Oct. 8, 1957 E. D. WILSON 2,808,714

TRIGGER TYPE GASEOUS BLOW TORCH

Filed Oct. 21, 1953

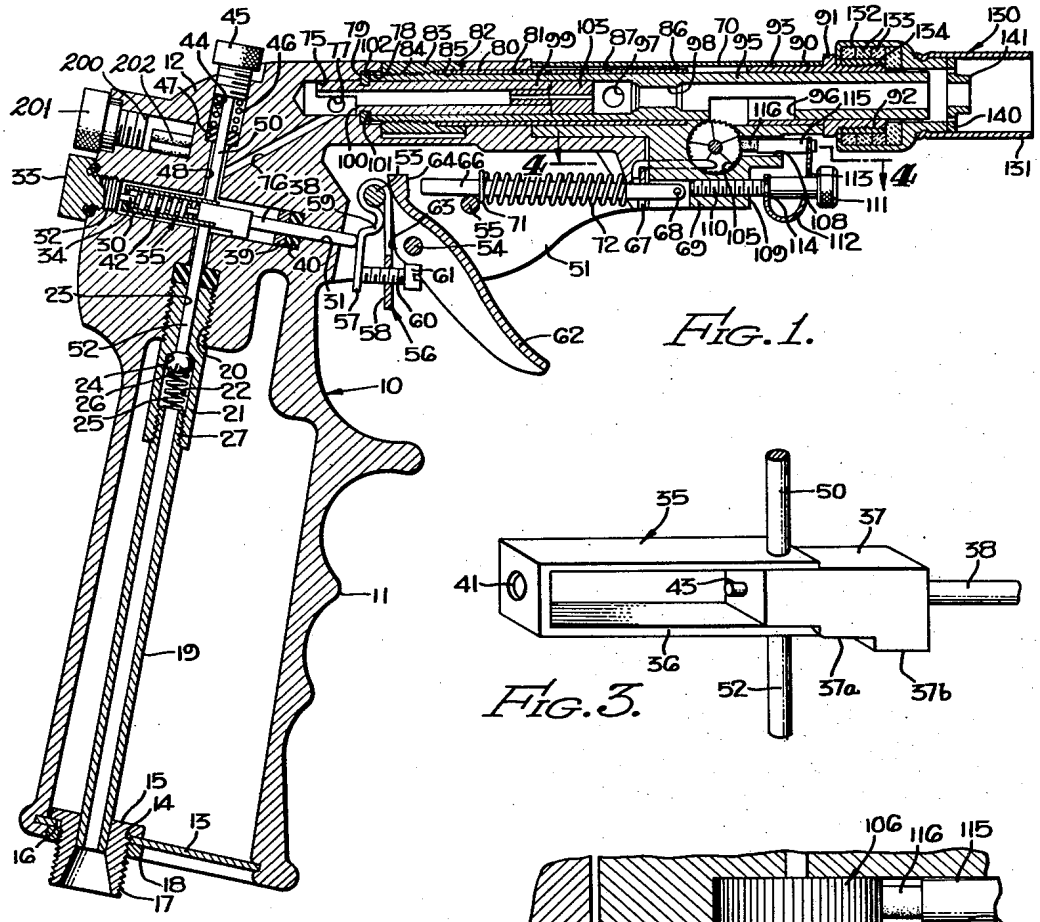

FIG. 1.

FIG. 3.

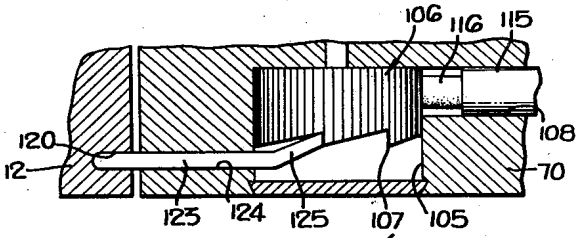

FIG. 4.

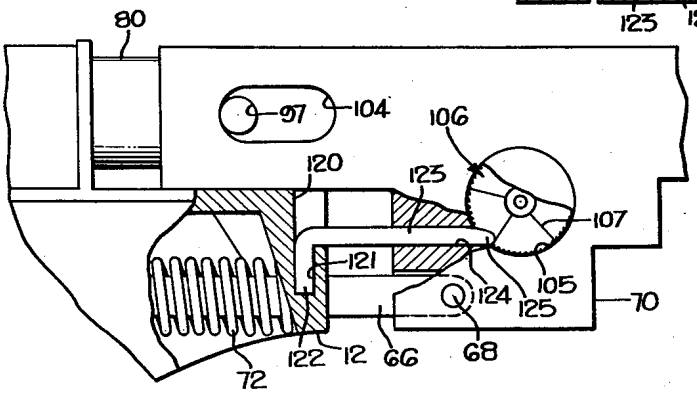

FIG. 2.

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TRIGGER TYPE GASEOUS BLOW TORCH

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4 Claims. (Cl. 67—20.1)

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 consequent 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 **30**. 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**. Pivoted 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 after it is once 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 inturned 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 on the inturned 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 tubular draw-nut bearing **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 seated in the bore **85** and 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. A 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 on the shoulder 79 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 into 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: Assuming the fitting 15 to be attached to a source of butane or propane 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 rearward end 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 37*a* 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 end of the lower leaf spring 36 is beveled and that the edges of the steps 37*a* and 37*b* are rounded to permit this 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 to the combustion tube only a small amount of gas at a consequent reduced pressure and velocity. This will result in igniting of the flame and will maintain a usable small flame. Further depressing of the trigger 62 will cause the second step 37*b* of the stepped cam 37 to enter between the leaves of the spring housing 36 thus further depressing the rod 52 and completely 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 bushing 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 bore 200 closed 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 herein 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 two 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 unseat same; a step cam for variably moving said rod; means connecting said cam 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-

ing said cam and trigger and means for adjustably separating the leaves of said U-shaped spring.

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; 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.

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