A. H. PEIR, A. L. PETERSON AND C. MOLAS.

OXYHYDROGEN TORCH.

APPLICATION FILED OCT. 31, 1917.

1,365,600.

Patented Jan. 11, 1921.

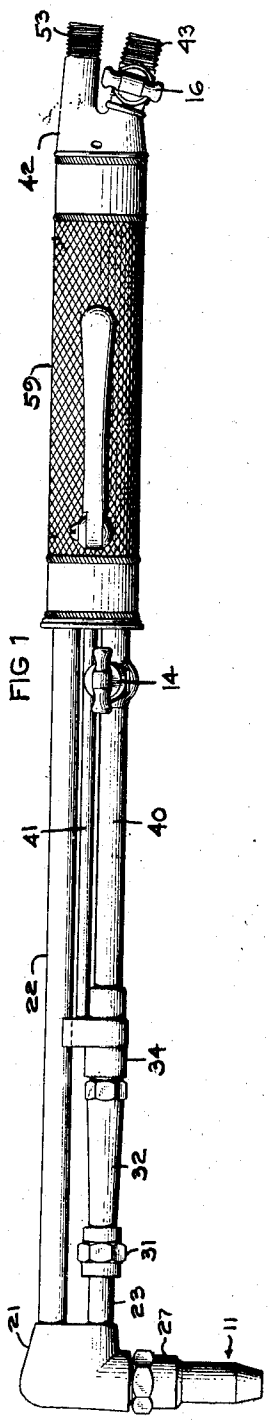

FIG 1

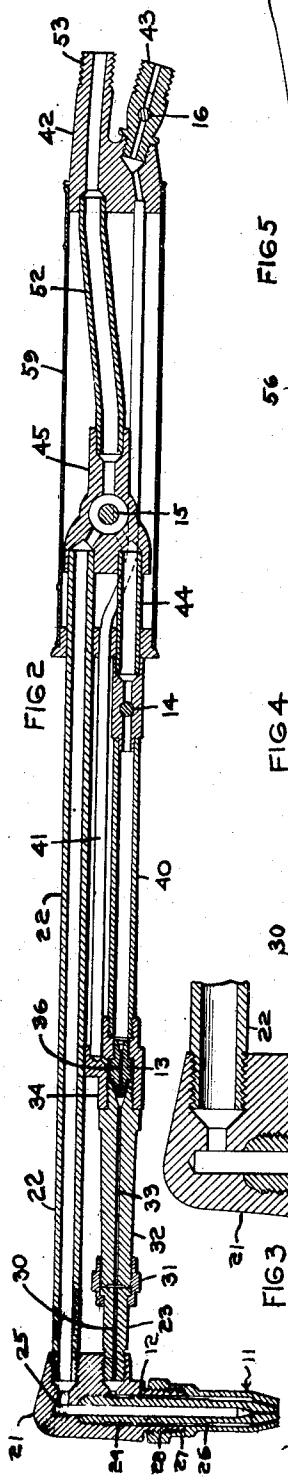

FIG 2

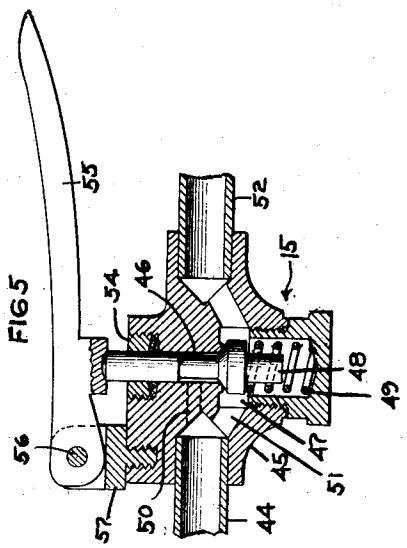

FIG 5

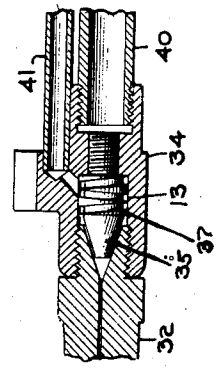

FIG 4

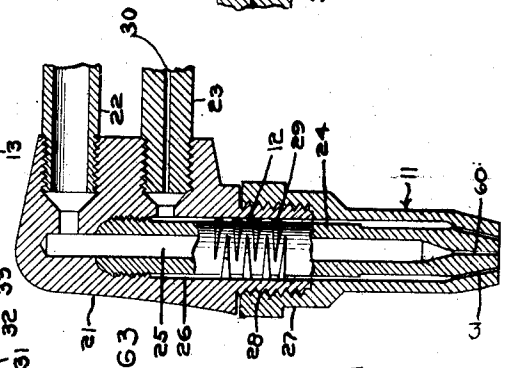

FIG 3

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UNITED STATES PATENT OFFICE.

ALOIS H. PEIR, ARVID L. PETERSON, AND CLODION MOLAS, OF LOS ANGELES, CALIFORNIA, ASSIGNORS TO BURDETT OXYGEN COMPANY, A CORPORATION OF CALIFORNIA.

OXYHYDROGEN-TORCH.

1,365,600. Specification of Letters Patent. Patented Jan. 11, 1921.

Application filed October 31, 1917. Serial No. 199,606.

To all whom it may concern:

Be it known that we, ALOIS H. PEIR and ARVID L. PETERSON, both citizens of the United States, and CLODION MOLAS, a citizen of the Republic of France, all residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Oxyhydrogen-Torch, of which the following is a specification.

Our invention relates to the art of cutting metals with an oxidizing flame, and the principal object of the invention is to provide a novel form of torch which has a special utility in that art.

The invention consists in the construction and novel combination and arrangement of parts hereinafter described, as illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

Further objects and advantages will be made evident hereinafter.

Referring to the drawings which are for illustrative purposes only,

Figure 1 is a view of the exterior of a torch embodying our invention.

Fig. 2 is a section through the device shown in Fig. 1 on a plane which has been somewhat distorted to better illustrate the internal construction.

Fig. 3 is a view on an enlarged scale of the burner end of the torch.

Fig. 4 is a view on the same scale as Fig. 3 of the primary mixer.

Fig. 5 is a sectional view on the same scale of the oxidizing valve, this section being taken on a distorted plane to better illustrate the invention.

Broadly considered, the invention consists of a burner 11, a secondary mixer 12, an injector 13, an oxygen regulating valve 14, an oxidizing flame regulating valve 15, and a hydrogen regulating valve 16.

The burner 11, best shown in Fig. 3, consists of a body 21 into which an oxidizing pipe 22 and a heating nipple 23 are connected. Threaded into the body 21 is an inner tip 24 which has a central opening 25 communicating through a central opening in the body 21 with the interior of the pipe 22. The nipple 23 communicates with an opening 26 surrounding the inner tip 24 and inside an outer tip 27 which is threaded as shown at 28 on the body 21. Formed on the exterior of the inner tip 24 is the secondary mixer 12 formed by cutting a series of mixing vanes 29 on the exterior of the inner tip 24. The vanes 29 are formed by cutting a right and left hand thread forming openings which intersect approximately as shown in Fig. 3 and provide a tortuous passage through which the gases must pass, the outer surface of the secondary mixer 12 fitting tightly inside the body 21.

The heating nipple 23 is provided with a small central opening 30 and is connected by means of a forward union 31 with a mixing chamber member 32 which has a small hole 33 registering with the hole 30. The hole 33 is made quite small, approximately .060 of an inch in diameter, so that the velocity of the mixture passing therethrough tends to check the flame from passing through said hole. The mixing chamber member 32 is threaded into a primary mixer body 34, best shown in Fig. 4, in which is placed an injector plug 35. This plug has a small internal opening 36 and is provided with a right and left hand thread 37 forming flash back vanes. The plug 35 is threaded into the mixer body 34, the central part 36 communicating with the inside of a heating pipe 40 which is threaded in the mixer body 34 and which extends back and connects with the oxygen regulating valve 14.

Threaded in the mixer body 34 is also a hydrogen pipe 41. This pipe communicates with the space outside the injector plug 35, feeding hydrogen into the interrupted threads formed on the outside of the mixer plug. The hydrogen pipe 41 extends back and connects into a connection body 42, communicating through the hydrogen regulating valve 16 with a hydrogen connection 43 which is connected by means of suitable piping with any source of hydrogen supply. The oxygen regulating valve 14 is connected through an oxygen nipple 44 with an oxidizing valve body 45, the pipe 22 also being connected with that body.

The oxidizing valve body 45 is provided with a central opening 46 and a lower central opening 47. A valve 48, forced upwardly by a spring 49, closes the communication between the openings 46 and 47 under normal conditions. The opening 46 connects through a by-pass 50 with the oxidizing pipe 22, and the opening 47 connects through an opening 51 with the oxygen nip-

ple 44. The opening 47 also connects to an oxygen supply pipe 52, this pipe extending back and being secured in the connection body 42 in open communication with an oxygen connection 53. The valve 48 passes through a stuffing box 54 and may be pressed down by means of a handle 55, pivoted at 56 on a plug 57.

A sheet metal shell 59 surrounds the valve body 45 and a certain portion of the piping. A small oxidizing opening 60 is formed in the extreme tip of the burner 11, communicating with a central opening 25. A series of small heating openings 61 are formed by grooves in the inner tip 24 forming holes between the outer tip 27 and the inner tip 24.

The operation of the invention is as follows:

Oxygen being supplied to the connection 53 and hydrogen being supplied to the connection 43, the valve 15 being closed as shown in Fig. 5, the oxygen passes through the pipe 52 into the opening 47 through the opening 51 into the nipple 44, passing from the nipple 44 through the valve 14 into the heating pipe 40. From the heating pipe 40 it passes through the central opening 36 in the injector plug into the opening 33 in the mixing chamber 32. Hydrogen passes from the hydrogen connection 43 through the pipe 41 into the space outside the injector lug 35, joining the oxygen in the mixing chamber 32. The mixture passes into the heating nipple 23 and into the space outside the inner tip 24 in the burner 11. This mixture in passing downwardly through this space is forced to pass through the interrupted threads formed between vanes 29 being thoroughly mixed therein, the mixture finally being forced out through the heating openings 61. This mixture is ignited and is used for the purpose of heating the metal which it is desired to cut. The amount of oxygen flowing into the flame is regulated by the valve 14 and the amount of hydrogen is regulated by the valve 16.

Whenever the material is sufficiently heated and it is desired to start to cut it, the handle 55 is depressed thereby forcing the valve 48 from its seat and allowing oxygen to flow from the opening 47 into the opening 46 and through the bypass 50. This oxygen flows through the oxidizing pipe 22 into the central opening 25 of the burner 11 and is forced out through the opening 60 into the center of the flame from the opening 61. This excess supply of oxygen readily unites with the material which it is desired to cut, which is in most cases steel, the cutting action being very rapid due to the oxidation of this material.

The purpose of the vanes 29 is to provide an additional safeguard to the hydrogen pipe 41. Under ordinary conditions there is no danger of a flash back into this pipe but where there is a leak in the connections and the hydrogen pressure falls oxygen may enter this pipe and in such cases the vanes 29 prevent the flame of combustion from running back into the pipe 41.

What we claim is:

1. In an oxy-hydrogen torch, a body having a central opening therein; an inner tip threaded in said central opening and having an oxygen passage centrally placed therein and in open communication with said central opening; an outer tip threaded on said body and surrounding said inner tip, small heating openings being left between the ends of said outer and inner tips; a combustible mixture pipe for supplying a combustible mixture to the space between said tips; an oxygen pipe for supplying oxygen to said central opening; a mixer in which said inner tip is provided with a plurality of vanes formed by cutting right and left hand intersecting threads on the periphery of said inner tip substantially across the line of flow of the combustible mixture, the circumference of said threads fitting tightly in said outer tip so that the gas passing through between said tips is thoroughly mixed in passing through said threads, a manually operated valve for regulating the oxygen supply, and a flame checking member forming a part of said combustible mixture pipe, said flame checking member having an opening therein so small that the velocity of the mixture flowing therethrough tends to check the flame from passing through said member.

2. In an oxy-hydrogen torch, a body having a central opening therein; an inner tip threaded in said central opening and having an oxygen passage centrally placed therein and in open communication with said central opening; an outer tip threaded on said body and surrounding said inner tip, small heating openings being left between the ends of said outer and inner tips; a combustible mixture pipe for supplying a combustible mixture to the space between said tips; an oxygen pipe for supplying oxygen to said central opening; a mixer in which said inner tip is provided with a plurality of vanes formed by cutting right and left hand intersecting threads on the periphery of said inner tip substantially across the line of flow of the combustible mixture, the circumference of said threads fitting tightly in said outer tip so that the gas passing through between said tips is thoroughly mixed in passing through said threads, a manually operated valve for regulating the oxygen supply, a flame checking member forming a part of said combustible mixture pipe, said flame checking member having an opening therein so small that the velocity of the mixture flowing therethrough will tend to

check the flame from passing through said member, and an injector comprising a plug having vanes formed on the periphery thereof substantially across the flow of gas passing therethrough, said plug having a central port, a hydrogen pipe so placed as to deliver hydrogen to said vanes, and an oxygen pipe so placed as to feed oxygen to said central port, said injector being so placed as to feed the mixture produced therein into said combustible mixture pipe.

In testimony whereof, we have hereunto set our hands at Los Angeles, California, this 25th day of October, 1917.

ALOIS H. PEIR.
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