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(54) **A LIGHTER WITH A REPLACEABLE FUEL BOX AND THE REPLACEABLE FUEL BOX**

(57) A lighter incorporates with a gas releasing arrangement, a replaceable fuel cartridge detachably received in a receiving cavity of a casing for storing a liquefied fuel, a gas releasing lever pivotally mounted on said replaceable fuel cartridge, and a gas releasable

valve extended from said replaceable fuel cartridge for controlling a flow of gas from said replaceable fuel cartridge. Therefore, a user is able to refill the fuel by simply replacing a used replaceable fuel cartridge with a new replaceable fuel cartridge which is fully pre-filled with fuel. (FIG.8)

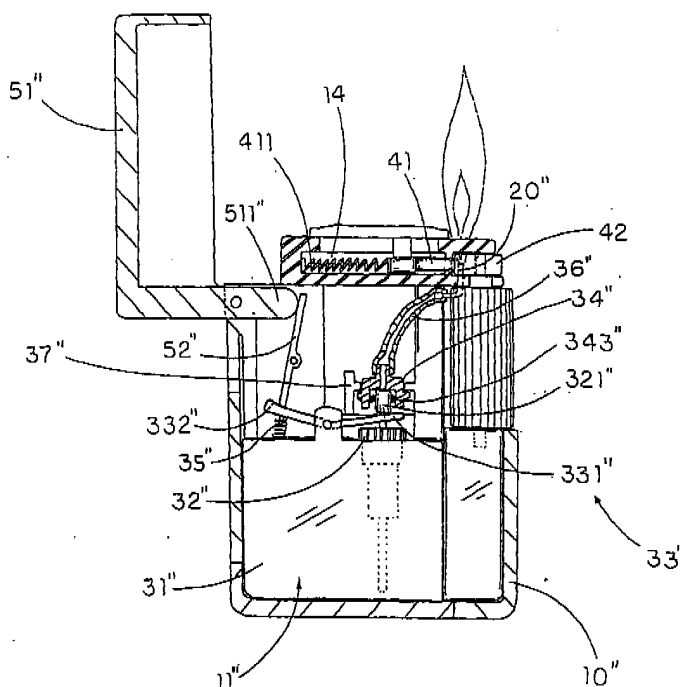


FIG 8

## Description

### Field of Invention

[0001] The present invention relates to a lighter, and more particularly to a lighter with a replaceable fuel cartridge, wherein the lighter is adapted for replacing an empty fuel cartridge with a full fuel cartridge so as to maximize and extend the life span of the lighter while being cost effective.

### Description of Related Arts

[0002] A lighter is common tool that replaces matches for igniting cigarettes and cigars. Generally, there are two types of lighters, namely the regular lighter that produces visible flame and the torch lighter that produces torch. No matter which type of lighter is used, the lighter must comprise a liquefied fuel storage for supplying fuel in order to provide the visible flame or the torch.

[0003] A conventional liquefied fuel storage has a releasable valve communicating with a nozzle and a refilling valve adapted for filling a fuel therethrough in such a manner that when the lighter is used up its fuel, a user is able to refill the fuel by means of a filling bottle.

[0004] It is known that the fuel is a gas form in a normal condition and in a liquid form when it is stored in the liquefied fuel storage of the lighter under a high pressure. In order to refill the fuel, the refilling valve must be fitted into a tip of the filling bottle such that the filling bottle provides a high pressure to transfer the fuel to the liquefied fuel storage through the refilling valve. However, during filling operation, the fuel may leak at the tip of the filling bottle. It is extremely dangerous because the fuel is a flammable mixture such as butane, especially when refueling the lighter in the kitchen near the sink or pilot light. Thus, it is difficult to prevent the leak of the fuel during filling operation such that the user may inhale the leaking fuel, which is harmful to the user's health.

[0005] Moreover, the user is unable to determine whether the liquefied fuel storage is fully filled with fuel such that the user may keep refilling the fuel to the liquefied fuel storage even though it is full. As a result, the excess fuel will be spilled out through the tip of the filling bottle, which is a waste of fuel. Besides, it is hassle for the user to carry the filling bottle everywhere.

[0006] A lighter with a replaceable fuel cartridge is disclosed in Japan patent document JP2001-12737A. According to the solution as disclosed, the fuel cartridge and top structure of said lighter can be dismantled and replaced freely. However, said fuel cartridge 3 and top structure 2 have to be fixed by the special members 4, 5 rotating with respect to each other, and accordingly both of them have also to be detached by said special members rotating with respect to each other. Additionally, when the fuel cartridge is replaced, the casing has to be removed completely. Therefore, the structure is relatively complicated. Furthermore, the casing must be removed

before the fuel cartridge can be dismantled and assembled, and as a result, it is very inconvenient in use.

[0007] The applicant of the present invention has disclosed a lighter with a replaceable fuel cartridge in the authorized China patent having application No.02116399.5 and its drawings FIG. 1 to FIG. 6. According to the description, the fuel cartridge and top structure can be freely replaced by simply opening a door 15 at the bottom of the casing 10 to take out the fuel cartridge of the lighter of the present invention or to insert it into the casing 10, followed by closing the door again as to complete replacement of fuel cartridge. Hence, it is characterized in simple construction and easy to operate. However, as the gas releasable valve of fuel filling lighter can release gas only by pulling said valve, the patent can not be adapted for conventional gas releasable valve as to feature high production cost. For this reason, after having made a series of modifications to the lighter, the applicant of the present invention provides a newly structured lighter and a replaceable fuel cartridge in the present application. The application of the authorized China patent having a number of 02116399.5 is to be used as the referenced document of the application of the present patent.

### Summary of the Present Invention

[0008] A main object of the present invention is to provide a lighter with a replaceable fuel cartridge, wherein the lighter is simple in construction, easy to operate, and adapted for fitting marketable gas releasable valve. Therefore, it features low production cost.

[0009] Another object of the present invention is to provide a lighter with a replaceable fuel cartridge, wherein the fuel cartridge is sealedly mounted to nozzle of the lighter so as to prevent the leakage of the fuel released from the fuel cartridge to the nozzle.

[0010] Another object of the present invention is to provide a lighter with a replaceable fuel cartridge, wherein the user is able to lighten the lighter by simply plugging a new and full fuel cartridge.

[0011] Another object of the present invention is to provide a lighter with a replaceable fuel cartridge, wherein the lighter is refilled by replacing the fuel cartridge so that the lighter can be ensured to be fully pre-filled with fuel after the new fuel cartridge is plugged.

[0012] Another object of the present invention is to provide a replaceable fuel cartridge, wherein said replaceable fuel cartridge is applied with the lighter of the present invention.

[0013] Accordingly, in order to accomplish the above objects, the present invention provides a lighter, comprising:

a casing having a receiving cavity and an opening communicating the receiving cavity with outside;

a gas emitting nozzle appearing at a ceiling of said

casing, the said nozzle comprising a sheltering cap located in the said casing and coupled with the replaceable fuel cartridge;

an ignition system supported by the ceiling of the casing for producing a spark toward the gas emitting nozzle to ignite the gas emitted from the gas emitting nozzle.

wherein, a gas releasing lever, which is pivotally mounted on said replaceable fuel cartridge, having an actuating end coupled to said gas releasable valve and a driving end, arranged when said driving end is depressed, said actuating end pivotally lifts up said gas releasable valve for releasing said liquefied fuel from said replaceable fuel cartridge; and

a gas releasing arrangement, comprising an actuator movably supported within said casing to engage with said driving end of said gas releasing lever in such a manner that when said actuator is moved to depress said driving end of said releasing lever, said gas releasable valve releases said gas to said gas emitting nozzle for being ignited.

**[0014]** Said actuator comprises a lighter cap pivotally mounted to said casing for enclosing said ceiling of said casing and a driving lever having an upper portion coupled with said lighter cap and a lower portion slidably engaged with said driving end of said gas releasing lever such that when said lighter cap is pivotally and upwardly folded to expose said ceiling of said casing, said driving lever is driven to depress said driving end of said gas releasing lever for releasing said gas from said replaceable fuel cartridge.

a replaceable fuel cartridge, received in said receiving cavity of said lighter for storing a liquefied fuel, wherein said replaceable fuel cartridge comprises a gas releasable valve coupled with said gas emitting nozzle for controlling gas flow from said replaceable fuel cartridge, a gas releasing lever, which is pivotally supported on said replaceable fuel cartridge, having an actuating end coupled to said gas releasable valve and a driving end, arranged when said driving end is depressed, said actuating end pivotally lifts up said gas releasable valve for releasing said liquefied fuel from said replaceable fuel cartridge.

**[0015]** These and other objectives, features, and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

### **Brief Description of the Drawings**

**[0016]**

FIG. 1 is an exploded perspective view of a lighter with a replaceable fuel cartridge according to a first

preferred embodiment of the referenced document of the present invention.

FIG. 2 is a sectional view of the lighter with the replaceable fuel cartridge according to the above first preferred embodiment of the referenced document of the present invention.

FIG. 3A is a partially sectional view of the lighter with the replaceable fuel cartridge according to the above first preferred embodiment of the referenced document of the present invention.

FIG. 3B is a partially sectional view of the lighter with the replaceable fuel cartridge according to the above first preferred embodiment of the referenced document of the present invention, illustrating the gas releasing valve releasing the fuel from the replaceable fuel cartridge through the lever arm.

FIG. 4 is an exploded perspective view of a lighter with a replaceable fuel cartridge according to a second preferred embodiment of the referenced document of the present invention.

FIG. 5 is a sectional view of the lighter with the replaceable fuel cartridge according to the above second preferred embodiment of the referenced document of the present invention.

FIG. 6 is a partially sectional view of the lighter with the replaceable fuel cartridge according to the above second preferred embodiment of the referenced document of the present invention, illustrating the gas releasing valve releasing the fuel from the replaceable fuel cartridge through the lever arm.

FIG. 7 is a perspective view of the lighter with replaceable fuel cartridge according to a preferred embodiment of the present invention.

FIG. 8 is a sectional view of the lighter with replaceable fuel cartridge according to the above preferred embodiment of the present invention.

FIG. 9 is a partial sectional view of the lighter with replaceable fuel cartridge according to the above preferred embodiment of the present invention, showing the lever arm disposed at the moveable operating tip with a closed position.

FIG. 10 is a partial sectional view of the lighter with replaceable fuel cartridge according to the above preferred embodiment of the present invention, showing the lever arm disposed at the moveable operating tip with an upper position.

FIG. 11 is a partial sectional view of the lighter with

replaceable fuel cartridge according to the above preferred embodiment of the present invention, showing a resilient member located between said transverse stopper ridges and said cap shoulder.

FIG. 12 is a partial sectional view of the lighter with replaceable fuel cartridge according to the above preferred embodiment of the present invention, showing said resilient member of FIG. 11 disposed in squeezed state for providing an urging force for said sheltering cap.

### **Detailed Description of the Preferred Embodiment**

[0017] FIG. 1 to FIG. 6 are the drawings showing the first and second embodiments of the authorized patent application having a number 02116399.5 of the present applicant, which have been taken as the referenced document of the present patent. Therefore, they will not be described in detail herein.

[0018] Referring to FIG. 7 to FIG. 10 of the drawings, a lighter according to a preferred embodiment of the present invention is illustrated, wherein the lighter, such as a conventional lighter, comprises a casing 10" having a receiving cavity 11", an opening 12" communicating the receiving cavity 11" with outside, and a gas emitting nozzle 20" appearing at a ceiling of the casing 10". The lighter further comprises a fuel supply arrangement 30" and an ignition system 40".

[0019] The fuel supply arrangement 30" comprises a replaceable fuel cartridge 31" detachably received in the receiving cavity 11" through the opening 12" for storing a liquefied fuel, a gas releasable valve 32" extended from the replaceable fuel cartridge 31" and coupled to the gas emitting nozzle 20" for controlling a flow of gas from the replaceable fuel cartridge 31", and a gas releasable lever 33", which is supported on the replaceable fuel cartridge 31" in a pivotally movable manner, being coupled with the gas releasable valve 32" and used for operating the gas releasable valve 32".

[0020] Preferably, the gas releasing lever 33" is embodied as a lever arm pivotally extended from the gas releasable valve 32" and probed into the receiving cavity 11" in such a manner that after the replaceable fuel cartridge 31" is inserted into the receiving cavity 11", the gas releasing lever 33" is disposed in the casing 10" with a pivotally moveable manner. That is to say, the gas releasing lever 33" has an actuating end 331" for shifting a movement of the gas releasable valve 32", and a driving end 332" extended into the casing 10" in such a manner that by depressing the driving end 332", the actuating end 331" is capable of being lifted to shift the gas releasable valve 32".

[0021] Accordingly, the light according to the preferred embodiment of the present invention further comprises a gas releasing arrangement 50" supported within the casing 10" for operating the gas releasing lever 33" into action. The gas releasing arrangement 50" comprises an

actuator to depress the driving end 332" of the gas releasable valve 32".

[0022] The actuator comprises a lighter cap 51" pivotally mounted to the casing 10" for enclosing the ceiling of the casing 10", and a driving lever 52" pivotally supported within the casing 10", wherein the driving lever 52" has an upper end coupled with the lighter cap 51" and a lower end slidably engaged with the driving end 332" of the gas releasing lever 33" for actuating the gas releasing lever 33" into movement. When the lighter cap 51" is pivotally and upwardly folded to expose the ceiling of the casing 10", the driving lever 52" is driven to depress the driving end 332" of the gas releasing lever 33" for releasing the gas from the replaceable fuel cartridge.

[0023] As shown in FIG. 8, the lighter cap 51" has a pivotal end 511" pivotally moveable with respect to the casing 10". Whenever the light cap 51" is pivotally unfolded to expose the ceiling of the casing 10", the pivotal end 511" is inwardly rotated so as to bias against the upper portion of the driving lever 52", thus making the driving lever 52" rotate in a clockwise manner. As a result, the outwardly rotated lower portion of the driving lever 52" will downwardly depress the driving end 332" of the gas releasing lever 33" for managing a gas outflow from the gas releasable valve 32".

[0024] It is worth to mention that the actuator can be an ignition button of the lighter to couple with the driving end 332" of the gas releasing lever 33" such that while the ignition button is being depressed for producing the sparks, the driving end 332" of the gas releasing lever 33" is depressed for ignition of the lighter.

[0025] Accordingly, the gas releasable valve 32" has a movable operating tip 321" extended upwardly. Whenever the driving end 332" of the gas releasing lever 33" is downwardly depressed, the gas releasable valve 32" releases the fuel from the replaceable fuel cartridge 31". In the preferred embodiment, the gas releasable valve 32" is arranged to release the fuel from the replaceable fuel cartridge 31" to the gas emitting nozzle 20" when the driving end 332" of the gas releasing lever 33" is depressed.

[0026] Here, the fuel supply arrangement 30" comprises a sheltering cap 34" engaged with the gas releasable valve 32", wherein the sheltering cap 34" has an interior chamber 341" to detachably fit the movable operating tip 321" of the gas releasable valve 32" therein and a guiding through slot 342" extended from the interior chamber 341" and aligned with the movable operating tip 321" of the gas releasable valve 32" for transferring the gas from the gas releasable valve 32" to the gas emitting nozzle 20".

[0027] As shown in FIG 9, the actuating end 331" of the gas releasing lever 33" is coupled onto a neck 322" of the moveable operating tip 321", so that when the driving end 332" of the gas releasing lever 33" is downwardly depressed, the actuating end 331" is capable of being lifted up for nudging the moveable operating tip 321" biasing against the roof of the sheltering cap 34", so that

the gas reserved within the replaceable fuel cartridge 31" could be released via the guiding through slot 342" to be ignited at the gas emitting nozzle 20". In other words, the movable operating tip 321" of the gas releasable valve 32" is normally in a lower closed position, as shown in FIG. 9, and is arranged to release the fuel from the replaceable fuel cartridge 31" to gas emitting nozzle 20" when the movable operating tip 321" of the gas releasable valve 32" is driven to an upper position, as shown in FIG 10.

**[0028]** The sheltering cap 34" further comprises a sealing member 343" having a ring-shaped coaxially mounted in the interior chamber 341" to sealedly mount the movable operating tip 321" of the gas releasable valve 32", so as to prevent a gas leakage from the sheltering cap 34".

**[0029]** It is noted that the replaceable fuel cartridge 31" further comprises means for applying an urging force against the gas releasing lever 33" to push the actuating end 331" thereof downwardly. The urging means comprises a resilient element 35" supported by the casing 10" and disposed below the driving end 332" for continuously biasing against the driving end 332" upwardly. As a result, under normal circumstance, the driving end 332" is upwardly biased for ensuring the moveable operating tip 321" rested in the close position.

**[0030]** Moreover, the sheltering cap 34" is directly coupled a gas transferring conduit 36" having another end serviceable to the gas emitting nozzle 20". It is worth to mention that the gas transferring conduit 36" is a flexible gas tube, such as rubber, allowing the gas to flow towards the gas emitting nozzle 20". When the sheltering cap 34" is pushed upwardly so that it is in the gas releasing process, the sheltering cap 34" is capable of allowing the gas transferring conduit 36" to move with it freely. Preferably, the fuel supply arrangement 30" further comprises two guiding walls 37" supported within the casing 10", wherein the sheltering cap 34" is slidably mounted between the guiding walls 37" such that the guiding walls 37" guide a movement of the sheltering cap 34" within a predetermined vertical distance. As shown in FIG. 9 and FIG. 10, each of the guiding walls 37" has a transverse stopper ridge 371" integrally and inwardly defined thereon, so that when the moveable operating tip 321" is lifted up forcing the sheltering cap 34" upwardly displaced, the stopper ridge 371" will automatically limit the moving distance of the sheltering cap 34".

**[0031]** Preferably, the sheltering cap 34" has a cap shoulder 344" protruding outwardly along the circumferential direction of said sheltering cap, such that when said sheltering cap is lightly pushed upwardly along the guiding walls 37" by moveable operating tip 321", said transverse stopper ridges 371" extending inwardly from the guiding walls can delay the said sheltering cap to move upwardly and block a further upward movement of said sheltering cap during the upward movement of said sheltering cap.

**[0032]** Accordingly, fuel supply arrangement 30" has

a resilient member 38" disposed between said transverse stopper ridges 371" and said cap shoulder 344", as shown in FIG. 11 to FIG. 12, so as to ensure the extension of the life span of the lighter and maintain reliable performance thereof. Thus, during the ignition, said sheltering cap, while moving upwardly, can squeeze said resilient member. After the actuator is released, said resilient member is let go so as to force said sheltering cap 34" to be disengaged with said transverse stopper ridges 371". That is to say, said resilient member 38" serves to keep said sheltering cap 34" to move vertically at an appropriate position. Once ignition operation is completed, said sheltering cap 34" being pushed upwardly can return to its original position so as to be ready for next ignition.

**[0033]** Said resilient member 38" can comprise two springs extending downwardly from the bottom of each of transverse stopper ridges, said cap shoulder 38" being detachably and repeatedly coupled to said springs and returning to its original position steadily. Accordingly, said resilient member 38" can also be a helical spring fitted over said sheltering cap and supported by said cap shoulder 38", such that when said sheltering cap is pushed upwardly, said helical spring is tightly held between said transverse stopper ridges 371" and said cap shoulder 38".

**[0034]** As the applicant of the present invention has made efficient modifications to said actuator, i.e. gas releasing arrangement, and replaceable fuel cartridge, said gas releasable valve 32" may be of type that can release gas only by pulling it upwardly, which is available at market, thus making great contribution to lowering the production cost of said lighter.

**[0035]** One skilled in the art will understand that the embodiment of the present invention as shown in the drawings and described above is exemplary only and not intended to be limiting.

**[0036]** It will thus be seen that the objects of the present invention have been fully and effectively accomplished. Its embodiments have been shown and described for the purposes of illustrating the functional and structural principles of the present invention and are subject to change without departure from such principles. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following claims.

## Claims

### 1. A lighter, comprising:

- a casing having a receiving cavity and an opening communicating said receiving cavity with outside;
- a gas emitting nozzle appearing at a ceiling of said casing, the said nozzle comprising a sheltering cap located in the said casing and coupled with the replaceable fuel cartridge.
- an ignition system supported by the ceiling of

- said casing for producing a spark toward said gas emitting nozzle;  
 wherein, a gas releasing lever, which is pivotally mounted on said replaceable fuel cartridge, having an actuating end coupled to said gas releasable valve and a driving end on said replaceable fuel cartridge, arranged when said driving end is depressed, said actuating end pivotally lifts up said gas releasable valve for releasing said liquefied fuel from said replaceable fuel cartridge; and  
 a gas releasing arrangement, comprising an actuator movably supported within said casing to engage with said driving end of said gas releasing lever in such a manner that when said actuator is moved to depress said driving end of said releasing lever, said gas releasable valve releases said gas to said gas emitting nozzle for being ignited.
2. The lighter, as recited in claim 1, wherein said actuator comprises a lighter cap pivotally mounted to said casing for enclosing said ceiling of said casing, and a driving lever having an upper portion coupled with said lighter cap and a lower portion slidably engaged with said driving end of said gas releasing lever such that when said lighter cap is pivotally and upwardly folded to expose said ceiling of said casing, said driving lever is driven to depress said driving end of said gas releasing lever for releasing said gas from said replaceable fuel cartridge.
  3. The lighter, as recited in claim 1, wherein said sheltering cap is movably supported within said casing to detachably couple with said gas releasable valve when said replaceable fuel cartridge is received in said receiving cavity, and a gas transferring conduit is extended from said sheltering cap to said gas emitting nozzle for guiding said gas released from said replaceable fuel cartridge to said gas emitting nozzle.
  4. The lighter, as recited in claim 2, wherein said sheltering cap is movably supported within said casing to detachably couple with said gas releasable valve when said replaceable fuel cartridge is received in said receiving cavity, and a gas transferring conduit is extended from said sheltering cap to said gas emitting nozzle for guiding said gas released from said replaceable fuel cartridge to said gas emitting nozzle.
  5. The lighter, as recited in claim 3, wherein said sheltering cap, having an interior chamber detachably accommodating an operating tip of said gas releasable valve therein, is allowed to be upwardly pushed to allow said gas releasable valve being lifted up for releasing said gas.
  6. The lighter, as recited in claim 4, wherein said sheltering cap, having an interior chamber detachably accommodating an operating tip of said gas releasable valve therein, is allowed to be upwardly pushed to allow said gas releasable valve being lifted up for releasing said gas.
  7. The lighter, as recited in claim 4, wherein the said sheltering cap further comprises two guiding walls supported within said casing, the said sheltering cap is slidably mounted between said guiding walls such that said guiding walls guide a movement of said sheltering cap when said sheltering cap is upwardly pushed by said gas releasable valve.
  8. The lighter, as recited in claim 6, wherein the said sheltering cap further comprises two guiding walls supported within said casing, said sheltering cap is slidably mounted between said guiding walls such that said guiding walls guide a movement of said sheltering cap when said sheltering cap is upwardly pushed by said gas releasable valve.
  9. The lighter, as recited in claim 7, wherein each of said guiding walls has a transverse stopper ridge integrally and inwardly defined thereon, so that when said gas releasing valve is lifted up to push said sheltering cap upwardly, said stopper ridges block a further upward movement of said sheltering cap.
  10. The lighter, as recited in claim 8, wherein each of said guiding walls has a transverse stopper ridge integrally and inwardly defined thereon, so that when said gas releasing valve is lifted up to push said sheltering cap upwardly, said stopper ridges block a further upward movement of said sheltering cap.
  11. The lighter, as recited in claim 9, wherein exterior wall of said sheltering cap has a cap shoulder protruding outwards along its periphery, so that when said sheltering cap is lifted up, said guiding walls can push said cap shoulder to block a further upward movement of said sheltering cap.
  12. The lighter, as recited in claim 10, wherein exterior wall of said sheltering cap has a cap shoulder protruding outwards along its periphery, so that when said sheltering cap is lifted up, said guiding walls can push said cap shoulder to block a further upward movement of said sheltering cap.
  13. The lighter, as recited in claim 11, wherein at least one resilient element is mounted between said transverse stopper ridge and said cap shoulder, such that when said sheltering cap is pushed upwardly, the resilient element is squeezed between said transverse stopper ridge and said cap shoulder, so that an urging force is produced that helps said sheltering

cap to be separated from said transverse stopper ridge, once said actuator is released.

14. The lighter, as recited in claim 12, wherein at least one resilient element is mounted between said transverse stopper ridge and said cap shoulder, such that when said sheltering cap is pushed upwardly, the resilient element is squeezed between said transverse stopper ridge and said cap shoulder, so that an urging force is produced that helps said sheltering cap to be separated from said transverse stopper ridge, once said actuator is released. 5 10
15. The lighter, as recited in claim 4, wherein said gas transferring conduit is a flexible gas tube allowing said gas to flow towards said gas emitting nozzle when said sheltering cap is pushed upwardly. 15
16. The lighter, as recited in claim 14, wherein said gas transferring conduit is a flexible gas tube allowing said gas to flow towards said gas emitting nozzle when said sheltering cap is pushed upwardly. 20
17. The lighter, as recited in claim 10, wherein a sealing member is further mounted in said interior chamber of said sheltering cap to be slidably mounted to said gas releasable valve for preventing said gas leaking when an operating tip of said gas releasable valve is slidably inserted into said interior chamber of said sheltering cap. 25 30
18. The lighter, as recited in claim 16, wherein a sealing member is further mounted in said interior chamber of said sheltering cap to be slidably mounted to said gas releasable valve for preventing said gas leaking when an operating tip of said gas releasable valve is slidably inserted into said interior chamber of said sheltering cap. 35
19. The lighter, as recited in claim 1, wherein a resilient element is further mounted between the driving end of said gas releasing lever and the ceiling of said replaceable fuel cartridge for applying an urging force against said gas releasing lever to push said actuating end thereof downwardly. 40 45
20. The lighter, as recited in claim 18, wherein a resilient element is further mounted between the driving end of said gas releasing lever and the ceiling of said replaceable fuel cartridge for applying an urging force against said gas releasing lever to push said actuating end thereof downwardly. 50
21. A replaceable fuel cartridge, storing a liquefied fuel and being received in the receiving cavity of a casing of the lighter as recited in claims 1-20, said replaceable fuel cartridge comprising a gas releasable valve coupled with said gas emitting nozzle for controlling 55

gas flow from said replaceable fuel cartridge, wherein:

- a gas releasing lever, which is pivotally supported on said replaceable fuel cartridge, having an actuating end coupled to said gas releasable valve and a driving end, arranged when said driving end is depressed, said actuating end pivotally lifts up said gas releasable valve for releasing said liquefied fuel from said replaceable fuel cartridge.
22. The lighter, as recited in claim 21, wherein a resilient element is further mounted between the driving end of said gas releasing lever and the ceiling of said replaceable fuel cartridge for applying an urging force against said gas releasing lever to push said actuating end thereof downwardly.

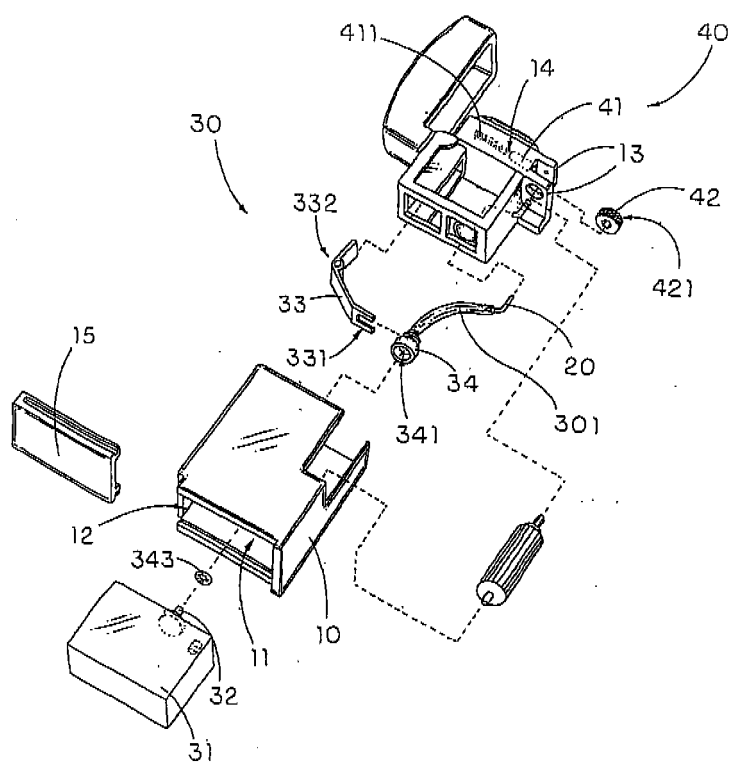


FIG 1

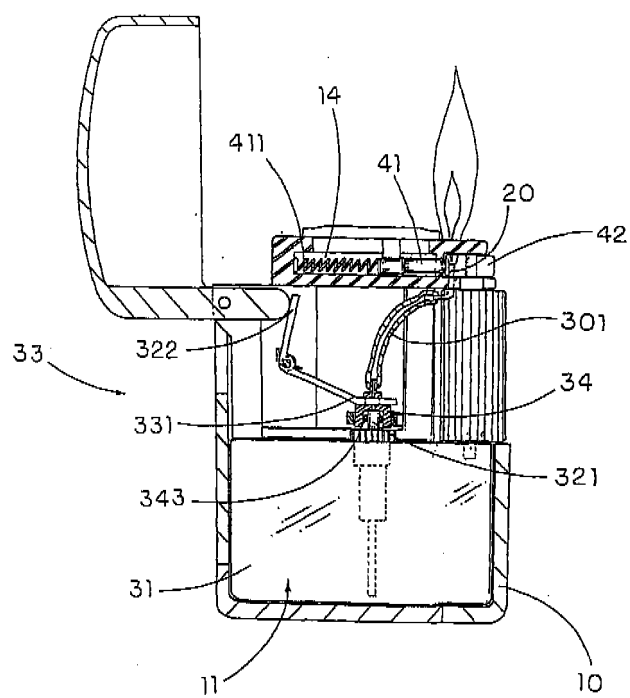


FIG2

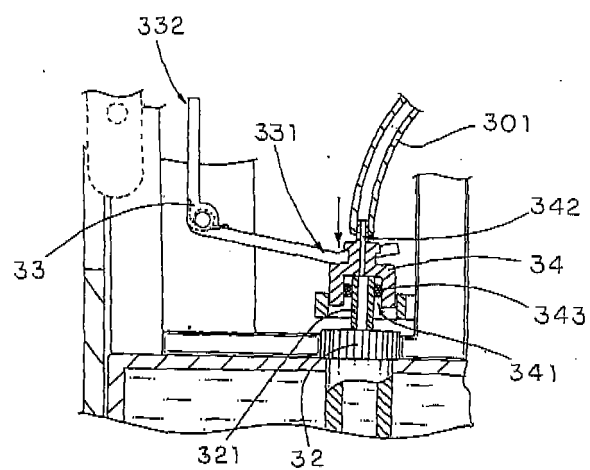


FIG 3A

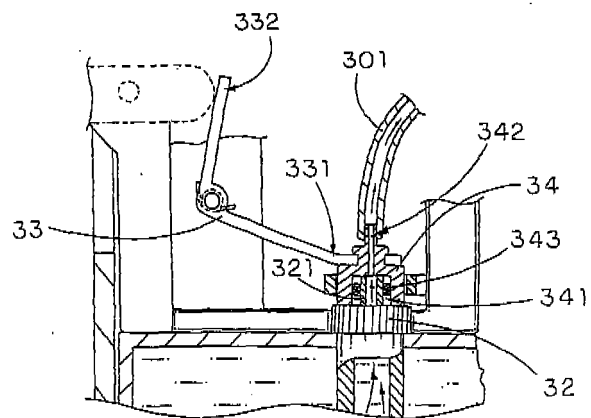


FIG 3B

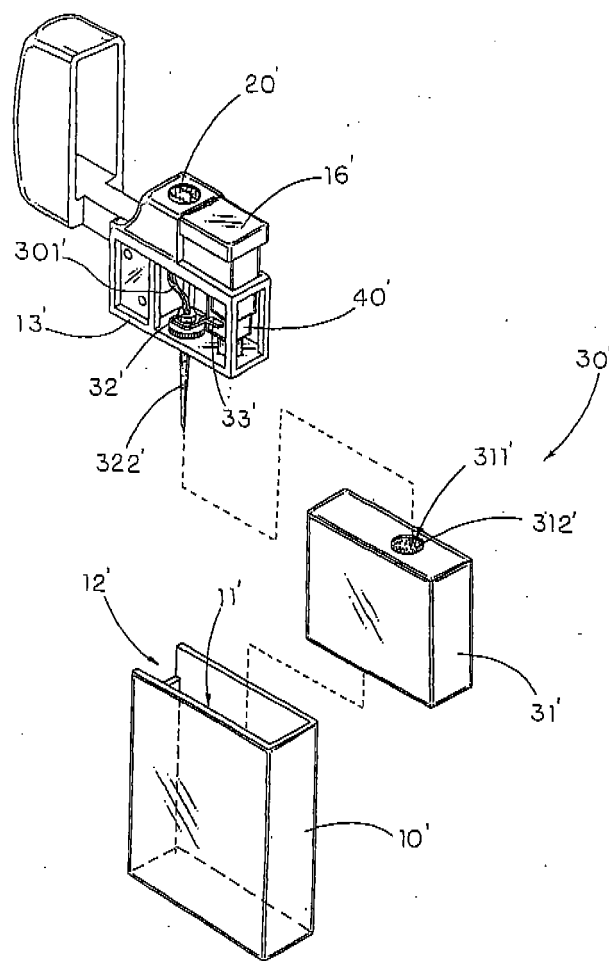


FIG 4

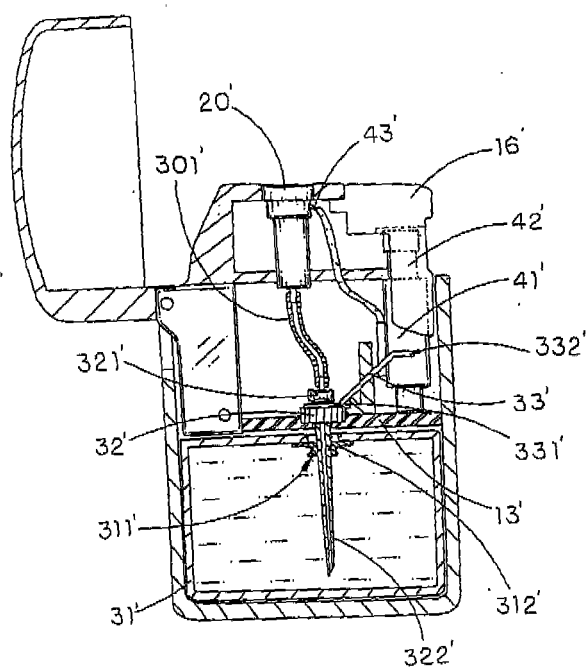


FIG 5

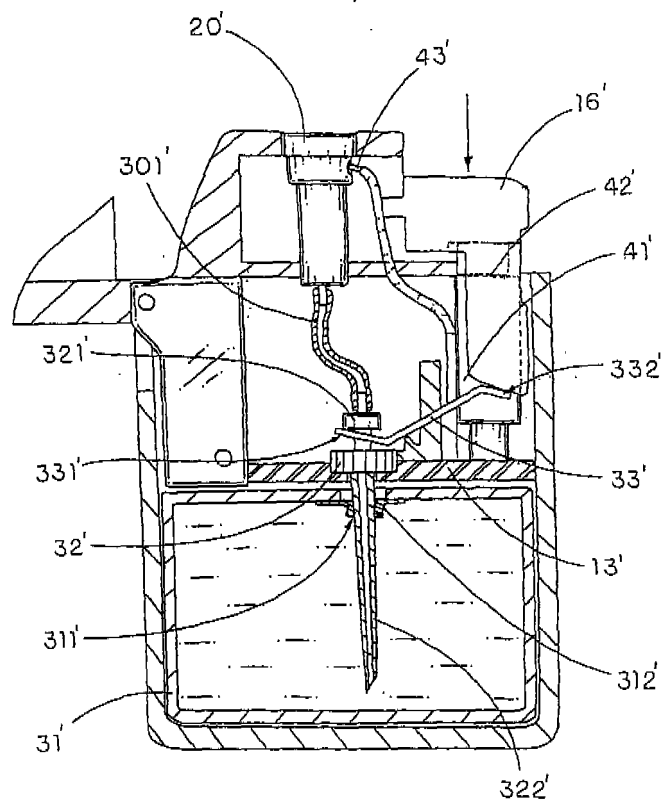


FIG 6

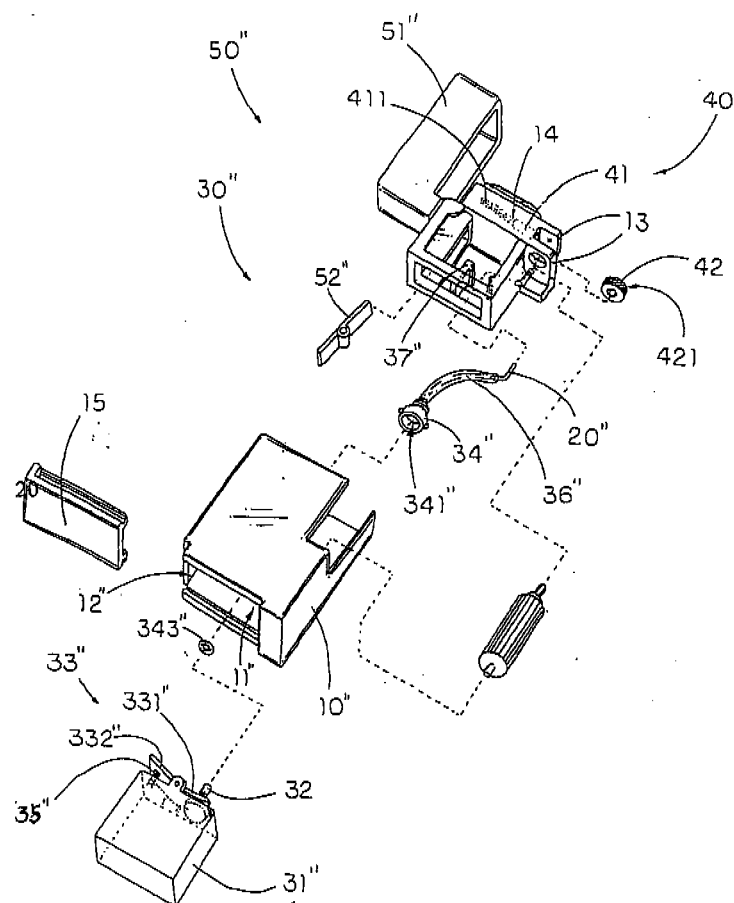


FIG 7

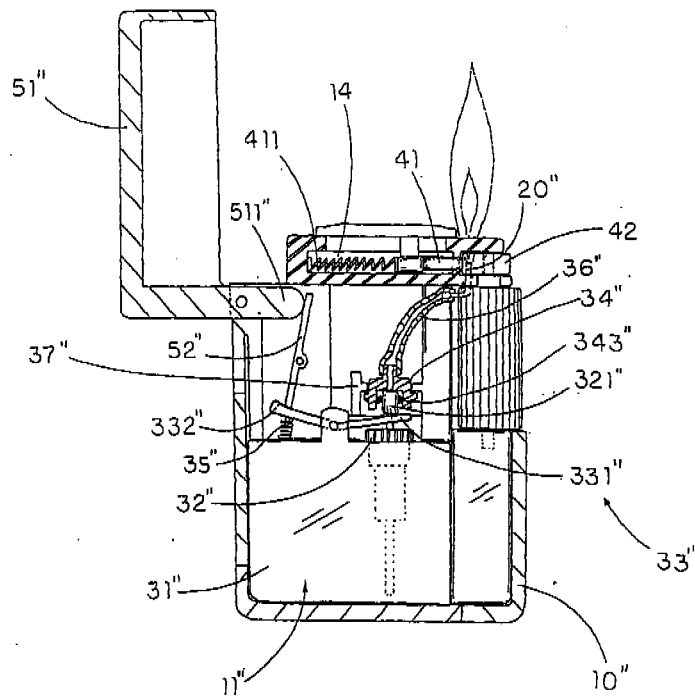


FIG 8

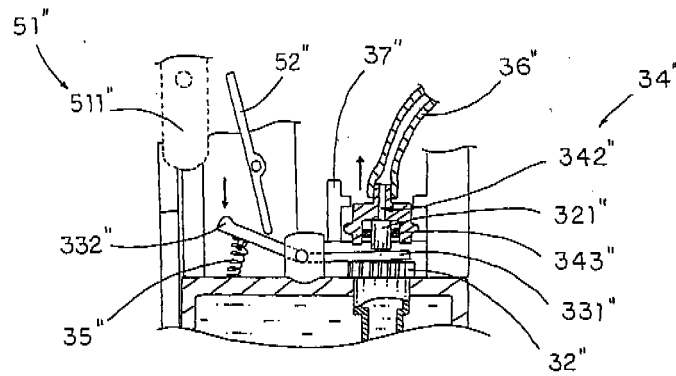


FIG 9

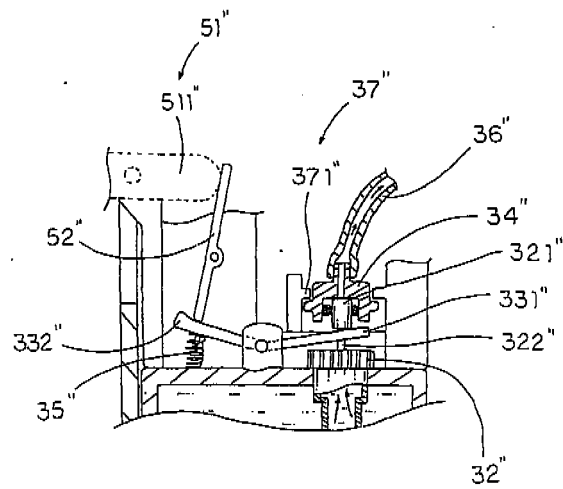


FIG 10

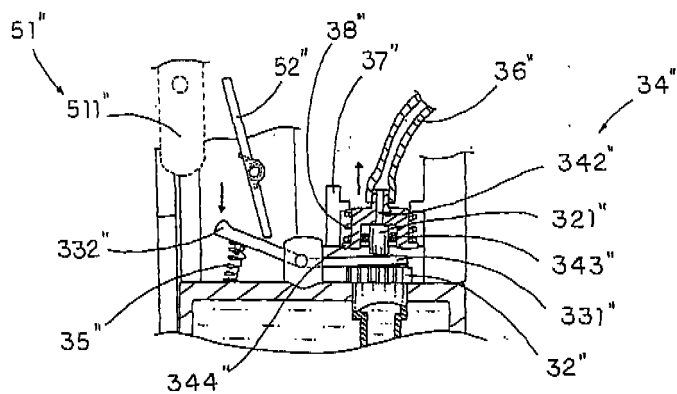


FIG 11

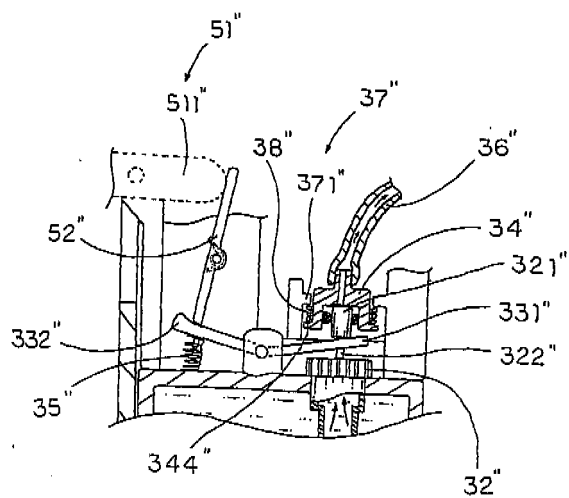


FIG 12

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2006/002241

## A. CLASSIFICATION OF SUBJECT MATTER

F23Q2/42(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F23D(2006.01)i F23Q (2006.01)i

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CHINA PATENT DOCUMENT (1985—)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI,PAJ,EPODOC,CNPAT ignit+ lighter fuel replac+ exchang+ gas slot channel trough trench

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                           | Relevant to claim No. |
|-----------|--------------------------------------------------------------------------------------------------------------|-----------------------|
| X         | CN,A,1448654 (XIE,Yiling) 15.Oct.2003 (15.10.2003) abstract, page 2 line 13-<br>page 7 line 20 and figs. 1-6 | 1-6、15、16、18、21       |
| E         | CN,Y,2823837 (XIE,Yiling) 04.Oct.2006 (04.10.2006) the whole document                                        | 1-22                  |
| A         | JP,A,2001-12737 (YOSHINAGA TECHNICA KK) 19.Jan.2001 (19.01.2001) the<br>whole document                       | 1-22                  |
| A         | WO,A2,03/036170 (ROSENBERG A) 1.May 2003 (01.05.2003) the whole<br>document                                  | 1-22                  |
| A         | US,B1, (XIE Y) 20.Sep.2005 (20.09.2005) the whole document<br>6945771                                        | 1-22                  |

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

|                                                                                                                                                                          |                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * Special categories of cited documents:                                                                                                                                 | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                                              |
| "A" document defining the general state of the art which is not considered to be of particular relevance                                                                 | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                                                                     |
| "E" earlier application or patent but published on or after the international filing date                                                                                | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family                                                                                                                                                                                                    |
| "O" document referring to an oral disclosure, use, exhibition or other means                                                                                             |                                                                                                                                                                                                                                                  |
| "P" document published prior to the international filing date but later than the priority date claimed                                                                   |                                                                                                                                                                                                                                                  |

Date of the actual completion of the international search  
17.Nov. 2006(17.11.2006)Date of mailing of the international search report  
21 · DEC 2006 (21 · 12 · 2006)Name and mailing address of the ISA/CN  
The State Intellectual Property Office, the P.R.China  
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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
PCT/CN2006/002241

| Patent document<br>Cited in search report | Publication date | Patent family members | Publication date |
|-------------------------------------------|------------------|-----------------------|------------------|
| CN,A,1448654                              | 15.10.2003       | CN,C,1184437          | 12.01.2005       |
| CN,Y,2823837                              | 04.10.2006       | NONE                  |                  |
| JP,A,2001-12737                           | 19.01.2001       | NONE                  |                  |
| WO,A2,03/036170                           | 01.05.2003       | AU,A,2002349789       | 06.05.2003       |
| US,B,6945771                              | 20.09.2005       | US,A,2003180676       | 25.09.2003       |
|                                           |                  | US,A,2005266365       | 01.12.2005       |
|                                           |                  | US,A,2005266364       | 01.12.2005       |

Form PCT/ISA /210 (extra sheet) (April 2005)

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- JP 2001012737 A [0006]
- CN 02116399 [0007] [0007]
- WO 02116399 A [0017]