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2,692,491

LIGHTER

Filed Nov. 28, 1951

4 Sheets-Sheet 1

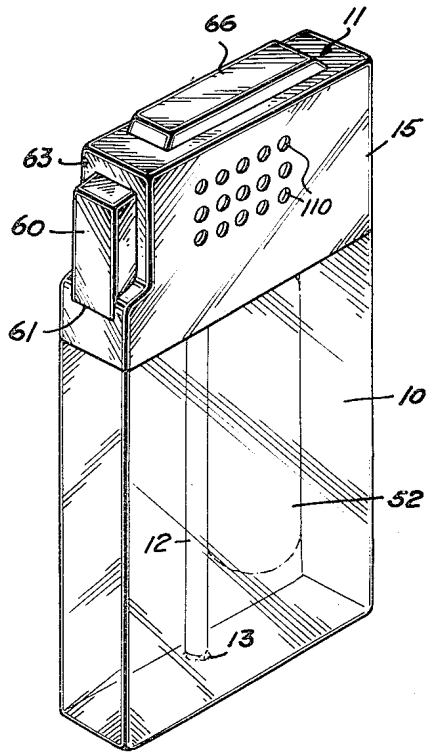


Fig. 1.

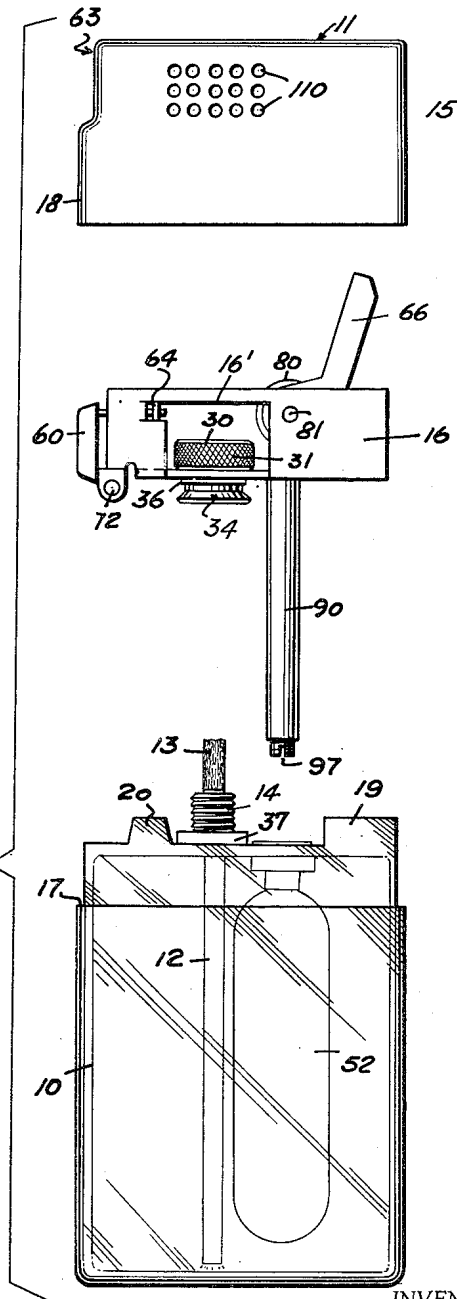


Fig. 2.

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4 Sheets-Sheet 2

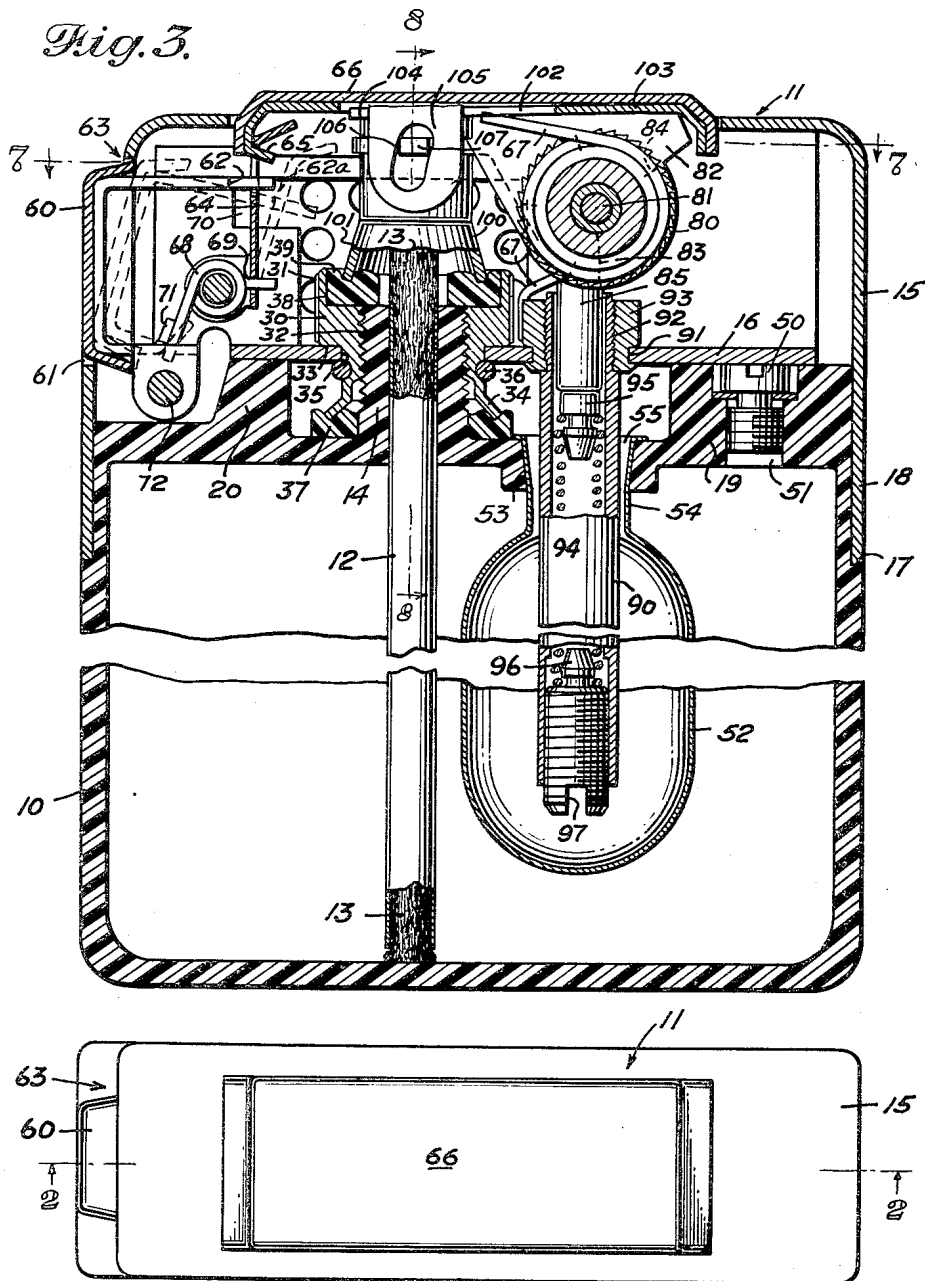


Fig. 4.

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4 Sheets-Sheet 4

Fig. 7.

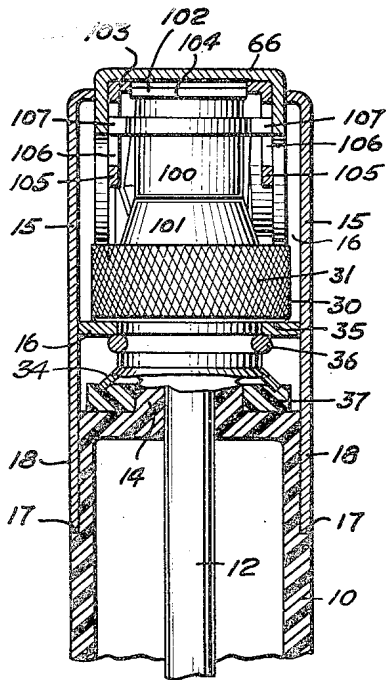
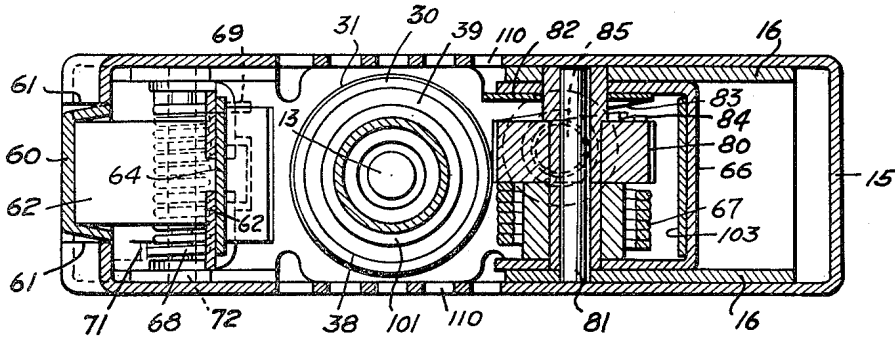


Fig. 8.

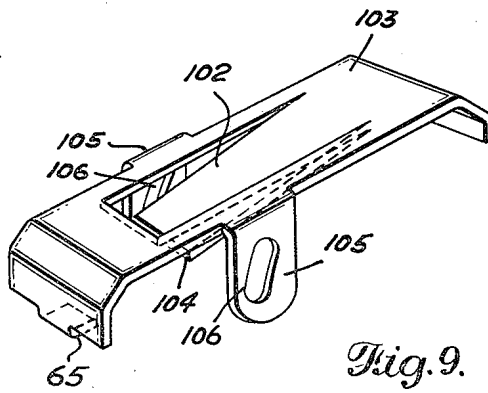


Fig. 9.

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2,692,491

LIGHTER

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11 Claims. (Cl. 67--7.1)

1

The present invention relates to lighters for cigars and cigarettes, and, more particularly, to lighters in which a detachable fuel chamber is provided so that the entire chamber may be removed from the lighter for refilling or replacing.

One of the defects of the cigar and cigarette lighters now in use is the lack of sufficient fuel space in the fuel chamber. The presently known lighters usually employ a fuel chamber having an absorbing material provided therein for the purpose of preventing flooding of the wick. However, by so inserting the absorbing material in the fuel chamber, a large amount of fuel space is consumed, thus preventing the maximum use of the fuel chamber. It is desirable that a lighter have the entire fuel chamber reservoir available for the lighter fluid. Thus, constant refilling of the lighter is obviated. It is, therefore, one of the primary objects of this invention to provide a fuel chamber in which the maximum amount of space is available for the lighter fuel.

Another object of the present invention is to provide a wick means which comprises a wick tube surrounding a wick wherein the wick is prevented from flooding.

Another object of the invention is a novel sealing means between the cover assembly and the fuel chamber, whereby a gas-tight seal is effected, thereby preventing the lighter fuel from escaping from the fuel chamber.

Still another object of the invention is a novel wick sealing means in which a snuffer cap arrangement is provided for sealing the wick when the cover is closed, thereby preventing the evaporation of the fuel.

Still another object of the invention is the provision of a diaphragm in the fuel chamber to compensate for internal pressures in the fuel chamber.

Other objects and the advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view of the lighter described herein;

Fig. 2 is an exploded view of the lighter shown in Fig. 1;

Fig. 3 is a vertical sectional view of the lighter showing the cover plate in latched position;

Fig. 4 is a plan view of the lighter;

Fig. 5 is a view similar to Fig. 3 showing the cover plate closed but not latched;

Fig. 6 is a view similar to Fig. 3 showing the cover plate open and in the lighting position;

Fig. 7 is a section taken along the line 7--7 of Fig. 4;

Fig. 8 is a section taken along the line 8--8 of Fig. 4 with parts shown in elevation; and

Fig. 9 is a detail view in perspective of the leaf spring and control ear.

2

Referring to the drawings, and particularly to Figs. 1, 2 and 3, a fuel chamber 10 is shown operatively connected to a cover assembly indicated generally at 11. The fuel chamber 10, which is preferably of oblong horizontal cross-section, comprises a single unit closed at both ends and includes a wick assembly which comprises a wick tube 12 and a wick 13. A threaded neck 14 integrally connected to the fuel chamber surrounds the wick tube 12 at the topmost end of the chamber 10, while the wick tube concentrically encases the wick 13. The wick extends to the lower extremity of the fuel chamber 10, the wick tube 12 also projecting into the fuel chamber surrounding the wick, but only extending to within a short distance of the end of the wick 13. At the top end of the chamber, the wick 13 extends substantially above the neck section 14 ready for lighting, as needed.

Flooding of the wick has been a common source of trouble to lighter owners. Flooding occurs particularly when the lighter is tipped, for instance, if carried in the pocket or purse. As a result of the wick flooding, evaporation of the fuel occurs and sometimes upon lighting, a fire hazard is present. In order to prevent the wick from flooding, the present invention utilizes a novel means whereby the wick fibres are compressed to reduce fluid flow. The wick tube 12, which is composed of a plastic material, is adapted to exert pressure on and compress the wick fibres. As a result of the pressure on the wick, the fluid flow from the chamber 10 is reduced and thus the fluid is prevented from running out of the chamber 10 via the wick 13.

Flooding of the wick in presently known lighters also occurs as a result of the internal pressures present in the fuel chamber. The fuel chamber is filled with a volatile fluid which has a relatively large thermal coefficient of cubical expansion. During the refilling operation, some air will find its way into the chamber and consequently, upon use of the lighter, an expansion of air and liquid occurs while the vapor pressure of the fluid increases. Since the conventional fuel chamber has no means to compensate for this expansion, the resulting increase in internal pressures will tend to force the liquid fuel to the wick which eventually will cause the wick to be flooded. This flooding not only renders the lighter inoperative, but, in addition, is dangerous as a fire hazard.

In order to compensate for the internal pressures in the fuel chamber 10, a collapsible diaphragm 52 is provided, the diaphragm being permanently attached to the inside of the fuel chamber. The fuel chamber has an opening 53 into which the neck section 54 of the diaphragm is inserted, the neck section having access to the atmosphere at 55. It will be ap-

3

parent that the collapsible diaphragm provides a variable volume in the fuel chamber 10, thus keeping the pressures within the chamber equal to atmospheric. By such an arrangement the objectional internal pressures normally present in the fuel chamber will be eliminated and thus the possibility of wick flooding or inadvertent lighting will be obviated.

The cover assembly 11, which houses a releasing and latching mechanism for the cover plate, a wick sealing means and a flint operating mechanism, further includes a cover jacket 15, which slidably fits over a cover frame 16. A shoulder 17 provided on the outer side of the fuel chamber wall supports a skirt 18 of the cover jacket 15, the skirt 18 cooperating with the shoulder 17 to give the lighter a neat and pleasing appearance in addition to providing a sufficient sliding surface to effectively hold the cover jacket in place.

In order to operatively connect the cover frame 16 to the fuel chamber 10, a novel attaching means is employed. By use of this novel attaching means, the fuel chamber may be readily detached from the cover assembly for refueling purposes or for replacing or adjusting the flint. Referring to Fig. 3, the cover frame 16 is shown mounted on the fuel chamber shoulders 19, 20 and secured thereon by means of a nut or attaching member 30. The nut 30 has a knurled outside edge 31 to facilitate turning and is internally threaded at 32, which threads engage the threaded neck section 14 of the fuel chamber 10. The cover frame has an opening 16' which affords access to the nut 30. This enables the nut 30 to be reached without effort whenever the fuel chamber is to be removed from the cover assembly. A flange 33 of the nut 30 contacts the cover frame 16, while the lowermost part of the nut, including the flared skirt 34, extends through an opening 35 in the cover frame. A retaining ring 36 is provided to hold the nut in position after the nut is firmly screwed onto the neck section 14, and a rubber washer 37 located at the lowermost side of the neck section is provided to receive the flared skirt 34. As the nut is tightened the ends of the skirt 34 bite into the washer 37, thereby effecting an efficient seal between the cover frame and the fuel chamber. The uppermost side of the nut 30 is provided with a cuplike cavity 38 surrounding the wick 13, the cavity 38 retaining a rubber washer 39, the purpose of which will be described hereinafter.

It is apparent that in order to replace or refill the fuel chamber 10, it is only necessary to remove the cover jacket 15 and unscrew the nut 30 from the neck section 14. The fuel chamber can then be removed from the cover frame for refilling or replacing. The fuel chamber is constructed of inexpensive plastic and has the advantage of being easily and cheaply renewed should it become damaged. Not only is the fuel chamber replaceable, but the present invention allows for the removal of the entire wick unit along with the fuel chamber including the wick tube 12 and wick 13. This arrangement keeps the lighter fuel out of contact with the flint and sparking wheel during the filling operation, and also allows a consumer to buy a new chamber already filled with fuel having a new wick provided therein.

In order to refill the fuel chamber 10 after it has been removed from the cover assembly, a countersunk screw 50, located in the shoulder 19, is removed and a suitable lighter fuel can then

4

be poured into the chamber through a refill opening 51.

The means for actuating the releasing mechanism, which results in the lighting operation, includes an operating button 60 located on the side of the lighter, an opening 61 in the cover jacket 15 providing convenient access to the button 60. To protect the user against possible unexpected lighting the button can be depressed a short distance before the release device is actuated. This amount of lost motion before the release device operates is governed by the position of a button shoulder 62. The lost motion will allow the button 60 to be depressed to the button recess 63 at which point the button shoulder 62 contacts a cover latch 64, as shown at 62a. Further pressure on the button 60 will force the cover latch 64 to the right, as seen in Fig. 3, releasing a latch tongue 65. The latch tongue 65, as shown in Fig. 9, is integral with a plate 103, the purpose of which will be described hereinafter. The plate 103 with the latch tongue 65 is securely fastened to the cover plate 66 which is continually urged upwardly by a spring 67. Upon release of the latch tongue 65, the cover plate 66 springs upwardly into lighting position due to the action of the spring 67.

A spring 68 bears against the cover latch 64, as shown at 69, forcing the cover latch 64 into the latched position continuously, the cover latch being limited from extending beyond the latched position by a lug 70 bent out from the cover frame 16. The spring 68 also acts to force the button 60 into operating position by bearing against the button assembly, as shown at 71. It is this spring 68 that also provides the tension against the button 60 while the lost motion is being overcome in the initial lighting operation. A pin 72 acts to pivot the button 60 as it is actuated during the lighting operation.

The cover plate 66, which is released when the button 60 is depressed, is operatively connected to a sparking wheel 80 by means of a pin 81, an operating member 82, a pawl 83, and a ratchet 84. The pin 81 is supported by the frame 16 and carries the operating member 82, which, in turn, has connected therewith the pawl 83. The sparking wheel 80 loosely surrounds pin 81 and has integrally attached thereto the ratchet portion 84, the ratchet portion 84 engaging the pawl 83. The operating member 82 is contoured to snugly fit the cover plate 66 and serves to rotate the ratchet 84 through pawl 83 when the cover plate moves upwardly into lighting position. As the ratchet 84 rotates carrying the sparking wheel 80, which frictionally engages a sparking member 85, a spark results which sprays on the wick 13. As the cover plate is manually returned to the latched position after the lighting operation, the pin 81 will rotate loosely in the ratchet-sparking wheel due to the inoperative position of the pawl 83.

The flint assembly includes a flint tube 90 which extends through the opening 91 in the cover frame 16. The flint tube 90 is threaded at its topmost end at 92 and is secured to the frame 16 by a collar 93, which engages the topmost end of the tube 90. The collapsible diaphragm 52 provides a convenient recess for the lower portion of the flint tube 90, the tube projecting into the diaphragm 52 through the opening 55. This arrangement provides for easy removal of the flint assembly when the cover frame 16 is detached from the fuel chamber 10. The flint or sparking member 85, located in the flint tube 90, is

urged against the sparking wheel 80 by a spring 94, which is positioned below the flint 85. The spring 94 urges a plunger 95 upwardly against the flint 85, while the spring 94 is held in place by a screw plunger 96 located at the bottom of the flint tube 90. A slot 97 is provided for turning the screw plunger 96 which adjusts the tension of the spring 94. The friction between the sparking wheel and flint will then be determined by the tension of spring 94.

In order to adjust or replace the flint, it is only necessary to slide the cover jacket 15 off the cover frame 16 and then remove the fuel chamber by unscrewing the knurled nut 30 from the neck section 14. The plunger 96 can then be removed or tightened for the proper flint adjustments.

The efficiency of any wick lighter is dependent upon how effectively evaporation of the fuel is controlled or inhibited. It is desirable that the lighter have some means to prevent the fuel evaporation and it is to accomplish this end that a novel snuffer cap assembly is employed by the present invention. Referring to Fig. 3, the wick sealing means is shown comprising a snuffer cap 100 having a bell-shaped configuration. The snuffer cap 100 encloses the wick 13 when the cover plate is latched, the skirt 101 of the snuffer cap 100 biting into the rubber washer 39 and by so doing providing an effective wick seal. In order that sufficient pressure is exerted on the cap 100, a leaf spring 102 operatively connected to the cover plate 66 is provided. The leaf spring assembly, a detail of which is shown in Fig. 9, comprises a plate 103 which is secured to the cover plate 66. Cut out from the plate 103 is the spring portion 102 which operatively bears against the top of the snuffer cap 100, as shown at 104.

In order to allow the cover plate to close and lock without changing the lateral position of the snuffer cap 100 relative to the rubber washer 39, a snuffer control ear 105 is provided. The control ear 105, shown as part of the leaf spring assembly, has a slot 106 which receives a pin 107 attached to the snuffer cap. As the cover plate 66 moves upwardly or downwardly carrying the control ear 105, the pin 107 will ride in the slot 106 and since the control ear is fixed to the cover plate 66, the snuffer cap will retain its same relative position with respect to the rubber washer 39. When the cover plate is closed, the leaf spring 102 will act to exert additional pressure on the snuffer cap 100, causing the snuffer cap skirt 101 to bite more deeply into the rubber washer 39. By this means, an airtight wick seal is produced insuring a minimum of fuel evaporation.

Referring to Figs. 1 and 2, windproofing holes 110 are provided in the jacket 15 for assuring an instant light and a steady flame.

The operation of the lighter is apparent from the foregoing description. The lighting operation results after the button 60 is depressed. Depressing the button 60 causes the shoulder 62 to contact latch 64 moving it to the right, as seen in Figs. 3, 5 and 6. The cover plate 66 operating the sparking wheel 80 is released which results in a spark as the cover plate 66 moves to its open position, as seen in Fig. 6. In order to move the cover plate 66 to the inoperative position, the plate is manually pressed downwardly until the latch tongue 65 engages the cover latch 64 securing the cover plate. The lighter is then ready for a further lighting oper-

ation or for handy disposal in the pocket or purse.

If it is desired to refill or replace the fuel chamber, the operation is as follows:

The button 60 is depressed to the button recess 63. The jacket 15 is then slid upwardly off the cover frame 16 to expose the nut or attaching member 30. The nut 30, securing the frame 16 to the fuel chamber 10, is then unscrewed, releasing the fuel chamber from engagement with the frame. The fuel chamber can be replaced with a full fuel chamber or replenished with fuel through the refill opening 51. Adjustment of the spark assembly is also possible while the frame and fuel chamber are detached.

It is apparent that the present invention provides a lighter for cigars or cigarettes that is a vast improvement over those now on the market. Constant refilling of the fuel chamber, which is both objectionable and costly, is substantially reduced. An instant light is at all times assured and, moreover, a neat appearing and safe lighter is available to the user.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention and, therefore, the invention is not limited to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A lighter comprising a cover assembly, a fuel chamber having a neck section, wick means inserted in said fuel chamber and extending through said neck section, and securing means engaging said neck section thereby connecting said cover assembly to said fuel chamber so that said fuel chamber is readily detached therefrom, said wick means including a wick tube and a wick extending coaxially into said fuel chamber, said wick tube exerting pressure on and compressing said wick along substantially the entire length thereof whereby the fluid flow through the wick from the fuel chamber is modulated, flint means secured to said cover assembly, and pressure compensating means secured inside said fuel chamber at the upper portion thereof and receiving said flint means, said pressure compensating means compensating for internal pressures within said fuel chamber.

2. A lighter comprising a fuel chamber having a wick inserted therein, a cover assembly operatively attached to said fuel chamber, a collapsible diaphragm attached within said fuel chamber at the upper portion thereof compensating for internal pressure in said chamber, a passage connecting said diaphragm with the outside of said chamber at the upper portion thereof and a flint assembly connected to said cover assembly and extending downwardly into said diaphragm through said passage.

3. In a lighter, a cover assembly including a cover frame, a fuel chamber having an elongated neck section formed integral therewith, flexible means located around said neck section, a wick disposed in said fuel chamber and extending upwardly through said neck section, and means securing said fuel chamber to said cover frame, said securing means engaging said flexible means to form a seal at said neck section, said cover frame having an opening formed therein affording access to said securing means, thereby enabling said fuel chamber to be easily and quickly disassembled from said cover frame.

4. In a lighter, a cover assembly including a

cover frame and a cover jacket positioned around said cover frame, a fuel chamber slidably receiving said cover jacket and having a neck section formed integral therewith, a wick disposed in said fuel chamber and extending upwardly through said neck section, said cover frame having an opening formed therein, said opening affording ready access to securing means, said securing means operatively connecting said cover assembly to said fuel chamber, a flexible member disposed in said securing means and surrounding said wick, said cover assembly including a cover plate pivotally secured to said cover frame, a leaf spring secured to said cover plate, and a snuffer cap operatively connected to said leaf spring, said flexible member receiving said snuffer cap when said cover plate is latched and said leaf spring firmly pressing said snuffer cap into said flexible member, thereby effecting an air-tight seal around said wick.

5. In a lighter, a cover assembly, a fuel chamber having a threaded neck section formed integral therewith, wick means disposed in said chamber and extending upwardly through said neck section, securing means connecting said fuel chamber to said cover assembly so that said fuel chamber is readily detached therefrom, a collapsible diaphragm secured in said fuel chamber at the upper portion thereof having access to the outside of said chamber, thereby preventing the building up of internal pressures in said chamber, flint means secured to said cover assembly and extending into said diaphragm, and a flexible member located around said neck section at the lowermost portion thereof, said flexible member receiving said securing means when said cover assembly is in the latched position, thereby effecting a seal between said cover assembly and said fuel chamber.

6. In a lighter, a fuel chamber having an elongated neck section formed integral therewith, said neck section having an opening formed therein and having threads formed on the outer surface thereof, said chamber having a passage formed in the upper end thereof adjacent said neck section, and a collapsible diaphragm disposed in said chamber having an upper neck section engaging said passage, and flint means extending through said passage and into the interior of said diaphragm, said diaphragm adapted to compensate for internal pressures in said chamber.

7. In a lighter, a cover assembly, a fuel chamber having a threaded neck section formed integral therewith, a flexible washer surrounding said neck section at the lowermost portion thereof, wick means disposed in said chamber and extending upwardly through said neck section, an internally threaded nut secured to said cover assembly and engaging said neck section, thereby connecting said fuel chamber to said cover assembly so that said fuel chamber is readily detached therefrom, said nut having a recess formed in the upper portion thereof and a skirt formed on the lower portion thereof, a resilient member disposed in said recess, said skirt engaging said flexible washer to form a seal between said cover assembly and said fuel chamber, and a snuffer cap secured to said cover assembly and engaging said resilient member when said cover assembly is in the latched position, thereby forming a tight seal around said wick.

8. In a lighter, a wick sealing means comprising a wick, a snuffer cap surrounding said wick, resilient means receiving the snuffer cap, a pin

integrally connected to said snuffer cap, a pivotally mounted cover plate forming the top of said lighter, said cover plate having a control ear secured thereto, said control ear having a slot formed therein receiving said pin, a leaf spring secured to said plate and to the top of said snuffer cap, said spring positively urging said snuffer cap against said resilient means thereby effecting an air-tight seal around said wick.

9. In a lighter, a cover assembly, a fuel chamber secured to said cover assembly, said cover assembly including a cover frame, a cover plate pivotally secured to said cover frame and a cover jacket positioned around said cover frame and slidably engaging said fuel chamber, neck means formed on said fuel chamber, and securing means positioned in said cover frame and engaging said neck means for securing said fuel chamber to said cover frame, said cover frame having an opening formed therein for affording easy access to said securing means whenever said fuel chamber is to be disconnected from said cover assembly, said cover jacket being removed from said cover frame leaving the opening on said cover frame exposed during the fuel chamber disconnecting operation.

10. In a lighter, a cover assembly, a fuel chamber having a neck section formed integral therewith, wick means disposed in said chamber and extending upwardly through said neck section, a nut operatively secured to said cover assembly and engaging said neck section, thereby connecting said fuel chamber to said cover assembly so that said fuel chamber is readily detached therefrom, said nut having a recess formed in the upper portion thereof, a resilient member disposed in said recess, and a snuffer cap secured to said cover assembly and engaging said resilient member when said cover assembly is in the latched position, thereby effecting a tight seal around said wick.

11. In a lighter, a cover assembly including a cover frame and a cover jacket positioned around said cover frame, a fuel chamber slidably receiving said cover jacket and having a threaded neck section formed integral therewith, a flexible washer surrounding the lowermost portion of said neck section, a wick disposed in said fuel chamber and extending upwardly through said neck section, securing means operatively connecting said cover frame to said fuel chamber, said cover frame having an opening formed therein for affording access to said securing means, said securing means comprising a threaded nut having a skirt formed on the lower end thereof, said skirt engaging said flexible washer to form a seal between said cover assembly and said fuel chamber.

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