Nov. 17, 1931. A. J. FAUSEK ET AL 1,832,623

WELDING TORCH

Filed June 17, 1929

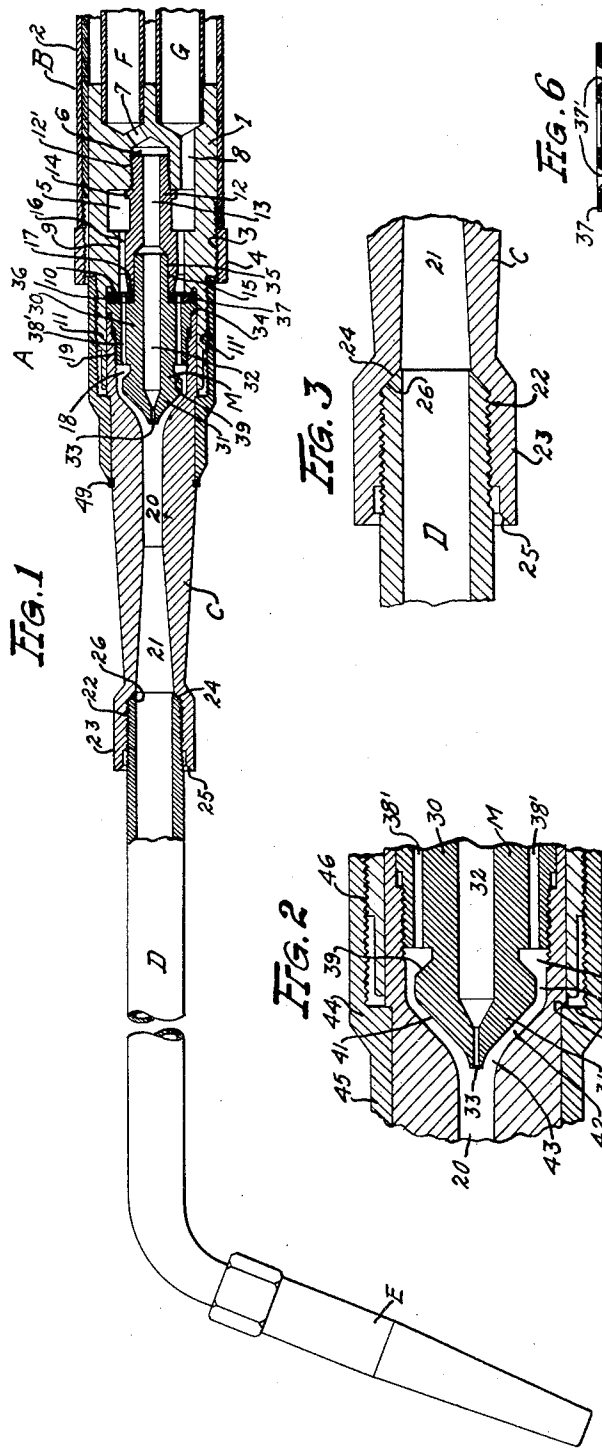


FIG. 1

FIG. 2

FIG. 3

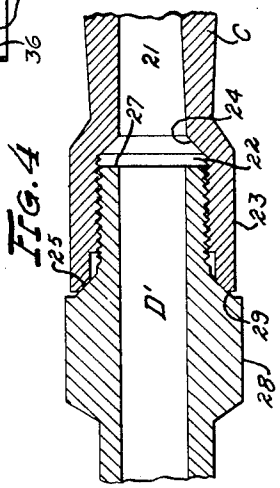


FIG. 4

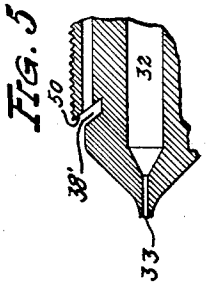


FIG. 5

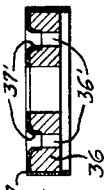


FIG. 6

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WELDING TORCH

Application filed June 17, 1929. Serial No. 371,311.

This invention relates generally to torches of the type employed for utilizing oxygen-acetylene and other gases as a flame producing medium for welding metals, and more specifically to an improved apparatus of this type which includes as a part thereof a mixer of improved construction which functions with greater efficiency than did the mixers formerly employed in welding torches, the predominant object of the invention being to provide a welding torch with improved gas mixing means whereby the gases which are commingled to produce the combustible mixture may be readily and completely admixed at the mixer of the torch.

Another object of the invention is to provide a welding torch with a mixer shell which is so constructed that torch attachments of different types may be associated with said mixer shell.

Figure 1 is a fragmentary view, partly in side elevation and partly in longitudinal section, showing our improved welding torch.

Figure 2 is an enlarged fragmentary section of the portion of the torch illustrated in Figure 1 adjacent to the discharge end of the mixer.

Figure 3 is an enlarged fragmentary sectional view of the forward end portion of the mixer shell showing one type of torch attachment in association therewith.

Figure 4 is a view similar to Figure 3 but showing another torch attachment associated with the mixer shell.

Figure 5 illustrates a modified form of the invention.

Figure 6 illustrates a detail of the gasket structure of the torch.

In the drawings, wherein is shown for the purpose of illustration merely one embodiment of the invention, A designates our improved welding torch which comprises a handle portion B, a mixer shell C and a forward tube D to which a nozzle E is attached in the usual manner. The handle portion B includes a handle head 1 which is located at the forward end of said handle portion. Gas tubes F and G are extended longitudinally of the handle porion B, said gas tubes being disposed within a sleeve 2 which likewise extends longitudinally of the handle portion of the torch and constitutes the handle of the torch. The handle head 1 is provided with recesses into which the forward end portions of the gas tubes F and G extend and in which said tubes are securely fixed, and said handle head is externally screwthreaded as indicated at 3. 4 designates an internally screwthreaded ring which is screwed on the externally screwthreaded portion 3 of the handle head 1, said ring being arranged to abut against the forward end of the sleeve 2 for the purpose of maintaining said sleeve in place.

Formed in the approximate center of the handle head 1 is a space 5 which communicates with a screwthreaded opening 6, said screwthreaded opening being in turn arranged in communication with the tube F by a passageway 7. Also the tube G is arranged in communication with the space 5 by a gas passageway 8.

Forwardly of the space 5 the handle head 1 is provided with a centrally disposed opening 9 and forwardly of this opening 9 the handle head is provided with a raised seat 10. The seat 10 is located at the inner end of a tubular portion 11 of the handle head which is extended longitudinally of the torch and forwardly from the main body portion of the handle head 1. The tubular portion 11 is provided with external screwthreads 11′ for a portion of its length as shown in Figure 1.

12 designates a member (Figure 1) which is disposed within the handle head 1, said member having a screwthreaded end portion 12′ which is screwed into the screwthreaded opening 6 within the handle head. The member 12 is provided with a passageway 13 extended longitudinally therethrough and said member is provided with a flange 14 adapted to contact with a wall of the space 5 whereby movement of the member 12 rearwardly with respect to the handle head 1 is limited. At its forward end the member 12 is of enlarged diameter and the passageway 13 through said member is likewise enlarged

within the enlarged end portion of the member as indicated at the point designated by the reference character 15. The enlarged end portion of the member 12 is provided with radial ribs 16 which extend outwardly from the outer face of said enlarged end portion, the outer ends of said radial ribs being arranged in contact with the wall of the space 9. Because of this arrangement the spaces between the radial ribs 16 are constituted gas passageways the inner and outer walls of which are the wall of the opening 9 within the handle head and the outer surface of the enlarged portion of the member 12 respectively. The forward end of the member 12 tapers slightly as shown in Figure 1 and the extreme outer edge of said tapered portion provides a seat 17 which is alined transversely of the torch with the seat 10 already referred to.

The mixer shell C of the torch illustrated in Figure 1 is of greater diameter at the rear end portion of said mixer shell than at the front portion thereof, and said rear portion of said mixer shell is provided with an enlarged recess 18 which is provided with screwthreads 19. At the forward end of the recess 18 the diameter of the opening tapers to a relatively small passageway 20 which is extended longitudinally through a portion of the mixer shell. Forwardly of the passageway 20 the opening through the mixer shell C tapers to a larger diameter as indicated at 21 in Figure 1 and this tapered portion of the opening communicates with a screwthreaded recess 22 formed in the enlarged forward portion 23 of the mixer shell. The enlarged forward portion 23 of the mixer shell is provided at its inner end with a tapered seat 24 and at its outer end the recess 22 is provided with a second tapered seat 25.

The tapered seats 24 and 25 are employed to permit of gas tubes of different types being associated with the mixer shell C; that is to say a tube D such as that illustrated in Figures 1 and 3 may be associated with the mixer shell and when this type of tube is employed the screwthreaded end portion of said tube is screwed into the screwthreaded recess 22 within the enlarged end portion 23 of the mixer shell until the tapered face 26 at the extreme end of the tube D contacts with the tapered seat 24 at the inner end of the recess 22. Such contact between the tapered face 26 and the tapered seat 24 will provide a fluid tight joint between the tube D and the mixer shell C. Also instead of a tube such as that illustrated in Figures 1 and 3 we may associate a tube such as the tube D′ illustrated in Figure 4. This tube is provided with a flat face 27 at the extreme end thereof and said tube is provided with an enlarged portion 28 having a tapered annular face 29. The screwthreaded end portion of the tube D′ is screwed into the screwthreaded recess 22 in the enlarged end portion of the mixer shell until a fluid-tight joint is obtained between the tube and the mixer shell by the annular tapered face 29 on the tube contacting with the tapered seat 25 at the outer end of the recess 22.

Screwed into the enlarged recess 18 at the rearmost end of the mixer shell C is the mixer M of the torch A, said mixer comprising a body portion 30 and a head portion 31. The mixer M is provided with a gas passageway 32 which extends longitudinally therethrough from end to end thereof and at the forward end of the head portion 31 of the mixer the passageway 32 tapers to a relatively small orifice 33. The body portion 30 of the mixer is provided with external screwthreads which engage the screwthreads within the recess 18 and also said body portion is provided with a shoulder 34 which abuts against the rearmost end of the mixer shell. At the end of the mixer opposite to the end thereof at which the head portion 31 is located said mixer is provided with an extension 35 which extends into the opening 15 at the forward end of the member 12, and at the rearmost end of the body portion 30 of the mixer said mixer is provided with a gasket 36 and a gasket shell 37 formed of suitable soft metal, which gasket shell encloses and protects the gasket 36. 38′ designates a plurality of gas passageways which pass through the body portion of the mixer and through the gasket and gasket shell, said passageways being extended longitudinally of the mixer and communicating at their rearmost ends with the spaces between the radial ribs 16 on the member 12.

At the inner end of the head portion 31 of the mixer, said mixer is provided with an annular groove 38, the forward wall 39 of which is inclined as illustrated in Figures 1 and 2. Also the outer face of the head portion 31 of the mixer M is spaced from the wall of the recess 18 to provide an annular gas passageway 40 which communicates with the annular groove 38, and the tapered outer surface 41 of the forward portion of the head portion 31 is spaced from the wall of the opening through the mixer shell C to provide an annular gas passageway 42 which communicates with the gas passageway 40 and the opening 20 through the mixer shell. It will be noted that the annular gas passageway 42 is of constant width until same approaches the forward end of the mixer where said gas passageway is increased slightly in width as at 43. This increased width of the gas passageway 42 serves an important function which will be hereinafter set forth.

44 designates a nut which serves as the means for attaching the mixer shell C to the handle head 1, said nut having a tubular forward portion 45 which encircles the mixer

shell and an internally screwthreaded portion 46 which is adapted to be screwed on the externally screwthreaded tubular portion 11 of the handle head 1 to draw the gasket shell 37 into close contact with the seats 10 and 17. The nut 44 is provided with a shoulder 47 which engages a shoulder 48 on the mixer shell, and a ring 49 associated with the mixer shell abuts against the forward end of said nut.

In the use of our improved welding torch gas, oxygen for instance, under low pressure passes through the tube F and passageway 7 into the opening 13 within the member 12 and from said opening 13 to the passageway 32 formed through the mixer M, said gas being ejected forcibly from the restricted orifice 33 at the forward end of the mixer. The forcible discharge of gas from the orifice 33 will serve to draw the other gas, acetylene for instance, which is combined with the oxygen to produce a combustible mixture from the tube G, through the passageway 8, space 5, the spaces between the radial ribs 16, and passageways 38′ into the annular groove 38, and through the passageways 40 and 42 to the discharge end of the mixer M where the oxygen and acetylene is thoroughly mixed to produce a combustible mixture.

It will be noted that all of the faces at the head portion 31 of the mixer which are encountered by the acetylene on its way to the discharge of the mixer are inclined in the direction of flow of the acetylene. In other words, no abutments are present in the path of travel of the acetylene which would interfere with the free flow of said acetylene. This is an important feature of the invention as acetylene has viscosity which causes it to adhere to walls of passageways through which it passes, hence by providing a mixer which is free from all obstructions which would tend to interfere with the free movement of the acetylene a more efficient torch is provided. Also because of the greater width of the passageway 42 as indicated at the point designated by the reference character 43 a sufficient volume of acetylene is provided at the point where the mixing of the gases takes place. It will be noted also that there are no sharp corners on the surface of the head portion of the mixer or on the adjacent wall of the opening formed through the mixer shell, these surfaces being provided with graceful curves which will induce free movement of the acetylene in contact therewith.

In the form of the invention illustrated in Figures 1 and 2, the rearmost wall of the annular groove 38 is arranged at an approximate right angle to the axis of the mixer. In the form of the invention shown in Figure 5, however, the rear wall 50 of the annular groove 38′ is approximately parallel with the inclined forward wall of said annular groove.

It has been found in the actual use of our improved torch that the length of the passageways 42—43 prevents back-firing of the torch, said length of said passageways preventing the formation of eddy currents which if produced would result in back-firing of the torch. Also to prevent back-firing of the torch the width of the passageways 42—43 must be proportionate to the length of said pasageways.

In Figure 6 we illustrate our improved gasket structure in which view the apertures 36′ formed through the gasket 36 and gasket shell 37 are clearly shown. In the assembled torch these apertures register with the gas passageways 38′ formed through the mixer M and to prevent burning out of the gaskets 36 at the walls of the apertures 36′ we turn portions 37′ of the metal of which the shell 37 is formed inwardly as shown in Figure 6 so as to provide linings for the apertures 36′. In this manner metal linings for the apertures 36′ are provided at practically no increase in the cost of production of the gaskets as the holes through the gasket shell would have to be cut anyway, and the only additional labor involved is in turning the metal inwardly into the apertures 36′ instead of entirely removing said metal from the gasket shell.

We claim:

1. In an apparatus of the class described a handle portion, a gas tube having a nozzle associated therewith, a mixer shell interposed between said handle portion and said gas tube, and a mixer supported within said mixer shell, said mixer shell being provided with an opening formed longitudinally therethrough and said mixer having a head portion the outer surface of which is spaced from the wall of said opening through the mixer shell to provide a gas passageway, the junctions between all portions of said passageway which are disposed at angles with respect to each other being in the form of curves, and said passageway being provided with a tapered portion to produce a portion of increased width adjacent to the discharge end of the mixer shell.

2. In an apparatus of the class described a handle portion, a gas tube having a nozzle associated therewith, a mixer shell interposed between said handle portion and said gas tube, a mixer supported within said mixer shell, said mixer shell being provided with an opening formed longitudinally therethrough and said mixer having a head portion the outer surfaces of which is spaced from the wall of said opening through the mixer shell to provide a gas passageway, said mixer being provided with an annular groove at the inner end of the head portion thereof into which

gas ports formed in the mixer lead, and an inclined face at a wall of said groove.

3. In an apparatus of the class described a handle portion, a gas tube having a nozzle associated therewith, a mixer shell interposed between said handle portion and said gas tube, a mixer supported within said mixer shell, said mixer shell being provided with an opening formed longitudinally therethrough and said mixer having a head portion the outer surface of which is spaced from the wall of said opening through the mixer shell to provide a gas passageway, said mixer being provided with an annular groove at the inner end of the head portion thereof into which gas ports formed in the mixer lead, and an inclined face at a wall of said groove against which gas is directed by said gas ports.

4. In an apparatus of the class described a handle portion, a gas tube having a nozzle associated therewith, a mixer shell interposed between said handle portion and said gas tube, a mixer supported within said mixer shell, said mixer shell being provided with an opening formed longitudinally therethrough and said mixer having a head portion the outer surface of which is spaced from the wall of said opening through the mixer shell to provide a gas passageway, the junctions between all portions of said passageway which are disposed at angles with respect to each other being in the form of curves, said mixer being provided with an annular groove at the inner end of the head portion thereof into which gas ports formed in the mixer lead, and an inclined face at a wall of said groove against which gas is directed by said gas ports.

5. In an apparatus of the class described a handle portion, a gas tube, a nozzle associated with said gas tube, and a mixer shell interposed between said gas tube and said handle portion, said mixer shell being provided with a screwthreaded recess at one end thereof, and tapered, annular seats at the opposite ends of said recess with which correspondingly shaped faces on gas tubes are caused to contact to provide fluid-tight joints between said gas tubes and said mixer shell.

6. In an apparatus of the class described a handle portion, a gas tube having a nozzle associated therewith, a mixer shell interposed between said handle portion and said gas tube, said mixer shell being provided with an enlarged portion at one end thereof within which a screwthreaded recess is formed, tapered, annular seats at the opposite ends of said recess with which correspondingly shaped faces on gas tubes are caused to contact to provide fluid-tight joints between said gas tubes and said mixer shell and an annular depression formed in the wall surrounding said screwthreaded recess adjacent to one of said tapered, annular seats.

7. A torch including a mixer having a plurality of gas passageways formed therethrough, a torch portion with which said mixer cooperates, a gasket interposed between said mixer and said torch portion, and a gasket shell arranged in contact with one face and the edge only of said gasket in a manner to protect same, said gasket and said gasket shell being provided with registering apertures which are alined with said plurality of gas passageways formed in said mixer and material of which said gasket shell is formed being turned inwardly into the apertures formed through the gasket a portion of the depth only thereof to provide linings for said apertures formed through said gasket.

8. A torch including a mixer having a plurality of gas passageways formed therethrough, a torch portion with which said mixer cooperates, a gasket interposed between said mixer and said torch portion, and a metal gasket shell arranged in contact with one face and the edge only of said gasket in a manner to protect same, said gasket and said gasket shell being provided with registering apertures which are alined with said plurality of gas passageways formed in said mixer and material of which said gasket shell is formed being turned inwardly into the apertures formed through the gasket a portion of the depth only thereof to provide linings for said aperture formed through said gasket.

In testimony whereof we have hereunto set our hands.

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