C. JOHNSON.

ACETYLENE TORCH.

APPLICATION FILED AUG. 4, 1916.

1,328,329.

Patented Jan. 20, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

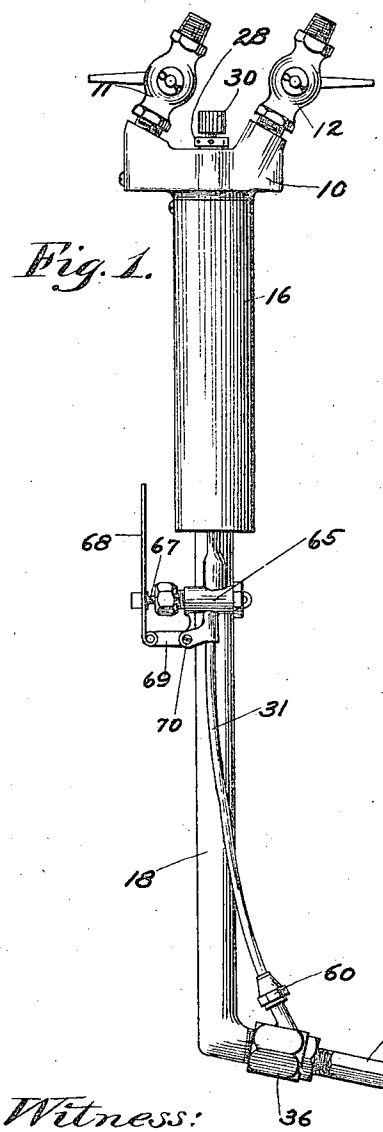


Fig. 2.

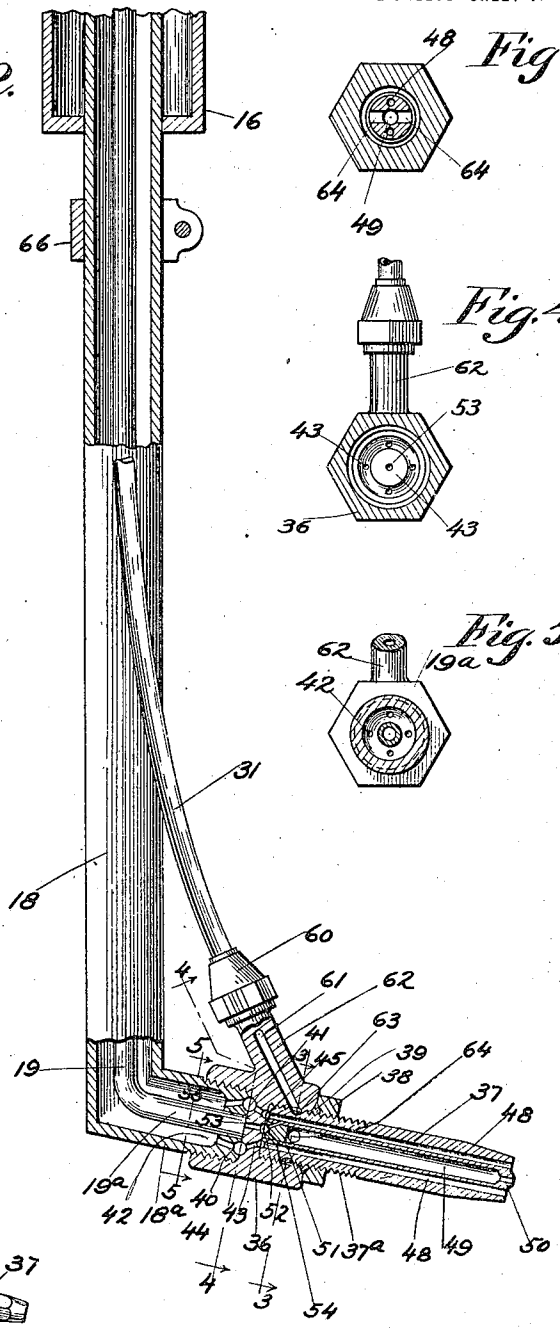


Fig. 3.

Fig. 4.

Fig. 5

Witness:

C. C. Burnap

Inventor:

Carl Johnson

By Sheridan, Wilkinson & Scott Attys

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2 SHEETS—SHEET 2.

Fig. 6.

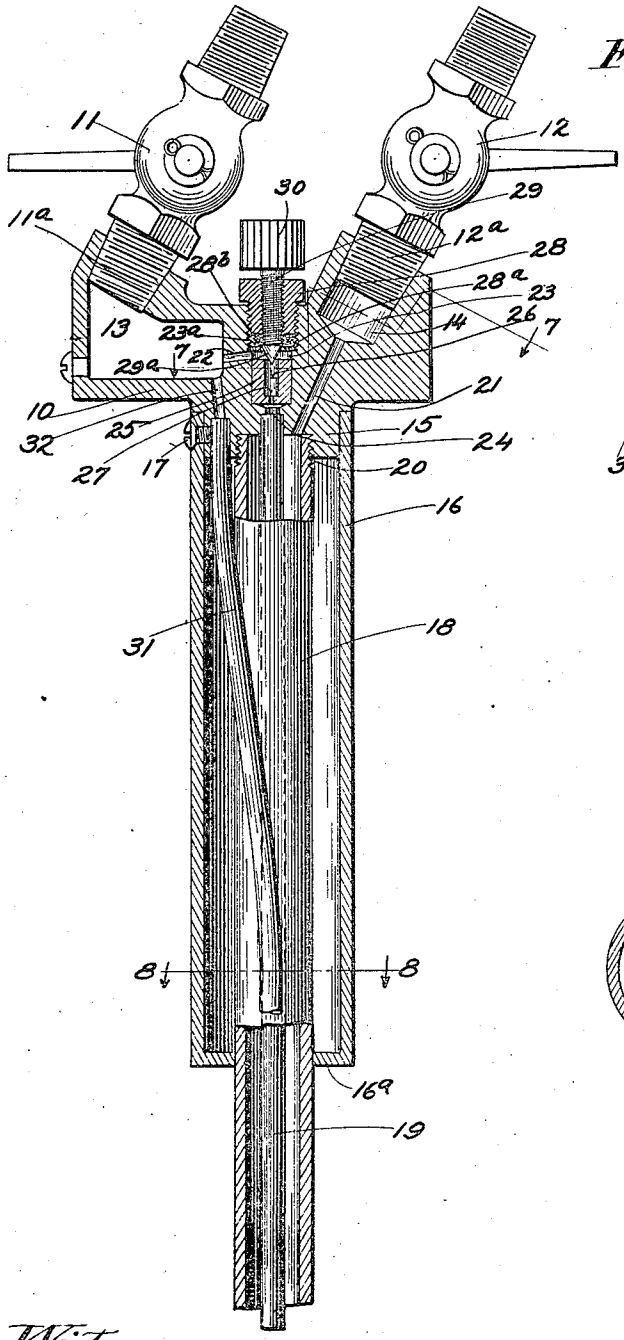


Fig. 7.

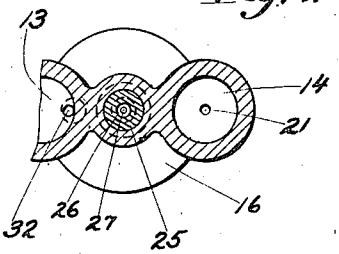
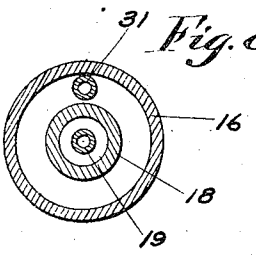


Fig. 8.



Witness

C. C. Burnap

Inventor.

Carl Johnson

By Sheridan, Wilkinson & Scott

UNITED STATES PATENT OFFICE.

CARL JOHNSON, OF CHICAGO, ILLINOIS.

ACETYLENE-TORCH.

1,328,329. Specification of Letters Patent. Patented Jan. 20, 1920.

Application filed August 4, 1916. Serial No. 113,166.

To all whom it may concern:

Be it known that I, CARL JOHNSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Acetylene-Torches, of which the following is a specification.

This invention relates to an acetylene torch and its purpose is to provide an improved device of this kind which may be used for cutting metal, or for other like uses.

The principal object of the invention is to provide an acetylene torch which may be adjusted for use in welding or for cutting metal without the necessity of interchanging any parts of the apparatus. Another important object is to provide an acetylene torch comprising means for rendering itself inoperative when the acetylene or other gas "back fires" or flashes back within the apparatus. This last described feature overcomes a very troublesome defect in a great many prior devices of this kind, since it is very common for the acetylene gas or other gas to flash back and burn within the apparatus, thereby unduly heating the burner or other part of the apparatus where the combustion takes place and causing the device to deteriorate very rapidly. This defective feature is also very annoying to the operator and it may cause defective results to be attained by the use of the device. A further object of the present invention is to provide an acetylene torch comprising an improved arrangement and construction of parts whereby the device may be readily assembled and disassembled and easily operated when in use. Another feature relates to an improved arrangement of the gas and oxygen supply tubes and to improved means for providing an auxiliary oxygen supply when the device is to be used for cutting metal. A further object is to provide an improved arrangement and construction of the burner head and tip.

These and other objects of the invention will appear more clearly from the following specification, taken in connection with the accompanying drawings, in which one embodiment of the invention is illustrated.

In the drawings—

Figure 1 shows a side elevation of my improved acetylene torch;

Fig. 2 is an enlarged side elevation of the lower portion thereof, showing a vertical section through the burner head and tip and other parts of the device;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2, looking in the direction of the arrows;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2, looking in the direction of the arrows;

Fig. 6 is an enlarged vertical section through the upper part of the torch, showing the means for controlling the supply of oxygen gas and acetylene gas;

Fig. 7 is a detailed sectional view taken on the line 7—7 of Fig. 6, looking in the direction of the arrows; and

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 6, looking in the direction of the arrows.

I contemplate using my device in connection with separate supplies of acetylene gas and oxygen gas, as is customary, but I have not considered it necessary to show the tanks, etc., containing these gases, since they form no part of the present invention. These gases are supplied to the connection head 10 of the apparatus through suitable pipes, a pipe leading from the oxygen supply being connected to the valve 11, and a pipe leading from the acetylene gas supply being connected to the valve 12. These valves are provided with threaded stems 11^a and 12^a, respectively, which are adapted to form threaded engagements with the inner walls of the chambers 13 and 14 formed in the head 10, the chamber 13 being adapted to receive the oxygen gas and the chamber 14 being adapted to receive the acetylene gas. The valves 11 and 12 are inclined with respect to the head 10 so that the pipes or hose to which they are connected may have a free and convenient inclination at the points of attachment. It will be obvious that by means of the valves 11 and 12 the supply of these gases may be controlled as desired.

The lower end of the connection head 10 is provided with a cylindrical projection 15, which is adapted to fit closely the elongated cylinder or casing 16. This casing is secured in position on the head by means of

screws 17, or the like, and it serves as a convenient handle or operating member which may be held in the hands of the operator when the torch is being used. The lower end wall 16[a] of the casing 16 is provided with a suitable aperture which is closely fitted by the acetylene gas tube or pipe 18. An oxygen tube or pipe 19, of relatively small size, is located within the acetylene pipe 18, an annular space being left around the oxygen pipe through which the acetylene gas passes. The acetylene pipe 18 forms a threaded engagement at 20 with the lower end of the head 10, and the oxygen pipe 19 is similarly secured to the lower end of the head 10 within the pipe 18. A duct 21 leads through the head 10 from the chamber 14 to the interior of the pipe 18, thereby furnishing means for supplying the acetylene gas to the pipe 18 from the chamber 14 which receives the gas from the source of supply. A duct 22 extends transversely through the wall of the chamber 13 and communicates with the upper part of a cylindrical chamber 23 which is formed in the head 10 above and communicating with the oxygen pipe 19 by means of a duct 24. A cylindrical valve plug or plunger 25 is mounted in the chamber 23 and is provided with a relatively large, vertically extending bore or recess 26, which communicates at its lower end with a small duct 27, by means of which a communication is formed between the bore 26 and the duct 24 which leads to the pipe 19. The lower wall of the cylindrical chamber 23, in which the plug 25 is mounted, is counterbored around the duct 24 in order to expose a relatively large part of the lower end of the plug to the pressure of the gas in the pipe 19. The enlarged upper end 23[a] of the chamber 23 is closed by a threaded nut or valve cap 28, which is provided with a central vertically extending aperture threadedly engaged by the needle valve stem 29 having a suitably knurled handle 30. A washer 28[a] seats upon the shoulder at the lower end of the enlarged part 23[a] of the chamber and suitable packing 28[b] is placed in the space around the valve stem between the washer and the nut 28. It will be seen that when the valve plug 25 is in normal position, as shown in Fig. 6, for instance, the duct 22 forms a communication between the chamber 13 and the upper part of the chamber 23 above the plug 25. The oxygen gas received in the chamber 23 through the duct 22 may then pass downwardly through the bore 26, duct 27, and duct 24 to the oxygen pipe 19. It will be seen that the conical extremity 29[a] of the valve stem 29 is adapted to extend partially into the bore 26, and by regulating the position of the needle the amount of gas admitted to the bore 26 and tube 19 may be regulated as desired. It will be apparent that the pressure of the gas will operate normally to hold the plug 25 in its normal position, since the exposed upper surface of the plug is slightly greater than the exposed lower surface thereof, and furthermore in ordinary operation the force of gravity serves to maintain the plug in its normal position; but if the acetylene torch "back fires" or flashes back as hereinafter more fully described, the back pressure in the pipe 19 will serve to cut off the oxygen supply by pushing the plug 25 upwardly and causing the upper end of the bore 26 to engage closely the conical portion 29[a] of the needle valve. When the needle valve is in an extreme open position the plug 25 may move upwardly to a sufficient extent to close the duct 22. In addition to the oxygen pipe 19, there is provided a supplementary oxygen supply tube 31, which is secured at its upper end to the lower end of the head 10 and which communicates with the chamber 13 through a duct 32. This tube 31 passes downwardly through the casing 16 and through a suitable aperture in the lower end wall 16[a] thereof.

The lower portion of the acetylene pipe 18 is provided with an angularly disposed extension 18[a], and the oxygen pipe 19 is similarly provided with an angularly disposed extension 19[a] which closely fits a suitable aperture in the end wall 35 of the pipe 18. The threaded extremity of the portion 18[a] of the pipe 18 engages a suitably threaded recess in the burner head 36, and the opposite end of the burner head is provided with another threaded recess which is engaged by the threaded portion 37[a] of the burner tip 37. A suitable lock nut 38 engages the threaded portion of the burner tip 37 and holds the same in fixed position with respect to the burner head 36, suitable packing 39 being placed between the nut 38 and the lower end of the burner head.

The end wall 35 of the pipe 18 is provided with an annular groove 40, and the opposed central wall 44 of the burner head is provided with a similar annular groove 40, these grooves forming together an annular channel 41. The end wall 35 is further provided with a plurality of small ducts 42, which provide a communication between the interior of the pipe 18 and the annular channel 41. Other ducts 43, extending through the central wall 44 of the burner head, provide a communication between the annular channel 41 and another annular channel 45 which is formed by suitably registering annular grooves formed in the opposite face of the wall 44 and in the adjacent end wall of the burner or tip 37. Two or more ducts or passages 48 extend through the burner from the annular channel 45 to the opposite end or tip of the burner where the combustion takes place, and a single passage 49, of

larger size, extends through the central part of the burner between the passages 48 and communicates with the atmosphere at the mouth of the burner through a small duct 50, which is located between the passages 48. The inner end of the passage 49 is closed by a plug 51 which has a fixed engagement therewith, the upper end of this plug and the wall 44 of the burner head being counterbored to form a chamber 52 to receive the oxygen gas which passes thereto from the oxygen pipe 19 through a small duct 53 formed in the wall 44 of the burner head. A plurality of small angularly disposed ducts 54 extend from the recess 52 through the plug 51 and the walls of the passage 49 to the passages or ducts 48, which serve as mixing chambers for the oxygen gas and acetylene gas which are admitted thereto. It will be seen that the oxygen gas and acetylene gas which are mixed in the ducts 48 pass therefrom to the mouth of the burner and are thoroughly mixed during such passage, so that a perfect combustion thereof takes place at the mouth of the burner.

The construction of the burner head just described furnishes means for highly heating the metal being operated upon, and when it is desired to cut the metal by a strong oxidizing flame, an auxiliary oxygen supply is used, and this supply is received through the supplementary oxygen pipe 31 previously referred to. This pipe 31 leads to a coupling 60, through which a communication is formed between the pipe and the duct 61 extending through the angularly disposed projection 62 which is formed on the burner head 36. The duct 61 communicates with an annular channel 63 formed in the wall of the burner 37 within the burner head, and the auxiliary supply of oxygen passes from this annular channel through suitable tubes or ducts 64 which extend through the wall of the burner between the passages 48 to the inner, centrally located passage 49. The auxiliary blast of oxygen then passes outwardly through the small vent or duct 50 at the end of the burner and impinges upon the heated metal within the flame projected from the burner, thereby effecting an oxidation and cutting of the metal. The supply of oxygen through the supplementary pipe 31 is controlled by means of a valve 65, which is located in the pipe 31 adjacent the lower end of the casing 16, this valve being secured to the pipe 18 by means of a suitable split collar 66. The valve 65 is preferably of the plug valve type, having a stem 67 which is connected to an operating lever 68. The lever 68 is pivotally connected to a link 69, which in turn is pivotally connected at 70 to the casing of the valve.

When using the apparatus the valves 11 and 12 are opened to the desired extent, thereby admitting the oxygen and acetylene gases to the chambers 13 and 14, respectively. The acetylene gas then passes through the duct 21 to the pipe 18, and the oxygen gas passes through the duct 22, chamber 23, bore 26, duct 27 and duct 24 to the oxygen pipe 19. From the pipe 18 the acetylene gas passes through the ducts 42 to the annular channel 41, and thence through the ducts 43 and the annular channel 45 to the mixing chambers or passages 48 in the burner. The oxygen gas passes from the pipe 19 through the duct 53, recess 52, and ducts 54 to the mixing chambers 48, where the two gases mingle and pass together to the mouth of the burner, where they are consumed. When it is desired to use the apparatus for cutting metal, the valve 65 may be operated to admit the auxiliary oxygen supply to the passage 49, thereby producing an oxidizing flame suitable for metal cutting purposes. During the operation of the device, the valves 11 and 12 and the valve stem 29 may be adjusted to regulate the amounts of oxygen gas and acetylene gas to pass to the mixing chambers 48, in order to secure the proper mixture of the gases for the purpose desired. During the operation of the apparatus, the combustion or explosion of the gas at any point within the apparatus, which may occur by reason of a "back fire" or flash back from the mouth of the burner, will operate to set up a back pressure in the oxygen pipe 19, which will move the plug 25 upwardly against the pressure of the oxygen supply and thus cut off the supply of oxygen and render the device inoperative. If any gas leaks back through the needle valve after the latter has been automatically closed, it will be carried downwardly through the auxiliary oxygen pipe when the latter is in use. When the oxygen supply is cut off the flash back ceases at once and the operator may then hold the tip of the burner near the heated metal operated upon whence the gas mixture will again be lighted without delay. The objectionable back fire or flash back, whether caused by clogging of the tip or backing up of the oxygen gas into the acetylene ducts, is thus effectively remedied and the device may be maintained in continuous operation. If obstructions on the tip cause a flash back, such obstructions may be readily removed and the burner then relighted. It will be apparent that this advantage is an important feature, since it prevents the possibility of accident or injury to the apparatus or the operator thereof, and overcomes serious and troublesome delays which usually occur in the use of apparatus of this kind.

It will also be apparent that the apparatus comprises a small number of parts and is

assembled in a convenient manner, so that it may be readily manipulated by the operator, who may manipulate and adjust the operation of the burner by grasping the casing 16 which provides a convenient means for supporting the apparatus.

Although I have shown and described a particular embodiment of the invention, it will be understood that it may be constructed in various forms without departing from the scope thereof so defined in the appending claims.

What I claim is:

1. In a device of the class described, a burner, means for supplying oxygen gas to said burner, means for supplying acetylene gas to said burner, and a valve comprising a needle member and a movable plug engaging said needle member for automatically cutting off the supply of one of said gases when said plug is actuated by a back-pressure.

2. In a device of the class described, a head, an oxygen pipe and an acetylene pipe connected to said head, one of said pipes being located within the other, said head having chambers therein and ducts leading from each of said chambers to one of said pipes, a normally open, gravity-actuated valve in one of said ducts, and a burner operatively connected to the other ends of said pipes.

3. In a device of the class described, a head, an oxygen pipe and an acetylene pipe connected to said head, said head having chambers therein and normally open ducts leading from each of said chambers to one of said pipes, a burner operatively connected to the other ends of said pipes, means for controlling the flow of gas through each of said pipes to said burner, and a normally open valve in one of said ducts, closed entirely by the back pressure in one of said pipes for preventing a back fire in said head.

4. In a device of the class described, a head, an oxygen pipe and an acetylene pipe connected to said head, said head having chambers therein and normally open ducts leading from each of said chambers to one of said pipes, a burner operatively connected to the other ends of said pipes, means for controlling the flow of gas through each of said pipes to said burner, a movable valve member mounted in one of said ducts and having an aperture therethrough forming a continuation of said duct, and a member adapted to engage and close said aperture in said valve member upon movement thereof due to a back pressure in the connected pipe.

5. In a device of the class described, a head having two chambers formed therein, means for controlling the admission of oxygen to one of said chambers, means for controlling the admission of acetylene gas to the other of said chambers, an acetylene pipe and an oxygen pipe leading from said head, said head having a duct therein forming a communication between said acetylene chamber and said acetylene pipe, said head being provided with a passage leading from said oxygen chamber to said oxygen pipe, and a needle valve for controlling the flow of oxygen through said passage, said needle valve having a movable seat operated by back pressure in said device.

6. In a device of the class described, a connection head having two chambers formed therein, means for controlling the admission of oxygen to one of said chambers, means for controlling the admission of acetylene gas to the other of said chambers, an acetylene pipe and an oxygen pipe leading from said head, said head having a duct therein forming a communication between said acetylene chamber and said acetylene pipe, said head being further provided with a passage leading from said oxygen chamber to said oxygen pipe, a needle member adjustably mounted in said head and entering said passage, a plug adapted to be actuated by a back-pressure to engage said needle member and close said passage, and a burner head connected to said oxygen pipe and said acetylene pipe.

7. In a device of the class described, a connection head having separate chambers in opposite sides thereof, inlet pipes leading to said chambers at an angle to the walls of said head, outlet pipes mounted one within the other and attached to said head at an angle to said inlet pipes, a duct leading through said head from one of said chambers to the outer one of said outlet pipes, a centrally located bore communicating with the inner one of said outlet pipes, a duct leading from the other of said chambers to said bore, a plug slidably mounted in said bore, and a valve engaged by said plug when operated by back pressure in said device for closing the communication between said bore and said other chamber.

In testimony whereof, I have subscribed my name.

CARL JOHNSON.