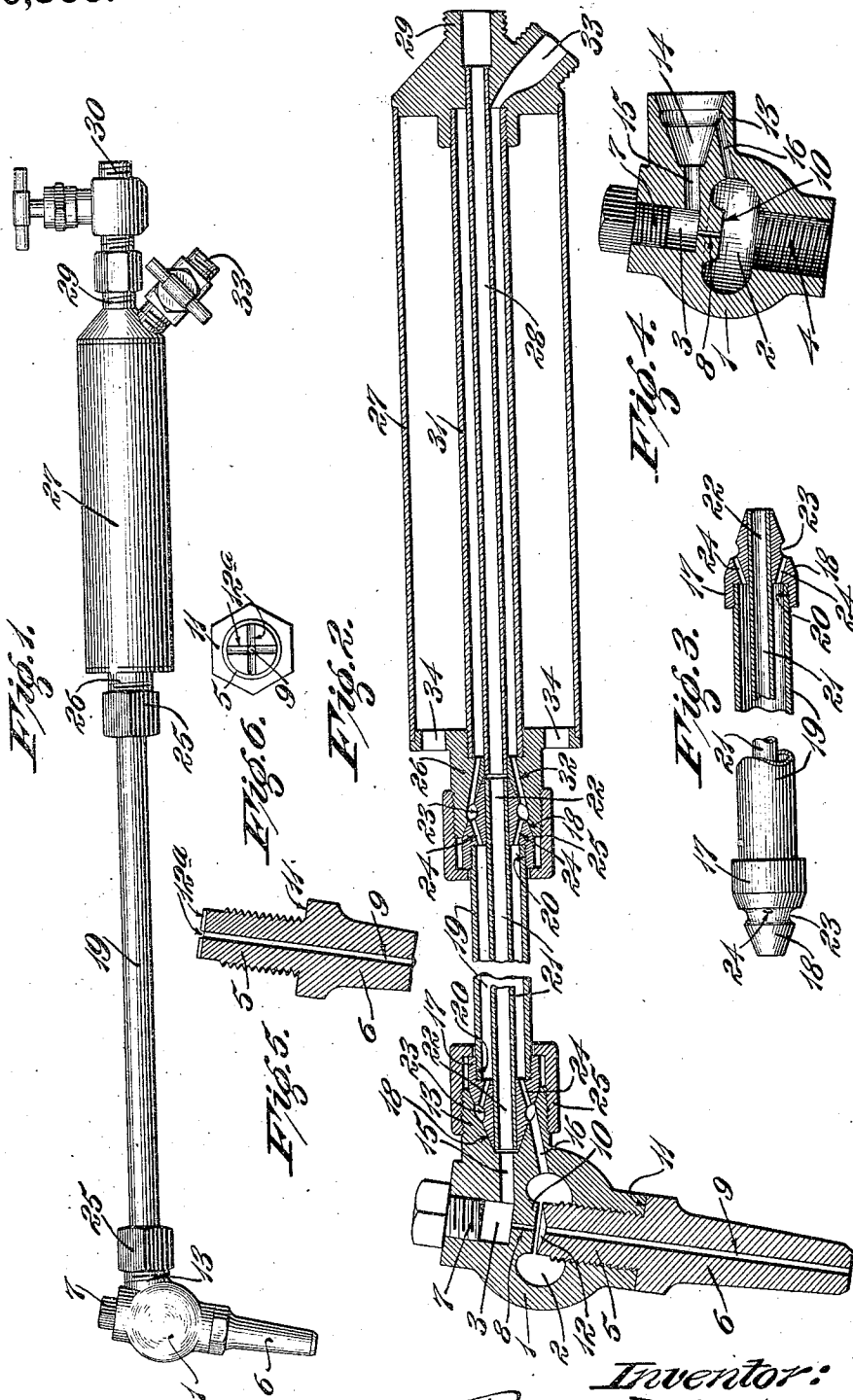


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TORCH.

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UNITED STATES PATENT OFFICE.

PRIOR F. WILLIS, OF ST. LOUIS, MISSOURI.

TORCH.

1,070,866.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PRIOR F. WILLIS, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Torches, of which the following is a specification.

This invention relates to torches for heating metals in the welding, cutting and other treatment thereof, and more particularly to torches whose flame is produced by a mixture of oxygen and acetylene gas.

The invention has for its principal objects to secure and maintain a proper mixture of the gases; to avoid premature mixing and leakage; to minimize the number of separable and interchangeable parts and yet permit of considerable adjustment in a single apparatus to suit different conditions and character of work; and to attain certain advantages which will hereinafter more fully appear.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawing which forms part of this specification and wherein like symbols refer to like parts wherever they occur,—Figure 1 is an elevation of a torch illustrating an embodiment of the invention; Fig. 2 is a longitudinal section through the torch on an enlarged scale; Fig. 3 is a fragmentary view, partly in elevation and partly in section, of the supply pipes constituting the detachable and interchangeable handle extension member of the torch; Fig. 4 is a section of the burner head detached; Fig. 5 is a longitudinal section through a modification of the burner tip; and Fig. 6 is an inner end view of the burner tip shown in Fig. 5.

The torch comprises a burner head 1 consisting of an integral casting or body of metal. This body is provided with a round chamber 2 adapted to receive the supply of the acetylene gas, and another chamber 3 arranged to receive the supply of oxygen. A screw-threaded bore 4, to which the screw-threaded shank 5 of a burner tip 6 is fitted, extends from the end of the burner head to the acetylene chamber 2; while the oxygen chamber 3 extends to the opposite end of the burner head and is normally closed by screw-plug 7.

A relatively small axial bore or drill hole

8 connects the oxygen chamber 3 with the acetylene chamber 2; and the tip 6 is provided with an axial bore 9 extending throughout the length thereof in line with said bore 8. Surrounding the bore 8 and projecting into the acetylene chamber 2 is a boss 10 adjacent to which the inner end of the shank 5 of the tip 6 terminates. The gap between said boss 10 and end of the shank 5 is determined by the relative length of said shank 5, the tip 6 being provided with an annular shoulder 11 adapted to be brought tight against the end of the burner head and the face of said shoulder and end of said burner head being ground true so as to insure an absolutely tight joint. By the above arrangement, the bore 8 through which communication is established between said chambers 2 and 3 may be made of a maximum size to suit a maximum bore 9 in one of a series of the burner tips 6 which are relatively proportioned for a flame suitable for different conditions or kinds of work, the bores of said interchangeable tips being graduated from said maximum down to a certain minimum, while the shank portions 5 of the burner tips may be made in different lengths, so that the gap between the inner end of the shank and said boss 10 will be proportionately changed with the application of the respective tips. In this way, the desired changes in the size of the jet may be effected by the mere interchange of the tips without necessitating a change in the pressures of the constituent gases.

The inner end of the shank 5 may be perfectly flat in some cases, but it is preferably dished or concaved slightly, as at 12, so as to secure a proper mixture of the oxygen and acetylene gas. So, too, in some cases, the end of the shank may be provided with grooves 12^a intersecting the bore 9, and these grooves may be made of different cross areas for the respective interchangeable tips, in which case the shanks 5 may all be of the same length and the variations in the grooves 12^a alone depended upon for regulating the proportion of the acetylene gas.

For practical purposes, the boss 10 should be approximately of the same diameter as the cooperating end of the shank 5 of the burner tip, and, in any case, not larger than the diameter of the opening 4, but preferably a little less, as shown in Figs. 2 and 4. This facilitates the application of a tool for

finishing the face of the boss and also secures uniformity in the annular slit between the edges of the boss and shank.

The burner head is provided with a coupling portion 13 which may project at an angle to the axis of the burner tip or in a line parallel therewith, as desirable. As shown in the drawing, it extends at an inclination. This angle may be varied to suit different kinds of work. This coupling portion is provided with a tapered socket 14, and extending axially with the socket is a duct 15 which communicates with the chamber 3, while a second duct 16 communicates with said chamber 2 and opens at its outer end also into said socket 14.

A handle member comprising a tube within a tube is provided at its ends with like heads 17 having portions 18 tapered to correspond to the taper of the socket 14. The outer tube 19 is secured at its ends in circular recesses 20 in said head, while the inner tube 21 has its ends 22 fitted tight in axial bores in said heads. The tapered portions 18 of the heads are provided with annular grooves 23, and opening into these grooves are a series of ducts 24 which communicate at their inner ends with the outer tube 19. The handle member has coupling nuts 25 swiveled thereon, said nuts being adapted to engage external screw threads on the coupling portion 13 of the burner head and also a coupling extension 26 at the end of a second tubular handle member 27, said coupling extension 26 being provided with a tapered socket similar to the socket 14 in the coupling portion 13 of the burner head.

In the handle member 27 is a tube 28 which communicates at one end axially with the socket in said coupling extension 26. The opposite end of this tube 28 communicates with a coupling nipple 29 having a valved extension 30 adapted for connection with the usual flexible oxygen supply pipe. Surrounding the tube 28 is another tube 31 which communicates at one end with the tapered seat in the coupling extension 26 through a series of ducts 32. The opposite end of this tube 31 communicates with a valved coupling nipple 33 which is adapted for connection with the usual flexible acetylene supply pipe.

The outer tube or shell of the handle member 27 constitutes the grasping portion of the handle, and the head from which the coupling extension 26 projects, is preferably provided with a series of perforations 34 for ventilation.

By the arrangement of the tapered coupling heads 17 and the correspondingly tapered sockets in the coupling extensions 13 and 26, it is obvious that the head at either end may be attached to either of said coupling extensions; and the annular grooves 23 in said heads provide continu-

ous passageways which communicate with the respective ducts 16 and 32 in whatever position the burner head or handle member 27 may be. Hence, the burner head may be readily swung around to different positions on the handle by merely loosening the nut 25 and then tightening said nut after the adjustment has been effected, without disturbing the connection with the coupling extension 26 on said handle member 27. This adjustment is advantageous in certain classes of work where the torch has to be turned about the axis of the handle while the handle is firmly grasped in the hand of the operator, which turning of the handle twists the flexible supply pipes and causes an undue strain which soon tires the operator and interferes with the manipulation of the torch. By this arrangement, also, a number of interchangeable handle pipe sections may be provided in different lengths, thus obviating the necessity for providing separate entire torches of different lengths. Furthermore, owing to the integral structure of the burner head and the arrangement of the tip, an accurate mixture of the gases is secured and maintained and the changes for the different conditions and character of work are readily accomplished.

Obviously, the device admits of considerable modification without departing from the invention. Therefore I do not wish to be limited to the exact construction and arrangement shown.

What I claim is:

1. A torch comprising a burner head having intake ducts for separate gases, and a coupling portion through which said intake ducts extend; and a handle having separate supply ducts for the respective gases, said handle having a coupling portion through which said supply ducts extend; the coupling portion of said burner head and the coupling portion of said handle being arranged and adapted for relative rotation and being also relatively arranged and adapted so that the respective intake ducts and corresponding supply ducts are in separate communication in any relative rotative position of said coupling portions; and releasable means engaging said burner head and said handle for coupling them in adjusted position.

2. A torch comprising a burner head having intake ducts for separate gases, and a coupling portion through which said intake ducts extend; a handle member having supply ducts for the respective gases, said handle member having a coupling portion like the coupling portion of said burner head; and a handle extension member having ducts therethrough for the respective gases, said handle extension member having like coupling portions at its ends through which said ducts extend; the coupling portions of

said handle extension member being adapted for interchangeable engagement with the coupling portion of said burner head and of said first mentioned handle member; said cooperating coupling portions having relative provisions for maintaining separate communication between the particular ducts for the respective gases while permitting relative rotation of said burner head and said handle members; and releasable means for securing said burner head and handle members in relatively adjusted position.

3. A torch comprising a burner head having mixing provisions for a combustible gas and oxygen, and separate intake ducts for said combustible gas and oxygen communicating with said mixing provisions, said burner head having a coupling portion through which said ducts extend and being provided with a tapered socket, one of said ducts communicating axially with said socket and the other through the side thereof, and a detachable handle comprising separate supply pipes for the combustible gas and oxygen, a coupling head to which the ends of said pipes are attached, said coupling head having a tapered portion which is a counterpart of the socket in said coupling portion of the burner head, said coupling head having provisions for maintaining separate communication between the respective supply pipes and the intake ducts in said burner head while permitting relative rotation of said burner head and said handle, and means for detachably connecting said coupling head to said coupling portion of the burner head.

4. A torch comprising a burner head having mixing provisions for a combustible gas and oxygen, and separate intake ducts for said combustible gas and oxygen communicating with said mixing provisions, said burner head having a coupling portion through which said ducts extend and being provided with a tapered socket, one of said ducts communicating axially with said socket and the other through the side thereof, and a detachable handle comprising separate supply pipes for the combustible gas and oxygen, said pipes being arranged the one within the other, a coupling head to which the ends of said pipes are attached, said coupling head having a tapered portion which is a counterpart of the socket in said coupling portion of the burner head, the inner pipe of said handle opening axially through said coupling head, and said coupling head having an annular groove in its tapered portion and ducts therethrough communicating with said annular groove and the outer pipe of the handle, and means for detachably connecting said coupling head to said coupling portion of the burner head.

5. A torch comprising a burner head having mixing provisions for a combustible gas

and oxygen, and separate intake ducts for said combustible gas and oxygen communicating with said mixing provisions, said burner head having a coupling portion through which said ducts extend and being provided with a tapered socket, one of said ducts opening axially into said socket and the other through the side thereof, a handle member comprising a grasping portion having a coupling extension provided with a socket identical with the socket in the coupling portion of said burner head, and two supply pipes arranged the one within the other and attached at one end to said handle coupling extension, the inner pipe communicating axially with the socket in said handle coupling extension and said coupling extension having ducts communicating with the outer pipe and the side of said socket, and a detachable handle extension comprising a pipe within a pipe, and duplicate heads to which the ends of said handle extension pipes are connected, said heads having tapered portions which are counterparts of the before-mentioned sockets, the inner pipe opening axially through at its opposite ends through the respective heads, and said heads having annular grooves in their tapered portions and ducts therethrough communicating with said annular grooves and the ends of said outer pipe, and means for detachably connecting said heads to the coupling portion of said burner head and to the coupling extension of said first-mentioned handle member.

6. A torch comprising a burner head, said burner head having mixing provisions for a combustible gas and oxygen, and separate intake ducts for said combustible gas and oxygen communicating with said mixing provisions, said burner head having a coupling portion through which said ducts extend, a handle member comprising a grasping portion having separate supply pipes therein for the combustible gas and oxygen, said handle member having a coupling portion to which said pipes are connected, said coupling portion having ducts communicating with said pipes, a handle extension comprising separate pipes for the combustible gas and oxygen, said pipes being connected at each end to a single coupling member, said coupling members being adapted for attachment either to said coupling portion of the burner head or said coupling portion of said first-mentioned handle member, said coupling members having provisions for establishing communication between the pipes attached thereto and the respective ducts in said coupling portions of the burner head and said first-mentioned handle member, and means for detachably connecting said coupling members of the handle extension to said coupling portions of the burner head and said first-mentioned handle member.

7. A torch comprising a burner head having separate supply ducts for a combustible gas and oxygen respectively, a screw-threaded bore in its end, and a chamber communicating with said screw-threaded bore and the supply duct for the combustible gas, an annularly shouldered burner tip having a screw-threaded shank portion fitted to said screw-threaded bore, said tip having an axial bore extending the entire length thereof, the shoulder of said tip cooperating with the end of the burner head to make a gas-tight joint, the end of said shank portion terminating adjacent to the wall of said chamber to provide a restricted mixing space having a continuous restricted annular slit in communication with said chamber, and said burner head having a bore in line with the bore in said tip and communicating with said oxygen supply duct and said restricted mixing space.

8. A torch comprising a burner head having separate supply ducts for a combustible gas and oxygen respectively, said burner head having a screw-threaded bore in its end and a circular chamber communicating with said screw-threaded bore and said combustible gas supply duct, the wall of said circular chamber having a circular projection in line with said screw-threaded bore, a tip having a screw-threaded shank portion fitted to said bore, said tip having an annular shoulder adapted to make a gas-tight joint with the end of the burner head, and the end of the shank portion terminating adjacent to said projection on the wall of the chamber to provide a restricted mixing space having a continuous restricted annular slit in communication with said chamber, said tip having an axial bore therethrough, and said burner head having a bore in line with the bore in said tip and communicating with said oxygen supply duct and said restricted mixing space.

9. A torch comprising an integral burner head having separate supply ducts for a combustible gas and oxygen respectively, said burner head having a screw-threaded bore in its end and a circular chamber com-

municating with said screw-threaded bore and the combustible gas supply duct, a tip having a screw-threaded shank portion fitted to said screw-threaded bore, said tip having an annular shoulder adapted to make a gas-tight joint with the end of the burner head, and the end of the shank portion cooperating with the juxtaposed wall of said circular chamber to provide a restricted mixing space having a continuous restricted annular slit in communication with said chamber, said tip having an axial bore therethrough, and the burner head having a bore in line with the bore in said tip and communicating with said oxygen supply duct and said restricted mixing space.

10. A torch comprising an integral burner head having separate supply ducts for a combustible gas and oxygen respectively, said burner head having a screw-threaded bore in its end and a circular chamber communicating with said screw-threaded bore and the supply duct for the combustible gas, the wall of said chamber having a circular projection in line with said screw-threaded bore and approximately of the same diameter, a tip having a screw-threaded shank portion fitted to said screw-threaded bore, said tip having an annular shoulder adapted to make a gas-tight joint with the end of the burner head, and the end of said shank portion being of substantially the same diameter as said circular projection on the wall of said chamber and cooperating therewith but without engagement so as to provide a restricted mixing space having a continuous restricted annular slit communicating with said chamber, said tip having an axial bore therethrough, and said burner head having a bore in line with the bore in said tip and communicating with said oxygen supply duct and said restricted mixing chamber.

Signed at St. Louis, Missouri, this 21st day of February, 1913.

PRIOR F. WILLIS.

Witnesses:

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