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PATENT SPECIFICATION

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Nov. 4, 1937. No. 32374/37.

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Specification not Accepted

COMPLETE SPECIFICATION

Improvements in or relating to Automatic Lighters

We, CARTIER, SOCIETE ANONYME, a Body corporate organized according to the laws of France, of 13, Rue de la Paix, Paris, France, 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 present invention relates to automatic lighters.

The object of the present invention is to provide a lighter of this kind which is adapted to meet all requirements of a mechanical, practical and aesthetic kind, and, in particular which is capable of constituting a luxury article both by its neat appearance and the minimum volume it occupies and by the ornamentation it can receive.

The lighter according to the invention includes a reservoir and lid which contains the whole of the mechanism so that, in the closed state, the apparatus may have the appearance of a box or case without any projection or any recess. There is nothing to show that this article is a lighter and no mechanical or other piece can soil the handbag or the pocket in which it is placed.

According to a feature of the present invention, the mechanism includes a single torsional spring which acts as well for keeping the lid in the closed position as for suddenly completing the opening thereof, when said opening movement has been started manually.

This spring, which is substantially U-shaped, is pivoted at one of its ends to a part rigid with the case, for instance to the spindle of the friction wheel, and at the other end to a spindle carried by the lid.

According to an embodiment of the invention, which has proved to be advantageous, rotation of the friction wheel is automatically produced, when the lid is suddenly opened, by the pivoting, about

the axis of friction wheel, of the branch of the U-shaped spring that is pivoted thereon. In order to give the branches of this spring an improved rigidity, it is advantageous to associate them with, or to replace them by, a structure analogous to a pair of compasses having rigid elements.

Other features of the present invention will result from the following detailed description of some specific embodiments thereof.

Preferred embodiments of the present invention will be hereinafter described, with reference to the accompanying drawings, given merely by way of example, and in which:

Fig. 1 is an elevational view of the lighter in the opened position;

Fig. 2 is a side view of the lighter in the same position;

Fig. 3 is an elevational view of the lighter in the closed position, the lid being supposed to have been cut away so as to show the mechanism;

Fig. 4 is a plan view of the lighter corresponding to Fig. 1 with the lid partly cut away;

Fig. 5 is a perspective view of the mechanism in the open position;

Fig. 6 to 8 inclusive are diagrammatical views illustrating the operation of the torsional spring in the different positions of the lid;

Fig. 9 is a sectional view on the line 9—9 of the detail of the pawl means for driving the friction wheel;

Fig. 10 is a perspective view showing a detail of a modification;

Fig. 11 is a side view of a lighter made according to another embodiment of the invention, shown in the open position, the wall of the lid being supposed to have been removed;

Fig. 12 is a front view corresponding to Fig. 1, the front wall of the lid being partly cut away so as to show the mechanism;

[Price 1/-]

Fig. 13 is a side view analogous to Fig. 11, the lighter being in the closed position;

Fig. 14 shows a detail of the lighter of Figs. 11 to 13, seen in front view.

The body 1 of the lighter, which constitutes the gasoline reservoir, is provided with a conduit 13 extending therethrough and adapted to receive the firestone or flint 2 and the coil spring 3. The latter constantly applies the flint against the friction wheel 4, which is mounted on a spindle 5 supported by casing 1 and parallel to the hinge 6. The latter constitutes the pivot of lid 7, which, when in the closed position, completes the casing so as to form, for instance, a prismatic body having a neat and elegant geometric structure.

The lid 7 carries a spindle 8 parallel to hinge 6. A compass, the rigid branches 9, 10 of which are pivoted on a free axis 11, constantly connects spindle 8 to the spindle 5 of the friction wheel. The end of branch 9 is pivoted to spindle 8 and the end of branch 10 is pivotally connected to spindle 5. On this spindle 5 are freely rotatable, on the one hand the friction wheel 4, and, on the other hand a small sleeve 12 provided at the end of arm 10 and rigid therewith (Figs. 4 and 9).

Friction wheel 4 is caused to rotate about spindle 5 when sleeve 12 turns in the direction of arrow f (Fig. 1), but not in the opposite direction, by the ratchet device which will now be described:

Sleeve 12 contains, in an annular housing, a small spiral spring 14 the rectilinear end 15 of which projects on the outside of the cylindrical wall of sleeve 12, through a slit 16 parallel to axis 5. This end 15 of this spring is constantly applied, by the action of said spring, against ratchet teeth cut in the usual manner in the side of friction wheel 4.

The pivoting of lid in the opening direction is limited by an abutment 17 against which a prolonged portion of lever 10 comes into contact (Figs. 1 and 5). The rotation of friction wheel 4 in the direction of arrow f , which corresponds to the opening of the lid, causes flint 2 to be rubbed by said friction wheel and the spark thus produced ignites wick 18, which projects from reservoir 1.

The three parallel axes of articulation 6, 5, and 8 are arranged in such manner that, when they are in line (Fig. 7), the lid is not quite closed. A torsional spring 19 is wound around spindle 11 and it bears through the ends of its substantially rectilinear branches on the one hand against spindle 8, and on the other hand against the top of sleeve 12, in such manner as to tend constantly to move spindle 8 away

from spindle 5, or in other words, to increase the angle α of lines 5—11 and 11—8 (Figs. 6 to 8).

If, on the views of Figs 6 to 8, we trace triangles 5—11—8 and 5—6—8, it is clear that, in view of the proportions chosen, each of these two triangles has two sides of constant length and that the variable side is common to both of these triangles. It follows that if, side 5—6 remaining fixed, the angle β made with said side by side 6—8 is varied (that is to say if lid 7 is caused to pivot about hinge 6), the length of the side 5—8 of triangle 5—6—8 varies in the same manner as the absolute value of angle β . Now, in triangle 5—11—8, side 5—8 also varies, for the same reason, in the same manner as the absolute magnitude of angle α . Therefore, angle α is minimum when β is also minimum in absolute value, that is to say equal to zero, which corresponds to the neutral position of Fig. 7. The V-shaped spring 19, which tends to increase α , therefore tends to increase β either in one direction or in the opposite one, that is to say either to apply lid 7 against the body of the lighter (Fig. 6) or to move it violently away from it (Fig. 8).

The operation of a lighter made as above described is therefore extremely simple. Lid 7 being closed, that is to say applied by spring 19 against casing 1 (Figs. 3 and 6) it is caused to pivot manually through an angle slightly greater than the small value of angle β in Fig. 6, so as to cause it to move slightly beyond the neutral position shown by Fig. 7. Then it is left to itself. Its opening movement is suddenly complete under the action of spring 19, which produces a quick and violent pivoting of connecting rod 10, therefore of friction wheel 4 about axis 5. The lighter is ignited. In order to close it, lid 7 is pivoted manually in the opposite direction, until it has moved past the neutral position of Fig. 7, after which its closing is automatically completed. Friction wheel 4 does not turn in the course of this last mentioned movement because in this direction it is not driven by the pawl 15 of sleeve 12.

From a constructive point of view, the lighter made as above described has the following advantage, which is particularly advantageous when the casing and the lid are made of precious matter or are delicately ornamented: the whole of the mechanism can be assembled separately and fitted easily and rapidly in the casing by mere engagement of the two spindles 5 and 8 above mentioned.

However, it is clear that, without departing from the principle of the present invention, the arrangement, disposition

and shape of the parts may be modified. For instance, the compass constituted by rigid branches 9 and 10, which is associated with torsional spring 19 might be
 5 dispensed with and in this case, the ends of this spring might be one wound and pivoted about spindle 8 and the other fixed to sleeve 12, by engagement in a corresponding recess, welding or in any other
 10 way. Spring 19 might also be pivoted to any fixed point of the casing different from the axis of the friction wheel.

In the modifications of Fig. 10, the edge of piece 9 is articulated on spindle 8
 15 through a notch 9a the periphery of which is in contact with spindle 8 over a portion of said periphery owing to the action of spring 19, which bears at its end upon said branch 9. Spindle 8 is rigid with the lid
 20 and does not extend therethrough.

This last mentioned arrangement has the advantage of facilitating the fitting of the mechanism in the lid.

The embodiment of the invention shown
 25 by Figs. 11 to 14 differs from the preceding embodiments by the construction of the driving pawl which actuates friction wheel 4 and by the means for stopping the lid in the opened position.

30 Simultaneously with the branch 10 of the compass, a thin plate of spring steel 20, having substantially the shape of a disc, can turn about spindle 5. It is mounted between branch 10 and the
 35 toothed face of friction wheel 4 and it is made rigid with arm 10 for instance by riveting a prolonged portion 21 thereof to said arm. Plate 20 is notched at its periphery in such manner as to constitute a
 40 tongue 22 which is curved toward friction wheel 4.

When, in the course of the opening of lid 7, the branch 10 of the compass pivots about spindle 5, it
 45 drives small plate 20 together with it, since said plate is rigidly fixed to said arm 10 of the compass. Said plate in turn drives friction wheel 4 through tongue 22, which acts as a pawl by engaging
 50 between the teeth of said friction wheel.

Arm 10 is prolonged, at right angles thereto, beyond pivot 11, by a nose 23, which limits the opening of lid 7 by coming into contact with an abutment constituted by a part rigid with the lid, for instance spindle 8. This arrangement has the advantage of being very strong, especially as a consequence of the fact that
 55 hinge 6 is efficiently protected against the shock produced when nose 23 comes into contact with the corresponding abutment.

In a general manner, while we have, in the above description, disclosed what
 65 we deem to be efficient and practical em-

bodiments of the present invention, it should be well understood that we do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without
 70 departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

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

1. An automatic lighter including a casing forming a reservoir for the fuel and containing the wick and the flint, and a lid pivoted to said casing by means of a hinge, characterized by the provision of a torsional V-shaped or U-shaped spring adapted both to keep the lid in the closed
 85 position and violently to finish its opening movement once it has been started manually.

2. A lighter according to claim 1, further characterised by the fact that the torsional spring is pivoted on the one hand about a spindle rigid with the casing and on the other hand about a spindle fixed to the lid, these two spindles being parallel to the hinge and disposed in such manner
 95 that, when the lid is being opened, the spindle fixed thereto passes from one side to the other of the plane determined by the hinge and the spindle fixed to the casing.

3. A lighter according to claim 2, further characterized by the fact that the friction wheel is freely rotatable on the spindle rigid with the casing, which acts as a pivot for one end of the torsional
 100 spring.

4. A lighter according to claim 3, further characterized by the fact that the end of the torsional spring which is pivoted about the spindle of the friction
 110 wheel drives the friction wheel, when pivoting about said spindle, through a pawl which engages the friction wheel when the lid is being opened but from which said friction wheel escapes when
 115 the lid is being closed.

5. A lighter according to any of claims 1 to 4, further characterized by the fact that the branches of the torsional spring are associated with, or replaced by, the
 120 rigid branches of a compass, the spring in question being wound about the pivoting axis of this compass.

6. A lighter according to any of claims 4 and 5, further characterized by the fact that the friction wheel is driven by a sleeve rigid with the end of one of the branches of the spring or of the compass and freely rotatable on the spindle of the
 125 friction wheel.

7. A lighter according to any of claim 4 to 6, further characterized by the fact that the pawl of claim 4 is housed in the sleeve of claim 6.
- 5 8. A lighter according to either of claims 4 and 5, further characterized by the fact that the pawl for driving the friction wheel is constituted by a thin plate with an elastic tongue, which is fixed to the branch of the compass pivoted to the spindle of the friction wheel and is mounted on said spindle between said branch and the front toothed surface of the friction wheel.
- 10 9. A lighter according to any of claims 1 to 8, further characterized by the fact that the opening movement of the lid is limited by the fact that a piece rigid with the lid, for instance the pivot of the corresponding branch of the compass comes into contact with a prolonged part of the other branch extending beyond the axis of articulation of the two branches with each other.
- 15 10. A lighter according to any of claims 1 to 9, further characterized by the fact that the whole of the mechanism is housed inside the lid when the latter is closed.
11. A lighter according to any of claims 1 to 10, further characterized by the fact that, when it is closed, the lid can form with the casing a single block without any projection or hollow.
12. A lighter according to any of claims 1 to 11, further characterized by the fact that, the whole of the mechanism being assembled separately, it can be fitted to the casing and to its lid by mere engagement of the two spindles about which are pivoted the ends of the spring and/or of the compass.
13. A lighter substantially as above described and illustrated by the appended drawings.
- 30 35 40 45

Dated this 24th day of November, 1937.
 MEWBURN, ELLIS & CO.,
 70 & 72, Chancery Lane, London, W.C.2,
 Chartered Patent Agents.

Fig:6

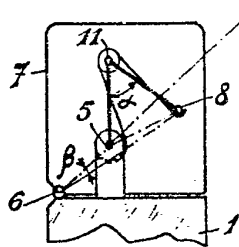


Fig:7

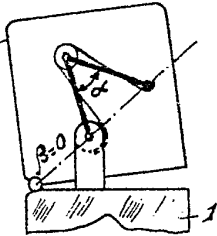


Fig:8

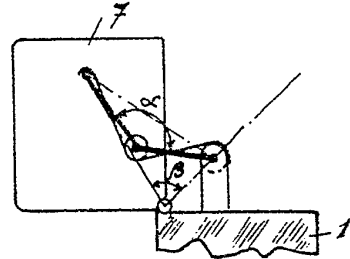


Fig:1

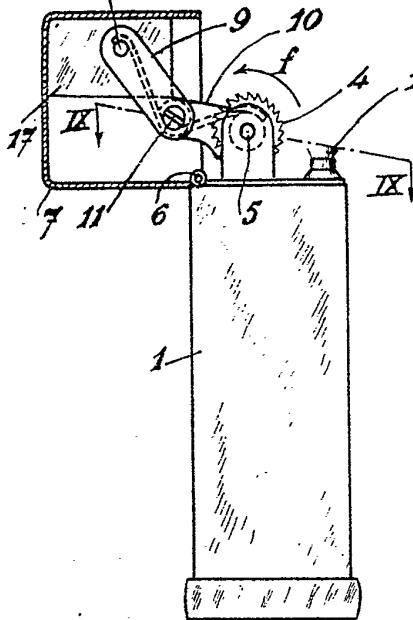


Fig:2

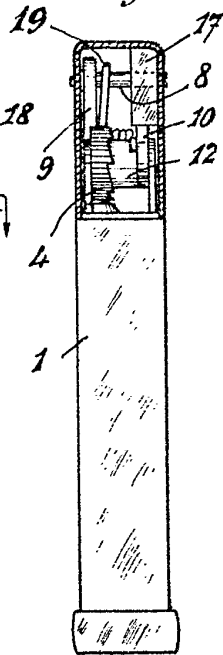


Fig:3

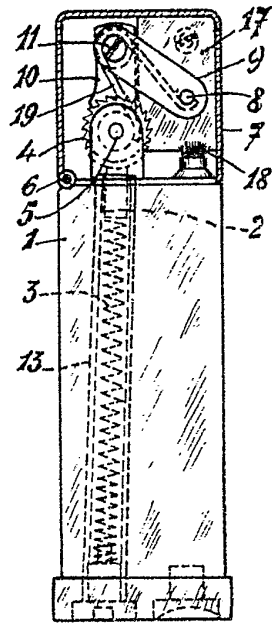


Fig:4

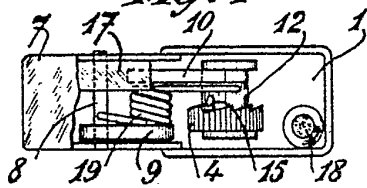


Fig:5

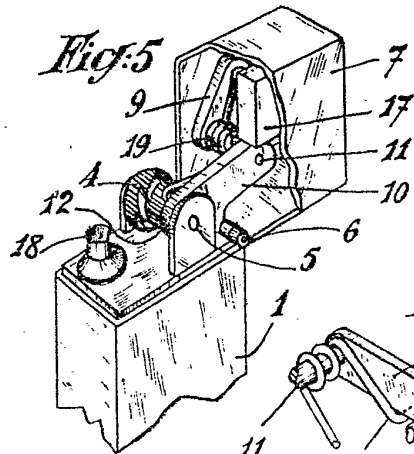


Fig:9

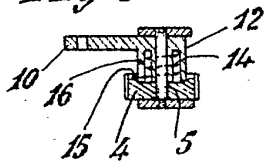
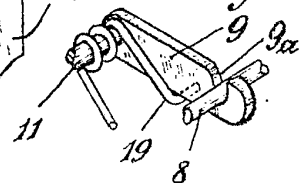


Fig:10



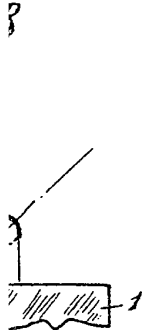
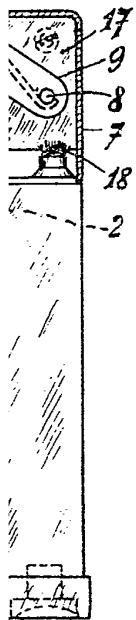


Fig. 3



- 7
- 17
- 11
- 10

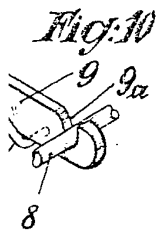


Fig. 10

Fig. 11

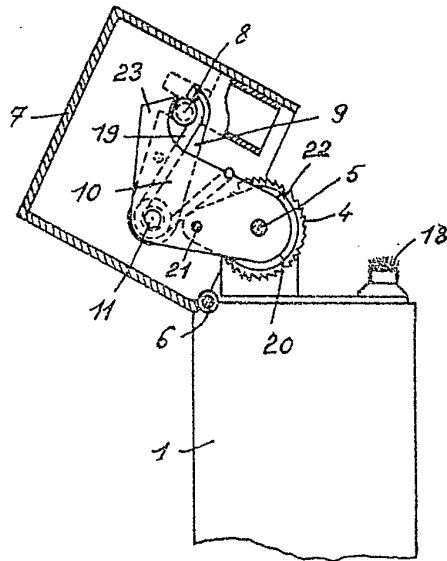


Fig. 12

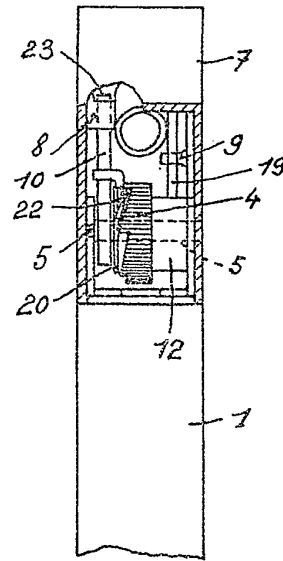


Fig. 13

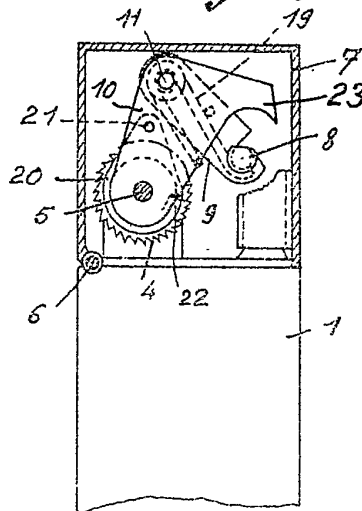


Fig. 14

