

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in Portable Lighter.



I, GIANNI BETTINI, a Subject of the King of Italy, of 67, West 44th Street, New York, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to portable lighters, employing a sparking member, as, for instance, a particle of a pyrophoric alloy.

In connection with pocket lighters suggestions have been made previously to lock the wick cover in its closed position by the spark producing apparatus and for this purpose the spark producing apparatus has been slidably mounted on a fuel container and provided with a pin for engaging with a catch provided on the wick cover, the initial sliding movement of the spark producing apparatus serving to disengage the pin from the catch so as to enable the cover to be raised by spring action whereupon the spark is produced by rotation of a friction wheel in contact with a spark producing element such as a flint. Suggestions have also been made to arrange a pronged sliding member in a tube of the fuel container, this pronged member being adapted to engage with a disc for the purpose of screwing this in the tube in order to vary the pressure of the spring which presses pyrophoric material against a friction wheel.

In connection with cigar and like cases containing a pyrophorous lighting box, suggestions have been made to provide a sliding member adapted to contact with a friction stone or to rotate a friction wheel so as to produce a spark when moved under the action of a spring which is compressed when moving the sliding member against the action of the spring, the movement of the sliding member against the action of the spring also serving to release a cover, covering the friction device and the wick which is to be ignited, the cover when released being opened by a spring and being adapted to be closed and locked by the sliding member when closing the case.

According to the present invention a

lever operating spark producing apparatus when moved from its normal position tensions a spring which then serves to actuate the spark producing apparatus so as to produce a spark and at the same time moves the lever towards its normal position, said lever when in its normal position preventing opening of a wick cover and being prevented from returning to its normal position until after the wick cover has been closed.

For a fuller understanding of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of one embodiment of the invention;

Figure 2 is a plan view looking at the top of the lighter;

Figure 3 is a vertical section on the line 3—3 of Figure 2;

Fig. 4 is a side elevation of the upper portion of the lighter, partly in section to show details;

Fig. 5 is a view similar to Fig. 4, but taken from the opposite side of the lighter, and

Fig. 6 is a cross section of the upper part of the lighter taken on the line 6—6 of Fig. 2.

Referring now more specifically to the drawing, the numeral 1 indicates the metal fuel reservoir. The fuel in the reservoir may be kerosene. Extending into the reservoir is the wick 2, which projects through the nipple 3 of the top of the reservoir the upper end of the wick being disposed to be lighted from sparks produced by the sparking apparatus. In addition to the kerosene, the reservoir may contain a mass of absorbent cotton or other suitable absorbent material. In the bottom of the reservoir is a filling opening closed by a removable plug 3'. On the side wall of the reservoir a large glass mirror 4 may be placed. One end of the reservoir may have an opening 5 communicating with a lip stick receptacle 6 sealed from the fuel content of the reservoir, and adapted to be closed by a cap 7.

The sparking apparatus includes the

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sparkling particle, or member, 8, as for instance a particle of pyrophoric alloy containing cerium and iron. The sparking apparatus also includes an abrader 10 which, in the embodiment illustrated, is a steel disk or wheel, roughened on its periphery, as by the teeth 11, for more effectively abrading the sparking particle 8. In the embodiment illustrated the abrader 10 is fixed to the upper end of an abrader shaft 12, which latter is journaled for rotative movement in the upper end of the reservoir and is encircled by a helical spring 13, one end of which spring is fixed to the shaft 12, the other end being fixed to the reservoir as, for instance, to the under side of the top of the reservoir at 14. As will more fully be explained hereafter, one purpose of the spring 13 is to effect rotation of the abrader 10 in contact with the sparking particle 8 so as to produce sparks, the rotation being in a direction so that the sparks will be projected toward the upper end of the wick 2 so as to ignite the wick. In this wise the spring 13 serves as a motor and expends energy to effect relative movement in one direction between the members 8 and 10 to produce sparking.

The numeral 15 indicates a lever fixed to the operating member, or abrader 10, and which is manually operable to rotate the shaft 12 in the direction to wind up the spring 13, and thereby tension the latter so that its reactive effect shall compel spark-effecting rotation of the abrader 10 as just explained. In the present embodiment the spring 13 is always under sufficient tension quite strongly to retract the lever 15 until it is arrested as, for instance, by contact with some fixed portion of the lighter, said portion in the present embodiment being the channel member 16, to be further described, or a part of or connected to the top of the reservoir. When the lever 15 is moved from the full line position to the dotted line position illustrated in Fig. 2, the spring 13 is further tensioned, as will be understood.

The numeral 17 indicates the wick cover, which may be a cup or thimble-like member into which the upper end of the wick may enter when the cover is in closed position, as illustrated in Figs. 1 and 4, and the mouth of the thimble may closely contact with the upper face of the nipple 3, so as completely to enclose the upper end of the wick, thus minimizing exuding of fuel through the joint between the cover and nipple; also it will be understood that the cover extinguishes the flame of the wick.

For moving the wick cover to open posi-

tion, illustrated in the dotted line in Fig. 4, a cover opening device is provided. In the present embodiment the cover opening device includes a cover supporting arm 18 pivoted for oscillatable movement in an upstanding bearing 19 by being fixed to a rotative pin 20 passing through said bearing. The numeral 21 indicates a spring disposed in a chamber, or tube 22, depending from the top member, or plate 23, of the reservoir, the lower end of the chamber being closed and supporting one end of the spring 21. Projecting through a small opening in the plate 23 is a cover actuating pin 24, the base of which rests on the top of the spring 21 and is enlarged to limit the upward movement of the pin 24. The pin 24 is disposed to coact with the cover supporting arm to one side of the pivotal axis of said arm.

In the present embodiment the arm 18 has a depending lug, or hub 26, against which said pin is adapted to contact so as to urge the cover toward open position. As illustrated in Fig. 4, the hub has a flat face 27 which, when the cover is in open position, rests against the top 23 and limits opening movement of the cover. From the flat face 27 the hub continues in a gradual curve or cam-like face to another flattened portion of the hub indicated at 28 to one side of the pivotal axis, the pin 24 being adapted to contact the latter face to one side of the pivotal axis when the cover 17 is closed. When the hub 26 moves in a direction to close the cover, the cam-like face effects gradual compression of the spring 21 by moving the pin 24 downwardly, the spring 21 being relatively strongly compressed when the cover is closed. It will be seen, therefore, that when the cover is free to open, its opening movement will be spring actuated by expansion of the spring 21.

In the present embodiment a latching mechanism is employed and is adapted to latch the wick cover in closed position. As illustrated in Fig. 5, the latching mechanism includes a latch member 29 fixed to oscillate with the pin 20 and being pivotally movable with the cover through its connection with the cover arm 18. When the wick cover is closed the latch arm 29 is in the position illustrated in Fig. 5 with its upper edge 30 adapted to lie underneath the lever 15. When the wick cover 17 is in closed position, retraction of the lever 15 by the spring 13 to the full line position illustrated in Fig. 2 causes said lever 12 to be positioned immediately above latch member 29, so that the lever 15 cooperates with the member 29 to latch said cover in closed position; the lever 15 thus also acting as a latch member and preventing pivotal movement of

the latch member 29 in cover opening direction under the influence of the spring actuated cover opening device.

The sparking particle 8 comprises a small cylindrical piece of pyrophoric alloy disposed in the channel 16, which channel consists of a tube fixed to the upstanding portion 19 of the top of the reservoir. For pressing the particle 8 into sparking position in contact with the abraded 10 a helical spring 31 is disposed in the channel 16 behind said particle. At the opposite end of the channel from the particle 8 is the screw 32 having screw threaded engagement with the inner wall of the channel 16, (Fig. 3) rotation of said screw being adapted to compress the spring 31 and more or less tension it so that the pressure between the particle 8 and the abraded 10 may be varied as desired. The screw 32 is provided with an extensible handle for facilitating its adjustment comprising a squared shaft 33 which loosely passes through a counterpart squared opening in the screw 32 and at one side of the screw enters the helical coil of the spring 31. At the opposite side of the screw from the spring the shaft 33 is provided with a knurled head 34 by which it may be conveniently and effectively gripped and actuated.

In the position illustrated in Fig. 3 the head 34 of the shaft 33 is close to the knurled flange 35 of the screw 32. By grasping the head 34 the shaft 33 may be drawn to the dotted line position indicated in Fig. 3, the enlarged end 36 preventing its complete removal, and in this extended position rotation of the shaft 33, and consequently of the screw 32, is very conveniently accomplished, thus effecting adjustment of the tension of the spring 31. After the spring 31 has been so adjusted, the head 34 may be pushed to the right (Fig. 3) so as to be out of the way. Furthermore, it will be noted that when particle 8 is to be replaced by another particle, the screw 32 may be conveniently removed by drawing the shaft 33 through the screw to its outer position and then rotating said shaft to turn off the screw from the channel 16. By then moving shaft 33 so as to project from the opposite side of the screw, the spring 31 may be shifted thereover and with the shaft and screw introduced into the bore of the channel and turned into place.

When the lighter is not being used it may be conveniently carried in the pocket, and at such time the wick cover will be in closed position and the lever 15 will be in retracted position close alongside the channel 16, in which position the lever

will be held by the spring 13, with its free end conveniently accessible for contact and actuation by the finger of the operator. Also, under such circumstances, the wick cover will be held closed by the lever 15, acting as a latch member, and coacting to prevent cover opening movement of the latch member 29. The lighter may conveniently be held and actuated by one hand. While so holding the lighter, the end of the lever 15 may be pressed toward the dotted line position (Fig. 2) by the thumb or finger of the operator, and such movement of the lever 15 will unlatch the latching mechanism, the lever 15 disengaging from the latch member 29 shortly after the movement of the lever 15 is started. Thus, the cover will be freed for opening and the cover opening mechanism will automatically rotate the arm 18 and the cover carried thereby to open position. Outward movement of the manually operated lever 15 will also tension the spring 13 to a sufficient degree, whereupon the finger is removed, permitting said lever to fly back under the influence of said spring 13, and with the result that the abraded 10 will be given a quick rotative abrading movement by the spring 13. In consequence of the quick movement, the sparking apparatus will be actuated, sparking will result, and the sparks will be projected toward the now open wick, which latter will be ignited. It will be noted that repeated manual operation of the lever 15 is possible at the will of the operator, while the wick cover is in open position and without moving said cover to closed position. It will, furthermore, be noted that when the latch member 29 is moved by the cover opening mechanism, said member 29 is moved to a position between the manually operable lever 15 and the channel 16, so that spring retracted movement of the lever 15 will be arrested by the latch member 29, and that further movement of the lever 15 will be required before it reaches latching position. By applying the thumb to the cover 17 or the arm 18, the cover may be closed at will, whereupon the spring 13 will effect further movement of the latch lever 15 and to cover latching position cooperating with the latch member 29, which latter will then be held in position to retain the cover closed. In this wise, once the cover is latched closed, relative movement between the abraded and the sparking member by manual power is required to effect unlatching, and consequent opening of the wick cover. When held in the pocket there is practically no chance of accidental spark actuation of the lighter. Furthermore, the cover will positively be

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latched in closed position, thus protecting the person from contamination by the liquid fuel employed. It will be seen that the spring actuated sparking actuation of the lighter is engendered by a preliminary, or partial manipulation of the lever 15 followed by the movement due to the spring for effecting sparking, so that movement of the finger of the operator is simple and need not be quick.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A portable lighter of the character described wherein a wick cover is held in its closing position by a lever for operating the spark producing apparatus, characterised in that the lever when moved from its normal position tensions a spring which then serves to actuate the spark producing apparatus so as to produce a spark and at the same time moves the lever towards its normal position, said lever when in its normal position preventing opening of the cover and being prevented from returning to its normal position until after the cover has been closed.

2. A portable lighter according to claim 1 wherein the cover is opened by a spring-actuated pin and is provided with a latch member co-operating with the lever in

such a manner that when the cover is open said latch member extends into the path of the lever so as to prevent it from returning to its normal position but after the cover is closed the latch member is engaged by the lever and prevents the cover from being opened.

3. A portable lighter according to claim 1 or 2 wherein the lever is capable of being repeatedly actuated without closing the cover.

4. A portable lighter according to claim 1 wherein the axes of rotation of the lever and cover are arranged at right angles to one another.

5. A portable lighter as claimed in any one of the preceding claims and having a channelled member in which is located a sparking member pressed into the sparking position by a spring, characterised in that the pressure of the spring is adjusted by means of a screw having a square bore through which passes an extensible handle for turning said screw.

6. Portable lighters constructed, arranged and adapted for use as a whole, substantially as described in connection with the accompanying drawings.

Dated this 5th day of February, 1929.

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[This Drawing is a reproduction of the Original on a reduced scale.]

