

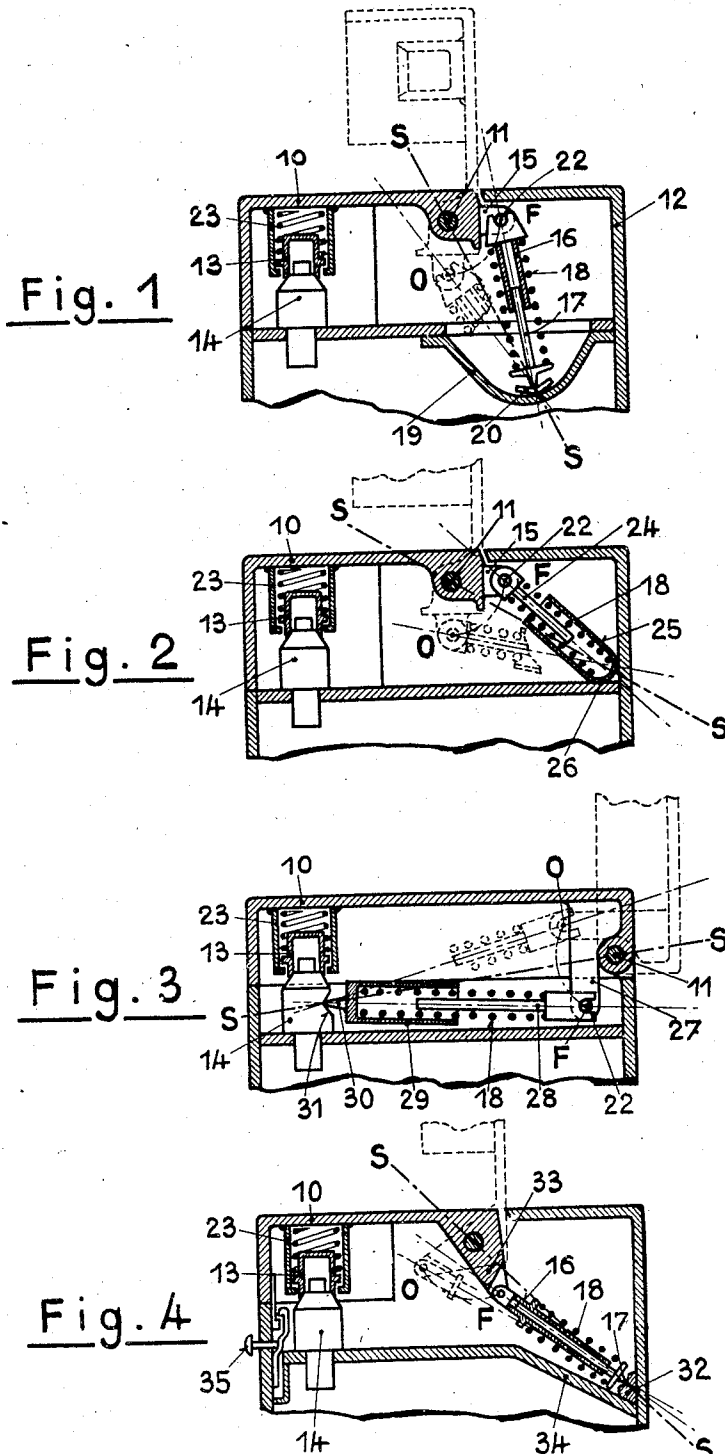
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PYROPHORIC LIGHTER

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## UNITED STATES PATENT OFFICE

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## PYROPHORIC LIGHTER

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In a pyrophoric lighter, the wick cap, that is to say the member which ensures the fluid-tight closure of the wick-carrying tube, is generally mounted, with or without freedom of movement, on a lever or in a pivoted cover subjected to the action of a spring adapted to hold this lever or cover in one or other of the extreme positions of use or even in each of these positions at different times. The spring which is a blade or coiled spring, frequently has a position which is fixed relatively to the container of the lighter and its action is applied to a heel secured to the pivoted lever. The movement of this heel in front of the stationary spring therefore sets up friction and consequently wear, which latter is the greater the shorter and less flexible the spring. When it is desired simply to reduce the size of the spring or in a lighter with an automatic cover to ensure greater freedom of movement of the cover, it is always desirable to reduce the friction as much as possible.

The present invention has for its subject a device which enables this friction and the wear to be reduced to a considerable extent by the use of a short and strong spring which is necessary when it is desired to effect an energetic closure of the cap.

This device is formed by a telescopic rod comprising two sliding parts which bear respectively against the ends of a compression spring and serve to guide the same, one of the parts resting against a stationary portion of the lighter while the other rests against a portion of the cover to be actuated.

Four forms of construction of the subject of the invention are shown diagrammatically by way of example in the accompanying drawing, wherein:

Figs. 1, 2, 3 and 4 are sectional elevations of these four different forms of construction.

Referring to Fig. 1 the cover 10 of the lighter is hinged at 11 to the body 12 and itself carries the cap 13 for closing the wick-carrying tube 14, the cap 13 being subjected to the action of a spring 23.

The cover 10 is provided with an arm 15 on the end of which there is hinged at 22 a part 16 of a telescopic guide for a coiled spring 18, the other part 17 of this guide being provided at its end with a knife edge bearing against the wall of a seating 19 of the body 12 through the medium of a small member 20 resting on this wall. The spring surrounds the parts 16, 17 of its guide.

In the drawing the open position O of the cover has been shown in broken lines, together with the corresponding position of the spring 18. In

this position the arm 15 bears against a transverse member 21 of the body 12. As will be seen, for passing from the closed position F, indicated in full lines to the closed position, the spring 18 with its guide 16, 17, oscillates from opposite sides of the dead center position located along the plane S passing through the hinge 11 of the cover 10 and the end of the knife edge of the guide part 17. It will be seen that the arc traversed by the hinge 22 of the arm 15, from the plane S to the position F, is considerably larger than that traversed by the hinge from the plane S to the position O. It will also be seen that in the position F the spring 18 acts substantially in the same direction as the initial displacement of arm 15 from closed position, that is to say with the maximum force, which enables an absolutely fluid-tight closure of the cap 13 on the wick-carrying tube 14 to be obtained.

In the form of construction shown in Fig. 2, the guide for the spring 18 is formed by a rod 24 hinged at 22 to the lever 15 of the cover, and by a small tube 25 which is rounded at its end 26 and engages with the corner formed between the wall of the body 12 and the fuel container. The rod 24 enters the spring 18, and the tube 25 surrounds the latter.

The operation is the same as in the preceding example but by reason of its position in the body 12 the action of the spring is less advantageous in the position F than in the first form of construction.

In the form of construction shown in Fig. 3, the cover 10 carries an arm 27 to the end of which there is hinged at 22 a rod 28 constituting with a small tube 29 a telescopic guide for the coiled spring 18. The rod 28 enters the spring 18 and the tube 29 surrounds the latter.

The tube 29 is provided at its end with a knife edge 30 resting in a corresponding angular sharp-edged seating 21 of the wick-carrying tube 14.

This form of construction operates in the same manner as the first with the maximum force of the spring 18 in the closing position F.

The form of construction shown in Fig. 4 is adapted to ensure the automatic opening of the cover and if necessary simultaneously entraining the friction wheel.

The rod is formed as in the first form of construction by two parts 16 and 17 sliding one within the other and around which is located the spring 18. The part 17 bears by its knife edge against a member 32 secured to the body 12 of the lighter. The other part 16 is hinged to an arm 33 of the cover 10 located in such a

manner that the spring 18 of the rod is approximately compressed to the maximum amount when the cover is closed (position F). For giving the spring a sufficient length and ensuring an advantageous position for the rod, the upper wall 34 of the container of the lighter is slightly inclined at the rear portion thereof. When releasing the cover 10, by pressing the knob 35, the spring 18 expands up to the position O where the cover is stopped by meeting the body 12. It will be seen that in this form of construction the swinging displacement of the rod always takes place on the same side of the plane S—S.

It will be understood that modifications may be made in the details of the devices described without departing from the scope of the invention. Thus for example in Fig. 2 the end of the tube 25 instead of being rounded may be provided with a knife edge.

The rod may also be formed by two tubular members sliding one within the other and containing the spring, these members being provided with rounded ends or with a sharp edge.

I claim:

1. A pyrophoric lighter comprising a container including a body formed with a recess at its upper end, a wick carrying tube mounted in the said recess and having a triangular sharp-edged notch in the side thereof, a cover hinged to the body at the upper edge of said recess for pivotal movement toward and from the body alternately to cover and uncover said recess therein, an arm carried by the cover adjacent its point of pivotal connection with the body and extending downwardly into said recess of the body, and means arranged between said wick tube and the lower end of said arm carried by the cover for tensioning the latter, said means comprising a pair of telescopically related members compressing a spring therebetween, one of said members having a pivotal engagement with the lower end of said arm carried by the cover and the other of said members having a knife edge for engaging with said notch in the wick tube.

2. A pyrophoric lighter comprising a container having a body provided with a recess at its upper end, a wick tube within the recess, a cover hinged to the body at one end of said recess and adapted to be moved into and out of closing relation to said recess, and spring means for holding said cover in its fully open or fully closed position, said means including an arm carried by

the cover and projecting into the recess when the cover is closed, and a pair of spring tensioned telescopic members normally arranged parallel to the bottom of the recess of the body when the cover is closed and disposed between said wick tube and the lower end of said arm.

3. In a pyrophoric lighter, a body portion, a cover for said body portion, a wick tube projecting upward from said body portion near one side thereof toward said cover, pivot means for pivotally mounting said cover on said body portion on the other side thereof, an arm fixedly carried by said cover adjacent said pivot means, the portion of said wick tube above said body portion being provided on its side toward said pivot means with a triangular recess having a sharp internal edge substantially parallel to the axis of said pivot means, and a resilient telescopic unit comprising a pair of mutually penetrable telescopic elements and a helical spring mutually engageable therewith, one of said elements being pivotally mounted on said arm, and the other of said elements being provided with a terminal knife edge and mounted with said knife edge received within said recess, whereby movement of said cover about said pivot means is subjected to accelerating resilient toggle action.

4. In a pyrophoric lighter, a body portion, a cover for said body portion, a wick tube projecting upward from said body portion near one side thereof toward said cover, pivot means for pivotally mounting said cover on said body portion on the other side thereof, an arm fixedly carried by said cover adjacent said pivot means, the portion of said wick tube above said body portion being provided on its side toward said pivot means with a triangular recess having a sharp internal edge substantially parallel to the axis of said pivot means, and a resilient telescopic unit comprising a sleeve, a helical spring received and mounted within said sleeve, and a rod positioned within said helical spring, said rod being pivotally mounted on said arm, said sleeve being provided with a terminal knife edge and mounted with said knife edge received within said recess, whereby movement of said cover about said pivot means causes confined linear expansion and contraction of said helical spring and imparts resilient toggle acceleration to said cover as it moves.

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