

April 14, 1959

J. C. LOCKWOOD

2,881,608

PYROPHORIC CIGARETTE LIGHTER

Filed Feb. 12, 1957

3 Sheets-Sheet 1

Fig. 1

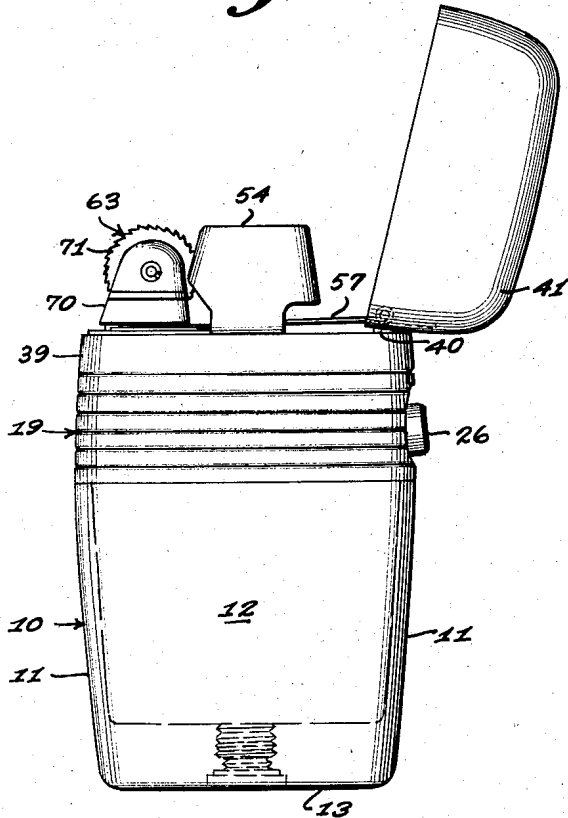


Fig. 3

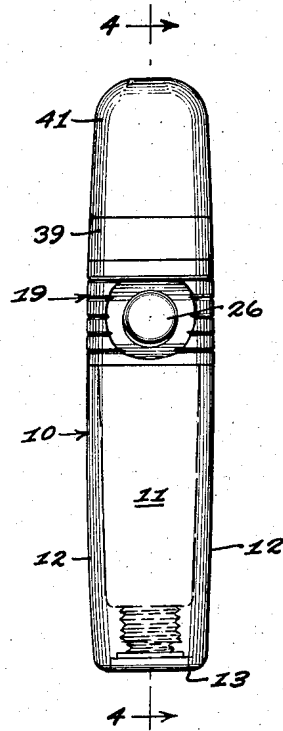
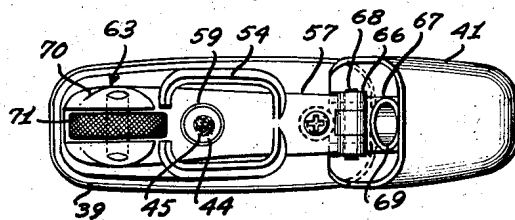


Fig. 2



INVENTOR.
JOHN C. LOCKWOOD
BY
Parrott & Richards
ATTORNEYS

April 14, 1959

J. C. LOCKWOOD

2,881,608

PYROPHORIC CIGARETTE LIGHTER

Filed Feb. 12, 1957

3 Sheets-Sheet 2

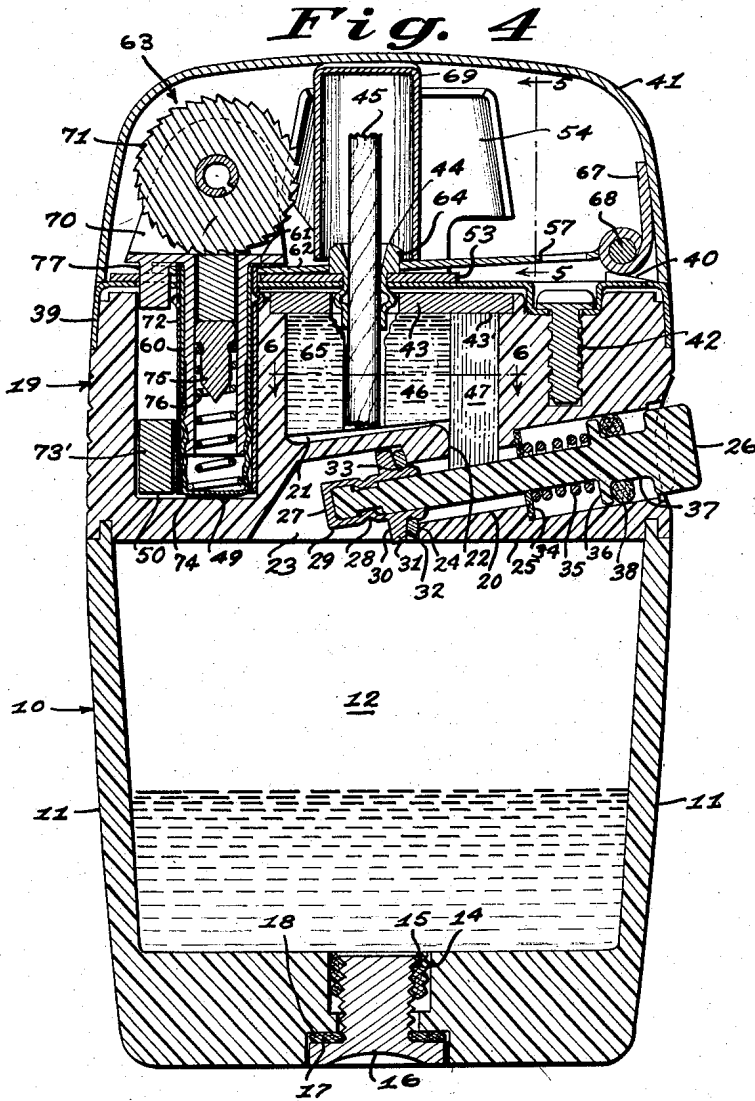


Fig. 5

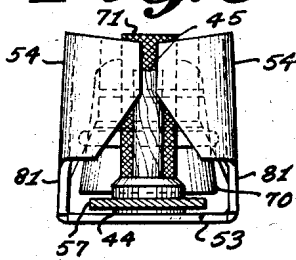
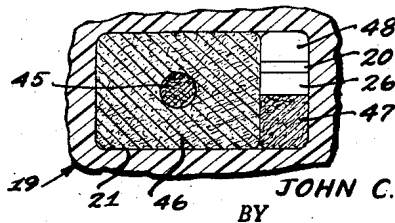


Fig. 6



INVENTOR.

JOHN C. LOCKWOOD

BY

Parrott & Richards
ATTORNEYS

April 14, 1959

J. C. LOCKWOOD

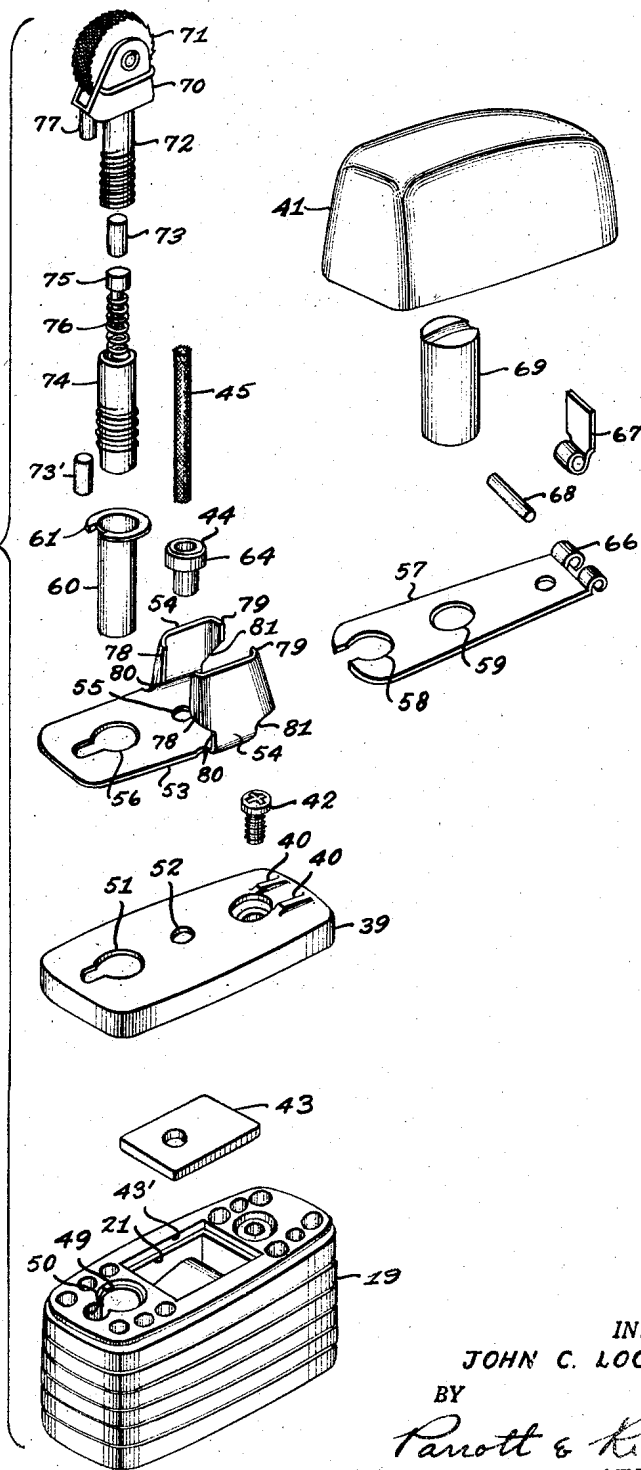
2,881,608

PYROPHORIC CIGARETTE LIGHTER

Filed Feb. 12, 1957

3 Sheets-Sheet 3

Fig. 7



INVENTOR.
JOHN C. LOCKWOOD
BY
Parrott & Richards
ATTORNEYS

1

2,881,608

PYROPHORIC CIGARETTE LIGHTER

John C. Lockwood, Atlanta, Ga., assignor to Scripto, Inc.,
a corporation of Georgia

Application February 12, 1957, Serial No. 639,725

7 Claims. (Cl. 67—7.1)

This invention relates to pyrophoric lighters such as pocket lighters of the type commonly used to light cigarettes, cigars, and pipes, and more specifically, to a windguard lighter having a transparent fuel reservoir which is normally sealed to the atmosphere, thereby preventing evaporation, while having means to open said reservoir and transfer the fuel from the reservoir to a wick chamber, and thus provide an instantaneously usable fuel supply therein.

In the past, windguard lighters which have operated successfully outdoors were not likewise suitable for indoor operation due to a construction which would provide too rich a fuel-air mixture at the wick. This was caused essentially by the windguard construction preventing sufficient air movement within the confines of the windguard when the lighter was used indoors. Also, the spark wheels were so positioned with respect to the wick that the sparks which were produced were in a space which had a saturated fuel-air mixture, and this did not lend itself readily to instantaneous combustion. In addition, windguard lighters were generally constructed with the spark wheel assembly permanently fixed to the lighter body, thereby making it difficult to clean the upper portion of the lighter. The replacement of a flint in the spark wheel assembly also involved a tedious manipulation in positioning the flint and compressing the flint follower spring in alignment therewith when reassembling the unit.

An object of this invention is to provide a lighter which is light in weight, convenient to operate, economical to manufacture, and attractive in appearance.

Another object of this invention is to provide a lighter whereby the user can visually determine when the fuel supply in the reservoir needs replenishing.

A further object of this invention is to provide a lighter whereby the fuel reservoir is sealed to the atmosphere except when the transfer valve is opened to allow fuel to be admitted to the wick chamber.

Another object of this invention is to provide for the location of the fuel transfer valve in a location where it is readily accessible to the user.

A further object of this invention is to provide means whereby the fuel transfer from the reservoir to the wick chamber may be accomplished rapidly, and thus avoid the requirement of maintaining the entire fuel supply in the wick chamber as is found in usual lighter arrangements.

Another object of this invention is to provide a spark wheel assembly which is so designed that the replacement of a flint may be easily accomplished.

Another object of this invention is to provide for placement of the wick and windguard assembly in proper space relation to the spark wheel assembly whereby ready ignition may be accomplished, and at the same time, provide protective means against extinguishment of the flame.

Other objects will become apparent when taken in

2

conjunction with the accompanying drawings and specifications.

Fig. 1 is a side elevation of the lighter with the cover open;

5 Fig. 2 is a top plan view corresponding to Fig. 1;

Fig. 3 is an end elevation of the lighter, as seen from the right in Fig. 1, with the cover cap closed;

Fig. 4 is a cross sectional view of the lighter taken substantially along line 4—4 of Fig. 3;

10 Fig. 5 is an end elevation detail further illustrating the arrangement of the windguard from the position indicated by line 5—5 in Fig. 4;

Fig. 6 is a cross sectional view of the wick chamber taken substantially along line 6—6 of Fig. 4; and

15 Fig. 7 is an exploded perspective view showing the component parts at the top of the lighter.

Referring now in detail to the embodiment chosen for purposes of illustration, and to Figs. 1 to 4 at first in particular, a fuel reservoir shell forming a lower body section of the lighter is generally denoted by numeral 10. This fuel reservoir 10 is formed of transparent material and has upstanding end walls 11 and side walls 12 with a bottom 13 through which a filling passage 14 extends that is fitted with a metal insert 15 threaded to receive a fill plug 16, an inwardly facing shoulder of fill plug 16 carrying a sealing washer 17 to seat at a shoulder 18 of the filling passage 14.

A center body section of the lighter, which is generally denoted by numeral 19, is permanently fixed to the fuel reservoir shell 10. Center body section 19 is formed with a channel 20 which extends at a slight incline to the horizontal and communicates laterally with reservoir shell 10 and with a wick chamber 21, and opens at an exterior surface of the center body section 19. Channel 20 communicates with wick chamber 21 at an aperture 22 and with reservoir shell 10 at a recess in the lower face of center body section 19 as indicated by numeral 23. The recess 23 is proportioned so as to form an annular shoulder 24 about the opening of the channel 20 therein, and the channel 20 is enlarged in diameter at a portion thereof extending beyond the wick chamber aperture 22 to the exterior surface of the center body section 19 so as to form an outwardly facing annular shoulder at 25 therein. Extending reciprocally through channel 20 is a valve stem 26 which is fitted at its inward end within the center body section recess 23 with a valve head or button 27, such fitting being accomplished in the embodiment chosen for illustration by two crimps 28 which are made in the valve head walls 180 degrees apart to grip a circumferential groove 29 at the inwardly extending end portion of the valve stem 26. The valve head 27 is cup-like in shape with an extending annular flange portion 30 presenting a face 31 complementary to the annular shoulder 24 at the opening recess 23 of channel 20. On the valve head annular flange 30 at its face 31 is a valve seat ring 32 which is held in position by the resilient nature of the material thereof tending to retain it in crevice 33 of the valve head 27. A washer 34 is disposed at the annular shoulder 25 formed by the enlarged diameter portion of channel 20 to support a spring 35 therein in biasing relation against an inwardly facing shoulder 36 presented by an enlarged diameter portion at the outwardly extending end of the valve stem 26, so that valve stem 26 is biased by spring 35 for normally maintaining the valve head 27 seated to close the channel 20 to the fuel reservoir 10, with the enlarged diameter outer end of valve stem 26 normally extending from the channel 20 at the exterior surface of the center body section 19 for depression against the force of spring 35 to open channel 20 whenever it is desired to transfer fuel to the wick chamber 21 from the fuel reservoir 10. As thus arranged, a substantial length of the enlarged diame-

3

ter portion of valve stem 26 is disposed for reciprocation within the enlarged diameter of channel 20 and the valve stem 26 is further formed at this length with a circumferential groove 37 in which a sealing ring 38, such as a conventional O ring, is disposed to prevent fuel leakage outwardly in the channel 20 past valve stem 26. It should be further noted that the width of this valve stem groove 37 substantially exceeds that of the sealing ring 38 so that displacement of this sealing ring 38 upon reciprocation of the valve is minimized.

Over the upper surface of the center body section 19 a metal, fire-resistant body cap 39 is fixed as a protective cover. This body cap 39 has a pair of spaced, parallel, knolls 40 formed adjacent one end thereof and inclined upwardly away from this end to have the adjacent edge of a hinged, fire-resistant, top cover cap 41 to ride thereon in opening and closing so as to facilitate its manipulation as pointed out further below. The metal body cap 39 is fixed to the center body section 19 by means of a screw 42. The wick chamber 21 is formed in the center body section 19 beneath the body cap 39 and is well-like in shape, having the previously mentioned aperture 22 in its bottom which communicates with channel 20. The wick chamber 21 is sealed at its top, below the metal cap 39, by means of a seal plate 43 which is seated and secured in place at a recess 43' formed in the top surface of the center body section, the seal plate 43 being apertured to receive a wick holder 44 by which a wick 45 extending from the wick chamber 21 is supported. The major portion of wick chamber 21 is occupied by a relatively dense storage-type felt 46 surrounding the absorbing end of the wick 45. The remaining portion of wick chamber 21, which extends the full height thereof above the aperture 22 communicating with channel 20, is approximately half occupied, longitudinally of the path of fuel transfer therethrough, by a wick-type felt 47 leaving the rest of this remaining chamber portion unoccupied so as to provide an air space, as indicated at 48 in Fig. 6, from which air may be displaced by fuel transferred from the fuel reservoir 10.

The center body section 19 is also formed (compare Figs. 4 and 7), beneath the body cap 39 and adjacent the wick chamber 21, with an additional recess having a major cylindrical portion 49 and a merging minor cylindrical portion 50 of smaller diameter, and the body cap 39 has a first aperture 51 therein registering with the portions 49 and 50 of this recess as well as a second aperture 52 aligned at the wick chamber 21 to receive the previously mentioned wick holder 44. Superimposed at the top surface of the body cap 39 is a base plate portion 53 of a windguard structure which also includes a pair of upstanding shield portions 54 spaced in opposed relation at the opposite sides of the base plate portion 53 in relation to an aperture 55 therein registering with the second body cap aperture 52 at the wick chamber 21, the windguard base plate portion 53 also being apertured at 56 in registration with the first body cap aperture 51 at the cylindrical recess portions 49 and 50.

Overlying the windguard base plate portion 53 is a flexible spring arm 57 which is apertured at 58 adjacent one end in registration with the first body cap aperture 51 and intermediate its length at 59 in oversize alignment with the second body cap aperture 52. A lock sleeve 60 is inserted in the recess portion 49 of body section 19 through the first body cap aperture 51 and the registering apertures 56 and 58 in the windguard base plate portion 53 and the spring arm 57, and this lock sleeve 60 is outwardly flanged at 61 over the spring arm 57 and clinched or expanded at 62 below the body cap 39 so as to secure the spring arm 57 and windguard structure on the body section 19 and additionally to form a mounting socket for a spark wheel assembly 63 as described further below. The previously mentioned wick holder 44 is also shouldered at 64 to overlie the windguard base plate portion 53 at the aperture 55 and is

4

likewise clinched or expanded at 65 below the body cap 39 so as further to secure the windguard structure on the body section 19.

The spring arm 57 extends freely, from the point at which it is secured by the lock sleeve 60, between the upstanding shield portions 54 of the windguard structure, with the oversize aperture 59 therein clearing the shouldered portion 64 of the wick holder 44, and with the free extending end thereof having a hinge eye portion 66 formed thereat to carry a hinge plate 67 by means of a hinge pin 68. The hinge plate 67 is secured to the previously mentioned top cover cap 41, which is formed with a mouth that is coextensive in outline with the surface of the center body section 19 over which the body cap 39 is fixed, and which is carried by the hinge plate 67 and spring arm 57 to close in alignment on this surface over the spark wheel assembly 63 and the wick 45 and related windguard structure to complete the body of the lighter. A snuffer cap 69 is preferably carried within the cover cap 41 to telescope individually over the wick 45 in closed position to snuff the wick flame locally.

The top cover cap 41 is arranged so that it is biased to remain selectively at closed or open position by the flexible spring arm 57. For this purpose, the hinge plate 67 is secured to the cover cap 41 so that the spring arm 57 is bowed upwardly to the point of assembly therewith at the hinge pin 68 to provide sufficient spring action for biasing the cover cap 41 about hinge pin 68 to remain securely in closed position while at the same time being readily shiftable toward open position whenever desired. In opening the cover cap 41, a very substantial mechanical advantage is available against the spring arm 57 to provide the above noted ease of opening, but at the same time the bias of the spring arm 57 initially increases during the opening movement so that the above noted secure bias towards closed position remains unless the cover cap 41 is purposely opened to the point where the bias thereon shifts toward maintaining it in open position. This point is reached when the adjacent end edge of the cover cap pivots beneath the hinge pin 68 so that the reach of the spring arm 57 extends beyond this edge to reverse the bias on the cover cap 41. The previously mentioned knolls 40 are formed in the surface of the body cap 39 to have this adjacent pivoting edge of the cover cap 41 ride thereon so as to ease the frictional contact during pivoting, to provide a track-like action at the pivoting edge that aids in maintaining the cover cap 41 aligned with the body section 19, to support the cover cap 41 at an open position well past 90° so as not to interfere with the operation and use of the lighter, and to cause an increase in the bias of the spring arm 57 as it approaches the point of reversal in either direction and thereby obtain a final snapping action from the spring arm 57 toward both the open and closed positions of the cover cap 41.

The windguard structure arranged about the wick 45 and the related spark wheel assembly 63, that are selectively enclosed by the top cover cap 41 or exposed thereby for operation and use, both incorporate further particularly advantageous features in accordance with the present invention. The spark wheel assembly 63 comprises a spark wheel holder having a yoke portion 70 in which a spark wheel 71 is rotatably mounted, and a tubular flint sleeve portion 72 through which a flint 73 may be presented at the spark wheel 71. A closed end cover sleeve 74 is arranged in telescoping relation on the flint sleeve portion 72, and the flint sleeve portion 72 being threaded adjacent its extending end and the cover sleeve 74 being correspondingly threaded adjacent its closed end for engagement to contain therein a flint follower 75 and a pressure spring 76. Pressure spring 76 is retained in cover sleeve 74 by means of an expanded coil bearing against the inner wall of cover sleeve 74 and at its closed end. The flint follower is carried on the pressure spring 76 by means of its shank being dis-

5

posed within the coils of pressure spring 76. By this arrangement the possibility of the pressure spring 76 and flint follower 75 becoming removed from cover sleeve 74 while replacing a flint is obviated. The total length of the flint sleeve portion 72 and the cover sleeve 74 is proportioned to exceed that of the pressure spring 76 and flint follower 75 together with the flint 73, so that the flint 73 may be replaced whenever necessary simply by unscrewing and removing the cover sleeve 74 with the pressure spring 76 and flint follower 75 to allow installation of a new flint 73 in the tubular flint sleeve portion 72, after which the cover sleeve 74 may be partially telescoped on the flint sleeve portion 72 to enclose the pressure spring 76 and flint follower 75 with the new flint 73 before screwing the cover sleeve 74 into place and thereby avoid any troublesome difficulty in controlling the spring 76 while compressing it to working relation with the new flint 73.

The cover sleeve 74 is also proportioned for frictionally fitting by means of a longitudinal rib on its exterior the mounting socket formed by the lock sleeve 60 in the major portion 49 of the recess provided for the spark wheel assembly 63 in the body section 19. The lock sleeve 60 also serves to partition the adjacent smaller recess portion 50 as a separate chamber in which spare flints, as indicated at 73', may be stored, and this recess portion is also employed to receive at its upper end a positioning lug 77 formed at the bottom face of the spark wheel holder yoke portion 70 so as to key the spark wheel 71 in alignment with the wick 45 and windguard shield portions 54, while allowing the spark wheel assembly 63 to remain removable readily from the mounting socket formed by the lock sleeve 60.

The pair of upstanding imperforate windguard shield portions 54 that are spaced at opposite sides of the wick 45 are arranged parallel with the alignment of the wick 45 and spark wheel 71. The end edges of each shield portion 54 have upper portions 78 and 79 that are turned inwardly in protective relation with respect to the wick 45, with the spark wheel 71 extending between the adjacent turned in edge portions 78. The remaining lower portions of these end edges are notched, as indicated at 80 and 81, to provide a chimney effect about the wick 45 sufficient to admit rapidly within the space confined by the windguard portions 54 a greater quantity of air than is needed to maintain continuous combustion. By this arrangement, the over-rich mixture that forms about the wick 45 when the top cover cap 41 is closed can be leaned immediately upon opening of cover cap 41 to prevent flashing of the lighter and provide satisfactory operation thereof under indoor conditions as well as outdoors.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

I claim:

1. In a cigarette lighter of the character described, a center body section having formed therein a wick chamber and containing a wick and a wick-type felt, a lower body section fixed on said center section and forming a fuel reservoir, said center section being further formed with a channel arranged between the wick chamber and fuel reservoir along a longitudinal axis that does not intersect said wick chamber, said channel opening at an exterior surface of said center section and extending inwardly therefrom in lateral communication intermediate its length with the adjacent wick-type felt disposed in said wick chamber and communicating at its inner end with said fuel reservoir, a valve reciprocally arranged in said channel and manually operable at the exterior extremity of said channel to allow transfer of fuel from the fuel reservoir to the wick chamber, spring means associated with said valve for normally maintaining said inner channel end closed, said spring being positioned

6

out of communication with the wick-type felt contained in said wick chamber to prevent disturbing said felt upon manipulation of the valve in opening and closing the inner channel end to the fuel reservoir, and sealing means associated with the valve within said channel exteriorly of the lateral communication with the wick chamber to provide a positive seal for preventing escape of fuel from the exterior extremity of said channel even when said inner channel end is in open communication with the fuel reservoir.

2. In a cigarette lighter of the character described, the structure defined in claim 1 and further characterized in that said valve comprises a valve stem extending through said channel from the exterior surface of said center section against the force of said spring means, and a valve button clinched on the extending end of said valve stem and normally seated at the inner end of said channel by said spring means.

3. In a cigarette lighter of the character described, the structure defined in claim 2 and further characterized in that said lower body section forming said fuel reservoir is transparent so as to render a fuel supply therein visible, and the inner end of the channel in said center section terminates at a recess in which said valve button is substantially shrouded from view through said transparent lower section.

4. In a cigarette lighter of the character described, the structure defined in claim 2 and further characterized in that the channel in said center section is enlarged in diameter at a portion thereof extending beyond the point of lateral communication with said wick chamber to the exterior surface of said center section, and a portion of said valve stem at its outwardly extending end is correspondingly enlarged in diameter to present an inwardly facing shoulder at which the force of said spring means is applied within the enlarged diameter portion of said channel.

5. In a cigarette lighter of the character described, the structure defined in claim 4 and further characterized in that a substantial length of the enlarged diameter portion of said valve stem is disposed for reciprocation within the enlarged diameter portion of said channel, said valve stem is formed with a circumferential groove at said length, and a sealing ring member forming said sealing means is arranged in said groove, the width of said groove substantially exceeding that of said sealing ring member whereby displacement of said sealing ring member upon reciprocation of said valve stem is minimized.

6. In a cigarette lighter of the character described, a fuel reservoir, a wick chamber, a fuel transfer channel between said fuel reservoir and said wick chamber, and a valve for selectively opening and closing said channel to said fuel reservoir, said wick chamber communicating with said channel at a chamber portion approximately half of which, longitudinally of the fuel transfer path into said chamber, is occupied by a wick-type felt and the remainder of which is unoccupied to provide an air space from which air may be displaced by fuel transferred from said fuel reservoir upon opening of said channel thereto.

7. In a cigarette lighter of the character described, a wick chamber, a fuel reservoir, a fuel transfer channel between said fuel reservoir and wick chamber, and a valve normally closing said channel to said fuel reservoir but displaceably arranged for selectively opening said channel to allow transfer of fuel therethrough to said wick chamber, the major portion of said wick chamber being occupied by a relatively dense storage-type felt surrounding the absorbing end of a wick, and the remaining portion of said wick chamber communicating with said fuel transfer channel and having approximately half thereof, longitudinally of the path of fuel transfer into said chamber, occupied by a less dense wick-type felt leaving the rest of said remaining chamber portion

unoccupied to provide an air space from which air may be displaced by fuel transferred from said fuel reservoir.

References Cited in the file of this patent

UNITED STATES PATENTS

2,469,507	Kolter et al. -----	May 10, 1949
2,515,092	Miller -----	July 11, 1950
2,529,094	Miller -----	Nov. 7, 1950

5

2,556,853
2,587,894
2,614,408
2,680,962
2,713,255
2,738,803
2,741,109
2,744,401
2,763,129

Shanks -----	June 12, 1951
Quercia -----	Mar. 4, 1952
Nissen -----	Oct. 21, 1952
Lipic et al. -----	June 15, 1954
Hubel -----	July 19, 1955
Manning -----	Mar. 20, 1956
Dupuis -----	Apr. 10, 1956
Salzer -----	May 8, 1956
Kohn et al. -----	Sept. 18, 1956