward the toe of the tip and are preferably parallel, the orifices 19 and 20 being successively less inclined, to

maintain the continuity of the flame, and the last two orifices 21 and 22 being formed without inclination, so as to direct their jets perpendicularly to the work, to obtain the deep heating and puddling effects described. As the character of the work changes, and it is desired to modify the number or position of jets, without changing the tip, in order to reduce the extent of the pre-heating or puddling flame, or to maintain the extent of the flame but lower its intensity, certain of the discharge orifices may be plugged with copper.

As shown in the drawings, the structure embodying my invention comprises a holder 23, formed at its upper end with a conical surface to fit in the usual socket member, well known in the art and constructed as shown in my prior Patent, No. 1,264,581, issued April 30, 1918. At its lower end, the holder is adapted for connection with the shank 24 of a removable torch tip 25, the connection being maintained between the holder and the socket member by a bushing 26, which screws into the socket member and bears against a shoulder on the holder 23. The shank 24 of the torch tip is rigidly connected to the holder by a coupling 27, one of the members and the corresponding part of the coupling being provided with reverse threads to permit proper alignment of the various openings in the abutting ends of the members, when the parts are assembled. The body of the tip 25 is preferably extended angularly, as shown in Figures 1 and 2, with respect to the shank 24, and preferably in both directions therefrom and the lower face of the body is serrated, the teeth being preferably of uniform shape and size, and in the forward faces of these teeth, the discharge orifices 11 to 22 are formed.

The holder 23 is formed with an axial mixing chamber 28 into which the different gases are admitted through the openings O and A, and the mixing chamber is extended by forming a similar axial opening 29 in the shank 24. At its lower end, this opening 29 connects with a passage or bore 30 extending longitudinally through the tip 25 and furnishing a common connecting passage for supplying the discharge orifices 11 to 22. The ends of the port 30 are closed by plugs 31 and 32, which may be removed when it is desired to have access to the ends of the discharge orifices for cleaning them.

The conical end of the holder 23 is provided with slots, as shown at W, to permit water or some other cooling fluid, to circulate through the structure. Connecting with these slots, passages 33 and 34 are formed in the holder and similarly positioned passages 35 and 36 are formed in the shank of the tip, these passages being widened slightly at the abutting faces of the holder and shank, as shown in Figure 4, to facilitate assembly. The passages 35 and 36 in the shank connect at their lower ends with passages 37 and 38, which extend adjacent to passage 30 and parallel therewith, and are connected near each end of the tip by cross passages 39 and 40. The cooling fluid can thus be conducted from one slot W through passages 33 and 35 until it meets passage 37, where the current divides, part going forward and across through passage 39 and part going to the rear and through passage 40, the two currents uniting on the opposite side and ascending through passages 36 and 34 to the other slot W. By passing water through the body of the tip, the latter is maintained at a low temperature, and backfire is effectively prevented.

While I have illustrated and described a preferred form of structure embodying my invention, it will be understood that changes may be made in the details of construction, without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim is:

1. In apparatus of the class described, a torch tip comprising a shank for attachment to a holder and having a fuel conducting passage therein, an extended body integral with said shank and having an opening extending therethrough which communicates with the passage in the shank and discharge orifices leading from said opening, and means for closing the ends of the opening.

2. In apparatus of the class described, a torch tip consisting of an elongated body having a shank projecting from one side thereof, said body having an opening extending longitudinally therein, said shank having a fuel conducting passage therein communicating with said opening, and a plurality of discharge orifices arranged in the same plane and connected with said opening, but extending at different angles thereto.

3. In apparatus of the class described, a torch tip consisting of an elongated body having a shank projecting from one side thereof, said body having an opening extending longitudinally therein, said shank having a fuel conducting passage therein communicating with said opening, and a plurality of discharge orifices arranged in the same plane and connected with said opening, and extending at different angles thereto, the acuteness of said angles decreasing from one end of the body to the other.

In testimony whereof I affix my signature.

JOSEPH C. THEBERATH.