

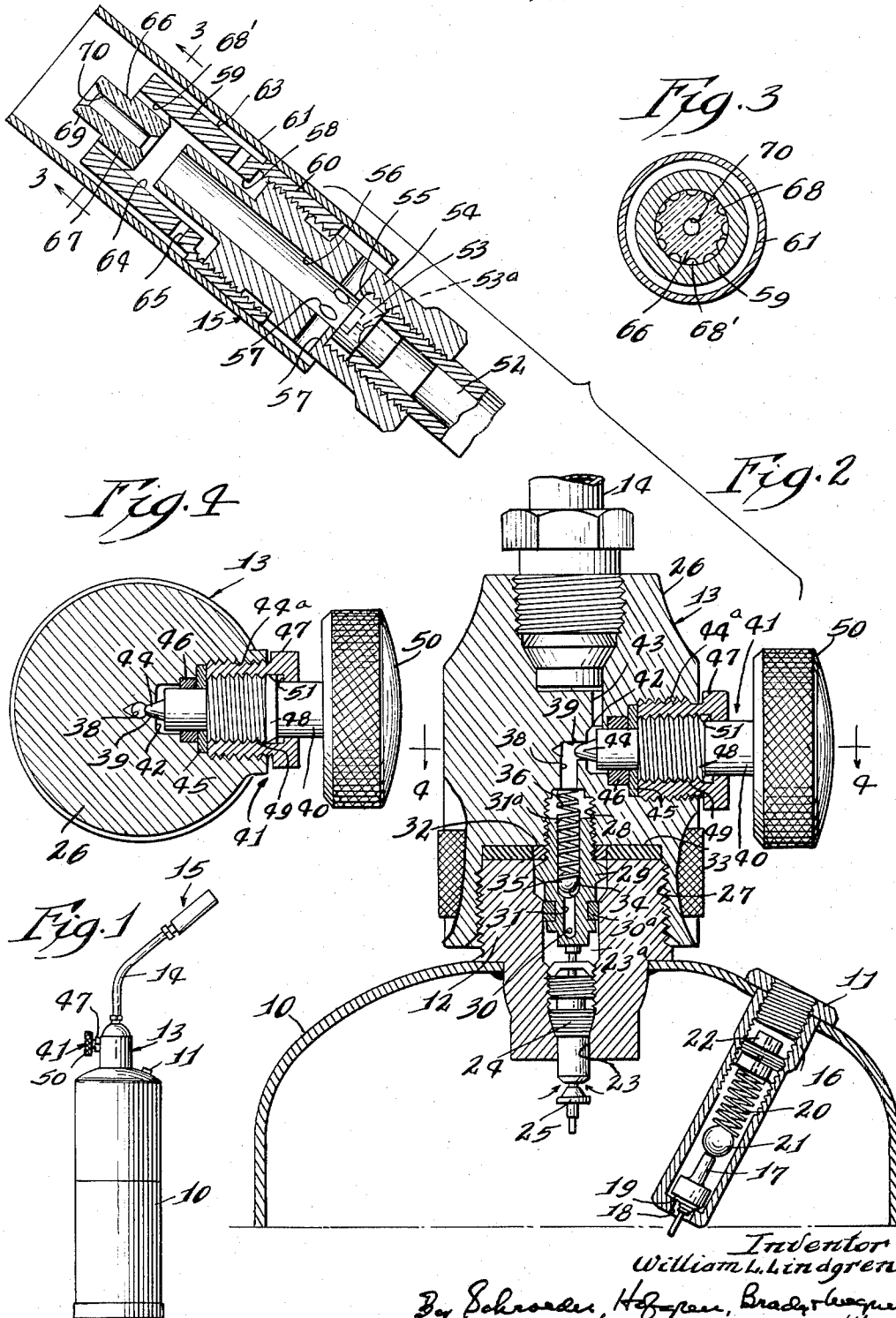
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W. L. LINDGREN

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HAND TORCH

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Inventor
William L. Lindgren
By Schroeder, Hefner, Braden, & Quinn
Attys

1

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HAND TORCH

William L. Lindgren, Sycamore, Ill., assignor to The Turner Brass Works, a corporation of Illinois

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1 Claim. (Cl. 158—33)

This invention relates to a hand torch and, more particularly, to a hand torch having a disposable fuel tank and a unitary valve assembly and burner means detachably connected thereto.

An object of this invention is to provide a new and improved hand torch.

Another object of this invention is to provide a hand torch having a fuel tank and a unitary valve assembly and burner means detachably connected thereto whereby the valve assembly and burner means may be detached from the fuel tank when the tank is empty and secured to a full tank for subsequent use of the hand torch and wherein the valve assembly is constructed so that the maximum number of necessary cooperating parts between the tank and valve assembly are carried by the valve assembly to reduce the wastage incurred by disposal of the empty tank.

Another object of the invention is to provide a hand torch having a tank, valve assembly, and burner means, said burner means including a hollow cylindrical tube and an insert having a longitudinal bore and a plurality of longitudinal grooves on its outer periphery press-fitted into engagement with the inner periphery of the hollow tube, the construction and arrangement being such that the combustion mixture passes through the passages formed by the grooves on the periphery of the insert and through the bore therein to form a circular array of flame jets with a flame centrally disposed therein at a position externally of the hollow tube.

Another object of the invention is to provide a hand torch having a fuel tank and a valve assembly connected thereto, wherein the valve assembly includes a valve body secured to the tank and has passage means therethrough leading from an inlet end to an outlet end, and valve means for controlling flow of fuel through the passage means in the valve body including a hollow cylindrical packing member mounted in the valve body, a valve stem threadably mounted in said packing member and having an end positioned for controlling the open or closed position of said passage means and means coacting between the packing member and the valve stem for limiting the open position of the valve.

Another object of the invention is to provide a hand torch having a fuel tank and a valve assembly and burner means connected thereto, wherein the valve assembly has a valve body connected to the tank and passage means therein leading from the fuel tank outlet to the burner means, spring-urged check means in one of said passages being operable to stop the flow of fluid from the tank when the back gas pressure developed between the burner and the check means becomes greater than the gas pressure in the tank so as to provide a substantially even flame at the burner.

Further objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawings in which:

Fig. 1 is a side elevational view of the hand torch;

Fig. 2 is an enlarged side elevational view of the in-

2

vention in vertical section and with parts of the angle tube and tank omitted;

Fig. 3 is a view taken along the line 3—3 of Fig. 2; and, Fig. 4 is a view taken along line 4—4 of Fig. 2.

5 While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail an illustrative embodiment of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claim.

15 In a preferred form of the invention, the hand torch embodies a cylindrical fuel tank 10 containing liquefied petroleum fuel or the like, and a valve assembly 13 for regulating flow of gas through conduit means such as an angle tube 14 for ignition at a burner means 15 carried at the end of the angle tube 14.

20 The tank 10 has a pressure relief valve 11 comprising a valve housing 16 which may be brazed to the tank. A stem 17 in the housing 16 extends through an opening 18 in the bottom of the housing and a rubber washer 19 on the bottom of the stem acts to seal opening 18 when urged down into closed position by a spring 20 pressing on a ball 21 slidably mounted in the housing 16. The washer 19 unseats to vent excess pressure through housing 16 to atmosphere, the pressure at which the valve vents being controlled by the position of a threaded stud 22 having a passage 22a and which may be shifted to vary the force of the spring 20.

30 A tank outlet member 12 brazed to the tank is provided with a bore 23 threadably receiving a mechanical type valve, such as a conventional tire valve 24, which permits egress of fuel from the tank as shown by the arrows upon depression of the valve core 25 to the position shown in Fig. 2.

40 The valve assembly 13 comprises a valve body 26 having a threaded bore 27 threaded on the burner inlet 12 and a coaxial threaded bore 28 for receiving a valve-operating member 29, the bottom of which engages and depresses the valve core 25 when valve body 26 is secured on the tank. A small opening 30 is provided near the bottom of member 29 and connects a portion 23a of bore 23 above the tank valve 24 and a bore 31 in the member 29 to permit gas to pass from the tank 10 to the bore 31. Surrounding the valve-operating member 29 and disposed in a groove therein is a rubber O-ring 30a which slides snugly in the portion 23a of bore 23 to prevent the escape of fuel as valve-operating member 29 is inserted in the tank outlet member 12 and begins to depress the valve core 25 in the tank. It will thus be seen that the valve assembly 13 is releasably connected to the tank 10 and that when a tank is empty, the valve assembly may be placed on a full tank. When the tank 10 and valve assembly 13 are assembled, a washer 32 and a gasket 33 make an air-tight connection between the parts.

50 An upper portion 31a of bore 31 is enlarged to provide a curved shoulder 34 facing away from the gas flow and providing a seat for check means such as a ball check valve 35 urged to a closed position by a spring 36. The ball check 35 is normally unseated by gas pressure in the tank 10 to permit flow of fuel but acts to prevent flow of fuel from the tank 10 whenever the back gas pressure developed between burner means 15 and check valve 35 combined with the pressure of the check spring 36 becomes greater than the gas pressure in the tank, closing check valve 35. As the back pressure is gradually reduced due to the passage of fuel through the burner means 15, the pressure in the tank 10 again opens check valve 35 to allow the passage of fuel from the tank 10. This cycle is continually repeated whenever the torch is

in operation and tends to provide a substantially even flame at burner means 15, the cycle being accelerated when liquid fuel passes beyond the check means because of the pressure created by its vaporization. The fuel flowing past the ball check 35 passes from bore 31a into a passage 38 having a cross passage 39 which connects with a control valve chamber 42 and a passage 43. Fuel flows from the passage 43 through the angle tube 14 to the burner means 15.

In order to control the flow of fuel from the tank 10 to the burner means 15, a control valve in the form of a needle valve 41 is provided. This valve has a valve stem 40 provided with an end 44 which is shaped to close the cross passage 39 in one limit position (as in Figs. 2 and 4) and to permit unrestricted flow through the cross passage in its other limit position. The control valve 41 is seated in a threaded bore 44 in the body 26 of the valve assembly 13. A packing member in the form of a sleeve 47 is threadably received in the bore 44 and abuts against a washer 45 fitted against an O-ring 46. The valve stem 40 has threads 48 which engage threads 49 on the inner wall of the packing member 47 so that rotation of a knob 50 on the valve stem will vary the position of the valve stem end 44 with respect to the cross passage 39. The packing member 47 is provided with a shoulder 51 which engages the outer edge of the threads 48 on the valve stem to limit the opening movement of the valve.

The angle tube 14 carrying the burner means 15 is threadably received in the upper end of the valve body 26. As best shown in Fig. 2, a filler rod 52 is loosely fitted in the angle tube to reduce the cross-sectional area within the tube while allowing gas to flow between the filler rod 52 and angle tube 14. The filler rod 52 terminates short of the angle tube 14 to allow for positioning of an orifice block 53 having an orifice 53a within the angle tube.

A primary tube 54 is threadably received on the end of the angle tube 14 and has a shoulder portion 55 mating with the top of the orifice block 53. A longitudinal bore 56 is provided in the primary tube 54 for communication with the orifice 53a in the orifice block. A plurality of radial openings 57 are provided in the primary tube through which air enters the bore 56 to mix with the fuel passing therethrough. The upper end of the primary tube is of a reduced outer diameter so as to form with a portion of the inner periphery of a cylindrical hollow mixer tube 59 having a lower sleeve portion 60 threadably received on the free end of the primary tube 54 an annular chamber 58. A cylindrical flame tube 61 is press fitted onto the sleeve portion 60 of the mixer tube 59. An annular chamber 63 is formed between the inner periphery of the flame tube 61 and the upper portion of the mixer tube 59 above the sleeve 60. A bore 64 into which the upper end of the primary tube 54 extends is provided in the mixer tube 59 extending through to the upper end thereof and in communication with a plurality of radial passages 65 provided in the mixer tube 59 which open to the annular chamber 63.

A mixer tube insert, which may be formed by the extrusion process, 66 is press fitted into the open end of the bore 64 and comprises a gear-shaped lower portion 67 provided with a plurality of equally-spaced grooves 68 around its periphery which form with the inner periphery of the mixer tube 59 a plurality of passages 68' communicating with the bore 64. A portion 69 of the mixer tube insert extends beyond the end of the mixer tube 59 and is pierced by a longitudinal bore 70 which is bevelled at both ends and is in communication with the bore 64. Fuel passing through the orifice block 53 flows through the bore 56 and mixes with air flowing through the passages 57. The mixture flows out the end of bore 56 and the flow is then divided so that a certain amount passes through the passages 65 and through the chamber 63, through passages 68' between the mixer tube 59 and mixer

tube insert 66, and through the bore 70 to be ignited at the upper open end of the flame tube 61 to form a series of jets disposed in a circle with a central jet disposed within the circle.

I claim:

In a liquefied petroleum appliance, a fuel tank containing a supply of liquefied petroleum fuel at increased pressure and having a conduit means connected thereto forming a passage extending from said fuel tank to a point of fuel utilization, a burner unit in one end of said conduit means at the point of fuel utilization operative as a restriction and effecting a build-up of back gas pressure in said passage, and a valve assembly in the other end of said conduit means to control the admission of fuel at increased pressure into said passage from said fuel tank, said passage having a valve seat formed therein intermediate said burner unit and said fuel tank, a movable valve engageable against said seat, a spring in said passage between said movable valve and said burner unit, said movable valve having a pressure responsive surface bottoming one end of said spring and being subject to back gas pressure developed in said passage between said burner unit and said movable valve, said valve member having a seating surface subject to the pressure in the fuel tank, said pressure-responsive surface and said seating surface of said movable valve being proportioned and said spring exerting a biasing force such that the forces provided by said spring together with the back gas pressure acting on said movable valve exceed the forces acting on said movable valve resulting from the pressure of the fuel in said fuel tank, thereby temporarily closing said movable valve against said seat, whereupon said back gas pressure is reduced by consumption of the gas at the burner unit, whereupon said movable valve will automatically cycle between closed and open positions, a second valve seat formed in said passage between said movable valve and said burner unit, and a valve engageable with said second valve seat and having a portion extending outside of said conduit means into an accessible position for selectively opening and closing said passage and for selectively initiating automatic regulation of said passage by said movable valve, said burner unit including a mixer tube having a cylindrical bore, and a mixer tube insert member comprising a generally cylindrical disc having a circumferential row of alternating peripheral ribs and grooves extending in an axial direction and said ribs having an outer diameter corresponding to the inner diameter of said cylindrical bore, said disc being inserted in firm assembly in one end of said cylindrical bore and together with said mixer tube forming a plurality of separated circumferentially spaced passages each communicating at one end with said bore and discharging outwardly of said mixer tube, said mixer tube insert having a centrally disposed orifice formed therein extending axially therethrough concentrically inwardly of said grooves, whereby the fuel will be burned in the form of a series of circularly disposed jets with a central jet disposed within the circle.

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