This invention relates to an acetylene torch and more particularly to an improvement in acetylene torches of the automatic type wherein the gas air mixture is automatically ignited upon the actuation of a grip or trigger by striking an abrasive wheel against a flint.

It is accordingly one object of this invention to provide such an improved automatic acetylene torch which is simple, durable and economical to manufacture.

It is a further object of this invention to provide a torch of the type described which is generally cylindrical in form.

It is another object of this invention to provide an acetylene torch of the class described which is quickly and easily assembled or disassembled for ease in manufacture or in cleaning or adjusting.

It is a further object of this invention to provide a torch of the class described embodying new and improved trigger mechanism.

It is a further object of this invention to provide an acetylene torch of the type described wherein provision is made for adjustment of a jet opening in the gas tube with respect to the air inlet openings whereby the flame may be adjusted from a hard, substantially 100% efficient and very hot flame to a softer flame, as desired.

These and other objects, features and advantages of the present invention will be apparent from the annexed specification in which:

Figure 1 is a side elevation of a torch embodying the present invention.

Figure 2 is an enlarged vertical elevation of the torch with parts broken away and partly in section.

Figure 3 is a plan view of the mechanism shown in Figure 2 the case being shown in section.

Figure 4 is a section taken along the line 4-4 of Figure 2.

Figure 5 is a section taken along the line 5-5 of Figure 2.

Figure 6 is a vertical section of the torch in operative position.

Figure 6A is a fragmentary view showing the position of the ratchet and pawl with respect to the wheel in the condition shown in Figure 6.

Referring now more particularly to the drawings, the torch includes a tubular case 10 which is provided on its lower side with a longitudinally extending slot 11 and at its upper front end is a much shorter longitudinally extending slot 12. The case 10 is open at both ends as at 13 and 14.

A separate trigger and valve mechanism is provided which is designed to be inserted through the end 14 which mechanism includes an end piece 15 having a reduced portion 16 adapted to be received within the end 14 of the case 10 and on which is mounted a pair of parallel longitudinally extending rods 17 and 18. The rods 17 and 18 are provided with enlarged portions 19 and 20 respectively at their rear ends and enlarged portions 21 and 22 respectively at their front ends. The front ends of the rods 17 and 18 are tapped to receive cap screws 23 and 24 which mount a generally circular plate 25 upon the rods 17 and 18.

The end piece 15 is provided with a central bore 26 which is threaded at 27 to receive the threaded end 28 of a plug 29. The plug 29 seats in the bore 26 as at 30 and is provided with a flange 31 adapted to seat against the inner end of the end piece 15, as clearly shown in Figure 6. The plug 29 is provided with a central bore passage 32 enlarged at its inner end as at 33 and also at its outer end as at 34. A hollow nut 35 is provided having threads engaging the threaded end 28 of the plug 29, which nut 35 is provided with a reduced bore 36 and a tubular extension 37. The tubular extension 37 is provided with serrations or grooves 38 for receiving and retaining with the aid of a clamp 39 the conventional hose 40 which is connected by means not shown to a source of acetylene gas under pressure. The nut 35 is also provided with an O-ring 41 to seal the same with the end piece 15 and prevent the escape of gas. The end piece 15 has its reduced portion 16 flattened as at 42 and 43 and is also provided with a vertically extending centrally disposed rib 44.

A plug 45 is provided seated within the enlarged portion 33 which plug 45 has a reduced end 46 to provide clearance from the inner walls of the enlarged portion 33. The plug 45 is provided with an O-ring 47 for sealing against the inner walls of the enlarged portion 33 and also with a transversely extending passage or bore 48 communicating with a longitudinally extending bore 49. At its inner end, the plug 45 is provided with a seat 50 adapted to receive an end of a tube 51. The plug 45 is provided with a flange 52. Affixed to the outer end of the plug 45 is a tube or shaft 53 which passes through the bore 32 and in the region of the enlarged portion 34 carries a collar 54 and a sealing ring 55. The sealing ring 55 is adapted to seat against the shoulder formed by the enlarged portion 34, and the shaft 53 at its outer end receives a coil spring 56 which has one end thereof abutting the collar 54 and the other end abutting the shoulder formed by the reduced bore 36 of the nut 35.

The tube 51 at its inner end is seated in a bore 57 formed in a slide 58, which slide 58 is itself received within a bore 59 of a boss 60 formed upon the plate 25.

An O-ring 61 is carried by the slide 58 for sealing the same to the interior of the boss 60. The plate 25 has a central passage 62 formed therein and at its forward end is provided with a central boss 63 having a passage 64 therein and also having a forwardly extending cylindrical member 65 adjacent which is provided a countersunk seat 66 for a purpose hereinafter described.

Mounted upon the rods 17 and 18 is a slide 17 having a bore 71 to permit the passage of the tube 51. The slide 70 is cut away upon its lower side as at 72 to form a shoulder 73 for a purpose hereinafter described. Adjacent the slide 70, also mounted upon the rods 17 and 18, is a plate 74 having a lower edge 75. The slide 70 at one side thereof is notched as at 76 to receive an arm 77 which is pivotally mounted in the slot 76 by means of the pin 78. The arm 77 is bent downwardly as at 79 and has teeth 80 formed thereon constituting a pawl. The arm 77 extends through a slot 81 formed in the upper edge of the plate 25. The arm 77 towards its outer end is tapped as at 82 and the slide 70 is similarly tapped as at 83 to receive a coil spring 84 resiliently biasing the arm 77 in a clockwise direction as shown in Figure 2.

A pivoted lever or trigger 90 is provided which is generally channel-shaped in form having side members 91 and 92 which are cut out to form shoulders 93. The side members 91 and 92 are pivotally mounted upon the rib 44 by means of a pin 94. The forward end of the trigger 90 is provided with an end wall 95 which is itself
provided with forwardly extending members 96 acting as stops to prevent the trigger 90 from swinging completely out of the slot 11. The trigger 90 has pivotally mounted thereon, between its side walls 91 and 92, by means of a pin 97 in an arm 98. The arm 98 has mounted thereon an upstanding arm 99 which is bifurcated to form a bifurcated cam 100, the two parts of which straddle the tube 51 and bear against the flange 52. The free end of the arm 98 is tapped to receive an adjusting screw 101 which is set by means of a nut 102. The screw 101 thus adjusts the position of the cam 100 with respect to the flange 49 and thus regulates the opening of the valve as hereinafter described. Also pivotally mounted between the side walls 91 and 92 of the trigger 90 as by means of the pin 103 is a block 104. The block 104 is provided with a bore 105 adapted to receive the end of a rod 106. The rod 106 has an enlarged flattened head 107 and on the rod abutting the head 107 at one end and the block 104 at the other end is a coil spring 108. A trip member 109 is provided pivoted at its lower end by a pin 110 to an arm 111. The trip member 109 is channel-shaped in cross section and the forward end of the flattened head 107 is pivoted between the two side arms as at 112. The upper end of the side walls of the trip member 109 are beveled as at 113 and the ends thereof are adapted in one position to engage the abutter 73 of the slide 70. The upper end of the arm 111 is also beveled as at 114 and this bevel when the trigger is released engages the rear of plate 25 as shown in Figure 2.

From the foregoing description it will be apparent that all of the above-identified mechanisms are mounted as a unit and are separately removable from the case 10. When the unit is inserted within the case 10, it is retained therein by a detent 115 which is mounted in a boss 116 formed on the rib 44 and resiliently biased upwardly by a coil spring 117 retained within the boss and a bore in the rib 44. The case 10 is provided with a hole 118 adapted to receive the detent 115 and resiliently retain the assemblies within the case 10. A coil spring 119 is mounted upon the rod 17 and a similar coil spring 120 is mounted upon the rod 18 between the enlarged portions, respectively numbered 19 and 20, and the slide 70.

The torch is provided with a second removable unit hereinafter to be described. This unit comprises a block 130 generally rectangular in form and having an end piece 131 which is circular in form and adapted to fit within the front opening of the tubular case 10. The block 130 is provided with a central bore 132 and a combustion tube 133 is mounted in a bore 134 in the end of the circular end piece 131. The rear of the block 130 is tapped as at 135 to receive the male threads of a connector 136. The connector 136 is provided with a bore 137 communicating with the bore 132 and an anti-flashback screen 141 is provided at each opening of the bore 140 through the side walls of the block 130. The connector 136 by reason of its threaded connection with the threads 135 may be adjusted so as to move the same longitudinally of the block 130. The connector is provided with a jet opening 136a and by the means this jet opening may be positioned as desired with respect to the transverse bore 140. Such adjustment permits regulation of the flame from a hard, substantially one hundred percent (100%) efficient flame to a softer flame as desired. Any movement of the jet opening 136a from the optimum position will cause a softening of the flame.

Such movement of the connector 136 in the threads 135 does not break the seal between the neoprene members 139 and the seat 66 because of their inherent resiliency and because of the fact that the entire block 130 is free to move a certain distance under the force of the spring 174 hereinafter described.

The block 130 is also provided with a vertical bore 142 and an enlarged opening 143 communicating with the passage 132. Mounted on one side of the block 130, as by means of a pin 144, is a ratchet wheel 145. Also mounted on the pin 144 is a serrated steel disc or wheel 146. The disc 146 is located within the enlarged opening 143. A flint assembly, generally indicated by the number 150 is provided. This flint assembly includes a post 151 which has a threaded portion 152 adapted to engage threads 153 formed within the vertical bore 142 and a reduced tubular portion 154 adapted to engage thrust support and a support post 155. Also within the post 151 there is disposed a coil spring 156. The post 151 has an enlarged portion 157 adapted to be received within a bore 158 in a block 159. The block 159 is affixed in a seat 160 in the top of the block 130 and when the unit is assembled in the case 10, lies within and substantially fills the slot 12. The end of the post 151 is tapped as at 161 to receive the threads of a hollow plug 162. The hollow plug is provided with a counterbore 163 which receives the upper end of the coil spring 156 and adjusts the tension thereof.

A retaining member 170 is provided which is generally rectangular in shape and is provided with a central aperture 171 adapted to surround the block 159. In its forward edge the block 159 is tapped to form a seat for a ball 172 and the forward end of the member 170 is tapped to receive the ball 173 at one end of a coil spring 174, the other end of which rides upon the ball 172. The other end of the member 170 is provided with a depending detent 175.

In its assembled condition, the assembly just described is held within the case 10 by latching the detent 175 into an opening 176 as clearly shown in Figure 6. However, by releasing the detent 175 from the opening 176, and then disengaging the post 151, the entire assembly can be removed from the case 10. When the assembly is inserted into the case 10, the arm 77 is first pivoted in a counterclockwise direction against the force of the spring 84, so that upon release the teeth 89 will engage with the teeth of the ratchet wheel 145.

The operation of the above-described device is as follows. With the hose 40 connected to a suitable source of flammable gas under pressure, preferably acetylene gas, the operator takes the case 10 in his hand with his fingers engaging the trigger 90. The fingers of the hand then depress the trigger 90 pivoting the same in a counterclockwise position as shown in Figure 2. The pivoting of the trigger in a counterclockwise position causes the cams 100 to bear against the flange 52 which in turn bears against the plug 45. Continued pivoting of the trigger thus moves the shaft 53 to the left and unseats the sealing member 55. Pivoting of the trigger in a counterclockwise direction also causes the upper end of the trip member 167 in engagement with the shoulder 73 to force the slide 70 along the rods 17 and 18 against the force of the coil springs 119 and 120. When the slide 70 has been depressed a suitable distance, the beveled surface 113 of the trip member 109 engages the bottom edge 75 of the plate 74 causing the free end of the trip member 109 to disengage from the shoulder 73 and permit a quick return of the slide 70 to its initial position under the force of the coil springs 119 and 120. As the rod 77 is carried by the slide 70, this quick return of the slide 70 causes a quick forward movement of the rod 77 and consequently achieves a quick spinning of the ratchet wheel 145 and the serrated steel disc 146, thus creating a vigorous spark from the flint 155. As the sealing member 55 has in the meanwhile become unseated, gas is permitted to enter from the hose 40 through the bore 32 into the transverse bore 48 and longitudinal bore 49 and hence into the tube 51. From the tube 51 the gas passes through the opening 62 in the plate 25 and the bore 137 and
into the bore 132 where it is mixed with air from the transverse bore 140 entering through the screens 176 to the region of the disc 146 where it is ignited by a spark from the flint 155, the flaming gas then emitting from the flame tube 133.

When the operator releases the trigger 90, the spring 56 forces the collar 54 and the sealing member 55 into sealing position and shuts off the flow of gas throughout the torch. As the slide 70 has previously been returned to its initial position, the trip member 109 re-engages the shoulder 73 and the torch is ready for a subsequent ignition.

While there has been described what at present is considered a preferred embodiment of the present invention, it will be apparent to those skilled in the art that various changes and modifications can be made therein without departing from the essence of the invention and it is intended to cover herein all such changes and modifications that come within the true spirit and scope of the appended claims.

I claim:

1. A gas torch comprising: a generally cylindrical casing; means forming an opening in a wall of said casing; a unitary assembly including a lever pivoted in said opening, a gas tube mounted in said casing, valve means operably associated with said gas tube, means connecting said lever and valve means for opening of said valve means on actuation of said lever, spring means opposing actuation of said lever, a slide mounted in said casing, a pawl carried by said slide, means operably connecting said lever and said slide for movement of said slide on actuation of said lever, spring means biasing said slide in the opposite direction therefrom and means operable upon substantially complete actuation of said lever to disconnect said means connecting said lever and said slide to free said slide for return movement under the force of said last mentioned spring means; said unitary assembly being removable from said casing as a unit; a ratchet wheel mounted in said casing and adapted to be engaged by said pawl; a serrated wheel mounted for rotation with said ratchet wheel and adapted to engage a flint; and means defining an air passage for supplying air whereby on actuation of said lever gas in said tube is ignited by sparking of the flint.

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