

Nov. 30, 1954

F. E. GRUBER  
POCKET GAS LIGHTER

2,695,508

Filed March 26, 1951

2 Sheets-Sheet 1

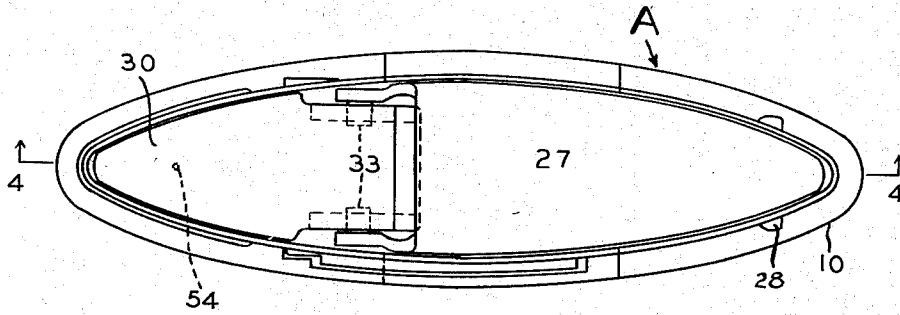


FIG. 2.

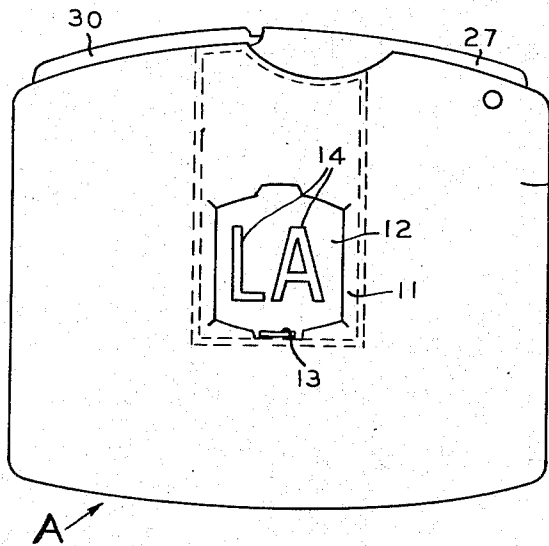


FIG. 1.

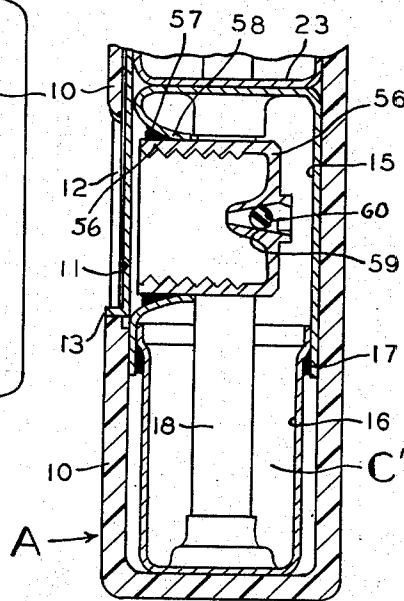


FIG. 3.

Inventor  
FRANCIS E. GRUBER

By

*Howard Fincher*

Attorney

Nov. 30, 1954

F. E. GRUBER

2,695,508

POCKET GAS LIGHTER

Filed March 26, 1951

2 Sheets-Sheet 2

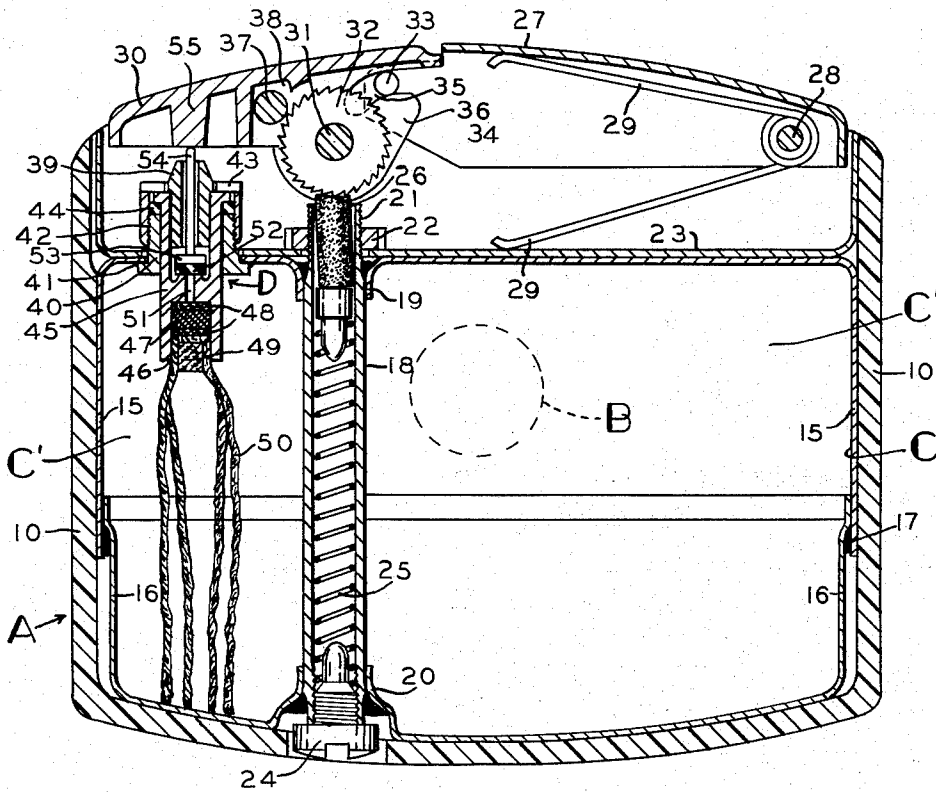


FIG. 4.

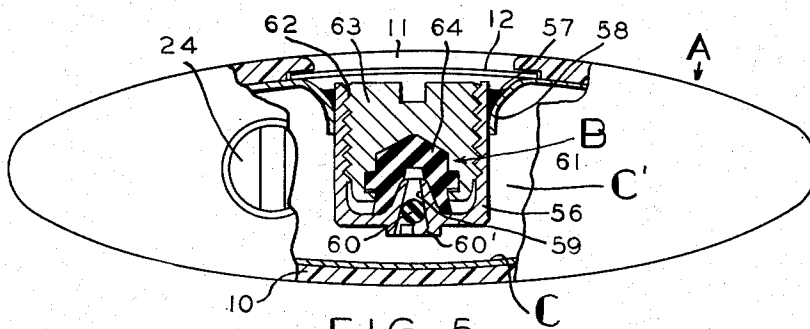


FIG. 5

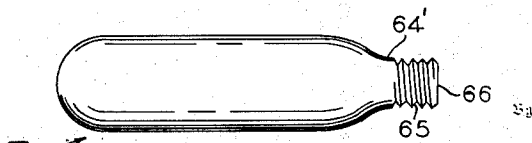


FIG. 6.

Inventor  
FRANCIS E. GRUBER

*Horning & Fischer*  
Attorney

1

2,695,508

**POCKET GAS LIGHTER**

Francis E. Gruber, St. Paul, Minn., assignor to Brown & Bigelow, St. Paul, Minn., a corporation of Minnesota

Application March 26, 1951, Serial No. 217,479

5 Claims. (Cl. 67-7.1)

This invention relates to a pocket gas lighter wherein the fuel is compressed liquid gas such as iso-butane, which when released to the atmosphere turns to gas and when mixed with the air provides a light for the pocket lighter.

The gas is ignited by a pyrophoric flint as the lighter is operated to open the gas valve so that the gas burns from the nozzle of the lighter until the flow of gas is shut off which extinguishes the flame of the lighter.

A feature resides in providing a pocket gas lighter having a sectional construction wherein the gas tank of the lighter which forms the lower part thereof may be made of thin sheet metal to give a light weight construction and which may be separately attached to the mechanism which includes the operating lever, the pyrophoric flint with its operating means, and the hood which normally extends over the nozzle of the lighter. The valve of the lighter with the nozzle is removeable.

A further feature resides in providing a plastic or non-metallic casing which extends over the fuel tank or chamber and about the operating mechanism of the lighter to form a non-metallic covering virtually over the entire lighter mechanism with the operating lever exposed at the top of the plastic casing. This provides a non-metallic covering for the metallic fuel tank and the working mechanism of the lighter to give a soft character or touch rather than a metallic touch to the body of the lighter when it is complete. A further advantage of the non-metallic covering for the pocket lighter resides in providing a covering for the lighter of different colors which enhances the appearance of the lighter where it is desired to finish the lighter in an attractive manner. The plastic covering also covers and protects the metal parts of the lighter so that these parts do not need to be plated or finished because the plastic casing provides the finish for the outside surface of the lighter.

It is also a feature to provide a lighter which is small in dimensions and of such a character that the lighter may be expanded at the center to provide a space for an injection valve so that when the tank of the lighter is empty, the injection valve may be uncovered by a sliding plate carried in the side wall of the plastic casing, which when moved into position to expose the closure cap of the injection valve permits the lighter to be filled. The lighter is filled by removing the injection cap and screwing a cartridge filled with iso-butane or other liquid fuel into the injection valve which pierces the cartridge and permits the liquid fuel to be discharged into the tank of the lighter.

A further feature resides in providing a closure valve for the nozzle of the lighter which is operated by the hood which covers the nozzle when the same moves into closed position. This closure valve includes a stem projecting out of the open end of the nozzle and which is formed with a head on the inner end thereof. A suitable rubber washer is positioned below the head of the rod so that when the rod is pressed downward in the nozzle, the rubber valve closes the small opening leading from the gas chamber of the lighter and shuts off the flow of gas. (A shutoff valve similar in character to this valve, which is provided with a valve stem and a valve head, is disclosed in Patent No. 1,757,231 dated May 6, 1930.)

It is also a feature to provide a simple means of operating the flint wheel which includes a ball or roller made of softer metal than that used for the flint wheel and which is adapted to be confined in a space provided in the hood of the lighter and so positioned that when the hood of the lighter is elevated, the roller is locked against

2

the teeth of the flint wheel causing the flint wheel to rotate; whereas, when the hood is released and moves toward it into closed position, the roller automatically releases and rolls over the teeth of the flint wheel without rotating the flint wheel. In this manner, a simple ball or roller clutch is provided for operating the flint wheel in one direction which throws a spark over the fuel nozzle and automatically releasing from the flint wheel when moving in the other direction, thus providing a ratchet operating roller means of a very simple character, yet more effective and durable than springs and ratchet teeth used heretofore for this purpose.

These features together with other details and objects will be fully and clearly defined.

In the drawings forming part of the specification:

Figure 1 illustrates a side view of the lighter.

Figure 2 illustrates a plan view of the same.

Figure 3 is an enlarged detail section through the injection valve chamber with the injection valve removed.

Figure 4 is a section on the line 4-4 of Figure 2, indicating only by dotted lines the position of the injection valve in the fuel tank.

Figure 5 illustrates a bottom view with a portion of the lighter broken away to illustrate a section through the injection valve.

Figure 6 illustrates in small form (as related to the rest of the drawings) the fuel cartridge used for filling the fuel chamber or tank of the lighter.

The drawings illustrate the lighter A with a plastic outside cover 10 which may be made of any suitable non-metallic material and which is adapted to virtually cover the entire lighter excepting the top operating portions thereof.

The casing 10 is formed with an opening 11 in one side wall thereof in which a slideable metal cover 12 is positioned to normally close the opening 11. When the cover 12 is engaged by the lip 13 and slid upward, it is adapted to expose the injection valve B. Normally the cover 12 is in closed position and may be used to carry a monogram or initials such as the indicia 14 shown on the cover in Figure 1.

The fuel tank or chamber C is made of thin sheet metal and ordinarily formed in two parts, namely 15 and 16, which are soldered or welded together at 17. The parts 15 and 16 may be made of drawn metal shells of sufficient strength to hold the liquid fuel within the tank C under pressure. The liquid fuel used in the lighter A may be iso-butane or any other suitable fuel which may be compressed into a liquid and which when it escapes to the outer atmosphere is discharged as a gas.

A flint tube 18 is soldered or welded to the inwardly projecting flange 19 of the tank portion 15 and to the inwardly projecting flange 20 of the cartridge portion 16 at the bottom to provide a flint tube 18 extending through the tank C and yet forming pressure tight joints where the flint tube 18 is attached to the respective portions 15 and 16 of the cartridge C.

The upper end of the flint tube is threaded at 21, and by means of the nut 22 which engages the threads 21, the tank C is connected and locked to the upper shell member 23 which carries the operating mechanism adapted to throw a spark to ignite the gas escaping from the nozzle of the lighter. Thus the lighter A is formed in sections consisting of the lower section formed by the tank C and the upper section carried by the removable shell portion 23.

The screw 24 closes the lower end of the flint tube 18 and supports the spring 25 in position to bear against the pyrophoric flint 26.

The operating means of the lighter A carried by the means of the shell portion 23 includes the hand operable lever 27 which is pivoted at 28 in the side walls of the shell portion 23. A spring 29 holds the lever 27 normally raised and in the position shown in Figure 4.

A hood member 30 is pivoted on the shaft 31 which supports the flint wheel 32. Operating pins 33 project from the side walls 34 of the lever 27 and operate in the slots 35 which are formed in the depending side walls 36 of the hood 30. Thus, when the lever 27 is depressed against the spring 29, the hood 30 is automatically elevated by the operation of the pins 33.

3

Simultaneously with the depressing of the lever 27 the flint wheel 32 is rotated by the roller clutch member 37 which is confined within the recess 38 of the hood 30 and is caused to be locked against the teeth of the wheel 33 as the hood 30 is elevated. This operation causes a spark from the pyrophoric element 26 to be directed over the open end of the nozzle 39.

The nozzle 39 forms the opening from the fuel chamber of the cartridge C to permit gas to escape through the hollow nozzle 39 when the hood 30 is elevated. The gas valve D which includes the nozzle 39 is removably positioned in the sleeve 40. The sleeve 40 is soldered or welded at 41 to the casing member 15 of the cartridge C. The sleeve 40 is threaded at 42, and the valve assembly D is held in place by the nut 43 which engages the threads 42 of the sleeve 40. The packing ring or gasket 44 forms a tight joint at the top of the sleeve 45 which supports the inner members of the valve assembly D, as well as the nozzle 39.

The lower end of the sleeve 45 is formed with a recess 46 in which the porous valve pellet 47 is positioned between the filter discs 48, which are positioned on either side of the pellet 47. A cork or other suitable retaining member 49 supports the cord-like wick 50 positioned in contact with the lower filter disc 48, and in this manner the wick 50 acts to keep the discs 48 and the valve pellet 47 moist from the liquid fuel contained in the cartridge C.

The small axial hole 51 formed in the sleeve 45 is adapted to be normally closed by the valve member 52 when the head 53 is pressed against the valve member 52 by the valve stem 54. The valve stem 54 is pressed into closed position by the projecting member 55 formed on the inside of the hood 30.

The spring member 29 normally holds the lever 27 in the position illustrated in Figure 4 and imparts spring tension against the valve stem 54 and the valve head 53 to close the small passageway 51 and prevent the escape of gas from the fuel chamber C when the lighter is not in use.

It will therefore be apparent that when the lever 27 is depressed, the hood 30 is automatically elevated, the flint wheel 32 is rotated to throw a spark over the nozzle 39 simultaneously with the opening of the valve head 53 when pressure is relieved from the stem 54 by the elevating of the hood 30 and the member 55. The pressure of the gas within the cartridge C automatically opens the valve head 53, and the gasket 52 raises with the valve head 53 permitting gas to escape around the valve head 53 out through the small opening 51 and passing around the stem 54 of the valve. As long as the hood 30 remains elevated once the gas is ignited as it escapes from the nozzle 39, the flame will continue to burn. However, when the hood 30 is released into closed position as illustrated in Figure 4, the valve head 53 is automatically closed by the member 55 striking the other end of the stem 54 and the flow of gas from the tank C is shut off, which also extinguishes the flame by reason of shutting off the flow of gas.

In the pocket lighter A as illustrated, it is desirable that the construction and the dimensions of the same be kept small and compact. The drawings illustrate the lighter in a large form to more clearly show the details of the construction of the lighter and to show the position of the fuel injection valve B together with the detail parts thereof.

The fuel injection valve B is illustrated in section in Figure 5 and is positioned in the thimble member 56 which is welded at 57 to the inwardly turned flange 58 formed in the wall of the tank C to form a gas tight joint between the thimble and the flange 58.

The thimble 56 is formed with a check valve seat 59 which is adapted to support the ball check valve 60. In-turned lips 60' hold the ball from moving out of the ball socket 59. The inner end of the check valve support is pointed at 61 to provide piercing means for piercing a cartridge which is used to fill the lighter tank C when the same is engaged by the threads 62 which are formed on the inner wall of the thimble. The threads 62 also support the closure cap 63 which is provided with a sealing gasket 64 on its inner end to provide an additional sealing means over the pointed end 61 of the check valve. The ball check valve 60 normally closes the opening through the valve by the pressure of the gas within the tank C.

The fuel cartridge E is illustrated in Figure 6. This cartridge has a restricted neck portion 64' which is formed with a thread 65. When it is desired to fill the tank C

4

with fuel, the metal cover 12 is raised to expose the cap 63 and the cap is removed. Then the cartridge E is threaded into the injection valve by engaging the threads 62 with the threads 65 on the neck of the cartridge as the cartridge is threaded home, pierces the closed end 66 of the cartridge, and the contents of the cartridge E are forced by pressure by the compressed liquid fuel therein past the check valve 60 and into the compartment of the tank C of the lighter. In filling the tank C from the supply cartridge E, the cartridge E is allowed to remain screwed into the injection valve B for a short time to allow all of the contents to pass into the tank C. Then the cartridge E is removed and the cap 63 replaced to insure a sealing of the injection valve after which the cover 12 is slid into closed position as illustrated in Figure 1.

The injection valve B is not illustrated in Figure 4. However, the dotted outline indicates the position of the valve and the thimble 56. The thickness of the lighter A through the center thereof provides sufficient room for the injection valve thimble 56 and the valve itself without increasing the other dimensions of the lighter A.

The outstanding features of the lighter reside in a simple light weight fuel tank C which is covered by the plastic casing 19 as well as the removable mechanism by loosening the nut 22 which provides a sectional lighter, and the removable valve mechanism D which may be readily removed by loosening the nut 43 and lifting the sleeve 45 out of the fixed sleeve 40. These details are important in providing a practical lighter which may be readily repaired or assembled in an economical manner.

Further, the free wheeling clutch 37 for operating the flint wheel 32 provides an economical means which is strong and durable and positive in its action in the operation of the flint wheel 32.

The closure valve 53 with its operating stem 54 is also of primary importance in closing the small passageway 51.

Furthermore, the retarder valve for the gas which includes the filter discs 48 positioned on either side of the porous pellet 47 together with the moistening wick 50 are also of primary importance. However, this valve is more clearly defined in a copending application.

These features are of primary importance in the use, operation, manufacture and maintenance of the lighter, and with this small number of parts a lighter with a large number of lights can be carried in the pocket of the user and requires only periodic filling from a cartridge E. I claim:

1. A pocket gas lighter having a sealed cartridge body for supporting liquid fuel under pressure which gasifies when released to the outer atmosphere, a removable valve unit including a burner nozzle, a valve stem and valve, a pyrophoric lighter means and operating lever with a free wheeling clutch for engaging the flint wheel of the pyrophoric lighter, a hood for covering said burner nozzle and adapted to engage said valve stem to hold said valve in normally closed position and releasable when said lever operates said pyrophoric lighter means, a plastic cover open at the top adapted to cover the major portion of said lighter and expose the operating lever thereof at the top, a recess formed in one of the walls of said body a slidable shutter plate moveably positioned between said cartridge body and a side wall of said plastic cover and in line with said recess, and a fuel injection valve secured to said recess and under said slideable cover plate which is adapted to receive a filter cartridge for charging said fuel cartridge of said lighter with a new supply of compressed fuel.

2. A cigarette lighter using liquefied petroleum fuel comprising a cartridge body member having an injection valve mounted in a wall thereof, an outer plastic casing having an opening therein in alignment with said injection valve, a shoulder formed on the lower edge of said opening, a cover plate slideably mounted between said outer casing and said cartridge body adapted to cover or expose said opening and said injection valve and abut said shoulder in closed position, guide means formed on the inner surface of said outer casing for said cover plate, a fuel outlet nozzle, and spark producing mechanism mounted on said cartridge body member.

3. A pocket gas lighter comprising a gas container tank having enclosing wall members adapted to hold a supply of liquid fuel under pressure which gasifies when released to the outer atmosphere, a detachable valve unit for said tank, a detachable lighter and lever operating unit for

5

said tank, a filler valve secured in one of said wall members of said tank, a plastic cover for enclosing the sides of said tank and the sides of said lighter and lever unit, said plastic cover having an opening formed therein in alignment with said filler valve, and a slidable shutter plate mounted between the wall of said plastic cover and said tank adapted to cover or expose said filler valve, said shutter plate having a lip portion formed thereon for moving the same and for engagement with the lower edge of said opening of said plastic cover.

4. In a pyrophoric lighter a tank adapted to hold a supply of liquified fuel under pressure, an upper open shell member secured to the top of said tank, a valve nozzle mounted on said tank and extending into said shell member, pyrophoric gas igniting means mounted on said shell member adjacent said nozzle, lever means mounted on said shell for operating said pyrophoric means, a plastic casing open at the top thereof adapted to receive said tank and said shell, said tank having an opening formed in one of the side walls thereof and having flanges extending into said tank, a thimble member connected to said flanges, a transfer valve mounted in said thimble, said casing having an opening aligned with said opening of said tank, recesses formed on the inner surface of said casing adjacent said opening therein, a plate member slidably positioned between said casing and said tank and in said recesses, a lip formed on said plate adapted to engage the lower edge of said opening of said casing to position said plate in closed position.

5. In a pyrophoric lighter, a tank adapted to hold a supply of liquified fuel under pressure, an upper open shell member secured to the top of said tank, a valve

6

nozzle secured to said tank and said shell member for allowing gas to escape from said cartridge, pyrophoric ignition means mounted on said open shell adapted to ignite gas issuing from said nozzle, lever means for actuating said valve nozzle, an outer plastic casing adapted to enclose and support said tank, the upper end of said casing being open and the upper edge thereof being substantially in line with the upper edge of said open shell, a recess formed on the inner surface of said plastic casing, said casing having an opening formed therein, a transfer valve positioned in said tank in line with said opening, a slidable plate mounted in said recess adapted to cover or expose said opening and said transfer valve.

## References Cited in the file of this patent

## UNITED STATES PATENTS

Number	Name	Date
1,757,231	Batley	May 6, 1930
2,034,750	Deming	Mar. 24, 1936
2,424,781	Vanetzian	July 29, 1947
2,454,501	Camm	Nov. 23, 1948
2,561,270	Felt	July 17, 1951
2,571,435	Flamm	Oct. 16, 1951
2,617,286	Prusack	Nov. 11, 1952
2,620,643	Nissen	Dec. 9, 1952

## FOREIGN PATENTS

Number	Country	Date
156,987	Austria	Sept. 11, 1939
585,239	Great Britain	Feb. 3, 1947