July 17, 1951 P. W. FELT 2,561,270

LIQUEFIED PETROLEUM GAS LIGHTER

Filed May 13, 1950 2 Sheets-Sheet 1

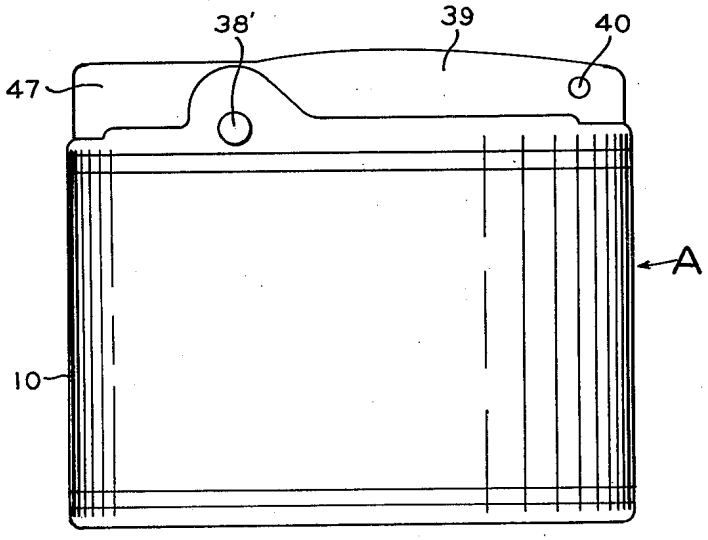

FIG. 1

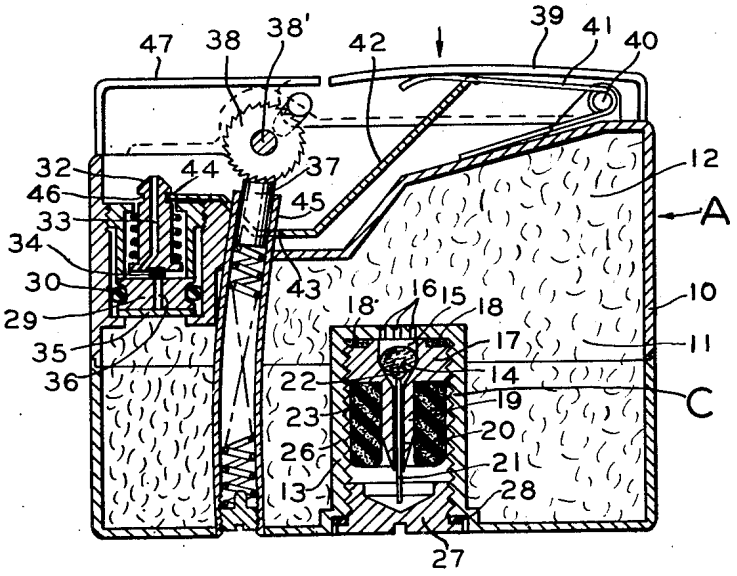

FIG. 2

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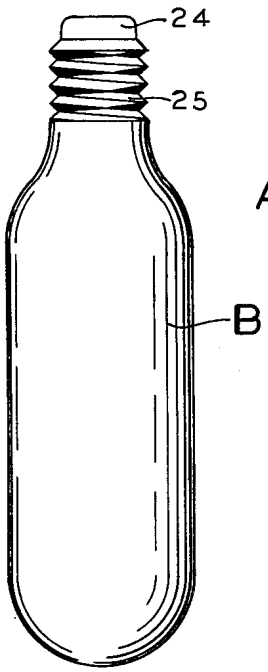

FIG. 4

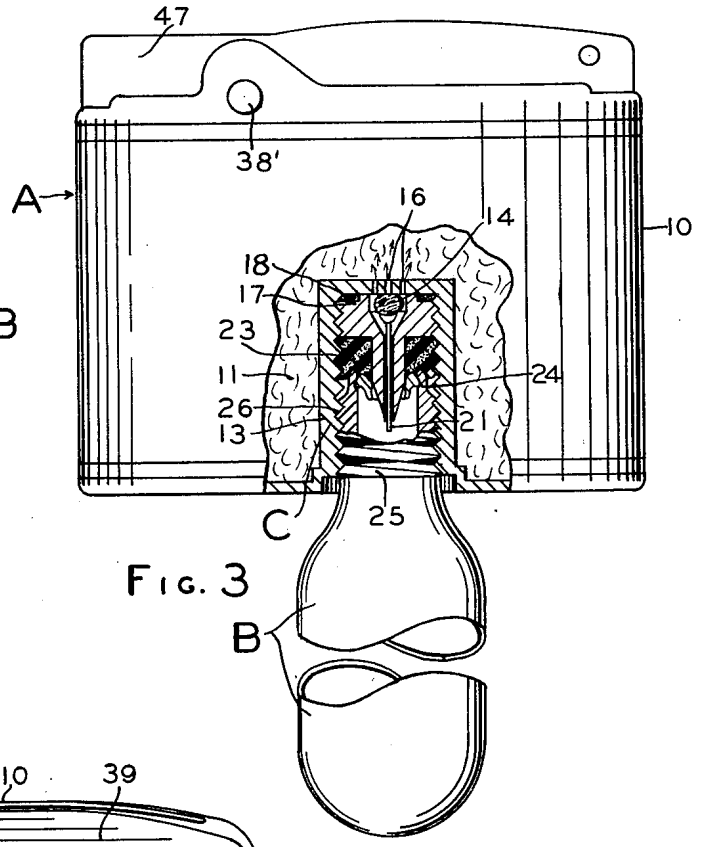

FIG. 3

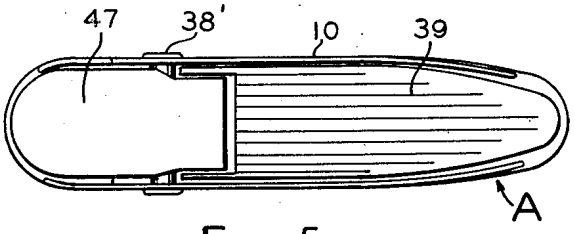

FIG. 5

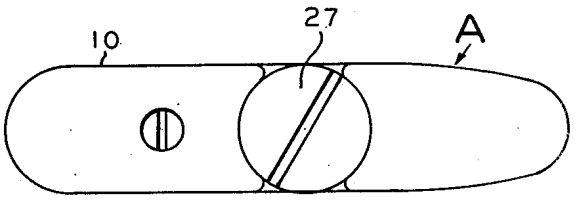

FIG. 6

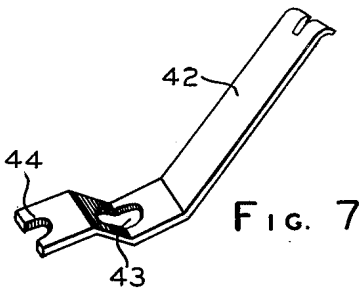

FIG. 7

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LIQUEFIED PETROLEUM GAS LIGHTER

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7 Claims. (Cl. 67—7.1)

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My invention relates to a gas pyrophoric lighter and similar articles where it is desired to provide a storage compartment for compressed petroleum fuel which is adapted to be used for the flame of a lighter or similar article.

A feature resides in providing a small compact pyrophoric lighter which can be readily carried in the pocket and which comprises a small number of parts.

A further feature of my lighter resides in providing an automatic valve which permits the gas chamber to be easily filled from a suitably designed cartridge in which liquefied petroleum gases are contained. The automatic valve is protected by an outer valve cap which closes the valve chamber from the outer atmosphere and which is adapted to be removed so that the cartridge containing the liquefied compressed petroleum fuel can be applied to the valve by screwing the cartridge into the valve opening which automatically pierces the cartridge and permits the petroleum fuel to expand into the storage chamber of the lighter. The storage chamber may be filled with suitable absorbent material.

A further feature resides in providing a lighter with a simple gas escapement valve together with means for automatically opening said valve at the same time that the flint wheel is operated to throw a pyrophoric spark over the nozzle of the escapement valve simultaneously with the opening of the gas escapement valve.

The lighter is also provided with an operating lever and a cover which is automatically raised when the lever for operating the escapement valve and the flint wheel is operated. A spring means is provided to normally keep the lever in position to close the cover.

A primary feature of my lighter and gas container resides in providing a storage compartment for the liquefied petroleum gases to hold the same under pressure set up by the liquefied gas and to introduce this liquefied petroleum gas into the storage compartment of the lighter from an auxiliary cartridge designed to fill the lighter through the valve which automatically closes as the cartridge is withdrawn and in the providing of a simple escapement valve adjacent the flint wheel and pyrophoric element which is operated simultaneously with the operation of the flint wheel by one hand. This method provides a means of filling a pyrophoric lighter with liquefied compressed petroleum fuel for the flame of the lighter, doing away with the need for a wick like that used in old types of lighters, and providing a lighter which will give a large number of lights before

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requiring refilling from the cartridge which supplies the liquefied petroleum gas. In this manner, I provide a lighter without the objectionable odor from gasoline or the like which does not require refilling very often under ordinary circumstances and wherein the liquefied compressed petroleum fuel can be supplied from storage cartridges of a comparatively small nature, yet providing a large volume of liquefied petroleum fuel.

The method includes a lighter which is adapted to be filled from a cartridge which contains the compressed liquefied petroleum fuel under sufficient pressure to maintain the fuel liquid and which liquid is injected into the lighter by simply screwing the cartridge against the filler valve which automatically closes as the cartridge is withdrawn. The filler valve is formed with a testing stem which lifts the valve sufficiently to indicate whether or not the storage compartment of the lighter is empty before applying a filled cartridge of compressed liquefied petroleum fuel to the valve.

These features, together with details of my lighter and the method of filling and operating the same will be thoroughly and fully defined.

In the drawings forming part of this specification:

Figure 1 is an enlarged side view of my lighter in pocket form.

Figure 2 is a vertical section of my pocket lighter.

Figure 3 illustrates the lighter partly in section showing the closure cap removed from the inlet valve chamber and a cartridge of liquefied petroleum gas screwed into filling position.

Figure 4 is a side elevation of the cartridge of liquefied petroleum gas.

Figure 5 is a top view of the lighter.

Figure 6 is a bottom view of the lighter.

Figure 7 is a perspective view of the valve operating lever removed from the lighter.

The lighter A may be of any suitable design, size or formation, and when made to be carried in one's pocket, it is desirable that it be small and flat or compact so as to be easily carried.

The lighter A is formed with a body portion 10 made of any suitable material and has an inner compartment 11 which may be virtually filled with absorbent cotton 12 and which is adapted to be saturated with the liquefied petroleum fuel when the lighter is filled.

The casing or body 10 is formed with an inwardly projecting socket portion 13 which extends into the chamber 11 and forms a support for the inlet valve 14 which may be in the form of a

Buna-N rubber ball adapted to be confined within the chamber 15. Passageways 16 are formed in the top of the member 13 above the ball valve 14 which permit gas to be injected into the compartment 11 when the ball valve 14 is raised by the pressure of the compressed liquefied petroleum fuel flowing into the compartment of the lighter.

The ball valve 14 is held in the member 17 which is threaded into the socket member 13 and bears against the sealing washer 18 which also may be made of Buna-N rubber. The member 17 is formed with a depending puncturing element 19. The piercing element 19 is formed with an axial passageway 20 extending through the same. Extending through the passageway 20 I provide a valve relief rod 21 which is formed with a head 22 which normally engages the ball valve 14 so that the valve 14 can be lifted by pressing on the lower end of the rod 21. This permits gas to escape through the hole 16 and out through the passageway 20 to indicate whether or not there is any compressed liquefied petroleum or gas remaining in the chamber 11. In this manner the user of my lighter can test the same to see if it needs refilling before applying a filling cartridge to the valve 14.

I provide a deep Buna-N rubber sealing washer 23 which surrounds the piercing element 19 and against which the nose 24 is adapted to press when the threaded neck 25 of the cartridge B is engaged with the threads 26 formed in the member 13 as illustrated in Figure 3. Before placing the cartridge B into engagement with the threads 26, the closure cap 27 is removed. The closure cap 27 carries a sealing washer 28 so as to close the lower end of the inlet valve chamber. This insures the sealing of the chamber 11 so that gas will not escape from the valve 14 or the relief valve stem 21 cannot be engaged until the cap 27 is removed.

The lighter A is provided with an escapement valve assembly 29 which is sealed in position by the Buna-N rubber O-ring washer 30 and the Buna-N valve 31. This escapement valve assembly 29 is provided with a nozzle 32 having an axial passageway 33 out of which the gas from the chamber 11 is permitted to escape when a light is desired. The nozzle 32 is normally held in closed position against the Buna-N valve 31 by the coil spring 34.

A valve leak disc 35 is provided which permits the gas to pass from the chamber 11 to the axial opening 36 formed in the body of the escapement valve assembly 29 so that when the nozzle 32 is lifted away from the valve 31, gas will pass through the passageway 33 and escape adjacent the pyrophoric flint 37.

The flint wheel 38 operates to throw a spark from the pyrophoric flint 37 toward the nozzle 32. The operation of the flint wheel 38 is simultaneous with the lifting of the nozzle 32 which opens the escapement valve assembly 29. The flint wheel 38 is operated by the hand lever 39 which is pivoted at 40 and is held normally elevated in position as illustrated in Figure 2 by the spring 41. A valve lifting lever 42 is formed with a hole 43 and a bifurcated end 44 and is positioned below the lever 39 as illustrated in Figure 2 and straddles the flint tube 45 which extends through the hole 43 so that when the lever 39 is pressed sharply downward, the bifurcated end 44 of the lever will engage under the shoulder 46 of the nozzle 32 raising the same sufficiently to open the valve 31 of the escapement valve assembly 29. In the operation of the lever 39, which is accomplished by one hand, the fluid wheel 38 is automatically rotated on its axis 38' to throw a spark over the nozzle 32 as gas escapes from the same and simultaneously lifting the cover 47. In this manner, my lighter A is easily operated to light the escaping gas from the nozzle 32. As the escaping gas is lit, the resultant flame may be maintained by keeping the lever 39 depressed. However, as soon as the lever 39 is released, the spring 41 will elevate the same closing the cover 47 and simultaneously closing the valve 31. The moment the lever 39 is released, the spring 34 closes the valve 31 shutting off the escapement of gas and extinguishing the flame.

My invention involves the method of providing a new form of pocket or desk lighter wherein no liquid gasoline or other similar fuel is required. Further, the method includes the use of a cartridge B which supplies the liquid petroleum and gases which are injected into the lighter A through the receiving valve assembly C. This assembly has a testing means to indicate whether or not there is any remaining gas or liquefied fuel within the storage chamber 11. Thus, the contents of the cartridge B do not need to be wasted in any manner whatsoever because before applying the cartridge (as illustrated in Figure 3), the valve 14 may be relieved from its seat by the relief valve stem 21 so that when the user inserts the cartridge B in position (as illustrated in Figure 3) to fill the chamber 11, he is assured that the chamber 11 is ready to receive the fuel in the form of a compressed liquefied petroleum fuel.

With my method, the fuel chamber 11 is charged with the liquefied fuel under sufficient pressure to maintain the fuel liquid, and I have found that a large number of lights may be obtained from one charge from a cartridge B so that it may be possible for the user of my lighter to carry the same for many months before it requires a new charge of fuel from a new cartridge B because the liquefied fuel turns into an extremely large volume of gas when released from the lighter to the outer atmosphere.

While I have illustrated a form of pocket lighter in which the drawings are enlarged to more clearly illustrate the parts, it will be obvious that a desk or home lighter may be provided, of any size, nature and shape, which can be charged in the same manner by a cartridge B so as to provide a lighter which requires little or no attention for a long period of time even though it may be used extensively for a large number of lights.

I claim:

1. A pyrophoric lighter having in combination a body having a fuel supply compartment formed therein, an inlet valve assembly including an internal thread adapted to receive the threads of a fuel filled cartridge, a compressible washer, a piercing element, a check valve for sealing liquefied petroleum gas fuel in said fuel compartment, a relief stem for said check valve, an outer sealing cap for closing said inlet valve assembly, an escapement valve assembly including a hollow nozzle, a valve under said nozzle for closing said escapement valve assembly, a spring for closing said nozzle, lever means for lifting said nozzle to open said escapement valve assembly to permit gas from said reservoir to escape out of said nozzle, a pyrophoric flint, a flint wheel for abrading said flint, a hand lever for operating said lifting valve and flint simultaneously to ignite the gas escaping out of said nozzle of said escapement valve assembly.

2. A pyrophoric lighter and the like having in combination a flint, an abrading element, a lever for operating said element to throw a spark from said flint, a cover for closing said lighter, an escapement valve assembly adjacent said flint wheel adapted to allow gas from a liquefied petroleum fuel to escape therethrough simultaneously with the operation of said flint and the raising of said cover by a single hand operation, a chamber for receiving a liquefied petroleum fuel under pressure, an injection valve assembly having a threaded portion and including a check valve to normally close said fuel chamber by the pressure of the liquefied fuel in said chamber, and a sealed supply cartridge of liquefied petroleum fuel having threads thereon for attaching said cartridge to said injection valve assembly to automatically transfer the liquefied fuel in said cartridge when said cartridge is pierced by attaching it to said injection valve assembly, said check valve automatically closing said injection valve assembly when said cartridge is withdrawn therefrom.

3. A pocket and desk lighter unit adapted to be operated by a pyrophoric flint to ignite the flame, a chamber for receiving the compressed liquefied fuel, an injection valve assembly positioned within said chamber including a threaded portion and a check valve for maintaining the compressed liquefied fuel and gas within said chamber, said injection valve assembly also including a compessible washer and a relief stem for said check valve, a threaded cartridge having a supply of compressed liquefied fuel therein and sealed for storage, means whereby said cartridge may be attached to said injection valve assembly and to simultaneously pierce said cartridge to discharge the contents thereof into said fuel chamber of said lighter, said check valve automatically closing when said cartridge is unscrewed, a cap for closing said injection valve assembly, an escapement valve assembly, a pyrophoric lighting element including a flint wheel positioned adjacent said escapement valve assembly, and lever means adapted to operate said flint wheel and simultaneously open said escapement valve assembly to ignite the escaping gas from said escapement valve assembly.

4. A desk and pocket lighter unit including a gas chamber for receiving under pressure liquefied petroleum fuel, an escapement valve assembly, pyrophoric lighting means adjacent said escapement valve assembly, an injection valve assembly, said injection valve assembly having means for engaging the neck of a fuel cartridge, means for simultaneously opening said escapement valve assembly with the operation of said pyrophoric lighting means by a single hand operating lever means, and means for attaching a fuel filled sealed cartridge having a neck adapted to removably engage said injection valve engaging means to automatically pierce said cartridge by said injection valve assembly, and check valve means in said injection valve assembly to automatically close the fuel chamber of said lighter when said cartridge is disengaged, said injection valve assembly also including a compressible washer and a relief stem for said check valve.

5. A lighter comprising a hollow casing forming a fuel chamber for compressed liquefied fuel, a throw-away fuel supply container filled with compressed liquid fuel, inlet means in said chamber for receiving and temporarily holding said fuel supply container, an inlet valve assembly including a compressible washer and a relief stem, means for puncturing said throw-away container, a check valve for sealing liquefied fuel in said chamber, a jet opening in said casing for projecting a stream of gas from said chamber, a valve controlling said opening and linkage connecting said valve and a hand lever whereby upon pressure upon said lever said valve is actuated to open position and said liquid fuel expands through said opening in the form of gas.

6. A lighter comprising a hollow casing forming a fuel chamber for compressed liquefied fuel, a throw-away fuel supply container filled with compressed liquid fuel, inlet means in said chamber for receiving and temporarily holding said fuel supply container, an inlet valve assembly including a compressible washer and means for puncturing said throw-away container, a relief stem projecting through said puncturing means, a check valve for sealing liquefied fuel in said chamber, a jet opening in said casing for projecting a stream of gas from said chamber, a valve controlling said opening and linkage connecting said valve and a hand lever whereby upon pressure upon said lever said valve is actuated to open position and said liquid fuel expands through said opening in the form of gas, and a pyrophoric lighter actuated by said lever.

7. In a cigarette lighter, a casing, a throw-away fuel supply container having a supply of compressed liquid fuel and provided with a connecting portion, said casing comprising a hollow fuel chamber adapted to receive said compressed liquid fuel, an inlet socket connected to a wall of said casing, means in said socket to receive the connecting portion of the container and temporarily hold said throw-away fuel supply container in place, an inlet valve assembly in said socket including a compressible member, a pressure relief means, to puncture said fuel container, and a check valve for sealing liquefied fuel in said chamber, whereby the liquid fuel in the container is automatically transferred to said fuel chamber under self contained pressure of said compressed fuel in said container, means associated with said chamber to release said liquid fuel in the form of gas therefrom, and pyrophoric means for lighting said gas when it is released from said fuel chamber.

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