

# PATENT SPECIFICATION

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COMPLETE SPECIFICATION.



## Improvements in or relating to Automatic Lighters.

I, GEORGE PAUL ROCH, of 8, Rue Rouget de Lisle, Courbevoie, (Seine), France, a French citizen, 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:—

The object of this invention is to provide an automatic lighter.

This lighter is of the kind comprising a liquid fuel reservoir, a spring actuated frictional wheel, devices for compressing and releasing said spring, a mass of pyrophoric material pressed against the wheel and a rigid lighting stick, provided with absorbent material, normally dipping into the reservoir and adapted to be withdrawn therefrom by being slid along its axis.

With the lighters of this type hitherto known, when the mechanism is operated for lighting purposes, the stick is automatically lifted so as to be brought and kept in vertical position opposite the frictional wheel above and close to the aperture of the reservoir. The ignition of the stick in such a position is liable, on the one hand, to cause flame to arise at the aperture, thereby causing an explosion and, on the other hand, the flame rising vertically along the stick makes the latter awkward to hold; lastly, with the above described arrangement, it is impossible to withdraw the stick from the reservoir without causing it to be automatically lifted and, consequently, ignited.

Furthermore, with those lighters, the stick is maintained moveable at the end of an arm arranged as a bracket on a rod that slides in the box or casing of the lighter, said rod being pressed by a spring which tends to lift it up and thereby, on being released, to pull the stick out of the reservoir. Besides, said supporting rod, on being lowered into the box, causes the setting of the spring that actuates the frictional wheel. Due to this arrangement of the stick overhanging the setting member, i.e. the supporting rod, the setting of the lighter requires two operations, firstly, placing the stick in position at the end of the bracket arm and, secondly, exerting a pressure on the axis of the set-

ting rod, for, as a matter of fact, were the pressure exerted on the stick, that is to say on the overhanging part, the setting rod would get jammed and could not work.

Another inconvenience of the lighters of this sort hitherto known is that the sudden and automatic pulling of the stick out of the reservoir opposite the wheel is liable to cause little drops of fuel to be thrown on to the wheel and on to the pyrophoric material, thereby impairing proper ignition.

Lastly, with those lighters, the reservoir, being integral with the whole mechanism, spilling of liquid fuel is likely to occur when the reservoir is being filled up.

My invention does away with those various inconveniences.

It is characterised in the first place by the fact that the members or parts intended to compress or set the spring that actuates the wheel and the members or parts whose duty is to release said spring are so arranged with respect to the stick that when said stick is introduced into the reservoir by a pressure exerted thereon along its axis, said stick actuates in the setting direction the members the duty of which is to set the spring of the wheel, and on the other hand, when said stick is pulled out of the reservoir it has no effect on the spring setting members.

The invention is further characterised by the fact that the member which actuates the release of the spring of the wheel is so arranged that the inflammable portion of the stick is within the radius of action of the ignition sparks when said releasing member is actuated by means of said stick;

The invention is still further characterised by the fact that the reservoir is removably secured so as to be separable from the mechanism and from the ignition members, wheel and pyrophoric material, for filling up purposes.

Due to this arrangement, the setting or compression of the spring of the wheel is automatically effectuated by the introduction of the stick into the reservoir. In order to light the stick, after having pulled the same out of the reservoir,

which motion does not release the spring, I have but to press on a pusher with the absorbent and imbibed portion of said stick, or with a member close to this portion, this motion causing the wheel to be actuated and the spark to jump, which ignites the stick; in this way no contact is at all possible between the inflammable liquid or fuel and the wheel.

In order to make my invention more clearly understood I have illustrated by way of example an embodiment of my automatic pyrophoric lighter in the accompanying drawing which shows the same in vertical middle section in its set position.

In this example the mechanism is enclosed in a box or casing 1, which is divided as to height into two compartments by a partition 1*a*. This partition has in its center a cap 1*b* which covers the neck or gullet 2*a* of the reservoir 2 containing some absorbent material 2*b* imbibed with inflammable volatile liquid. This cap 1*b* has its center perforated by a hole 1*c*. The upper compartment of box 1 is closed by a cover 3 through which are made on the one side a rectangular aperture 3*a* and centrally a hole in which slides a tube 4 adapted freely to run through a frame 5 secured on a boss 3*b* of cover 3 and resting on the other hand upon a boss 1*d* of the partition 1*a*. The lighting stick 6 is ended on the one hand by a button or knob 6*a* and on the other hand by a tube 6*b*. Said tube contains a wick 6*c* made of absorbent material and through which runs a finger 6*d*. Said stick is introduced into the reservoir 2 through the hole 1*c* provided in the cap 1*b*, after having passed through the tube 4. The latter is integral with a guide 7 which runs therewith through the frame 5 and upon which a coil spring 8 acts which is coiled around the tube 4. Said spring bears on the frame 5 so as to tend to push constantly upwards the guide 7 and the tube 4. In the guide 7 is provided a slot 7*a* wherein slides a spur 9*a* secured on the end of a lever 9, the latter rocking around a pin 5*a* mounted in the frame 5. On the other end of the lever 9 is fixed a second spur 9*b*, to which is linked one end of a connecting rod 10, the other end of which is linked to a spindle 11*a* integral with the frictional wheel 11. Said wheel engages into the rectangular aperture 3*a* and is adapted to rotate around a central spindle 12*a* mounted in a frame 12; said spindle 12*a* serves also to keep the frame 12 mounted in the frame 5. On the frame 12 is secured the tube 13 which contains the pyrophoric flint 13*a* pressed by means of a pusher 13*b*, a coil spring 13*c* and a screw 13*d* against wheel 11. Said tube 13 runs through the frame 5 and extends into a hole 1*e* provided in the boss 1*d* so as to permit of the pressure of the stone being adjusted by means of a screw driver after the box has been withdrawn from the reservoir 2. A pusher 14 slides through the frame 12 as well as through the frame 5; between these two frames it passes also through a slot 16*a* provided in the bent upper part of a trigger 16 whereon it is acting. The head of pusher 14 is provided with a small cavity or recess 14*a*. Around said pusher is coiled an expansion spring 15 located between the frame 5 and the bent part of the trigger 16. The trigger 16 has a nose 16*b* and is adapted to rock around a pin or spindle 5*b* mounted in the frame 5; the action of the spring 15 tends to keep said trigger in the set position shown in the drawing. Threaded rods 17 screwed in bosses 3*b* of the cover 3 serve to secure, on the one hand, by means of a nut 17*a*, the frame 5 on the cover 3, and on the other hand, by means of nuts 17*b*, the cover 3 on the partition 1*a* of the box 1 and, lastly, by means of nuts 17*c*, the bottom 2*c* of the reservoir 2 on the box 1, said bottom thus closing the lower compartment of said box. Longitudinal and transverse grooves 1*f* are provided on the outside of the box 1 for the attachment in known manner of advertising or other displayed matter (such as advertising matter on flexible supports sprung into said grooves), if desired.

In the drawing the lighter is shown at rest. The tubular end of the lighting stick 6 is dipping into the reservoir 2. The spring 8 is compressed; the spur 9*b* is resting on the nose 16*b* of the trigger 16 thereby holding the lever 9 in the set position shown so that the fact of withdrawing the stick from the reservoir by means of its button or knob 6*a* will have no effect on the mechanism. When, however, by means of finger 6*d* introduced into the recess 14*a*, a push is exerted with the stick on the pusher 14, the latter acts on the trigger 16 which rocks around the spindle 5*b* and the nose 16*b* of which releases the spur 9*b* together with the lever 9; the spring 8 is then suddenly relaxed and imparts to the wheel 11 through the guide 7, the lever 9 and the connecting rod 10, a sharp rotary motion of suitable amplitude in the direction indicated by the arrow F. Hot sparks are then thrown towards the pusher 14 on which is the lighting stick 6 the imbibed wick 6*c* of which gets ignited. At the same time the tube 4 is brought up and protrudes outside the cover 3. After having been used, the stick 6 is introduced

anew into the tube 4 and pressure is exerted on the button 6a and drives the tube down through the cover 3. The spring 8 is thereby compressed and the various parts are replaced in the set position illustrated in the drawing. The lighter is then ready for further use.

The above described lighter is more particularly designed for placing on a table in a public room, but, as will be readily apparent, my invention is by no means limited to the embodiment set forth. An embodiment may be devised, for instance, attachable to a wall for domestic purposes, as well as an embodiment of reduced size and of stylish appearance for putting on a desk and even a tiny embodiment adapted to be carried in a user's pocket.

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. An automatic pyrophoric lighter comprising a liquid fuel reservoir, a frictional wheel actuated by a spring, devices for setting and releasing said spring, a mass of pyrophoric material pressed against said wheel, a rigid lighting stick provided with absorbent material and normally dipping into the reservoir and adapted to be withdrawn therefrom by being slid along its axis in the reservoir, characterized in that the members or parts adapted to set the wheel actuating spring and the members or parts adapted to release said spring are so arranged with respect to the lighting stick that, on the one hand, when said stick is introduced into the reservoir by pressure exerted thereon along its axis, said stick will actuate in the setting direction the members for setting the wheel actuating spring

and, on the other hand, when said stick is pulled out of the reservoir it will have no influence on the spring releasing parts or members, substantially as described.

2. An automatic lighter according to claim 1, in which the member operating the release of the wheel actuating spring is so arranged that the inflammable portion of the lighting stick is within the radius of action of the ignition sparks when said releasing member is actuated by means of said lighting stick.

3. An automatic lighter according to claims 1 and 2, in which the reservoir is removably secured so as to be separable from the mechanism and from the ignition parts, frictional wheel and pyrophoric material, for filling up purposes.

4. An automatic lighter according to claims 1 to 3, in which the frictional wheel setting members or parts comprise a tube adapted to slide under the pressure of a thrust block located on the lighting stick which is housed in said tube, a spring adapted to return said tube to the released position, and a guide integral with said tube and in driving engagement with a lever adapted to actuate the frictional wheel through a control piece and the releasing parts or members comprise a pusher provided with a cavity or recess near the wheel, a return spring, and a trigger engaging on the one hand with the pusher and on the other hand with part of the setting members.

5. An automatic lighting device arranged and adapted to operate substantially as hereinbefore described with reference to the accompanying drawing.

Dated the 28th day of February, 1930.

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[This Drawing is a full-size reproduction of the Original.]

