

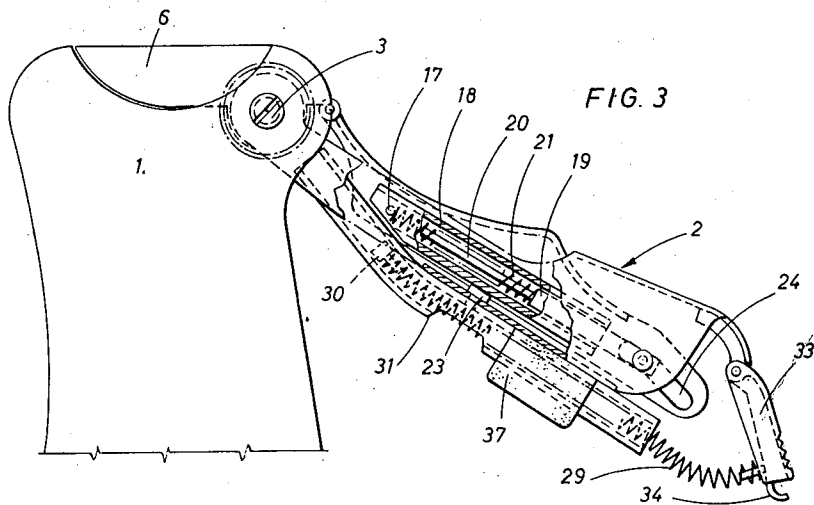
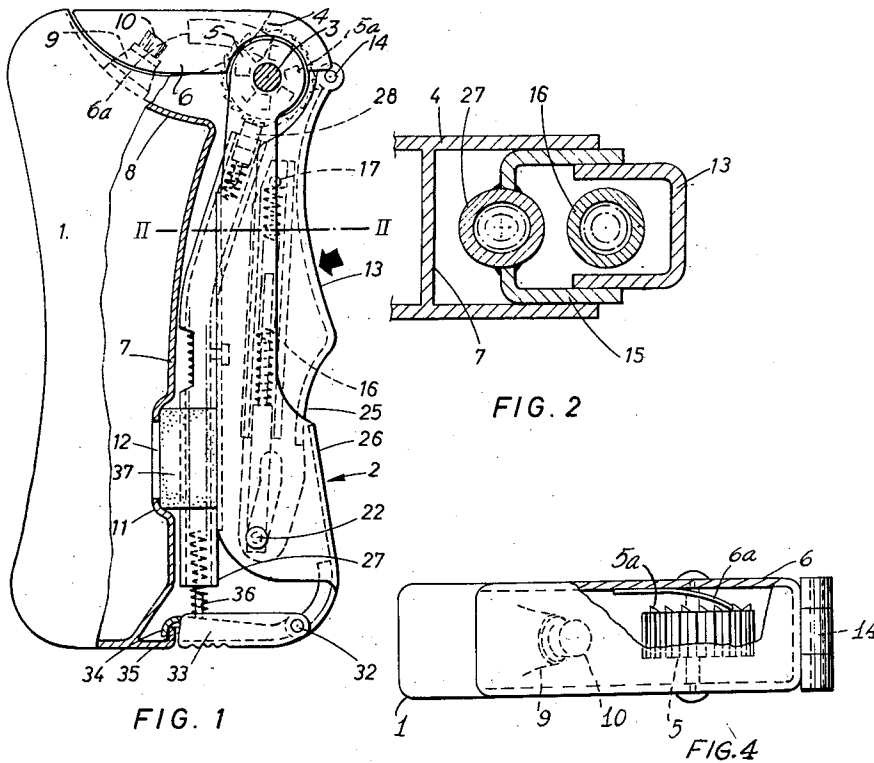
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PYROPHORIC LIGHTERS

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PYROPHORIC LIGHTERS

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This invention concerns improvements in or relating to pyrophoric lighters of the type equipped with a flint and flint wheel and using, as fuel, either a liquid fuel such as petrol in combination with a wick, or a gaseous fuel in combination with a valve, it being understood that under normal circumstances the gaseous fuel may actually be stored in liquid form under pressure, and wherein the burner (wick or valve) is normally covered by a cap.

Many different forms of pyrophoric lighters have been proposed and in general they comprise a body portion adapted to house the fuel and a mechanism portion which in some cases is unitary with the body portion and in other cases is separate. The operating mechanism generally comprises a finger-piece which is designed to be moved against the action of a spring so as to turn the flint wheel through a pawl and ratchet mechanism or the like to strike a spark from the flint in the direction of the burner (wick or gas valve, as the case may be). In the case where the finger-piece is directly connected to the flint wheel in this way, it is conventional to provide that a cap which is automatically opened to expose the burner by depression of the finger-piece and returns to the closed position when the pressure is removed. This action (which will hereinafter be called "double action") means that to use the lighter to light, for example, several cigarettes, it is necessary to keep a relatively heavy pressure upon the finger-piece during the whole time that the flame is required. Other lighters are known in which the cap is not connected to the operating mechanism and the arrangement is that the cap is opened and then the flint wheel is operated as two separate actions, this arrangement having the benefit that the lighter, while lit, may be passed easily from hand to hand without risk of the flame becoming extinguished. It might also be mentioned that it is known to provide this "single action" in a lighter in which the cap is coupled to the finger-piece, but of recent times such a construction has not proved popular in this country.

It is the object of the present invention to provide an improved lighter.

Another object of the invention is to provide a lighter in which a minimum of digital pressure on its operating finger piece will hold its cap open.

Still another object of the invention is to provide a lighter with the spring effective on its operating member extending substantially parallel to or lengthwise of its operating finger piece.

A still further object of the invention is to provide a lighter in which the disposition of its relatively movable parts and their connections in relation to the spring effective on the operating finger piece is such that the cap may have a single or double action.

As is conventional in pyrophoric lighters of the type specified, the flint wheel is mounted upon the pivot of the cap and is connected to the cap by means of a ratchet and pawl-type mechanism.

The end of the finger-piece is pivotally connected to the cap so that displacement of the finger-piece will move the cap to open position and the flint wheel to operate, the direction of digital pressure being generally transverse to the length of the finger-piece and towards the body of

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the lighter. The location of the pivots is desirably such that the cap is opened to a sufficient extent when the finger-piece almost reaches a dead-centre position and if a stop is provided to prevent the finger-piece passing beyond the dead-centre position, then double action will be provided. On the other hand, if the stop is fitted so that the finger-piece may go beyond the dead-centre position, then single action will be provided and the cap will remain open, requiring to be closed by a separate action. It is a further feature of this invention that the stop may be effectively displaceable so as to provide a choice of single or double action.

The finger-piece has spring means extending parallel to or lengthwise thereof to urge it to its normal position. In the preferred arrangement, two parts telescope one within the other and a spring is arranged to maintain the parts in the expanded condition. This spring is conveniently housed within the outer part and acts between the end of the inner part and the opposite end of the outer part but clearly it may be provided around the inner part to act between the end of the outer part and the end of the inner part.

It is possible to design the spring rate and the movement of the spring so that, when the finger-piece is approximately in the dead-centre position, the reaction from the spring for a given angular movement of the cap is small, with the result that if double action is being employed, the force necessary to maintain the cap open is small as compared with the force necessary to maintain the cap of a conventional double acting lighter in the open position.

The operating mechanism including the finger-piece is housed in a mechanism portion which is a separate unit from the body portion (housing the fuel container) but is pivotally connected thereto so that it may be hinged open to reveal a surface of the fuel container in which a fuel filling orifice (whether for gas or liquid fuel) may be located. In the case of a liquid fuel lighter, the filling orifice is desirably provided in a recess or the like which forms a funnel so as to direct the fuel into the fuel container and this filling orifice may be closed by means of a resilient pad of rubber or the like located upon the mechanism portion in a suitable position.

It will be known that it is necessary to press the flint against the flint wheel by means of a spring or the like and, in order to avoid the necessity of making a channel through the fuel container, it is preferred to mount the flint guide and spring in the mechanism portion.

In order that the invention may more readily be understood, one embodiment of same will now be described by way of example and with reference to the accompanying drawings, wherein,

FIGURE 1 is a side elevation partly in section;

FIGURE 2 is a partial section to an enlarged scale through the mechanism portion taken on the line II—II of FIGURE 1; and

FIGURE 3 shows the mechanism portion in the open position.

FIGURE 4 is a plan view, partly broken away and shown in section, illustrating the ratchet mechanism which drives the flint wheel.

Referring now to the drawings, the embodiment to be described is a liquid fueled lighter, that is to say a lighter operating on petrol or like fuels, and is so constructed that in the operative position (as shown in the drawings) the finger-piece is generally vertical whilst the wick is adjacent to the upper surface of the lighter.

Thus, in more detail, the lighter comprises a body portion 1 and a mechanism portion 2 which are hinged together about a main pivot pin 3, this pivot being in the form of a pin passing through side cheeks 4 at the upper

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part of the body portion and serving also as a bearing for a flint wheel 5 and for a cap 6. In known manner, the cap 6 is connected to the flint wheel 5 by ratchet and pawl mechanism (FIG. 4). This mechanism comprises ratchet teeth 5a formed on one side of the flint wheel 5 which cooperate with a leaf spring pawl member 6a. One end of the pawl 6a is fixedly secured to the internal surface of the cap 6. The free end of the pawl 6a is appropriately bent and biased by internal stresses in the leaf spring which cause it to be yieldingly urged into operative engagement with successive ratchet teeth 5a of the flint wheel so that when cap 6 is opened the flint wheel 5 is caused to rotate.

The cap 6 closes the upper portion of the lighter and the body portion of the lighter is provided with a junction surface 7 which, for the major part of its length, runs generally vertical but which is provided with an inclined portion 8 at its upper part and in this inclined part 8 a wick nipple 9 is inserted and serves to house a wick 10. In the generally vertical part of the junction surface 7 there is a depression 11 provided with a fuel filling orifice 12, the purpose of which and its mode of use being described in detail hereinafter.

The cap 6 is connected to a finger-piece 13 by means of a hinge construction 14, so that operation of the finger piece 13 in the general direction of the arrow in FIGURE 1 will cause the cap 6 to rotate about the pivot 3 due to the pull exerted on the hinge 14.

As can be seen from FIGURE 2, the finger piece 13 is of channel construction and has its side flanges sliding within a channel section housing 15, this housing serving as the main support for the mechanism portion and being mounted upon the main pivot 3.

It is known that in lighters of the type in question, the movement of the cap is against the action of a spring and in accordance with the present invention the spring takes the form of a telescopic strut 16 which is connected to the finger piece 13 by means of a pivot pin 17, although it could equally well be connected to the hinge pin 14 by a slight re-arrangement of the parts. In the construction shown in the drawings, the strut 16 comprises an outer tube 18 within which freely slides a piston 19 provided with a spigot 20 to support a compression spring 21 acting between the piston 19 and the pivot pin 17. The piston 19 is secured to side cheeks of the housing 15 by means of a pivot pin 22 and it will be apparent that pressure exerted in the direction of the arrow of FIGURE 1 will cause the strut 16 to move inwardly of the lighter to cause the cap 6 to open and at the same time to effect compression of the spring 21 so as to tend to return the finger-piece 13 to the original position so that the double action is provided. However, by the appropriate location of the pivots 3, 14 and 22, the pivot 14 may be caused to pass beyond the line joining the pivots 3 and 22, so as to go in an over-dead-centre position whereby single action is provided. However, in the embodiment illustrated a stop 23 is provided to limit this movement to ensure that double action takes place and this stop is removable if so desired.

In order to guide the finger piece 13 at its lower part, it is provided with a slot 24 in each of its side flanges and the pivot pin 22 passes, through these slots so that the lower portion of the finger piece 13 is caused to move in such a direction as to maintain a surface 25 thereof closely adjacent to a closing surface 26 of the housing 15.

On the side of the housing 15 of the mechanism portion adjacent to the junction surface 7, there is provided a flint guide tube 27 which is cranked at the end adjacent to the flint wheel 5 so as to bring the flint to the correct angle, the flint being depicted at 28 in FIGURE 1. In order to press the flint 28 against the flint wheel 5, a flint spring 29 is provided and as is conventional is provided with a small piston 30 to engage the flint. In order to insert the flint into the flint guide 27, this guide is provided with an aperture 31 of sufficient size to receive a flint, and the

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flint is charged into the guide by withdrawing the spring 29 to a sufficient extent and dropping the flint into the opening 31. This opening 31 also serves to give access to the stop 23.

The lower portion of the housing 15 has articulated to it by means of a hinge pin 32, a catch 33 which has a catch member 34 designed to engage with a similar catch member 35 upon the body portion 1, and on its inner surface of this catch 33 is provided with a spigot 36 to locate the flint spring 29. In order to open the mechanism portion the catch 33 is pressed upwardly against the action of the flint spring 29 to disengage the catch parts 34, 35, and then the mechanism portion is swung, to the position shown in FIGURE 3, about the pivot pin 3, the spring 21 of the finger-piece serving to tend to return the mechanism portion to the normal position. When in the position shown in FIGURE 3 the lighter may be turned so that the junction surface 7 is horizontal and uppermost, when liquid fuel may be poured into the body portion through the fuel-filling orifice 12, this fuel-filling orifice normally being sealed by a rubber or like resilient pad 37 located upon the underside of the housing 15.

I claim:

1. A pyrophoric lighter comprising a body including separate fuel container and mechanism portions, a pivot pin coupling said mechanism portion to said fuel container portion for pivotal movement therebetween, a flint wheel mounted on said pivot pin, a flint spring for urging a flint into contact with said flint wheel, a cap loosely journaled on said pivot pin for movement between open and closed positions, burner means in said fuel container portion, said burner means being enclosed by said cap in its closed position and exposed for use in the open position thereof, an elongated finger-piece member, one end of said finger-piece member being pivotally connected to said cap eccentrically of said pivot pin for producing opening and closing movements thereof, means in said mechanism portion for guiding said finger-piece member for lengthwise movement, spring means carried by said mechanism portion and effective on said finger-piece member for yieldingly urging said finger-piece to tend to move said cap to its closed position, lateral pressure applied to said finger-piece member intermediate its ends at least sufficient to overcome the yielding action of said spring means causing said cap to open, and ratchet means interconnecting said cap and said flint wheel for producing sparking action upon opening of said cap for igniting said burner means.

2. A pyrophoric lighter having a body portion including a fuel reservoir, a burner fed with fuel from said reservoir, a shaft carried by said body portion, a flint wheel rotatable on said shaft, a flame extinguishing cap on said shaft, and means for rotating said flint wheel on opening movement of said cap; a mechanism portion including tube means and a spring therein for guiding a flint into contact with said flint wheel, a finger piece, means for guiding said finger piece for substantially lengthwise movement relative to said mechanism portion, means for exposing part of said finger piece to receive digital pressure transverse to the length thereof and towards said body portion, pivot means connecting an end of said finger piece to said cap at a point off-set from said shaft, and spring means effective between said mechanism portion and said finger piece for biasing said finger piece in cap closing direction; and means for pivoting said mechanism portion on said shaft and for permitting angular displacement of said mechanism portion with respect to said body portion, and means including a spring loaded catch for holding said mechanism portion latched to said body portion.

3. The lighter of claim 2 wherein said tube means is apertured intermediate its length for the loading in of a flint.

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4. The lighter of claim 2 wherein said spring in said tube means also loads said catch.

5. The lighter of claim 2 wherein said spring means comprises a tube, pivot means connecting an end of said tube to said finger piece, a part telescoping in said tube, pivot means connecting an end of said part to said mechanism portion, and a spring within said tube to tend to urge said part out of said tube.

6. A pyrophoric lighter having a body portion with a concave curved side wall and containing a fuel reservoir, a burner at an end of said body portion, a flint wheel adjacent said burner, a shaft carried by said body portion, means for mounting said flint wheel for rotation on said shaft, a cap, means for mounting said cap for free pivotal movement on said shaft, and means between said cap and said flint wheel for rotating said flint wheel on opening pivotal movement of said cap; a mechanism portion disposed at the side of said body portion remote from said side curved wall and including tube means and a spring therein for guiding a flint into contact with said flint wheel, a finger piece, means for guiding said finger piece for substantially lengthwise movement relative to said mechanism portion, means for exposing part of said finger piece to receive digital pressure transverse to the length thereof and towards said body portion, pivot means connecting an end of said finger piece to said cap at a point off-set from said shaft, and spring means effective between said mechanism portion and said finger piece for loading said finger piece against displacement; and means for pivoting said mechanism portion on said shaft and for permitting angular displacement

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ment of said mechanism portion with respect to said body portion, and means including a spring loaded catch for holding said mechanism portion latched to said body portion.

7. The lighter claimed in claim 6, including a fuel filling means in said reservoir in a part thereof concealed by said mechanism portion.

8. The lighter claimed in claim 6, wherein the point of pivotal connection of said finger piece to said cap relative to said shaft is so displaced on opening said cap that said spring loading said finger piece may pass over-centre.

9. The lighter claimed in claim 6, including a stop on said mechanism portion for limiting displacement of said finger piece to prevent said spring passing over-centre.

10. The lighter claimed in claim 6, including a pin carried by said mechanism portion and a working in a slot in said finger piece for guiding such finger piece for its said exposed part to move close to part of said mechanism portion.

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