

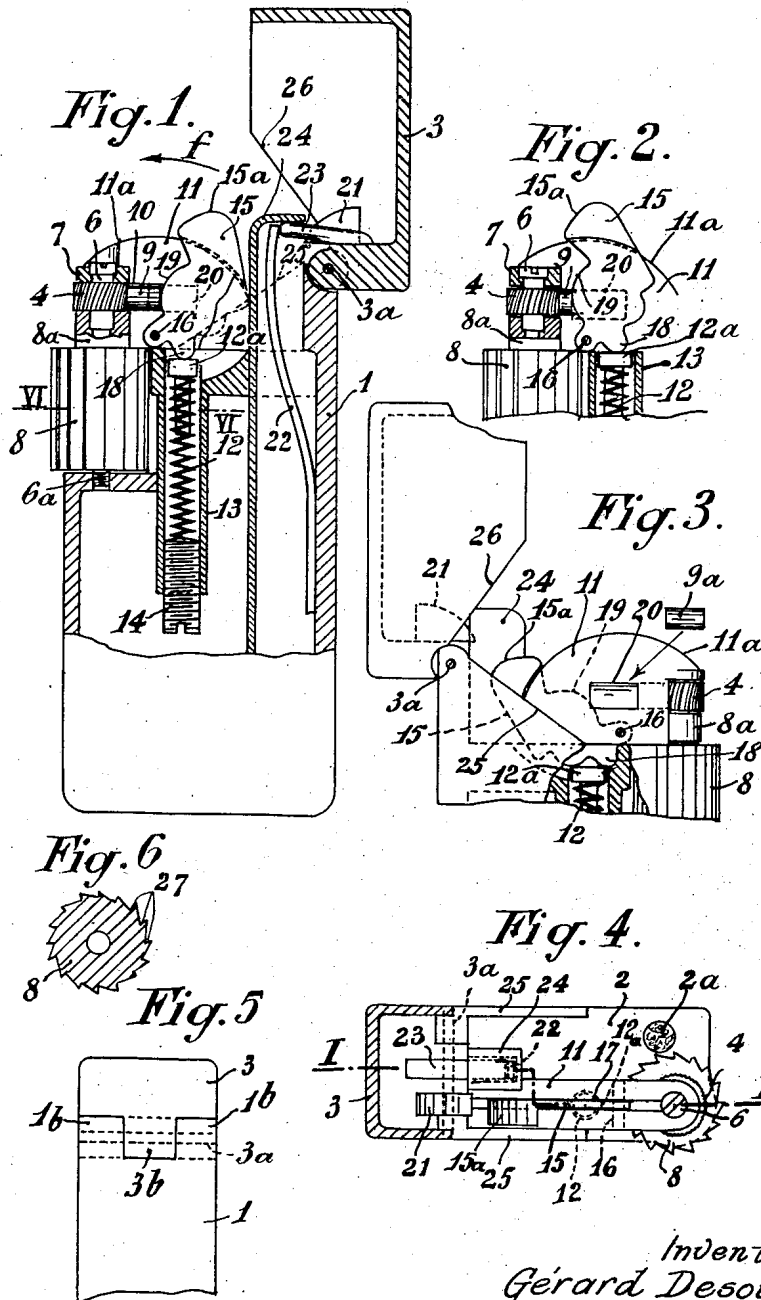
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LIGHTER

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## LIGHTER

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The object of the present invention is to improve lighters and, more particularly, pocket lighters, in such a way as to make their operation easier and more reliable.

In particular, the setting of a new flint of any kind including ferro-cerium in place of an old one is, in most of the known lighters, a more or less complicated process which requires taking apart various parts.

An object of my present invention, is to facilitate the setting of a new flint.

Accordingly, the flint guide, in which the flint is pressed against the emery wheel by a spring, is provided laterally, and a little to the back of the flint, with an opening of easy access and the size of which allows the introduction of a flint, while means are adapted to remove away from said opening, when the flint is being introduced, the part which presses the flint against the emery wheel.

Preferably, these means which include, for instance, a pivoted lever, are provided with a locking mechanism which stops it automatically in the position in which it has been set to free the opening, so that the user has both hands entirely free to handle the flint and set it in the guide opening. Said locking mechanism can be associated with the lid of the lighter so that it is released when the lid is closed, the parts being thus set back into their working position without the user having to perform any special operation.

This improvement is especially suitable for those lighters in which the flint guide can be reached through the upper end of the lighter, above the plate which carries the various parts. Above all, it suits those lighters in which the flint guide is placed horizontally above the said plate and especially those in which the flint spring is set in a vertical direction parallel to the axis of the emery wheel, the pressure of the spring being transmitted to the flint by means of an oscillating lever. In these lighters, the oscillating lever which is generally mounted in a slit in the guide, can be used to uncover the opening when it is pushed back. Furthermore, its bearing surface can be inclined in such a way that the pressure of the spring, in the position in which the lever frees the opening, maintains this lever in the said opening uncovering position; a lug or cam, carried by the lid, automatically pressing the said lever back against the flint when the said lid is closed.

With the object of rendering the manipulation of lighters as easy as possible, it has also been found advantageous to give the knurled knob op-

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erated by the finger to turn the emery wheel, a saw-like profile angularly set in such a way that the steep sections of this profile are those on which the finger presses when working the knurled knob. Thus the finger has a firm hold on the knurled knob without having to exert on the latter any considerable effort as is the case with ordinary knurled knobs.

Other improvements will appear in the following description and in the attached drawing given merely as a nonlimitative example.

Fig. 1 is a view in elevation and in vertical section through line I—I of Fig. 4 of one embodiment of an improved lighter according to the present invention; the lighter being supposedly provided with a new flint.

Fig. 2 is a part view showing the position of the various parts when the flint is worn down.

Fig. 3 is a part view in elevation of the same embodiment but on the side of the lighter opposite to the one shown in Fig. 2, so as to show the opening through which is introduced the flint.

Fig. 4 is a view in horizontal projection of the upper plate of the lighter, and shows at the same time a sectional view of the open lid.

Fig. 5 is a view in elevation of the lighter, showing the side on which is placed the hinge of the lighter lid, said lid being closed.

Fig. 6 is a sectional view of the knurled knob through line VI—VI of Fig. 1.

The lighter case 1, which is in the shape of a parallelepiped drawn out in height and flat, shows at its upper end, a plate 2 on or against which are mounted the principal parts, said plate and said parts being concealed, when not in use, by a lid 3 pivoted at 3a to the case. In particular, the drawing shows the wick 2a, as well as the emery wheel 4 which can rotate around the pin 6, set in a fixed bearing 7 and screwed into the case at its lower end 6a. On this pin is also mounted the knurled knob 8 which is used to turn the emery wheel by finger, and which includes at its upper end a sleeve 8a united to the emery wheel by a square fit. The flint 9, in rubbing contact with the emery wheel, is set in a horizontal guide 10 milled or cut in a vertical metal plate 11 welded to the plate 2. The said plate carries also the bearing 7. The flint 9 bears against the emery wheel and advances in its guide progressively as it is worn down, by the pressure of a helical spring 12. This spring is parallel to the axis of rotation of the emery wheel and of the knurled knob, and in the case considered is parallel to the long side of case 1 and is held in a tube 13 closed at its lower end by a screw 14

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against which abuts the lower end of the spring and which serves to regulate the tension of the said spring. The pressure of the said vertical spring is transmitted to the horizontal flint 9 by a flat lever 15 pivoted on a horizontal axis 16 and which moves in a slit 17 in plate 11. The spring 12 presses, by means of a piston 12a set above it, on the projecting part 18 of the lever 15, and thus tends to make this lever pivot in the direction shown by arrow *f* of Fig. 1, pressing it against the flint 9 and the latter against the emery wheel. The upper end of the piston 12a is flat so that it can enter the slit 17 of plate 11 in which rocks the lever 15. This lever 15 bears against the flint 9 through a surface 19 which acts as a cam the profile of which is such that the pressure exerted on the flint is as constant as possible in spite of the wear of the flint. In the surface of plate 11 which is the most directly accessible, the flint guide 10, cut in the plate, is provided with a rectangular opening 20 conveniently sized so as to allow the sidewise introduction of a new flint 9a in the flint guide (Fig. 3). This opening is set sufficiently far from the emery wheel for the flint, located inside the guide and pressed against the emery wheel, not to be liable to come out through the said opening. Consequently, the lever 15 appears normally in this opening and does not allow the flint to come out. When the flint is worn down and the user wants to replace it, the pressure of the thumb on the upper end 15a of lever 15 makes it fall back completely, as shown in Fig. 3. Then, the surface of the projecting part 18 of the lever opposite the surface which bears normally against the piston 12a of the spring, comes into contact with this piston (Fig. 3) and the pressure of the spring then retains the lever in its new position. Thus, the opening 12 is set free and the flint 9a can be introduced into it. The lever 15 can be brought forward again by acting on it with the finger, but it is of greater advantage to do this automatically by closing the lid 3. To this effect, the lid 3 bears a lug or a cam 21 which when the lid is being closed, pushes forward the head 15a. The projecting part 18 of the lever pivots with reference to the piston 12a and, as soon as it acts on this piston through its normal bearing surface, it is pushed back by the spring 12 against the flint and presses the latter onto the emery wheel.

The lever 15 is thus, in effect, a bell crank lever fulcrumed at 16, with a cam-like toe or projection 18 at the end of its power arm, and a cam-like surface 19 at the forward edge of its work arm 15a. When the lever is in the active position shown in Figures 1 and 2, the force exerted upon it through one side of the projection or toe 18 is such as to force the cam 19 against the flint 9 and press the flint against the wheel 4. However, when the lever is moved into its retracted position of Figure 3, the lowest point of the toe or projection 18 passes beyond dead-center between the axis of the piston 12a and the pivot 16, so that the other side of the projection 18 engages with the piston 12a and thus the lever becomes locked in its retracted position until engaged by the cam 21 which forms part of the lid and moved thereby over dead-center to return to the position of Figure 1.

The upper edge 11a of the plate 11 is in the shape of an arc of a circle, the center of which is on the axis of oscillation 16 of lever 15 so that the projection of the lever head over the edge 11a is always constant, which makes it easier to act on

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the head of the lever by moving one's finger along the said edge.

The lid 3 is pivoted to the case 1 by an axis 3a. Preferably, the eyes 1b and 3b of the hinge are provided respectively on the lid and on the case as shown in Fig. 5, so as to ensure a greater resistance for said hinge.

The lid is held fast in its extreme positions by means of a spring blade 22 fixed in the case and acting by means of its upper end on a finger 23 rigid with the lid. The spring 22 is concealed by a metal part 24 in an opening of the plate 2.

The bevelled edges of the case and lid 25 and 26 respectively, form a large V-shaped angle when the lid is open; the movement of the finger which pushes back completely the lever 15 and uncovers the opening 20, can thus be done with ease, while the lid can nevertheless mask completely the lighter parts when it is closed.

The knurled knob is a large cylinder-shaped piece which the finger can depress with ease without any unpleasant pressure. It is provided with saw-like striations the steep sides of which 27 are located on the side submitted to the pressure of the finger, this knurled surface ensuring a perfect hold on the knurled roll without any great effort.

Obviously, the embodiment of my present invention as described above has only been given as an example and it can be modified, in particular by substituting technical equivalents, without widening the field of the present invention as defined in accompanying claims.

What I claim is:

1. A lighter comprising: a casing, a spark wheel pivoted on the casing, said casing being provided with a recess radially of the spark wheel for housing a flint, the wall of said recess having a lateral opening through which a flint may be introduced into the recess, a lever pivotally secured to the casing on an axis perpendicular to the axes of the spark wheel and the recess to normally engage with and urge the flint against the spark wheel while covering said lateral opening, a spring acting upon said lever to selectively hold it in active position in engagement with the flint or in retracted position wherein it is free from such engagement and uncovers said lateral opening, a lid for the casing, and means on the lid to engage with and move the lever from its retracted position to its active position when the lid is moved from its opened to its closed position.

2. A lighter comprising: a casing, a spark wheel rotatably mounted on the casing, said casing being provided with a recess radially of the wheel for housing a flint, the wall of said recess having a lateral opening through which a flint may be introduced into the recess, a lever pivotally secured to the casing and adapted to urge the flint against the wheel while covering the opening of the recess, a spring, a pusher urged by the spring against the lever, said lever having a projection engaging said pusher, one side of which projection when in engagement with the pusher serving to force the lever into active position against the flint and the other side of said projection serving when in engagement with the pusher to hold the lever in retracted position withdrawn from the flint, a lid on the casing and a member on the lid positioned to engage with the retracted lever when the lid is closed to move the lever into active position.

3. In a lighter, the combination of a casing, a spark wheel mounted to rotate on the casing,

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said casing having a recess adapted to contain a flint, a lever pivotally secured to the casing and adapted to partake of an active position wherein it engages the flint and a retracted position wherein it is withdrawn from engagement with the flint, and a lid on the casing, said lever being so shaped that in its retracted position it will lie in the path of the lid when the lid is moved from open to closed position, whereby said lid is adapted to move the lever from its retracted to its active position when said lid is closed.

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