This invention relates to a trigger operated flint ignited gas torch and more particularly to a device of the type described, designed particularly for the burning of propane and butane.

In Patent No. 2,506,114, issued May 2, 1950, to Warren A. Sparks, there is illustrated a trigger operated gas torch which in general has been found satisfactory for the burning of acetylene but which, however, was found incapable of burning butane and propane.

It is the object of the present invention to provide such a trigger operated gas torch designed particularly for the burning of propane and butane.

In the designing of such a torch, the major problem is in the igniting, and it is a particular feature of this invention that novel valve means are provided by means of which the gas to be burned is presented to the burning tube in very small quantities and at a convenient low velocity to permit igniting the same, after which the valve means is fully opened to permit a full supply of gas to the burning tube which is capable of supporting combustion of the high velocity gases which it would otherwise be impossible to ignite.

It is another object of this invention to provide in a gas torch of the type described means for readily and accurately regulating the initial rate of flow of gas to the burning tube.

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

Figure 1 is a vertical section of a device embodying the present invention.

Figure 2 is an enlarged fragmentary side view with parts broken away for clarity of illustration and partly in section of the striker wheel and ratchet mechanism embodied in the present invention.

Figure 3 is an enlarged perspective of the valve plunger utilized in connection with the present invention.

Figure 4 is an enlarged section taken on the line 4-4 of Figure 1.

Referring now more particularly to the drawings, the torch is in the shape of a pistol and is provided with a body indicated generally by the numeral 10 having a handle 11 in the form of a pistol grip and an upper body portion 12. The handle 11 is hollow as indicated and is closed by a plate 13 provided with an opening 14 in which is seated a fitting 15 having a shoulder 16 and a threaded shank 17 on which is tightened a nut 18 to retain the fitting in the opening 14. The fitting 15 has seated in the bore thereof a tube 19 which extends upwardly through the interior of the handle 11. The upper portion 12 of the body 10 is provided with a tapped bore 20. A cylindrical member 21 is threaded at its upper end to be received in the tapped bore 20 and is provided with an enlarged central bore 22 and reduced central bore 23 forming a valve seat 24 between the two bores. A coil spring 25 is received within the bore 22, and a ball 26 is provided adapted to engage the valve seat 24 and the upper end of the coil spring 25. The upper end of the tube 19 is threaded and received within the threaded open end 27 of the cylindrical member and serves as a retainer for the lower end of the coil spring 25. The upper portion 12 of the body 10 is provided with a transverse bore 30 extending part way therethrough and a reduced bore 31 communicating therewith. The bore 30 is tapped as at 32 to receive a screw 33. The screw 33 has a reduced portion providing a stub shaft 34. A valve plunger 35, shown in detail in Figure 3, is provided seated in the bore 30, which plunger 35 is composed of a spring housing 36 and a stepped cam 37 having a rod 38 affixed to one end thereof. The rod 38 extends through the bore 31, and a pair of O-rings 39 and 40 provide an air-tight seal between the rod 38 and the bore 30. The spring housing 36 has a bore 41 at one end, through which extends the stub shaft 34, on the end of which there is seated a coil spring 42, the other end of which bears against one end of the stepped cam 37 and is retained thereon by a stub shaft 43 carried thereby.

The upper portion 12 of the body 10 is provided with a bore 44 which is tapped to receive a screw 45, the lower end of which bears upon a coil spring 46, the lower end of which coil spring 46 bears against an O-ring 47 seated in the bore 44. The bore 44 communicates with a reduced bore 48 which itself communicates with the bore 36. The screw 45 is provided with a reduced portion forming a rod-like extension 50, which extension 50 is disposed in the bore 48 and adapted to contact the upper surface of the spring housing 36. A rod 52 of smaller diameter than the bore 23 is received in the bore 23 and has its upper end contacting the lower side of the spring housing 36 when the valve mechanism is closed. The upper portion 12 of the body 10 is provided with a pair of spaced side pieces 51 presenting a channel, across which there are mounted pins 53, 54 and 55. Pivotally about the pin 53 is an adjustable toggle bar 56. As shown, the toggle bar 56 consists of a flat piece of metal bent about the pin 53 to present two superposed plates 57 and 58 held apart by an inwardly and outwardly bent portion 59 of the plate 57. The plate 58 is tapped to receive an adjusting screw 60 by means of which the distance between the plates 57 and 58 may be adjusted. The head 61 of the screw 60 is, in practice, squared or flattened on two sides for a sliding fit within the flanges of a channel-shaped trigger to be hereinafter described. Thus the head 61 will be locked against turning by the flanges of the trigger as it is set. The pin 54 pivotally mounts a trigger 62 which is generally channel-shaped as indicated, and the walls of the trigger are extended laterally opposite the toggle bar 56 forming a trigger cam 63 engaging the toggle bar. The upper end of the trigger 62 is flattened to provide a pad 64. A rod 66 is provided in the channel formed by the flanges 51 and extends between two turned flanges 67 to be pivotally engaged on a pin 68 carried in a channel-shaped extension 69 of the muzzle 70. The rod 66 is provided with a collar 71, and a coil spring 72 is mounted upon the rod 66 having one end bearing upon the collar 71 and the other end bearing upon the turned flanges 67. The rod 66 rests upon the pin 55, and its inner end is adapted to be engaged by the pad 64 on the trigger.

The upper portion 12 of the body 10 is provided with a bore 75, and a smaller bore 76 extends from the bore 75 to the bore 48. The bore 75 is enlarged as at 78 forming a shoulder 79. A rod 80 is mounted in a bore 81 aligned with the bore 78. The upper part of the body 12 is relieved as at 82 to provide access to the draw-nut 83 by the fingers of an operator. The draw-nut 83 is provided with a female thread 84 and with an enlarged bore 85. The draw-nut bearing 80 has one end thereof cut and the other end extends through the bore 81 and outwardly thereof, as indicated at 86, where it is received within the bore 87 of the muzzle 70. The muzzle 70 is provided with
a muzzle bushing 90 which is provided with a collar 91, a threaded portion 92 and a smooth portion 93 adapted to be seated in the bore 87. The combustion tube 95 is provided which is adapted to be received in the bushing 90, the draw-nut bearing 80 and the bore 75, and has its inner end threaded for threaded connection with the threads 84 of the draw-nut 83. The combustion tube 95 is provided with a notch 96 in the lower side thereof and is also provided with a pair of aligned holes 97 (one only of which is shown in Figure 1), which holes are adapted to align with similar holes (not shown) in the draw-nut bearing 80 and a pair of elongated slots (one only of which is shown and numbered 104 in Figure 2) in the rear portion of the muzzle 70.

The combustion tube 95 is provided with a venturi section 98. The combustion tube 95 houses an indexing tube 99, one end of which has a portion cut away as at 100 to provide a portion to overlie the indexing pin 77. The indexing tube 99 is provided with an annular recess 101 in which is mounted a rubber gasket 102 adapted to seal the bore 80 when the combustion tube 95 is drawn up tight by the draw-nut 83. The combustion tube 95 houses a metering jet 103, the nozzle of which jet is disposed substantially adjacent the holes 97 and associated openings in the draw-nut bearing and muzzle.

The mechanism just described and constituting the upper portion of the torch is substantially the same as that shown in the aforesaid patent to Warren A. Sparks No. 2,506,114.

The muzzle 70 is provided with a circular opening 105 in which there is pivotally mounted a lighter wheel 106, which lighter wheel mounts a stepped ratchet mechanism 107. The muzzle 70 is also provided with a bore 108 communicating with the opening 105, and the lower portion of the muzzle is bored and tapped as at 109 to receive a reduced threaded portion 110 of a screw 111. A leaf spring 112 is bent into a J-shape as shown and provided with a pair of aligned openings 113 and 114. The opening 113 receives the enlarged shank of the screw 111, and the opening 114 rides upon the shoulder formed by said enlarged shank. The upper end of the leaf spring 112 mounts a loosely riveted pin 115 disposed within the bore 108. A piece of flint 116 is disposed within the bore 108 and held in abrading contact with the wheel 106 by means of the leaf spring 112 and the pin 115, and the tension of the spring can be adjusted by making up or backing off the screw 111.

The forward end of the lower portion of the body 12 is provided with a slot 120 and a downwardly drilled hole 121 in which is positioned the leg 122 of an actuator 123, the forward portion of which lies in a bore 124 in the muzzle 70 communicating with the opening 105 therein.

As shown in Figures 2 and 4, the inner end 125 of the actuator 123 is bent inwardly to having a spring contact with the stepped portions of the ratchet 107.

The operation of the above-described device is as follows: As uninstalling 15 is to be attached to a source of butane or propylene under pressure, the operator simply takes the torch in hand, depresses the trigger 62 causing the pad 64 to strike the end of the rod 66 thus forcing the muzzle 70 to ride forwardly against the bias of the spring 72 on the bearing 80. As this is accomplished, the end 125 of the actuator 123 slips over one of the steps of the ratchet 107 and contacts the next of said steps. As the trigger continues to be depressed, the rod 66 of the rod 66 slips past the pad 64 and frees the muzzle 70 so as to permit the same to be returned under the force of the spring 72 to its original position. As this is done, the end 125 of the actuator 123 turns the wheel 106 against the flint 116 thus causing a spark to be thrown into the region of the notch 96 in the combustion tube 95.

In the meantime, the cam 63 engages the plate 58 which in turn forces the rod 38 and associated stepped cam 37 against the bias of the spring 42.

As the step 37a moves to the left (Figure 3), it will separate the upper and lower leaves of the spring housing 36 thus forcing the rod 52 downward and unseating the ball 26 from the valve seat 24. It will be noted that the free edge of the lower leaf spring 36 is beveled and that the edges of the steps 37a and 37b are rounded to permit the action. It may be well to point out that the screw 45 has been adjusted to regulate the position of the rod-like extension 50 bearing on the top leaf of the spring housing so as to provide for the exact amount of opening of the ball 26 from the valve seat 24 at this point. Gas thus released by the unseating of the ball 26 passes through the bore 76 into the gas combustion tube 95 and in so doing picks up air from the openings 97 and 104 and associated opening in the bearing tube. This mixture of gas and air is ignited by the spark from the wheel 106 and flint 116. As pointed out above, the mechanism just described has been adjusted to only slightly remove the ball 26 from the seat 24 so as to pass the combustion tube 95 and complete unseating the ball 26 from the seat 24, allowing gas at full pressure and volume to pass to the combustion tube.

A tip 130 comprising a cylindrical member 131 attached to a collar 132 in which there is seated a plurality of asbestos rings 133 retained by a sleeve 134 internally threaded for threaded connection with the threads 92 is removably received upon the muzzle housing 90. The cylindrical member 131 is provided with a perforated plate 140 which has a centrally disposed cylindrical extension 141.

The asbestos rings 133 are required in order to insulate the torch as it has been found in practice that butane and propane when burned in a torch of the type of this invention generate such an intense flame that in a very short period of time the entire torch becomes too hot to handle in the absence of such insulation.

A spare flint compartment is conventionally provided comprising a bowl 142 mounted by a threaded plug 201 to accommodate spare flints 202.

While there has been described what is at present considered a preferred embodiment of the present invention, it will be appreciated by 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 hereinafter all such changes and modifications as come within the scope of the appended claims.

I claim:

1. In a gas torch of the type described comprising a body; gas passage means in said body; a trigger mounted on said body; flint and striker means actuated by said trigger and a stage valve associated with said trigger and associated with one of said gas passage means whereby on initial depression of said trigger said valve is partially opened and said flint and striker are actuated to ignite said torch and on further depression of said trigger said valve is fully opened; said valve comprising a valve seat in one of said passage means and a ball spring biased towards said seat; a rod engageable with said ball to return same to its original position; said rod means connecting said cap and said trigger; and means for adjusting the degree to which said valve is initially partially opened.

2. A torch as set forth in claim 1 in which said adjusting means comprises a U-shaped spring carried by said trigger, one leaf of which engages said means connect-
2,808,714

3. In a gas torch of the type described comprising a body; gas passage means in said body; a trigger; flint and striker means actuated by said trigger and a two stage valve associated with said trigger whereby on initial depression of said trigger said valve is partially opened and said flint and striker are actuated to ignite said torch and on further depression of said trigger said valve is fully opened; means for adjusting the degree to which said valve is initially partially opened; and a nozzle associated with said gas passage, said nozzle including elements of poor heat conductivity to insulate said body from said nozzle.

4. In a gas torch of the type described comprising a body; gas passage means in said body; a trigger; flint and striker means actuated by said trigger and a two stage valve associated with said trigger whereby on initial depression of said trigger said valve is partially opened and said flint and striker are actuated to ignite said torch and on further depression of said trigger said valve is fully opened; and means for adjusting the degree to which said valve is initially partially opened; a nozzle associated with said gas passage, said nozzle including a plurality of asbestos rings to heat insulate said body from said nozzle.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Inventor</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,303,868</td>
<td>Stuckenbrot</td>
<td>Dec. 1, 1942</td>
</tr>
<tr>
<td>2,477,917</td>
<td>Wilson</td>
<td>Aug. 2, 1949</td>
</tr>
<tr>
<td>2,506,114</td>
<td>Sparks</td>
<td>May 2, 1950</td>
</tr>
</tbody>
</table>