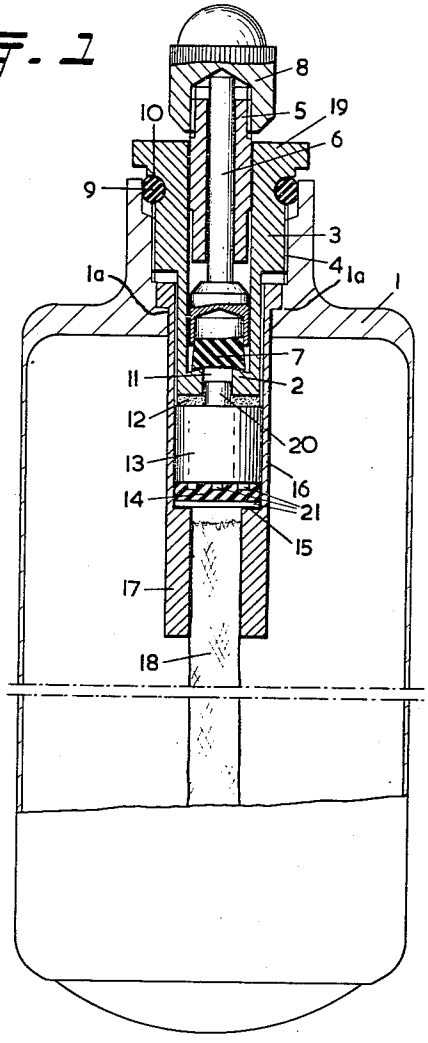
Jan. 21, 1964 A. VAN POPPEL 3,118,295

STOP VALVE AND BURNER FOR LIQUEFIED GAS

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FIG. 1

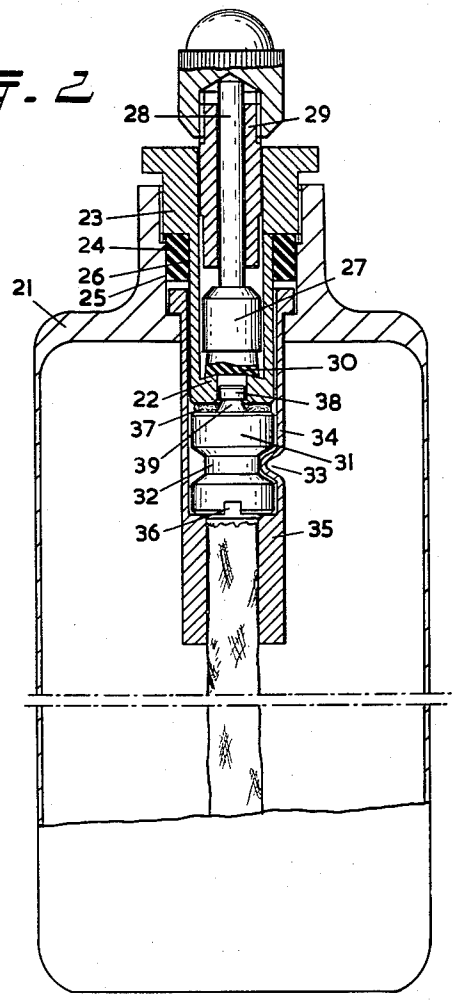


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STOP VALVE AND BURNER FOR LIQUEFIED GAS

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Fig. 2

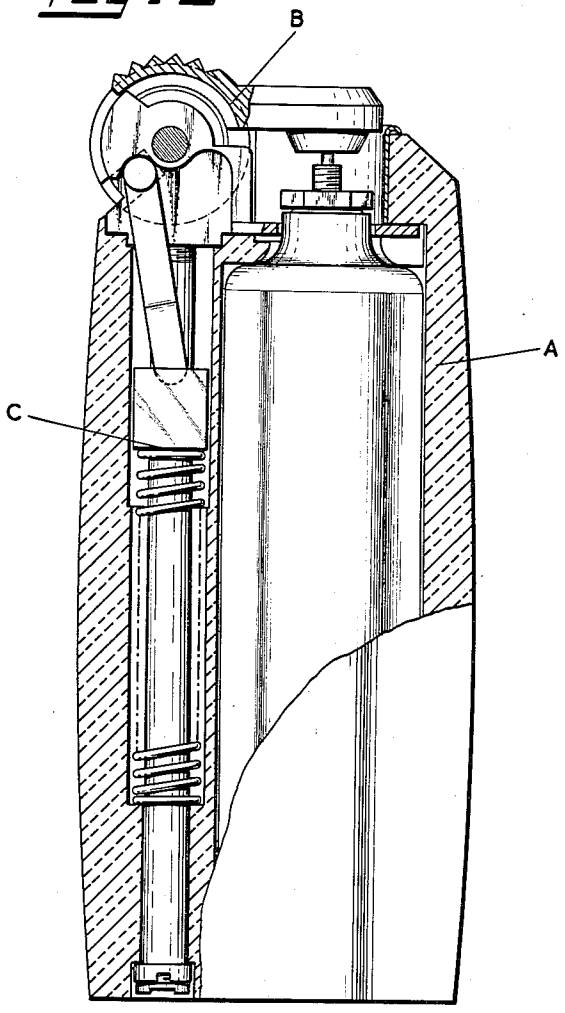


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Fig. 3



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STOP VALVE AND BURNER FOR LIQUEFIED GAS

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3 Claims. (Cl. 67—7.1)

The present invention relates in general to a fuel reservoir and burner device and more particularly to such a device for lighters.

The present invention comprises a reservoir for holding under pressure a low boiling liquid that at atmospheric pressure is a gas. A stop valve and a burner for the low-boiling liquid is mounted in the reservoir. The stop valve comprises a cylindrical sleeve internally provided with a seat. The sleeve is inserted in the filling opening of the reservoir and is so fitted to the reservoir by means of a screw-thread as to be adjustable relative to a regulating disc bearing on an abutment. A burner is mounted in the sleeve opposite seat and has a coaxial aperture or bore through which the stem of a valve seatable on said seat passes.

This type of pressure liquid reservoir with a stop valve and a burner is intended for use with a lighter, the stop valve is closed by a spring-loaded lever pivotally mounted on the lighter. One end of the lever bears on the valve stem projecting from the burner opening and presses the valve onto its seat. The reservoir is opened by pressing the other end of the lever to pivot the lever against the bias of the spring, freeing the valve which is lifted off its seat by the gas pressure prevailing in the reservoir, the vapour of low-boiling liquid flows along the stem out of the aperture of the burner.

The sleeve which comprises a seat on which the valve bears and which is mounted in the reservoir by means of screw-threads is adjustable relative to a regulating disc bearing on an abutment for controlling the rate of flow of the gas after the valve has been lifted off its seat.

The pressure exerted on this regulating disc enclosed between the abutment and sleeve determines the height of the flame which results when the gas is ignited at the moment when the valve is lifted off its seat.

The pressure exerted on the regulating disc not only depends on the screwing home of the sleeve into the reservoir, but, also on the force, with which the spring-loaded lever bears on the stem and thus on the valve and on the seat provided in the sleeve. The latter force is relieved when the lever is moved against the bias of the spring, and the sleeve, owing to its screw thread connection with the reservoir always has some play relative to said reservoir, will exert a varying pressure on the sealing disc during the opening and closing of the reservoir. The result is that immediately after the opening of the reservoir the ignited effluent gas will first form a large flame that will gradually grow smaller until it is the size for which the lighter was initially set. The reduction in flame size is caused by the reduced pressure exerted on the sealing disc slightly expanding it.

The object of the invention is to provide a flame of a uniform desired size.

To achieve this object the invention provides an abutment, on which the regulating disc bears, consisting of a follower resting on a resilient member that does not prevent the passage of the liquid.

A feature of the invention is that the follower is supported in a second cylindrical sleeve internally provided with a seat, the second sleeve rigidly supported by the reservoir and surrounding the first sleeve over a part of its length and extending with its seat containing portion further into the reservoir beyond said first sleeve.

Other objects and features and a more complete understanding of the invention may be had by referring to the following description and claims, taken together with the accompanying drawings, in which:

FIGURE 1 is a partial elevation and cross-sectional view of the invention including a reservoir, a stop valve and a burner.

FIGURE 2 is a partial elevation and cross-sectional view of a second embodiment of said reservoir.

FIGURE 3 shows a side elevation in partial cross-section of a lighter in which the invention is installed.

In the reservoir 1 the stop valve comprises a cylindrical sleeve 3 internally provided near one end with a valve seat 2. The sleeve is inserted, seat end first, in the filling opening of the reservoir and is adjustably secured to the reservoir by means of screw thread 4. In the opposite end of sleeve 3, a burner 5 is provided, the burner having a coaxial bore through which the stem 6, of a valve 7 resting on the seat, slidably passes.

The possibility of gas escaping between the screw threads 4 tapped in the reservoir and cut on the sleeve is prevented by a ring 9 of resilient material provided in an angular recess beneath the shoulder 10 of the sleeve 3.

A cap 8 is screwed on the burner, and bears on the stem projecting from the burner and presses the valve onto its seat for closing the reservoir filled with low boiling liquid when said reservoir has not been mounted in a lighter.

When the cap has been removed and the reservoir has been fitted in a lighter A as illustrated in FIG. 3, and a lever B pressed the gas flowing from the burner may be ignited. The height of the flame can be adjusted by turning the sleeve 3 relative to the reservoir so as to regulate the pressure which the sleeve exerts on a regulating disc 12 located beneath the port 11 in the valve seat.

The regulating disc 12 comprises a fibrous non-porous material and bears on a follower 13, which in turn rests on a resilient member 14, that does not prevent the passage of gas. The member 14 is preferably a disc of rubber provided with grooves 21 on either side, the grooves on the lower side extending at right angles to the grooves on the upper side. The member 14 loosely fits in and bears on a seat 15 of a second cylindrical sleeve 16, which is inserted in the filling opening of the reservoir coaxially with the first sleeve 3 and which surrounds the first sleeve over part of its length and which extends with its seat-containing portion further into the reservoir beyond said first sleeve. The second sleeve 16 is supported in the reservoir 1 on shoulders 1*a*. The follower 13 is axially movable in the second sleeve 16. In the extension 17 of said second sleeve 16 a wick 18 of cotton is provided. If the spring-loaded lever B is moved against the bias of a spring C, the valve 7 will be lifted off its seat by the pressure of the low boiling liquid and will flow from the cotton wick 18 through the grooves and around the edges of the loosely fitting resilient member 14, through the clearance left between the follower 13 and the inner wall of the second sleeve 16, along the fibres on the surface of the regulating disc 12, and as a gas through the port 11 in the first sleeve 3, past the valve 7 and through the clearance provided between said loosely fitting valve and the inner wall of the first sleeve and through the clearance between the loosely fitting stem 6 of said valve and the inner wall of the burner 5.

When the outflowing gas is ignited the height of the flame may be regulated by engaging the head 19 of the sleeve 3 by means of a wrench and by turning said sleeve relative to the reservoir 1 so that the pressure on the regulating disc 12 located between the first sleeve and the follower 13 supported in the second sleeve is adjusted

and the passage of low boiling liquid along the fibers on the surface of the sealing disc is regulated.

If the spring-loaded lever bears on the stem 6 of the valve 7 the valve is pressed on its seat 2 and the reservoir is closed. The sleeve 3 to which the pressure exerted on the valve 7 is transmitted will slightly move down owing to the play left in the screw thread connection 4 and will to that extent increase the adjusted pressure exerted on the regulating disc. The downward movement of the sleeve 3, however, is taken up by the resilient member 14 located beneath the follower 13. This resilient member thus guarantees that the pressure exerted on the regulating disc 12, once said pressure has been adjusted, will remain constant during the opening and closing of the valve 7.

The follower 13 is provided with a pin 20 extending through the regulating disc 12 into the port 11 in the seat of the first sleeve 3. The pin 20 fills the port 11 and minimizes the free space and the liquid present therein, if any.

According to another embodiment as shown in FIG. 2 the reservoir 21 includes a stop valve comprising a cylindrical sleeve 23, provided internally with a seat 22, and inserted in the filling opening of the reservoir and adjustably secured to the reservoir by means of screw threads. In this embodiment a rubber ring 24 closely fitting between the inner wall 25 of the filling opening and the cylindrical outer wall 26 of the sleeve constitutes a seal. The valve 27 which is guided in the burner 29 by the stem 28, bears on seat 22 via a rubber disc 30 as in the first embodiment.

A second sleeve 34 is inserted in the filling opening coaxially with the first sleeve 23. A loosely fitting follower 31 is provided with an annular groove 32 cooperating with a depressed portion 33 in the sleeve 34, so that said follower after being inserted in the sleeve is kept immobile in its place. The follower 31 bears directly on the enlarged wall portion 35 of the sleeve 34, a passage for the combustible fluid being provided by a groove 36 and the loose fit of the follower in the sleeve. The passage of the combustible fluid along the fibrous surface of the sealing disc 37 is the same as described for the first embodiment, the fluid changing into gas and passing through the clearance left between the loosely fitting pin 38 in the port of valve seat 22, past the valve closure rubber disc 30, and through the clearances between the valve 2 loosely fitting in the first sleeve 23, and the valve stem 28 loosely fitting in the coaxial aperture of the burner 29.

In order to guarantee that the non-porous disc 37 is secured on the end face of the follower 31 the pin 38 comprises a portion 39 of reduced diameter, the aperture in the non-porous disc 37 of fibrous material having a slightly smaller diameter than the head of the pin 38. The non-porous fibrous material of the disc 37 is resilient and is capable of taking up the slight changes of pressure exerted thereon when the valve and valve stem are operated without changing the height of the flame adjusted by turning the sleeve 23 relative to the reservoir 21.

Although we have described our invention with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What I claim and desire to secure by Letters Patent is:

1. An improved device for gas burning lighters comprising, in combination, means defining a pressure reservoir for containing fuel for a gas lighter, said fuel comprising a liquid under pressure and gasifiable at atmospheric pressure, a sleeve in communication with said reservoir, another sleeve adjustably movable axially relative to the first-mentioned sleeve extending partially into said first-mentioned sleeve and outwardly of said means defining said reservoir, said other sleeve having an inlet port and a portion defining a stop valve seat circumferentially of said inlet port, a valve disposed axially in said other sleeve and having a valve stem and a resilient valve member seatable on said seat, said valve stem being operable axially to seat said valve member on said seat and close said valve port and operable axially to move said valve member to an unseated position opening said valve port, follower means disposed axially spaced from said valve internally of said first-mentioned sleeve and having radial clearance between it and said first-mentioned sleeve, a non-porous regulating disk of fibrous material disposed between said follower and said sleeve portion defining said valve seat to regulate fuel flow along a surface thereof to said stop valve port, a burner extending in said other sleeve and having an axial bore through which said valve stem extends axially and spaced radially inwardly therefrom to allow fluid flow through said bore when said valve port is opened, and means cooperative with said valve stem for biasing said valve member toward said seat to close said valve port.

2. An improved device for gas burning lighters comprising, in combination, means defining a pressure reservoir for containing fuel for a gas lighter, said fuel comprising a liquid under pressure and gasifiable at atmospheric pressure, a sleeve in communication with said reservoir, another sleeve adjustably movable axially relative to the first-mentioned sleeve extending partially into said first-mentioned sleeve and outwardly of said means defining said reservoir, said other sleeve having an inlet port and a portion defining a stop valve seat circumferentially of said inlet port, a valve disposed axially in said other sleeve and having a valve stem and a resilient valve member seatable on said seat, said valve stem being operable axially to seat said valve member on said seat and close said valve port and operable axially to move said valve member to an unseated position opening said valve port, follower means disposed axially spaced from said valve internally of said first-mentioned sleeve and having radial clearance between it and said first-mentioned sleeve, a non-porous regulating disk of fibrous material disposed between said follower and said sleeve portion defining said valve seat to regulate fuel flow along a surface thereof to said stop valve port, a burner extending axially in said other sleeve and having an axial bore through which said valve stem extends axially and spaced radially inwardly therefrom to allow fluid flow through said bore when said valve port is opened, means cooperative with said valve stem for biasing said valve member toward said seat to close said valve port, and resilient means mounted in said first sleeve extending transversely thereof supporting said follower for taking up any movement of said other sleeve thereby keeping constant the amount of fuel passing along said fibrous surface, whereby said burner receives the same amount of fuel at any time whenever the stop valve is open.

3. In a gas burning lighter, in combination, means defining a pressure reservoir for containing fuel for a gas lighter, said fuel comprising a liquid under pressure and gasifiable at atmospheric pressure, a sleeve in communication with said reservoir, another sleeve adjustably movable axially relative to the first-mentioned sleeve extending partially into said first-mentioned sleeve and outwardly of said means defining said reservoir, said other sleeve having an inlet port and a portion defining a stop valve seat circumferentially of said inlet port, a valve disposed axially in said other sleeve and having a valve stem and a resilient valve member seatable on said seat, said valve stem being operable axially to seat said valve member on said seat and close said valve port and operable axially to move said valve member to an unseated position opening said valve port, follower means disposed axially spaced from said valve internally of said first-mentioned sleeve and having radial clearance between it and said first-mentioned sleeve, a non-porous regulating disk of fibrous material disposed between said

follower and said sleeve portion defining said valve seat to regulate fuel flow along a surface thereof to said stop valve port, a burner extending axially in said other sleeve and having an axial bore through which said valve stem extends axially and spaced radially inwardly therefrom to allow fluid flow through said bore when said valve port is opened, said lighter having means cooperative with said valve stem for biasing said valve member toward said seat to close said valve port and for releasing said valve stem when said lighter is to be used, resilient means mounted in said first sleeve extending transversely thereof supporting said follower for taking up any movement of said other sleeve thereby keeping constant the amount

of fuel passing along said fibrous surface, whereby said burner receives the same amount of fuel at any time whenever the stop valve is open.

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