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2,594,755

LIQUEFIED PETROLEUM GAS LIGHTER

Original Filed May 13, 1950

2 SHEETS—SHEET 1

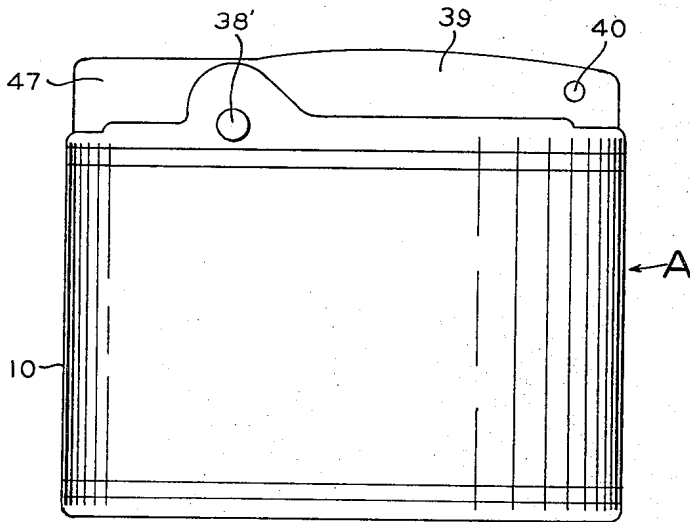


FIG. 1

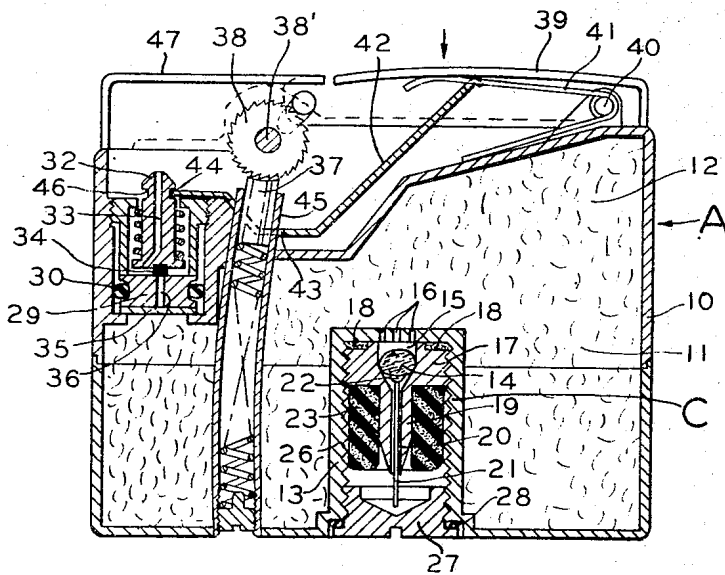


FIG. 2

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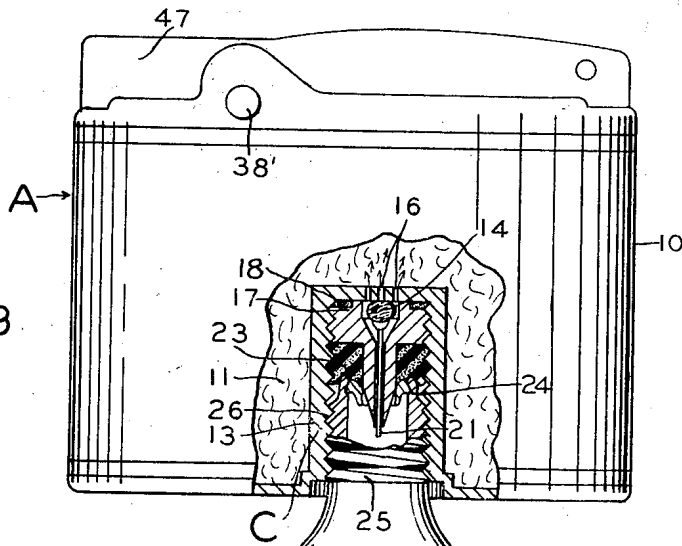
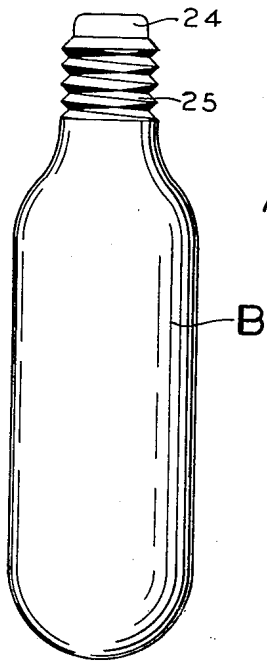


FIG. 3

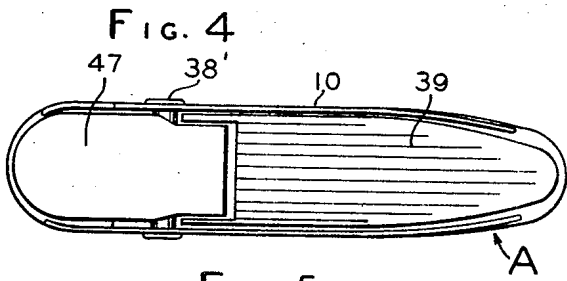


FIG. 5

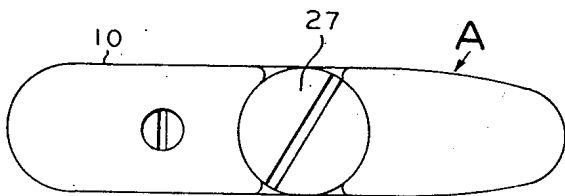


FIG. 6

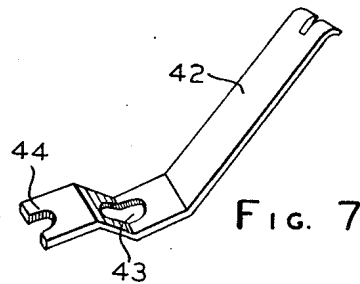


FIG. 7

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# UNITED STATES PATENT OFFICE

2,594,755

## LIQUEFIED PETROLEUM GAS LIGHTER

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Original application July 11, 1951, Serial No. 236,261, which is a division of application Serial No. 161,874, May 13, 1950, now Patent No. 2,561,270, dated July 17, 1951. Divided and this application January 28, 1952, Serial No. 268,608

2 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. This application is a division of application Serial No. 236,261 filed July 11, 1951, now pending, which is a division of application Serial No. 161,874 which issued into Patent No. 2,561,270 dated July 17, 1951.

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 fuel is 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 fuel to hold the same under pressure set up by the liquefied fuel and to introduce this liquefied petroleum fuel 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 pro-

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vides 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 requiring refilling from the cartridge which supplies the liquefied compressed petroleum fuel. 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 liquefied compressed 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 fuel screwed into filling position.

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

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

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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 34 by the coil spring as illustrated, to provide a shut-off valve.

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

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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 flint 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 B in position (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 picket 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.

So far as I know, my method is new in providing a lighter of a desirable nature and which will continue to operate successfully by merely replacing the pyrophoric flint when it wears out and charging the fuel chamber with a liquefied fuel under pressure from a suitable throw-away supply container, such as B, or any other similar supply of liquefied fuel which is injected in the fuel chamber 11 in a very simple operation.

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I claim:

1. A cigarette lighter comprising a hollow body adapted to form a fuel chamber for compressed liquefied fuel, said fuel chamber being pressure-tight to prevent the fuel from escaping therefrom while it is held in said chamber under pressure, an escapement valve in a wall of said body, said escapement valve including a pressure reducing means, a nozzle, and a shut-off valve, an injection valve in a wall of said body spaced from said escapement valve, each of said valves being normally closed, means for simultaneously opening said escapement valve and igniting the gas escaping therefrom to provide a flame, said fuel chamber being adapted to be filled through said injection valve from a source of compressed liquefied fuel to charge the fuel chamber with a supply of liquefied fuel where it is maintained under pressure.

2. A cigarette lighter including a body having a hollow pressure-tight chamber formed therein for compressed liquefied fuel which expands into a gas when released into the outer atmosphere from the fuel chamber, an injection valve, normally closed, positioned in a wall of said chamber to permit said chamber to be filled with compressed liquefied fuel from a source of supply, an escapement valve in a wall of said chamber for the release of gas from said fuel chamber which is normally closed, said

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escapement valve including a pressure reducing means, a nozzle, and a shut-off valve and means for opening said escapement valve to release gas from said fuel chamber and to simultaneously ignite the gas, as soon as it leaves said chamber, to provide a flame while said escapement valve is open and to extinguish the flame when the escapement valve closes.

PAUL W. FELT.

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