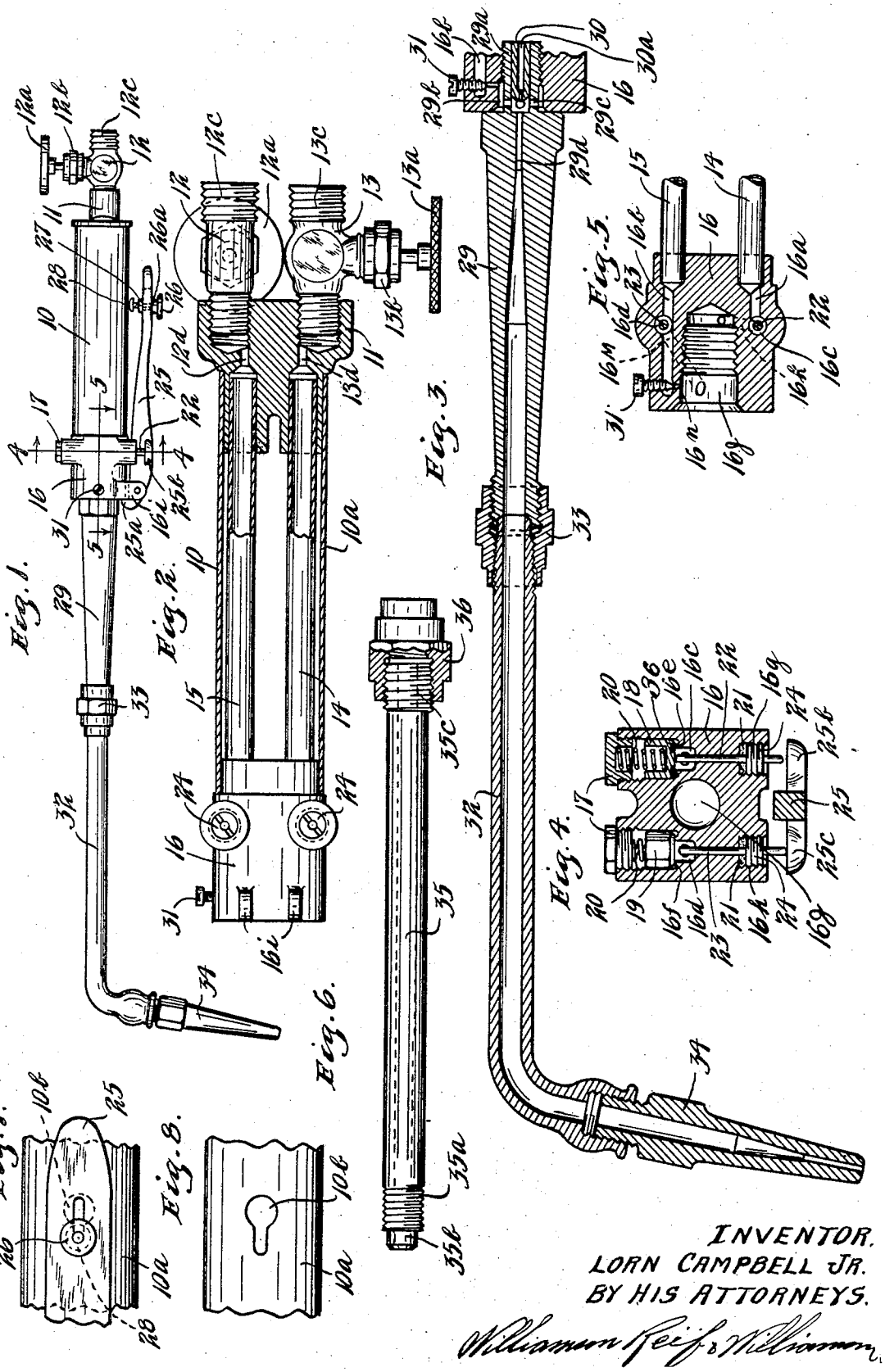
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WELDING TORCH

Filed April 18, 1929



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WELDING TORCH

Application filed April 18, 1929. Serial No. 356,271.

This invention relates to a welding torch. Such torches are now quite extensively used for a great variety of welding operations and the same employ a combustible gas and a combustion supporting gas which are mixed or co-mingled and burned at the tip or nozzle of the torch. The combustible gas now commonly used is acetylene and the combustion supporting gas used is oxygen. These gases are now commercially supplied in metal cylinders and the oxygen is under great pressure (2,000 pounds). The acetylene gas is rich in carbon and when burned in air alone in any volume there is not enough oxygen in the air to effect complete combustion so that immense clouds of soot form which are extremely objectionable and disagreeable. In order to properly burn the acetylene or to have complete combustion thereof it is necessary to have two and one-half parts by volume of oxygen to one part of acetylene. The oxygen added to the acetylene in the operation of the torch results in complete combustion and greatly increases the heat and flame propagation. If pure acetylene is used and ignited, a flame is generated which will travel approximately at the rate of 100 feet per second. If equal parts of acetylene and oxygen are ignited, a flame will be generated which will travel approximately at the rate of 330 feet per second and if the oxygen is increased in volume a much higher flame propagation or travel results. Care must therefore be exercised in the handling of the gases and in the design of the torch to prevent the flame from popping back through the torch from the flame at the tip. This popping back or back fire of a torch has been common in the previous torches and is very objectionable.

It is desirable in such a torch to reduce the flame when the use of the torch is temporarily discontinued. If the torch is laid down with the full flame burning there is a great waste of fuel and great danger of damage being done by the flame. If the flame is entirely extinguished, it is necessary and troublesome to light the torch every time its use is to be continued. Some torches have been designed wherein the volume of acetylene and oxygen have both been partially reduced through the action of a manually operated valve. It is not possible with such an arrangement, however, to insure only a small shutting off of acetylene gas without having some oxygen added thereto in order to complete the combustion. If no oxygen is added the objectionable clouds of soot will immediately appear. Such a reduction therefore of the flame from the mixed gases is not only wasteful of gas but is so difficult to maintain in proper adjustment as to be practically impossible in practice. Such structures usually involve a plug valve intersecting both of the passages for the two gases. If such a plug valve is sufficiently tight to properly separate the gases it will not turn freely and if constructed to be loose enough to turn freely in operation the gases will leak past the valve and unite forming an explosive mixture in the torch, which is very dangerous to the operator on account of the possibility of a back fire. For this reason it is better to entirely cut off the supply of oxygen and to depend on a small continually burning or pilot flame of minute size formed by the acetylene.

It has heretofore been proposed to construct a torch having the mixing chamber in the head or tip part of the torch and the control means for the supply of gas in the handle of the torch. With such an arrangement it has been found in practice that when the gases are turned on by the control means the oxygen being under much higher pressure than the acetylene, will reach the mixing chamber and end of the nozzle or point of ignition of the torch before the increased supply of acetylene and will blow out the pilot flame. Either this will happen or if the oxygen predominates in the mixed gases the flame propagation is increased and when such a mixture reaches the pilot flame it necessarily pops back to the point of mixture where the oxygen first meets the acetylene and combustion continues in the mixing chamber until the gases are shut off.

It is extremely important in order to have a proper operation of the torch that the oxygen and acetylene be correctly proportioned. This proportioning is done by the regulating

valves. These valves must be capable of very fine adjustment. The flame for proper welding is well known and defined and it is important that this particular flame be obtained. There is adjacent the tip of a torch a cone in the flame which has substantially parallel sides and has a rounded end. This is called the neutral flame and results from equal parts of acetylene and oxygen supplied by the torch, a volume of oxygen equal to one end one-half times the volume of acetylene being supplied from the atmosphere to provide perfect combustion of the acetylene. This flame is characteristic of the oxy-acetylene art and differs vastly from that of a blow pipe using city gas and compressed air commonly employed for hard and soft soldering as in the jewelry art. If there is a minute excess of acetylene in the gas at the tip a carbonizing flame results and this can be detected by the fact that the said cone has a feathered edge at its rounded end. Such a flame introduces carbon into the weld made by the torch, making the metal hard and much more liable to break. Such metal is also difficult to machine. If there is an excess of oxygen in the gases the said cone has a decided pointed shape. Such a flame oxidizes the metal being welded and this is quite objectionable. Some operators can do good welding if they have the flame properly adjusted for them, but are not good at adjusting the flame. It is most desirable in a torch therefore to be able to extinguish and reproduce the flame and at the same time maintain the adjustment once the adjustment has been made so that the adjustment does not have to be made each time the torch is put into operation. With such a torch a firm can have one good man to adjust the flames and the other men can use the torches for welding.

It is also very desirable to have the mixing chamber or place where the gases unite and are co-mingled at a considerable distance from the tip. This acts to greatly reduce the possibility of a back fire as the flame has a much longer distance to travel from the nozzle back to the mixing chamber. Also with a torch having the mixing chamber adjacent the tip, the adjustment of the gases will vary when the torch is cool and when it is quite hot after having been used for some time. As will be readily understood, there is an immense heat developed at the tip of the torch and this heat affects the end portions of the torch both by radiation and by convection from the tip. If the mixing chamber is adjacent the tip it will be heated and the oxygen will be heated and expanded and a lesser amount of oxygen will be furnished thus interferring with the proper proportioning of the gases. It may be stated that in order to withstand the heat at the tip, which is much more than sufficient to melt steel, the tips are usually made of copper on account of its great conductive properties.

It is an object of this invention, therefore, to provide a torch having means to properly control the gases so that the flame will be shut off when the use of the torch is temporarily discontinued and a small pilot flame will be maintained at the tip of the torch.

It is another object of the invention to provide a control means for the supply of the combustible gas and the combustion supporting gas so that the supply of the latter at the point of ignition will be cut off before the supply of the former is greatly reduced.

It is a further object of the invention to provide such a control means, as just set forth, which will further act to increase the supply of the combustible gas and restore the same practically to full volume before the supply of the combustion supporting gas is fully restored to a full supply when the use of the torch is again continued.

It is a further object of this invention to provide a torch in which a mixing head, so-called, is eliminated, and in which a mixing chamber is provided in the handle of the torch adjacent the control means.

It is also another object of the invention to provide a torch in which the mixing chamber is located remote from the tip of the torch.

It is still another object of the invention to provide a torch having the usual regulating means for the proportionate supply of the two gases and in addition, having control means for positively shutting off the supply of the combustion supporting gas and shutting off all but a small amount of the combustible gas.

It is still another object of the invention to provide a torch having a regulating means for the amount of the combustible gas which is supplied while the supply of combustion supporting gas is shut off.

It is also an object of the invention to provide a torch so constructed that when a back fire does occur from abnormal operating conditions the torch can be readily extinguished and operation thereof resumed without appreciable loss of time and without the necessity of readjusting the flame.

It is a still further object of the invention to provide a torch having means for quickly shutting off the operation thereof and quickly resuming the same having a locking means by means of which the torch can be locked in operating position.

It is a further object of the invention to provide a torch having means by which the length thereof can be easily and quickly extended.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection

with the accompanying drawings in which like reference characters refer to the same parts throughout the different views, and in which:—

Fig. 1 is a view in side elevation of the torch;

Fig. 2 is a view of a portion of the torch, partly in plan and partly in horizontal central section;

Fig. 3 is a view in vertical section of the forward portion of a torch shown on an enlarged scale;

Fig. 4 is a view in vertical section taken on line 4—4 of Fig. 1 as indicated by the arrows;

Fig. 5 is a view in horizontal section taken on line 5—5 of Fig. 1 as indicated by the arrows;

Fig. 6 is a view partly in side elevation and partly in vertical section showing an extension member for the torch;

Fig. 7 is a bottom plan view of a portion of the hand lever used showing the locking mechanism, and

Fig. 8 is a bottom plan view of the body portion of the torch showing the locking feature.

Referring to the drawings, the torch comprises what may be called the handle or body portion 10. This portion comprises a cylindrical casing 10*a*, and has secured therein at its rear end the forward reduced cylindrical portion of an end member 11. Said end member has a portion disposed at the rear of casing 10*a* in the form of a flange from which projects a portion which is oblong in vertical cross section and has tapped holes therein into which are screwed the ends respectively of a pair of regulating valves 12 and 13 which project rearwardly from the torch. Said regulating valves have operating hand wheels 12*a* and 13*a* respectively, the stems of which are tightly packed by the packing nuts or glands 12*b* and 13*b* respectively. Valves 12 and 13 have rearwardly projecting threaded portions 12*c* and 13*c* respectively adapted to receive connections leading to the supply of the gases. The gases are usually supplied in metal cylinders which are connected to the valves by suitable flexible hose members. The valves 12 and 13 must be provided with fine threads for their adjustment and must be capable of fine and accurate adjustment. The gases will leak past any ordinary threads. The valves must also remain with firmness in their adjusted position so that they will not be varied in position by the wheels 12*a* and 13*a* being struck against some object. The regulation of the flame on the torch is so delicate that the slightest change in position of one valve or the other will cause a variation in the character of the flame. Member 11 has parallel holes bored in its inner end into which fit respectively tubes 14 and 15 and small passages 13*d* and 12*d* lead respectively from the bottom of the tapped holes in the ends of member 11 to the tubes 14 and 15. Member 10*a* has secured therein at its forward end the reduced cylindrical portion of a valve carrying member 16. Member 16 has a pair of holes bored therein at its rear end into which are secured the front ends of tubes 14 and 15 respectively. Passages 16*a* and 16*b* lead forwardly in member 16 from the ends of tubes 14 and 15 respectively. These passages communicate respectively with passages 16*c* and 16*d* extending at right angles thereto in member 16. Cylindrical holes extend upward in member 16 from the passages or recesses 16*c* and 16*d* respectively which holes are threaded at their top portions to receive threaded and headed plugs 17, the heads of which are shown as hexagon in shape. Valve seats illustrated as narrow annular flanges 16*e* and 16*f* surround the upper portions of recesses 16*c* and 16*d* respectively with which cooperate the vertically movable valves 18 and 19 respectively. Said valves have hexagon shaped bodies which reciprocate in the cylindrical holes in member 16 above recesses 16*c* and 16*d*, and have yielding or resilient material 36 in their lower ends which engages and cooperates with the valve seats 16*e* and 16*f*. Compression coiled springs 20 are disposed in valves 18 and 19 and also received in the recesses in plugs 17 respectively, said springs acting to move the valves 18 and 19 downward to closed position. Member 16 has small holes formed therein extending downwardly axially of openings 16*c* and 16*d* and valves 18 and 19 and these holes are enlarged at their lower ends and interiorly threaded to form the openings 16*g* and 16*h*. Packing material 21 is disposed in the bottom of openings 16*g* and 16*h*, through which passes respectively a pair of plungers 22 and 23, which plungers also pass through the small openings in member 16 extending from recesses 16*c* and 16*d* to the openings 16*g* and 16*h*. Plungers 22 and 23 also pass through a pair of threaded plugs 24 which are threaded into the openings 16*g* and 16*h* respectively and engage and compress the packing 21. It will be noted that the plunger 23 extends downwardly below member 16 a greater distance than does the plunger 22. A lever 25 is disposed below members 10 and 16 and is pivoted adjacent its forward end to a pair of lugs 16*i* extending downwardly from member 16, said lever having an upwardly projecting portion 25*a* at its end adapted to engage the front end of member 16 to form a stop. Lever 25 has outwardly extending portions or lugs 25*b* and 25*c* having flat upper surfaces adapted to engage the lower end of plungers 22 and 23. As shown in Fig. 4, plunger 23 is normally quite close to lug 25*c* while plunger 22 is spaced a short distance from lug 25*b*. Plungers 22 and 23 normally contact the

lower central portions of valves 18 and 19 respectively and it will be seen that when the rear end of lever 25 is moved toward barrel 10*a*, said plungers will be lifted and said valves raised from their seats. Lever 25 has a slot extending longitudinally of its handle portion in which a stud 26*a* forming the shank of a button member 26 is slidable, said button member being disposed at the outer side of said lever. At its inner side shank 26*a* has secured thereto a small plate 27 from which projects a headed stud 28. Casing or barrel member 10 has a slot 10*b* therein which is substantially circular at one end and of a size to receive the head of member 28 and which slot has a narrow portion of a width to receive the shank of stud 28. When lever 25 is moved adjacent casing 10, the head of member 28 will enter the large portion of slot 10*b* and the button 26 can then be slid longitudinally of lever 25 so that the shank portion of member 28 will enter the narrow portion of slot 10*b*, the head of member 28 being thus within the barrel 10. The lever is then locked in position with the valves 18 and 19 open.

Block 16 has a central opening 16*j* at its forward end which is tapped at its rear end and adapted to have screwed thereinto the exteriorly threaded end 29*a* of a member 29 forming a mixing chamber. A small injector nozzle 30 is fitted centrally into the end of member 29*a* and has a small passage 30*a* leading centrally thereof terminating in a reduced forward portion communicating with a recess or chamber 29*b* in member 29 and in front of member 30. A plurality of holes 29*c* extend from chamber 29*b* outwardly and communicate with the opening 16*j*. A passage 16*k* leads from the recess 16*c* to the rear of opening 16*j* and, as shown in Fig. 3, this opening communicates with the passage 30*a*. Another passage 16*m* leads from the recess 16*d* to the forward part of opening 16*j* and this will communicate with the passage 29*c*. The oxygen passes through the valve 13, tube 14, passages 16*a* and 16*k* and through passage 30*a* and member 30, while the acetylene passes through valve 12, tube 15, passages 16*b* and 16*m* and through the openings 29*c*.

The passage 16*b* in member 16 is continued beyond the recess 16*d* which leads to the valve 19 and a small passage 16*n* extends therefrom into the forward portion of opening 16*j*. The outer end of passage 16*n* is formed as a valve seat with which cooperates the pointed end of a set screw 31. Member 29 has a passage 29*d* at its rear end communicating with chamber 29*b* which passage flares outwardly and continues through member 29 with a considerably larger diameter than the same has at the inner end of member 29. Member 29 at its outer end is exteriorly threaded with comparatively coarse threads, which in one embodiment in practice, have been made eleven to the inch. An extension or tip holding member 32 is provided exteriorly threaded at its inner end with comparatively fine threads, which in one embodiment in practice have been made twenty to the inch. The outer end of member 29 is provided with a rounded recess forming a seat into which the inner rounded end of member 32 fits. A coupling member 33 is provided threaded at its forward end to fit the threads on member 32 and at its rear end to fit the threads on member 29. Members 29 and 32 are thus coupled together with a tight joint when coupling member 33 is tightened. By having the differential threads on members 29 and 32 the joint can be tightened with member 32 and the tip carried thereby disposed at different angles relatively to member 29. The member 32 is of considerable length compared to the rest of the torch and the same carries a tip member 34 which is thus disposed at a point very remote from the mixing chamber at the inner end of member 29. Member 32 has a bore which is comparatively large and said member has an enlargement at its outer end with a terminal flange and is interiorly bored and threaded to receive the threaded end of the nozzle or tip member 34. It will be seen that the bore of tip 34 tapers from its inner end to its outer end, the top opening being comparatively small.

An extension member 35 is provided as shown in Fig. 6 comprising a section of tubing which will be provided with threads 35*a* at its inner end similar to the threads on the inner end of member 32, the inner end 35*b* of said extension also being rounded to fit within the end of member 29. The outer end of member 35 will have threads 35*c* thereon similar to the threads on the outer end of member 29. Another coupling member 36 similar to coupling member 33 will be provided, the inner end of which will engage the threads 35*c* and which will have threads at its other end to engage the threads on the inner end of member 32 when the extension 35 is used.

In operation the portions 12*c* and 13*c* of the torch will be connected to the hose lines extending to the supply of acetylene and oxygen respectively. The valve 12 will be opened to allow some acetylene to flow through the torch to the tip 34 and this will be lighted at the tip 34. The screw valve 31 will be opened very slightly to allow a small portion of acetylene to flow around the valve 19 so that it can always flow to the tip. This small portion of acetylene will provide the pilot flame. In adjusting the flame the lever 25 can be moved toward barrel 10 and locked in position by means of button 26 and the locking mechanism. The operator will now open the oxygen valve 13 and will

then manipulate the two valves 12 and 13 until the proper flame is secured at the tip 34. As previously explained, this flame is well defined and has a cone the sides of which are almost parallel and which has a rounded end. The valves 12 and 13 must be adjusted to a nicety and with great accuracy to produce the proper flame and when so adjusted must retain their adjusted position. When the flame is properly adjusted and the lever 25 is released, the springs 20 will close valves 18 and 19 and all oxygen will be cut off from passing to the tip and all acetylene will be cut off except the small portion which can pass valve screw 31. When the torch is to be again placed in operation or its use resumed, the operator merely grasps lever 25 with barrel 10 and lugs 25*b* and 25*c* lift the plungers 22 and 23 respectively opening valves 18 and 19. It will be seen that the valve 19 will be opened prior to the valve 18, hence plunger 23 will be first engaged by one of the lugs 25*c* and 25*b*. The acetylene is thus first admitted to the mixing chamber and allowed to flow to the tip. A short time after valve 19 is opened valve 18 is opened and oxygen is permitted to flow to the mixing chamber. If the oxygen were first admitted or if it were allowed to flow to the tip in a separate passage it would rush to the tip owing to the fact that it is under great pressure and would blow out the pilot flame. By allowing the acetylene to first pass to the mixing chamber the pilot flame will be built up by the acetylene and the oxygen is not permitted to rush to the tip and blow out the pilot. When the lever 25 is released, valve 18 will close before valve 19 can close and the supply of oxygen will thus be discontinued before the supply of acetylene is discontinued. There will thus be no chance for the oxygen to blow out the pilot and the small amount of acetylene will continue to burn with a minute flame. As above stated, the normal pilot flame is about the size of a small pea and the small amount of acetylene receives enough oxygen from the air to afford combustion and prevent the deposit of any appreciable amount of soot. The welding flame after once being adjusted is therefore maintained in applicant's torch and the use of the torch can be discontinued and the torch laid aside by merely releasing the lever 25. The flame is instantly reduced to the small pilot flame and when the operation of the torch is resumed by grasping the lever 25, the properly adjusted welding flame will again be reproduced without any further adjustment.

The gases after being mixed in member 29 pass into the bore 29*d* of said member and owing to the flaring or expanding shape of this bore, the gases will expand and pass through the larger passage in said member and member 32 thus providing for further co-mingling of the gases before they reach the tip. The length of the passage from the mixing chamber to the tip is again emphasized and this results in a great advantage in applicant's torch. This advantage is that back firing is largely eliminated, since the mixing chamber which is at the rear end of member 29, is far removed from the tip and there is small chance for the flame to pass back to the mixing chamber. The flame under ordinary operating conditions will not pass or flare back through the long passage from the tip to the mixing chamber to cause a back fire. Applicant's torch, therefore, not only provides for an easy and quick discontinuance of the welding flame and an easy and quick resumption thereof without losing the proper character of the flame, but also insures that under such operation and other normal operations the torch will not back fire.

In the welding operation the operator usually holds the torch in the right hand and places the flame against the desired parts, while with his left hand he holds a filler rod, which is melted at the end and used to supply additional metal needed for the weld. If the welding is being done in a confined location, the reflected and radiated heat will sometimes heat the tip to a red heat. The tip will also be heated red hot at times when the operator carelessly allows the tip to be placed down into the welding zone. When the tip becomes so abnormally heated the gases preignite before reaching the tip and the flame propagated will fire back or pop back to the mixing chamber and the gases will burn in the mixing chamber. The torch must be quickly extinguished if this occurs else the same will be melted and destroyed. It will readily be seen that a flame which is hot enough to melt steel will readily destroy the much more easily fusible brass. With torches of the prior art, when such a back fire occurred the operator would have to drop the filler rod and reach back with his left hand to turn off the valve in the oxygen line. After that the acetylene valve would be turned off to extinguish the torch. After so extinguishing the torch, the operator would again have to open the acetylene valve and light the torch and then open the oxygen valve and repeatedly manipulate both valves until the proper welding flame was again secured. He would then have to look around to secure the filler rod before resuming the welding operation. All of this would take up much time and cause a lot of trouble. With applicant's torch, if such a back fire should occur from the causes above noted, the torch would be easily and quickly extinguished by merely releasing the lever 25. The adjustment of the flame by the valves 12 and 13 would not be destroyed and the torch could be again placed in operation very quickly without readjustment of the flame.

The operator would not have to drop the filler rod and practically no time would be lost in extinguishing the back fired torch and resuming operations.

From the above description it is seen that applicant has provided a very simple and highly efficient welding torch using acetylene and a combustion supporting gas. The torch is not only compact and convenient for operation, but functions with the largest possible factor of safety and efficiency. If, as previously pointed out, the torch should back fire under abnormal conditions and the gases burn in the mixing chamber, all the operator has to do is to release lever 25 and the gases will be extinguished. It will not be necessary for the operator to drop other things and quickly turn off the regulating valves. The operation of the torch can be discontinued and resumed and a pilot maintained with no danger of blowing out the pilot and the torch will not back fire under normal operating conditions. The torch has been developed after a long period of experimental work and time devoted to the solving of problems presented by the torches of the prior art. The device has been amply demonstrated in actual practice and found to be very successful and efficient.

This application is in part a continuation of applicant's copending application for welding torch, S. N. 554,105, filed April 17th, 1922.

It will, of course, be understood that various changes may be made in the form, details, proportions and arrangement of the parts, without departing from the scope of applicant's invention, which, generally stated, consists in a device capable of carrying out the objects above set forth, in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. A welding torch having in combination, a handle portion, a mixing chamber at one end of said handle portion, a delivery tip located at a relatively great distance from the mixing chamber, an elongated member having a single passage therethrough for conveying the said gases from said chamber to said tip, means for supplying a combustion supporting gas to said chamber, means for supplying a combustible gas to said chamber, regulating devices for both of said means, each of said means including a valve chamber disposed transversely of said handle portion, a spring-pressed valve slidably mounted in said chamber, and an operating plunger also disposed transversely of said handle portion and having an abutment end and a hand lever adapted to be grasped with said handle portion for controlling said last two mentioned means for cutting off the supply of combustion supporting gas and only partially cutting off the supply of combustible gas.

2. A welding torch adapted to burn acetylene and oxygen having in combination, a delivery tip, a mixing chamber for co-mingling said gases, a conduit of varying diameter for conveying the mixture of acetylene and oxygen from said chamber to said tip, a supply passage for acetylene, a supply passage for oxygen, valve chambers disposed in said passages and extending transversely with reference to said mixing chamber, spring pressed valves in said chambers for closing said passages, said valves having longitudinally disposed plungers projecting from said torch and a lever pivoted externally to said torch and having means for engaging the ends of said plungers to open said valves, one of said plungers being arranged to be engaged subsequently to the other, differentially to open said valves.

3. A torch adapted to burn acetylene and oxygen having in combination, a handle portion, a mixing chamber adjacent one end of said handle portion, a pair of conduits for conducting acetylene and oxygen, respectively, extending through said handle, a pair of valves for said conduits disposed at one end of said handle and between the same and the mixing chamber, said valves being spring-pressed to closing position for shutting off the supply of acetylene and oxygen respectively, to said mixing chamber, a conduit extending from said mixing chamber adapted to convey a mixture of acetylene and oxygen, said conduit being removable, constructed and arranged for extension, and of considerable extent, a discharge tip at the outer end of said conduit, regulating valves for said conduits at the other end of said handle, constructed and arranged for very fine and accurate adjustment, plungers projecting at one side of said handle from said valves, and an operating lever adapted to successively engage the extremities of said plungers to differentially control said valves so that the valve controlling the acetylene will be opened slightly before the valve controlling the oxygen is opened.

4. An acetylene torch having in combination, a supply means for acetylene and a regulating means therefor constructed and arranged to maintain a fine and accurate adjustment, a supply means for a combustion supporting gas and a regulating means therefor constructed and arranged to maintain a fine and accurate adjustment, a mixing chamber extending longitudinally of said torch to which said gases are separately supplied, a tip remote from said mixing chamber connected thereto by an elongated single passage conveying the mixed gases, a valve in each of said supply means, a spring for each valve normally pressing the same to closed position, a lever actuated in one direction by said springs and held in normal position thereby, said lever and valves controlling both of said

supply means so that the supply of the combustion supporting gas is cut off before the supply of acetylene is completely cut off and for renewing the supply of acetylene, before the supply of combustion supporting gas is renewed.

5. An acetylene welding torch having in combination, a supply means for acetylene, a supply means for a combustion supporting gas, a mixing chamber to which said gases are supplied, and means in close proximity to said mixing chamber for controlling both of said supply means for causing the supply of combustion supporting gas to cease at the point of ignition and for causing the supply of acetylene subsequently to be diminished, a single member for operating said last mentioned means, and a locking means for said single member.

6. The structure set forth in claim 3 and means for holding said lever in position with said first mentioned valves in open position.

7. An acetylene torch having in combination, a handle portion, means at one end thereof connected to separate valved conduits for supplying acetylene and a combustion supporting gas, separate conduits extending through said handle from said first mentioned conduits, a mixing chamber at the other end of said handle connected to said last mentioned conduits, valves spring-pressed to closed position normally closing said last mentioned conduits and disposed closely adjacent said mixing chamber, a hand lever adapted to successively open said valves, a tip, a single conduit connecting said mixing chamber and tip, a coupling between said mixing chamber and tip adapted to be removed to permit the insertion of an extension and an extension means adapted to be disposed between said mixing chamber and single conduit.

In testimony whereof I affix my signature.

LORN CAMPBELL, JR.