

Oct. 26, 1954

W. G. HEPBURN

2,692,492

LIGHTER

Filed Dec. 3, 1951

3 Sheets-Sheet 1

Fig. 1.

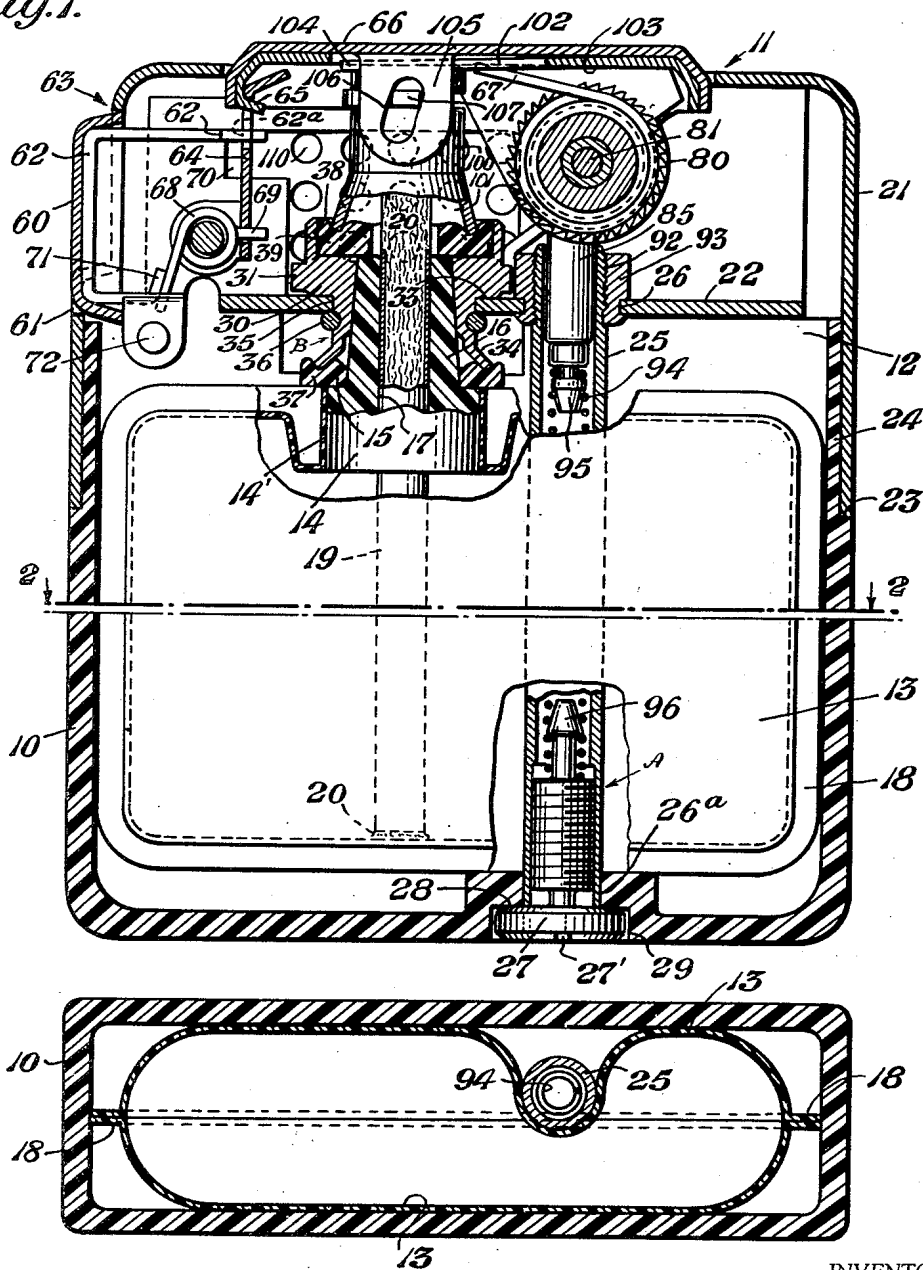


Fig. 2.

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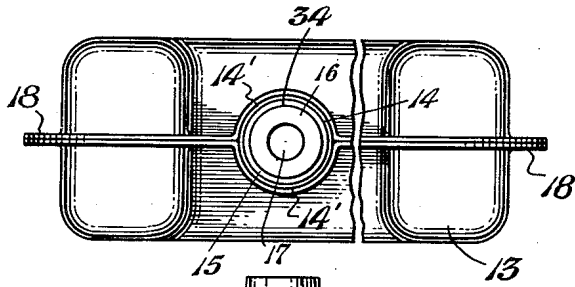


Fig. 5.

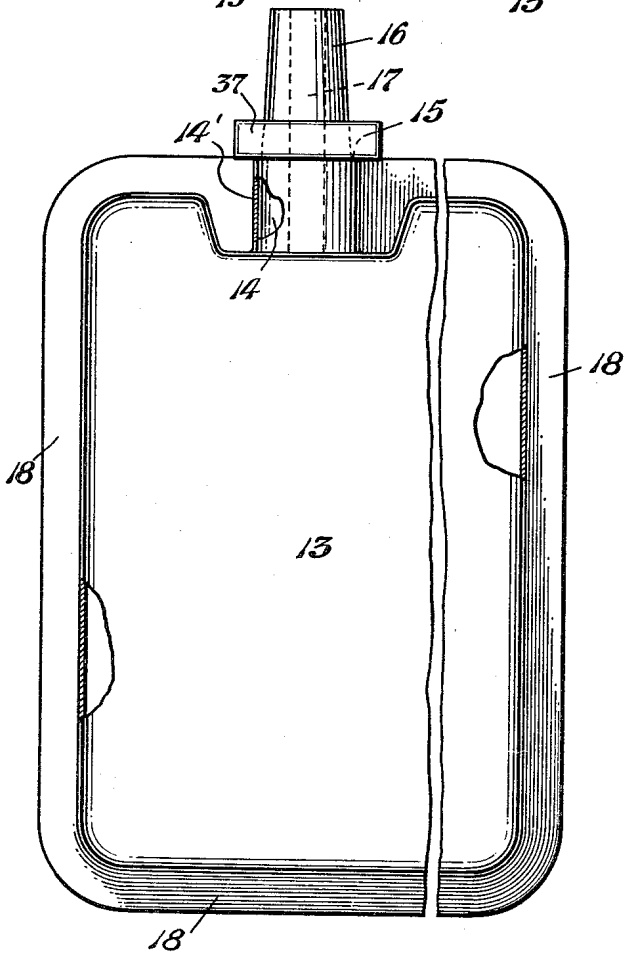


Fig. 3.

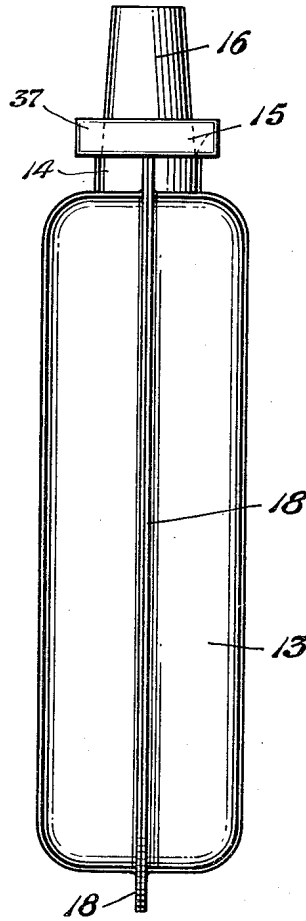


Fig. 4.

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Fig. 6.

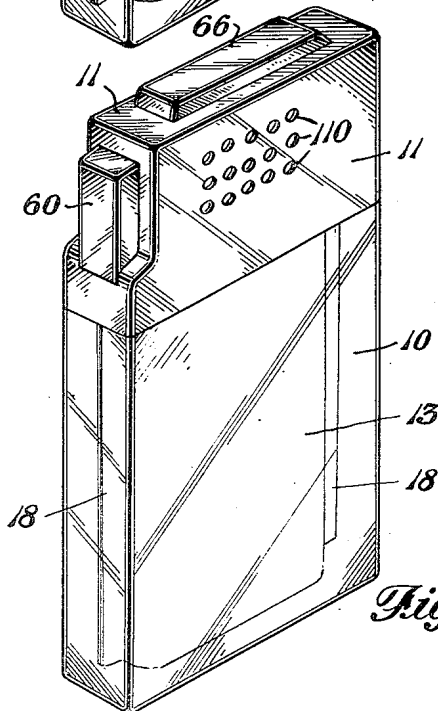
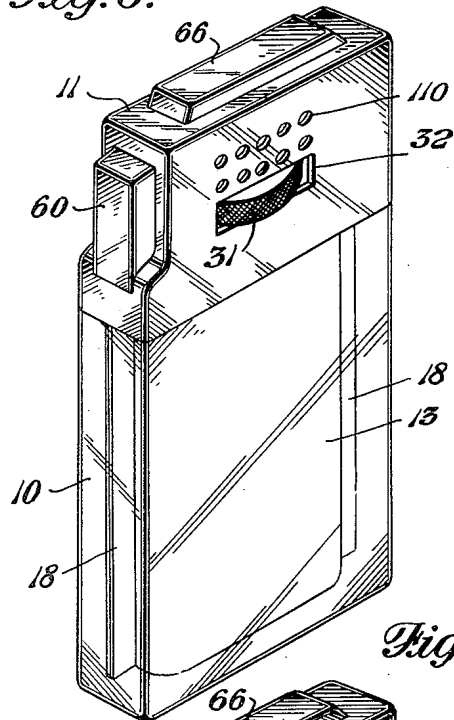


Fig. 7.

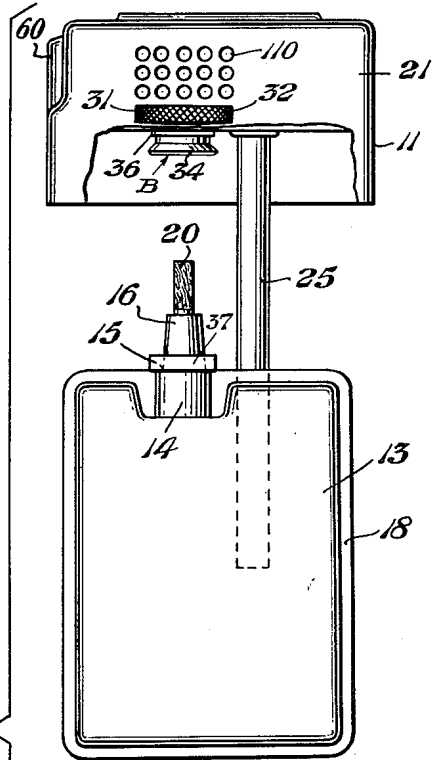
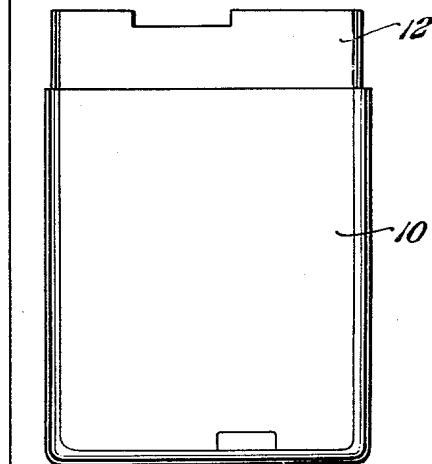


Fig. 8.



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Application December 3, 1951, Serial No. 259,617

7 Claims. (Cl. 67—7.1)

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The present invention relates to lighters for cigars and cigarettes, and more particularly to lighters in which the fuel chamber is adapted to be detached from the lighter assembly for replacing.

The invention described herein relates to the copending application Serial No. 258,589, filed November 28, 1951.

A common fault in all presently known lighters is the necessity for constant filling. This requires the user to have on hand at all times a ready supply of fuel for the filling operation, which often results in a needless waste of time and ever increasing irritation.

In order to avoid constant refilling, the presently known lighters must resort to larger fuel chambers which result in an oversized and bulky lighter, not practical for pocket or purse use. Some attempts have been made to increase the fuel capacity of a lighter without increasing the size of the fuel chamber, but fuel evaporation due to wick flooding or insufficient wick snuffer control resulted, which caused such lighters to be impractical for all intents and purposes.

Fuel evaporation and wick flooding have been the most common causes for the failure of the modern-day lighters to convince the public of the indispensability for the use of lighters. Wick flooding can result from various causes, but the most common cause is the inability of the wick to absorb the fuel in the fuel chamber without becoming saturated and eventually flooding.

The present invention not only solves the problem of controlling the fuel flow through the wick, thus reducing evaporation, but once and for all cures the common fault of all lighters, refilling the fuel chamber. It is, therefore, one of the primary objects of the present invention to provide a replaceable fuel chamber that can be easily and quickly removed and replaced after the exhaustion of the used chamber fuel supply.

Another object of the present invention is to provide a replaceable fuel chamber in which wick flooding resulting in fuel evaporation is substantially eliminated.

Another object of the present invention is to provide a fuel chamber in the form of a deformable plastic bag capable of easy replacement.

Still another object of the present invention is to provide a novel attaching means whereby the replaceable plastic bag is easily attached to and detached from the lighter assembly.

Still another object of the present invention is to provide a novel attaching means whereby the lighter assembly is securely held together.

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

Fig. 1 is a vertical sectional view of the lighter; Fig. 2 is a section taken along line 2—2 of Fig. 1;

Fig. 3 is a front elevation of the disposable fuel bag without the wick assembly, with parts broken away;

Fig. 4 is a side elevation of the disposable fuel bag shown in Fig. 3;

Fig. 5 is a plan view of the disposable fuel bag shown in Fig. 3;

Fig. 6 is a perspective view of the lighter;

Fig. 7 is an exploded view of the lighter shown in Fig. 6; and

Fig. 8 is a perspective view of a modification of the lighter.

Referring to the drawings, and particularly to Figs. 1 and 7, a shell 10 which is preferably formed of a plastic material is shown operatively connected to a cover assembly, generally indicated at 11. The shell 10 is preferably of oblong horizontal cross-section, and comprises a unit which is open at its top most end 12. A fuel bag 13, which is formed of a deformable plastic material, is adapted to be inserted into the shell 10 through the topmost end 12.

Referring to Figs. 1, 3, 4 and 5, the fuel bag has an oblong horizontal cross-section similar to that of the shell 10. A neck 14 extends from the top of the fuel bag 13 and has formed thereon a shoulder 15. A washer 37, the purpose of which will be described hereinafter, rests on the shoulder 15. Extending from the shoulder 15 integral with the neck 14 is the tapered section 16, the purpose of which will be hereinafter described. An opening 17 extends through the tapered section 16 and neck 14, into the deformable plastic bag 13. The fuel bag is made from a filmy plastic material in which the edges are sealed, the sealing operation resulting in the edge 18 surrounding the bag body. The neck 14 and tapered neck section 16, which are formed in one piece, as shown in Fig. 1, are sealed to the bag 13 at 14'.

The fuel bag 13 also includes a wick assembly which comprises a wick tube 19 and a wick 20. The wick 20 extends through the opening 17 to the lower extremity of the fuel bag 13. The wick tube 19 also projects through the opening 17 into the fuel bag and surrounds the wick 20, but extends to within a short distance of the bottom end of the wick. At the top end of the fuel bag the wick 20 extends substantially above the

tapered neck section 16 ready for lighting, as needed. Prior to insertion of the wick assembly into the fuel bag, the bag is filled with a suitable fuel. The wick assembly is then positioned in the bag 13, which is ready for insertion into the lighter assembly.

In order to prevent the wick from flooding, the wick tube 19, which is composed of a plastic material, is adapted to exert pressure on and compress the wick fibers. As a result of the pressure on the wick 20, the fluid flow through the wick is reduced and the escape of fuel due to wick saturation is prevented.

In order to compensate for the expansion of the fluid, increased vapor pressure of the fuel and expansion of any air present in the bag due to variations in temperature or pressure of the atmosphere, the bag is provided with additional capacity. This is accomplished by filling the bag with only enough fuel to insure an adequate number of lights. By reason of the additional capacity, and because of its flexibility, the bag 13 is able to respond to the changes in pressure of its contents by altering its internal volume to conform more closely to the shape of the shell 10. It is apparent that this variable volume in the fuel bag 13 will keep the pressures within the bag equal to atmospheric. By such an arrangement, the objectionable internal pressures normally present in ordinary fuel containers is eliminated, thus obviating the possibility of wick flooding or inadvertent lighting.

Referring again to Fig. 1, the cover assembly 11 is shown housing a releasing and latching mechanism, a wick sealing means, and a flint operating mechanism, and further is shown providing a cover jacket 21 which fits over a cover frame 22. A skirt 24 extending from the cover jacket 21 cooperates with a shoulder 23 provided on the outer side of the shell 10 to give the lighter a neat and pleasing appearance in addition to providing a surface to effectively hold the cover jacket 21 in place.

In order to operatively connect the shell 10 to the cover assembly 11, an attaching means, generally indicated at A, is employed. The attaching means A actually serves a dual function not only providing a means whereby the shell 10 and fuel bag 13 may be readily detached from the lighter assembly, but also providing a simple and accessible means to adjust the flint. Referring to Figs. 1, 2 and 7, the cover assembly includes a flint tube 25 extending through the opening 26 in the cover frame 22. Fig. 2 shows the position of the flint tube 25 with respect to the bag 13. Due to the flexibility of the fuel bag 13, it is adapted to be formed around the tube 25 which extends down into the shell 10. The flint tube 25 is part of a flint assembly that will be described hereinafter. When the lighter is assembled, the flint tube 25, which is threaded at its lower end, extends downwardly to the bottom-most end of the shell 10, where it is received in a hollow portion 26a formed in the shell wall. An adjusting and holding screw 27 is inserted into the tube, the head of the screw 27 contacting the shoulder 28 of the countersunk recess 29, thereby securely bringing the shell and cover assembly together. A slot 27' is provided for turning the screw, thereby releasing or joining the parts, as desired. The flint adjusting feature of the screw 27 will be described hereinafter.

It will be apparent that in order to remove the fuel shell 10, it is only necessary to unscrew the screw 27 from the flint tube 25. The shell 10,

after being removed, exposes the fuel bag for easy removal and replacement.

The fuel bag 13 is operatively connected to the cover assembly 11 by means of another novel attaching means, generally indicated at B. The tapered section 16 of the fuel bag 13 engages a hollow nut 30 which has a tapered inside diameter as shown in Fig. 1. The tapered section 16 can also be formed with threads which can be adapted to engage threads provided on the inside diameter of the nut 30. The nut 30 has an outside knurled edge 31 which, as seen in Figs. 6 and 7, extends through the opening 32 in the cover jacket 21. A flange 33 of the nut 30 contacts the cover frame 22, while the lowermost part of the nut 30, including the flared skirt 34, extends through an opening 35 in the cover frame. A snap ring 36 is provided to hold the nut 30 in position after it is firmly mounted on the tapered section 16, and the rubber washer 37, located at the lowermost side of the nut resting on shoulder 15 and surrounding the tapered section 16, is provided to receive the flared skirt 34. As the nut 30 is tightened on the tapered section by turning the knurled edge 31, the ends of the skirt 34 bite into the washer 37, thereby effecting an efficient seal between the cover frame and the fuel bag. The uppermost side of the nut 30 is provided with a cup-like cavity 38 surrounding the wick 20, the cavity 38 retaining a rubber washer 39, the purpose of which will be described hereinafter.

It is apparent that in order to replace the fuel bag 13, it is only necessary to remove the shell 10 by unscrewing the screw 27, then releasing the nut 30 from the tapered section 16. Since the nut 30 has the knurled edge 31 easily accessible, as shown in Figs. 6 and 7, it is but a simple operation to turn the nut 30, thereby disengaging the fuel bag 13. Not only is the fuel bag 13 replaceable, but, as pointed out hereinabove, the present invention further allows for the removal of the entire wick unit along with the fuel bag, including the wick tube 19 and the wick 20. This arrangement allows a user to supply the lighter with a new bag already filled with fuel and having a new wick assembly provided therein.

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 21 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. 1, releasing a latch tongue 65. The latch tongue 65, as shown in Fig. 1, 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 22. The spring 63 also acts to force the button 60 into operating position by bearing against the button assembly, as shown at 71. It is this spring 63 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 pin 81 and an operating member, pawl and ratchet, the latter elements not indicated herein. As shown in Fig. 1, the sparking wheel 80 frictionally engages a flint or sparking member 85. From the above description, it is obvious that as the button 60 is depressed, releasing the cover plate 66, the sparking wheel is caused to rotate, which results in sparks spraying onto the wick 20. The cover plate is returned to the inoperative or next lighting position by a manual manipulation of the cover plate toward the latch mechanism.

The flint assembly includes the flint tube 25 extending through the opening 26 in the cover frame 22, the flint tube 25 being externally threaded at its topmost end at 92. A collar 93 secured to the frame 22 engages the flint tube 25, securing the tube to the cover frame. The flint 85, located in the flint tube 25, 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 plunger 96 which is formed as part of the attaching and adjusting screw 27. The slot 27' can be turned to rotate the plunger 96 upwardly or downwardly, thereby adjusting the tension of the spring 94. The friction between the sparking wheel 80 and the flint 85 will then be determined by the tension of spring 94.

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. 1, the wick sealing means is shown comprising a snuffer cap 100 having a bell-shaped configuration. The snuffer cap 100 encloses the wick 20 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 comprises the 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, 6 and 7, windproofing holes 110 are provided in the jacket 21 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 Fig. 1. 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. 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 operation or for handy disposal in the pocket or purse.

If it is desired to replace the fuel bag, the operation is as follows:

The screw 27 is unscrewed from the tube 25. The shell 10 is then removed from the lighter assembly, leaving the fuel bag 13 exposed. By turning the nut 30 and pulling on the fuel bag 13, the tapered neck of the fuel bag is released from engagement with the nut. A new fuel bag, complete with wick assembly, is then inserted in place of the one just removed.

Turning the nut 30 on the tapered neck section of the newly inserted fuel bag securely engages the bag with the cover assembly. The shell 10 is slipped into place and the screw 27 screwed into the flint tube 25. The lighter assembly is then complete and ready for the lighting operation.

The fuel bags, while in storage, are equipped with a temporary wick snuffer cap which will prevent fuel evaporation but which can be easily removed when the fuel bag is inserted into the lighter assembly. The plastic used in making the bag can be transparent as can the shell bottom. This arrangement will allow for a visible fuel supply.

A modification of the lighter is illustrated in Fig. 8 in which the knurled nut 30 is enclosed by the cover jacket 21. The operation of the lighter is exactly the same as that illustrated in Figs. 1-7, the only difference residing in the manner in which the fuel bag 13 is replaced. After the removal of the screw 27, the shell 10 is slipped out of engagement with the cover frame 22 and jacket 21. In order to reach the knurled nut 30, it is necessary that the cover jacket 21 be slipped off the cover frame 22. This operation is accomplished by depressing the button 60 to the recess 63. The jacket 21 is then slipped out of engagement with the cover frame 22 exposing the knurled nut 30. The removal and replacement of the bag 13 is carried out as set forth above in the description of Figs. 1-7.

The operation for the adjustment of the flint, in the modification, is not altered, the screw 27 serving to maintain the flint 85 in contact with the flint wheel 80.

It is apparent from the foregoing descriptions that the present invention provides a lighter that obviates the prime evil of all cigarette and cigar lighters—constant refilling of fuel. A plas-

tic deformable fuel bag, such as described herein, whose cost will be relatively minute, can be initially filled with fuel to last under normal conditions for a period far exceeding that of any fuel chamber known heretofore. This obviates the necessity of constant refilling of the fuel chamber as known in present lighters which is both objectionable and costly. The use of the deformable bag with the compressed wick further assures a lighter that will have a minimum of fuel evaporation due to wick flooding. An instant light is at all times available which is assured by the intermittent replacing of the wick assembly along with the fuel bag. Moreover, a neat appearing and handy lighter is illustrated which, combined with the other features, presents a lighter that is both safe and practical for all purposes.

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.

I claim:

1. A lighter comprising a cover assembly, a bottom shell portion secured to said cover assembly, fuel containing means operatively connected to said cover assembly and positioned in said shell portion, said cover assembly comprising an attaching means including a nut, said nut operatively securing said fuel containing means to said cover assembly, and a cover jacket slidably engaging said shell portion and having a cut-out portion formed therein, said nut projecting through said cut-out portion thereby providing easy access to said attaching means.

2. In a lighter, a cover assembly including a securing means and an elongated flint tube, said securing means comprising a nut having an inner tapered portion, a bottom shell, screw means extending through said bottom shell and engaging said flint tube to secure said bottom shell to said cover assembly, a deformable fuel bag disposed in said shell, said fuel bag having a tapered neck portion formed integral therewith, said tapered neck portion engaging the inner tapered portion of said nut thereby securing said fuel bag to said cover assembly.

3. In a lighter, a shell, a fuel bag disposed in said shell, a cover assembly, an elongated tube secured to said cover assembly and extending into said shell, said fuel bag being deformable to accommodate said tube in said shell, screw means engaging said tube to secure said shell to said cover assembly, and nut means secured to said cover assembly and engaging said fuel bag at the upper end thereof for holding said fuel bag in position, said nut means including a tapered inner portion cooperating with a corresponding tapered portion formed on the upper end of said fuel bag.

4. In a lighter, a cover assembly including a cover frame and a cover jacket, a shell portion slidably engaging said cover jacket and formed with an opening in the lower end thereof, a fuel bag positioned in said shell portion, said fuel bag having a tapered neck section formed in-

tegral therewith, a securing member secured to said cover frame having a tapered opening engaging said tapered neck section thereby securing said fuel bag to said cover frame, a flint tube secured to said cover frame extending through said shell portion and into said opening formed in the lower end of said shell portion, said fuel bag being formed of a deformable material to accommodate said tube in said shell portion, said fuel bag having a variable volumetric capacity to compensate for pressure variations therein, and screw means extending through said opening in said shell portion and engaging said flint tube to secure said shell portion to said cover frame, said screw means also providing for adjustment of the flint in said flint tube.

5. In a lighter, a cover assembly including a cover frame and a cover jacket, a bottom shell portion slidably engaging said cover jacket and secured to said cover frame, a fuel bag having an elongated neck section, and a securing member operatively secured to said cover frame and engaging said fuel bag, thereby securing said fuel bag to said cover frame, said cover jacket having openings formed therein, said securing member projecting through said openings to provide easy access to said securing member when removing said fuel bag from said lighter.

6. In a lighter as set forth in claim 5, wherein a flint tube is secured to said cover frame, said flint tube extending through said shell portion, and screw means engaging said flint tube thereby securing said shell portion to said cover frame, said screw means also providing for adjustment of the flint in said flint tube.

7. A lighter comprising a cover assembly, a shell secured to said cover assembly, a cover frame mounted in said cover assembly, a securing nut mounted in said cover frame and having a tapered opening formed therein, a fuel container enclosed by said shell and formed with a tapered neck portion, said tapered neck portion extending into said tapered opening in said securing nut and being firmly retained therein by friction to secure said fuel container to said cover assembly such that said fuel container depends from said cover assembly by said neck, and means for securing said shell to said cover assembly, said shell being detachable from said cover assembly to expose said fuel container for removal from engagement with said securing nut.

References Cited in the file of this patent

UNITED STATES PATENTS		
Number	Name	Date
1,819,319	Bell et al. -----	Aug. 13, 1931
1,937,080	Bilde et al. -----	Nov. 28, 1933
2,008,128	Spruegal et al. ----	July 16, 1935
2,546,128	Lloyd -----	Mar. 20, 1951
2,608,080	Simon et al. -----	Aug. 26, 1952
2,617,286	Prusack -----	Nov. 11, 1952
FOREIGN PATENTS		
Number	Country	Date
10,826	Great Britain -----	May 7, 1912
340,965	Great Britain -----	1931
566,710	Great Britain -----	Jan. 10, 1945
749,796	France -----	May 15, 1933