

Aug. 20, 1957

W. MALTNER  
CIGARETTE LIGHTERS

2,803,122

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2 Sheets-Sheet 1

Fig. 1

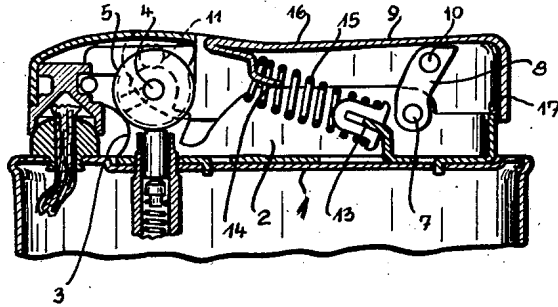


Fig. 2

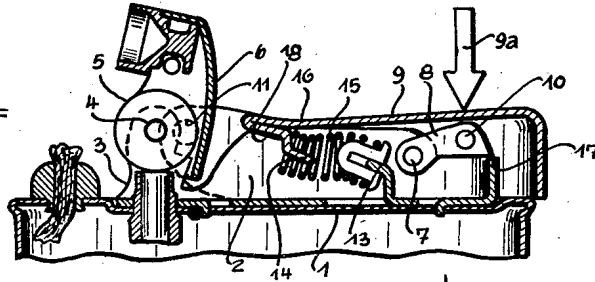


Fig. 2a

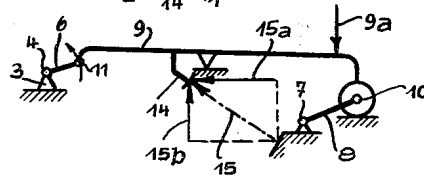


Fig. 3

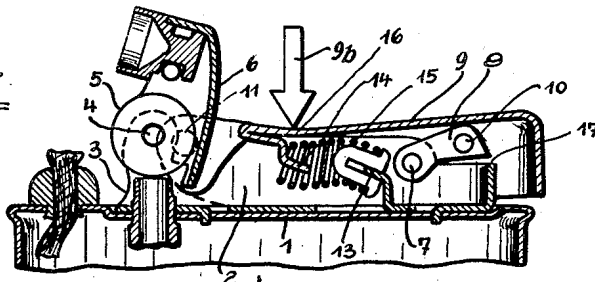
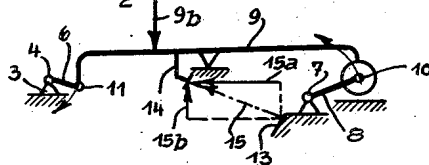


Fig. 3a



INVENTOR.  
WOLFGANG MALTNER  
BY *Leon M. Strauch*  
1957

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Fig. 4

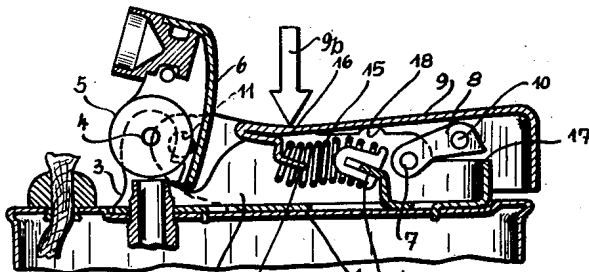


Fig. 4a

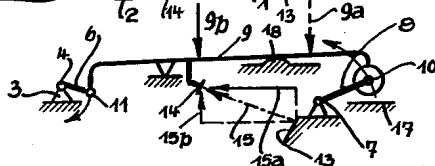


Fig. 5

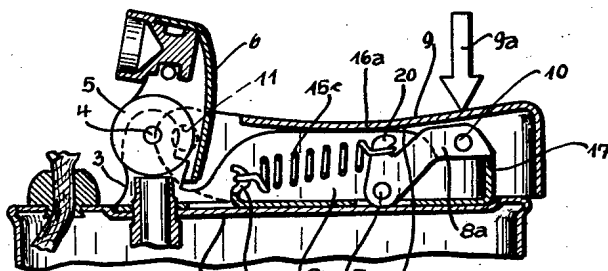


Fig. 5a

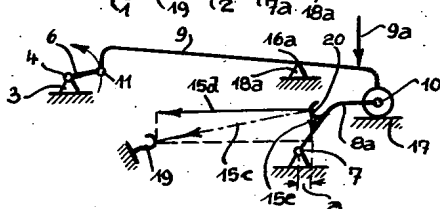


Fig. 6

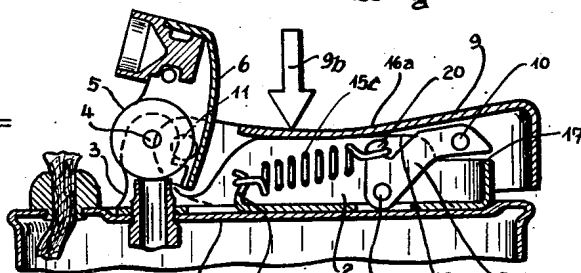
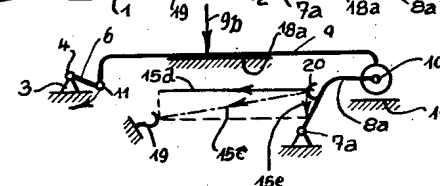


Fig. 6a



INVENTOR.

WOLFGANG MALTNER

BY

Leon M. Strauss  
AET

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2

2,803,122

**CIGARETTE LIGHTERS**

Wolfgang Maltner, Frankfurt am Main, Germany

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Claims priority, application Great Britain July 5, 1954

7 Claims. (Cl. 67-7.1)

The invention relates to an improvement in lighters which are opened by pressing a finger of an operator's hand on an actuating member against the action of a spring and which are closed again when the finger pressure is removed by the action of said spring.

Arising from the fact that these lighters only burn or remain open as long as the pressure of said finger on the actuating member is maintained, it has been found desirable to provide constructional features which permit the lighter to remain in the open position also without constant finger pressure being applied. These constructions were mainly utilized in connection with lighters having an extinguishing or snuffing cap carrier which is adapted to pivot about the axis of the flint engaging friction wheel and carrying the latter with it in the opening movement, the actuating member being pivotally connected at one of its ends to the cap carrier, while the other end thereof is connected, also pivotally by means of a rocking or supporting lever, to the lighter casing.

Consequently, the axis of the friction wheel, the articulation points of the actuating member on the cap carrier and on the lever and also the articulation thereof to the lighter casing form a four-link chain. This arrangement produces a movement of all parts which is substantially without friction and permits an arrangement of the pivot points which imparts a substantially parallel movement to the actuating member in relation to the lighter casing.

In connection with lighters of this type a construction has been known in which the lighter remains open due to the fact that the two front ends of the fork-like actuating member come into engagement with a retaining means with a remaining means which holds the actuating member and thus the cap carrier in the open position even after the pressure of the finger has been removed. The retaining means in this case comprises notches into which the ends of the actuating member are moved, the pivot point of the actuating member on the cap carrier in the engaged position which has been described being disposed substantially vertically beneath the axis of the friction wheel. If the lighter is not to remain in the open position, but is to close automatically when the finger pressure is removed, the actuating member must come to a stop before it is engaged by said retaining means. Consequently, with the construction which has been described, two different open positions are provided, which are also readily apparent from the outside by virtue of conspicuous differences in the position of the actuating member and also of the cap carrier. When this constructional arrangement is used, the following operating requirements result:

The "first" open position, from which the lighter returns to the closed position automatically by spring action when the finger pressure is removed, is obtained by the pressure applied to the actuating member being vertical or directed downwardly and somewhat rearwardly. In this first open position, the axes of the friction wheel and of the pivot point of the actuating member on the cap carrier are substantially in a horizontal plane. On the other hand, if it is intended to produce the "second" open position, in

which the locking of the actuating member takes place, it is necessary, after reaching the first open position, to exert a supplementary or additional, substantially horizontal sliding pressure on the actuating member in the direction towards the friction wheel. This sliding pressure, the direction of which is substantially at right-angles to the direction of the initial pressure necessitates a shifting of the thumb on the actuating member from one operating surface to another and, as a result of the said additional sliding pressure on the new operating surface, causes further rotation of the cap carrier and of the friction wheel until the locking of the actuating member with the associated recesses or notches has taken place.

A disadvantage of this construction is that the "second" open position can only be reached after the "first" open position has been produced and even then only after shifting the pressure of the thumb from one operating surface to another and applying at this second surface a supplementary pressure in quite a different direction from the initial thumb pressure. In addition to these requirements which are inconvenient to the user of the lighter, the differences in the position of the cap support are also obviously apparent.

In the "first" open position, the opening angle of the cap carrier is less than 90°, whereas in the "second" open position this angle is more than 90°. The differences in the opening angle may be appreciated from the fact that the pivot point of the actuating member on the cap carrier in the "first" open position is in a substantially horizontal plane with the axis of the friction wheel, whereas the said pivot point of the actuating member in the "second" open position is disposed substantially vertically below the friction wheel axis. Finally, the holding action in the locked open position depends merely on the presence of the retaining means which has been described.

In a modification of the above construction it has heretofore become known to employ a rod-like actuating member which is pivotally mounted at one end on the cap carrier and at the other end on a pivoted lever. The arrangement in this case is that the pivoted lever is under the action of a spring which, by pressure on a cam arranged on the pivoted lever, exerts a turning momentum which constantly tends to erect said pivoted lever. This turning momentum is transmitted to the actuating member as a longitudinal force which acts in the direction towards the cap carrier. In the use of the lighter, a powerful pressure on the actuating member causes a rotation of the cap carrier through 90°. In this open position, the actuating member assumes such an inclined position that the longitudinal force originating from the spring-loading of the pivoted lever holds the cap carrier in the open position.

If the other open position is to be produced, from which the lighter is automatically closed again, it is only necessary to exert a light pressure on the actuating member, and this must be terminated so promptly that the actuating member does not force the cap carrier into the second open position.

With the construction last described, it must be considered to be a particular defect that the situation as regards that open position from which the lighter automatically reassumes its closed position when the finger pressure is removed is very uncertain and is in no way established in advance for the user of the lighter. In this case, there are in fact provided two different open positions which are distinguished by very different positions of the actuating member and thus also of the cap carrier, but with which, however, there is no exact limitation relatively to one another. It is true that the open position in which the cap carrier remains open is adapted always to be reliably obtained by a strong continuous pressure of the finger of the operator. On the other hand, the other

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open position depends merely upon the skill of the user, in so adapting the intensity and duration of the thumb pressure to one another that the actuating member is not pressed down too far.

The present invention has for its object to provide means conducive to an improved construction for obtaining two open positions, whereby according to the position of the application of the opening pressure on the actuating member, the latter returns to the closed position or remains in the open position when the pressure is removed, the closing in the latter case then being effected by renewed pressure on that part of the actuating member which is intended for the other operation. Consequently, each operating position may be obtained independently of the other operating position merely by choice of the position at which pressure is applied to the actuating member.

Another object of the present invention is to provide means facilitating a considerably simplified construction of a lighter which renders any retaining means superfluous and eliminates the necessity for any particular attention or skill on the part of the user for obtaining a predetermined open position of the lighter.

It is a further object of the invention to provide means affording a highly efficient lighter structure in which a single finger pressure applied to one or the other of two operating surfaces of an actuating member suffices to produce one or the other of the different open positions.

Still a further object of the invention is to provide means leading to a novel lighter construction employing a minimum number of parts and which obviates appreciable differences in the locations of the extinguishing cap carrier in the two different open positions, the locations of said cap carrier being practically identical in both open positions.

In order to achieve these results according to the invention, in a lighter having a cap carrier mounted on the pivot of the friction wheel, and an actuating member which is pivoted on said carrier and which is pivotally connected to the lighter casing at its other end by a connecting member, the friction wheel pivot, the hinge points of the actuating member on the cap carrier and on the connecting member, and also the pivot point thereof on the lighter casing forming a four-link chain, a spring is arranged between the lighter casing and the actuating member. The anchoring points of said spring on the lighter casing at one end and on the actuating member at the other end are related to the pivot points of the actuating member and cap carrier in such manner that a dead-center position of the pivot points is positively produced by pressure on one part of the operating surface of the actuating member which retains the actuating member and cap carrier in the open position, while no dead-center position is produced when pressure is applied to another part of said operating surface, whereby the actuating member and cap carrier return to the closed position again under the action of the spring when the finger pressure is removed.

In the construction according to the invention, four-link chains are particularly suitable in which the lever arms and pivot points are so adapted to one another that, in the open position, preferably all the pivot points, but at least the friction wheel pivot and the pivot points of the actuating member on the cap carrier and on the connecting member are disposed substantially on a straight line. Furthermore, it is expedient if the pivot point of the actuating member on the cap carrier is disposed substantially vertically above the pivot of the friction wheel in the closed position.

One of the anchoring points of the spring acting between the lighter casing and the actuating member is preferably disposed close to the fixed pivot point of the connecting member on the lighter casing. The movable effective point of this spring on the actuating member must

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be so chosen that it is disposed between the two operating surfaces of the actuating member. Moreover, the position of the spring between these two points must be such that its direction in the open position substantially conforms to the line of connection of the movable pivot points. The effect obtained in this manner is that, according to the position at which the finger pressure is applied, the actuating member and cap carrier return to the closed position again as soon as the finger pressure is removed or remain in the open position even after said finger pressure is removed.

Fixed stops limit both the path of opening of the connecting member and also the path of opening of the cap carrier or the actuating member, so that it is possible to operate against a fixed stop when using both operating surfaces. This relieves the user of the necessity to observe any particular conditions as regards the intensity of the pressure to be exerted on the operating surface in question and in addition avoids any undesirable tensions in the pivot points.

It is, therefore, yet another object of the present invention to provide means presenting a compact lighter structure which is easily and inexpensively manufactured and which lends itself to extremely facile operation without undue or excessive manipulations by the user.

Still another object of the invention is to provide means facilitating predetermined operation of the lighter by means of its actuating member into the desired one of its open positions, the actuating member being provided with index marks or suitably differentiated structural portions to indicate the location at which said actuating member is to be pressed to assume the desired position.

These and other objects, advantages and purposes of the invention will become further apparent from the following detailed description, reference being made to the accompanying drawings, showing preferred embodiments of the invention.

In the drawings:

Fig. 1 is a longitudinal and fragmentary section of a lighter with parts of a driving mechanism embodying the invention, said parts being shown in closed position;

Fig. 2 is a similar section of said parts in open position for brief or temporary opening;

Fig. 3 is a longitudinal section showing the said parts in locked or permanent open position;

Figs. 2a and 3a are diagrams corresponding to Figs. 2 and 3, respectively;

Fig. 4 is a longitudinal and fragmentary section of the upper portion of a lighter with parts of another driving mechanism embodying the invention, said parts being shown in open position;

Fig. 4a is an associated diagram of the parts of Fig. 4;

Figs. 5 and 6 show longitudinal sections of a lighter with parts of a further driving mechanism embodying the invention, the respective parts being shown in "brief open" and "locked open" positions, respectively; and

Figs. 5a and 6a are the associated diagrams.

Referring now more particularly to the drawings, there is illustrated on the housing cover 1 of a lighter a top support 2, on which a front bearing lug 3 is disposed, which accommodates the pin 4 constituting a first stationary pivot for the friction wheel 5 and the extinguisher or snuffer cap support 6. Articulated near the rear end of top support 2 by means of a transverse pin 7 constituting a second stationary pivot is a connecting member or link 8, to which an actuating member or thumb pad 9 is coupled by means of a pin 10 constituting a movable pivot. The forward end of the thumb piece or pad 9 is pivotally connected to a snuffer cap support or carrier 6 by means of a rivet pin 11 constituting another movable pivot. Arranged between a projection 13 on support 2 and a projection 14 on thumb pad 9 is a compression spring 15 which holds said pad 9 and the cap support 6 in the closed position (Fig. 1).

The upper face of thumb piece 9, which is U-shaped

in cross section, is slightly indented near the forward end or terminal surface portion 16 and is preferably formed with a knurled or like face (not shown) at the outwardly arched portion at the rearward end or terminal surface portion. Other differentiating means, such as index marks, narrow and wide portions, and the like, may be provided on the actuating member to indicate to a user where to press to cause the lighter to assume the desired one of its operating positions. Associated with the connecting member or link 8 on the support 2 is an abutment 17, which determines the end position of the connecting member closest to the casing.

To open the lighter, if a pressure is applied to thumb piece or pad 9 in the direction of arrow 9a (Fig. 2) substantially above pin 10, connecting member 8, the pivot 10 of which is initially located to the rear of transverse pin 7, is rocked in a clockwise direction, its pivoting movement being limited by contact with abutment 17 (Fig. 2). Spring 15, tensioned between projections 13 and 14, thus exerts on thumb pad 9 a force which is composed of a larger horizontal component 15a (Fig. 2a) and a smaller vertical component 15b. Due to the vertical component 15b, thumb pad 9 has its front portion forced upwardly, so that therefore the pivot pin 11 remains above a plane passing through pin 10 and friction wheel pin 4. Consequently, after the loading pressure is removed, thumb pad 9 and the parts articulated thereto are automatically returned to their initial position. The parts of the driving mechanism therefore only remain in open position as long as the pressure 9a on thumb pad 9 is maintained.

If the parts of the driving mechanism are to remain in open position after the opening operation has been completed, the loading pressure for opening purposes is applied at the position of depression 16 on thumb pad 9 (arrow 9b in Fig. 3). Due to the force along 9b, thumb pad 9 is displaced rearwardly and downwardly, the force 9b overcoming the spring component 15b, so that pivot pin 11 is swung in a downward direction to such an extent that it is located below a plane passing through pivot pin 10 and friction wheel pivot 4. Connecting member 8 in this case does not bear on abutment 17. The horizontal spring component 15a influences thumb pad 9 in the direction of extinguisher cap support 6, and it thereby locks the parts of the driving mechanism in open position.

For closing the lighter, the thumb pressure is applied at the rear end of the thumb pad 9, approximately at the position corresponding to the position of the arrow 9a in Fig. 2, so that connecting member 8 contacts abutment 17. By this means, pivot pin 11 is swung upwardly beyond said plane passing through pivot pins 4 and 10, so that the position according to Figs. 2 and 2a is produced, whereupon the parts return to the closed position after the loading pressure is removed.

Having reference now to the modified construction illustrated in Fig. 4, support 2 is also provided with a projection 18 on each of its side walls to assist tilting movements of thumb pad 9 in a different manner. When a force 9b is applied to thumb pad 9, the latter is first of all displaced rearwardly until it bears on projections 18. It then pivots about said projections in a counter-clockwise direction until pivot pin 11 is swung downwardly to such an extent that it is disposed beneath a plane passing through pivot pins 4 and 10, locking thumb pad 9 in open position. To close the lighter, a force 9a is then applied to the rear part of thumb pad 9, whereby the latter pivots in a clockwise direction about projections 18 to swing pivot pin 11 upwardly beyond a plane through pivot pins 4 and 10, whereupon spring 15 returns the parts to the closed position after the loading pressure 9a has been released.

Referring to the modification of Figs. 5 and 6, it is seen that the parts are held in the closed position by a tension spring 15c, said spring being arranged between a hook 19 on support 2 and a projection 20 of connecting member

8a. A pivot pin 7a carrying the connecting member or link 8a is situated near the bottom plate of support 2. Depression 16a of thumb pad 9 is disposed substantially at the center of said thumb pad and its depth is such that thumb pad 9, when being pivoted, is supported by means of the underside of depression 16 on side walls 18a of support 2. When thumb pad 9 is loaded near the rear end by a force 9a, said pad initially swings rearwardly and downwardly until depression 16a is supported on the side walls of the support 2. Due to the continued action of force 9a, thumb pad is rocked about the bearing point of depression 16a on the support in a clockwise direction until connecting member or link 8a abuts against stop 17. Pivot pin 11 remains above a plane passing through pivot pins 4 and 10, and projection 20 of connecting member 8a is disposed a distance a to the rear of pivot pin 7a (Fig. 5a). The tensile force of the spring is split up into a horizontal component 15d and a downwardly directed component 15e. Since the horizontal component 15d is larger than the vertical spring component 15e, the component 15d returns thumb pad 9 with the parts articulated thereto into the closed position after the pressure 9a is removed from thumb pad 9.

On the other hand, if a force 9b is applied to thumb pad 9 in front of depression 16a (Fig. 6), then after depression 16a bears on side walls 18a, thumb pad 9 is pivoted in a counter-clockwise direction, so that connecting member 8a remains spaced from abutment or stop 17 while pivot pin 11 is swung until it is located below a plane passing through pivot pins 4 and 10. The parts are thus held in the open position by the horizontal spring component 15d. To close the lighter, a force 9a is applied to thumb pad 9 near its rear end. Connecting member 8a is thereby urged onto abutment 17 whereby pivot pin 11 is swung upwardly above a plane through pivot pins 4 and 10, so that the parts are returned to the closed position under the action of spring 15c immediately upon removal of the loading force.

It is to be noted that the effective lengths of the link arms constituted by the actuating member 9 and the connecting member 8 (or 8a) are fixed and invariable and are so predetermined, in conjunction with the height of the stop 17 above the casing 1, that the stationary pivot 7 is always located between the casing and a plane passing through the two movable pivots 10 and 11. This constructional arrangement enables the spring means 15 (or 15c) to exert the desired forces on the actuating member, either directly as in Figs. 1 to 4 or indirectly as in Figs. 5 and 6, so as to return the snuffer cap carrier 6 automatically to its closed position or so as to lock said carrier in its open position, depending only on the location at which finger pressure is applied to the actuating member and completely independent of the magnitude and duration of the applied finger pressure.

In all the various embodiments of the invention, the lighter will be locked in the open position if pivot pin 11 is disposed only a small distance below a horizontal plane through pivot pin 10. Such locking, however, begins to take place as soon as the two pivot pins 10 and 11 are disposed in the same horizontal plane since the spring force in such a case cannot cause the pin 11 to be moved in a counterclockwise direction about the pin 4.

Thus, it may be seen that according to the invention there has been provided a mechanism for a lighter comprising a casing, a snuffer cap carrier, a pivot on said casing supporting said carrier for rotation about said pivot, an actuating member pivotally connected to said cap carrier for causing rotation of said cap carrier from a closed to an open position thereof, a connecting member having one portion pivotally connected to said actuating member and another portion pivotally connected to said casing, spring means operatively interconnecting said actuating member and said casing, and stop means on said casing for limiting the extent of pivotal movement of said connecting member relative to said casing, the loca-

tions of the connection between said cap carrier and said actuating member on the one hand and the connection between said actuating member and said connecting member on the other hand being so chosen that pressure applied upon said actuating member adjacent said cap carrier and in the direction of said casing results in movement of said actuating member to a position in which said connection between said actuating member and said cap carrier is located below a plane extending through both said pivot and said connection between said actuating member and said connecting member to permit said spring means to lock said cap carrier and said actuating member in open position, while pressure applied upon said actuating member adjacent said connection between said actuating member and said connecting member moves said actuating member only to a position in which said connection between said actuating member and said cap carrier is located above said plane and thereby permits said spring means to return said carrier and said actuating member automatically to closed position upon release of said applied pressure.

A mechanism constructed in accordance with the invention may be advantageously employed in lighters of various types, whether pyrophoric or otherwise in nature.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. In a pyrophoric lighter having a casing, first and second stationary pivots located on said casing and spaced from one another, a flint-engaging friction wheel rotatably mounted on said first stationary pivot, and a snuffer cap carrier mounted on said first stationary pivot for joint rotation about the latter with said friction wheel and from a closed to an open position; an actuating member having forward and rearward terminal surface portions engageable, respectively, by a finger of a user for application of pressure, a connecting member having spaced ends, a first movable pivot interconnecting said snuffer cap carrier and said actuating member adjacent said forward terminal surface portion of the latter and movable arcuately about said first stationary pivot toward and away from said casing, a second movable pivot interconnecting said actuating member adjacent said rearward terminal surface portion thereof and said connecting member adjacent one of said ends thereof, said connecting member being mounted adjacent its other end on said second stationary pivot to thereby enable said one end of said connecting member with said second movable pivot to move along an arcuate path about said second stationary pivot toward and away from said casing, the distance between said first and second movable pivots being invariable, the distance between said second movable pivot and said second stationary pivot being invariable, spring means arranged on said casing and urging said one end of said connecting member to move along said path in a direction away from said casing, and stop means on said casing for limiting the extent of movement of said one end of said connecting member along said path and in a direction toward said casing to ensure that said second stationary pivot is always located between said casing and a plane defined by said first and second movable pivots, the initial spacing of said first movable pivot from said casing when being greater than the spacing of said first stationary pivot from said casing when said snuffer cap carrier is in its closed position, whereby upon application of pressure to said actuating member at said forward terminal surface portion said first movable pivot is moved to a location the spacing of which from said casing is at most as great as the spacing of said first stationary pivot from said casing, to thereby permit said spring means to retain said actuating member and said

snuffer cap carrier in open position even after release of said pressure, while upon application of pressure to said actuating member at said rearward terminal surface portion said first movable pivot is moved to a location the spacing of which from said casing is less than said initial spacing of said first movable pivot and greater than that of said first stationary pivot, to thereby permit said spring means to return said snuffer cap carrier and said actuating member automatically to closed position upon release of said pressure.

2. A lighter comprising a casing, a snuffer cap carrier, a pivot on said casing supporting said carrier for rotation about said pivot, an actuating member having forward and rearward terminal surface portions engageable, respectively, by a finger of a user for application of pressure, said actuating member being pivotally connected to said cap carrier adjacent said forward terminal surface portion for causing rotation of said cap carrier from a closed to an open position thereof upon application of pressure to either of said terminal surface portions, a connecting member having one portion pivotally connected to said actuating member adjacent said rearward terminal surface portion and another portion pivotally connected to said casing, the distance from the pivotal connection between said actuating member and said snuffer cap carrier to the pivotal connection between said actuating member and said connecting member being invariable, the distance from the pivotal connection between said actuating member and said connecting member to the pivotal connection between said connecting member and said casing being invariable, spring means carried by said casing and urging said actuating member to rotate said cap carrier into said closed position, and stop means on said casing for limiting the extent of pivotal movement of said connecting member toward said casing, the location of said pivotal connection between said casing and said connecting member being always between said casing and a plane defined by said pivotal connections between said actuating member and said cap carrier on the one hand and between said actuating member and said connecting member on the other hand, whereby pressure applied upon said actuating member only at said forward terminal surface portion adjacent said cap carrier and in the direction of said casing results in movement of said actuating member to a position in which said connection between said actuating member and said cap carrier is located closer to said casing than said pivot to permit said spring means to lock said cap carrier and said actuating member in said open position even when said applied pressure is released, while pressure applied upon said actuating member only at said rearward terminal surface portion adjacent said connection between said actuating member and said connecting member moves said actuating member only to a position in which said connection between said actuating member and said cap carrier is located farther away from said casing than said pivot and thereby permits said spring means to return said carrier and said actuating member automatically to closed position upon release of said applied pressure.

3. A lighter according to claim 2, said spring means having one portion thereof connected directly to said actuating member and another portion thereof connected directly to said casing.

4. A lighter according to claim 3, the connection between said spring means and said casing being located at a greater distance from said cap carrier than the connection between said spring means and said actuating member.

5. A lighter according to claim 2, said connecting member being provided with a projection adjacent one of said portions, and said spring means having one portion thereof connected to said casing and another portion thereof connected to said projection.

6. A lighter according to claim 5, the connection be-

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tween said spring means and said casing being located closer to said cap carrier than the connection between said spring means and said projection.

7. A lighter according to claim 2, said differentiated terminal surface portions comprising, respectively, a smooth surfaced depression and a roughened surface. 5

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