Sept. 2, 1947. A. H. ARONSON 2,426,853

LIGHTER

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Fig. 1.

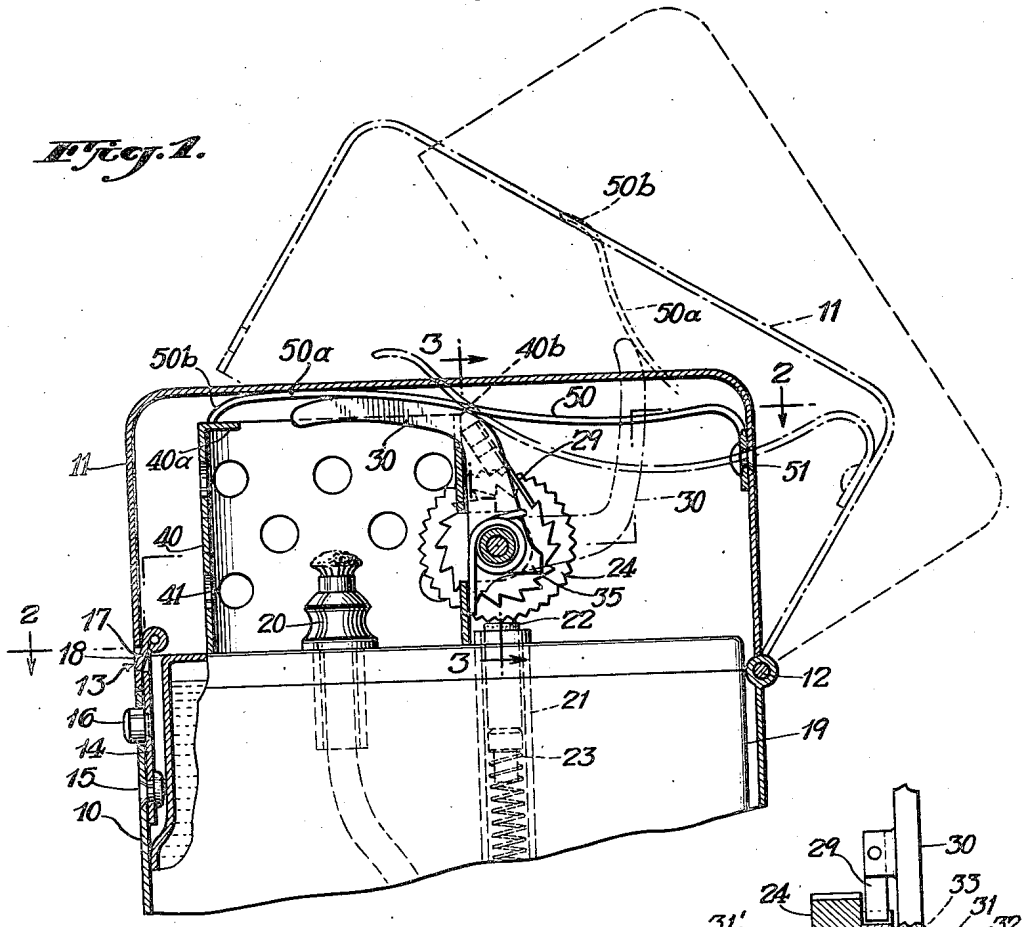

Fig. 3.

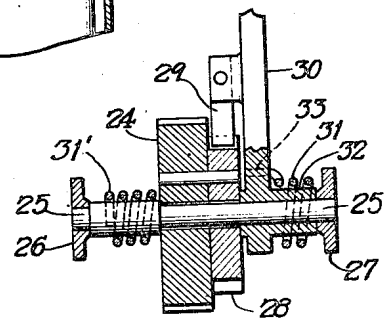

Fig. 2.

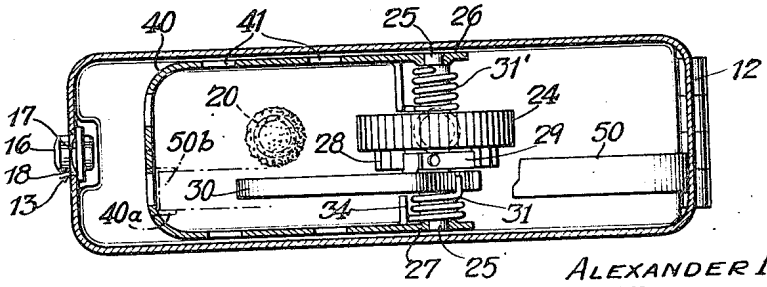

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Fig. 4.

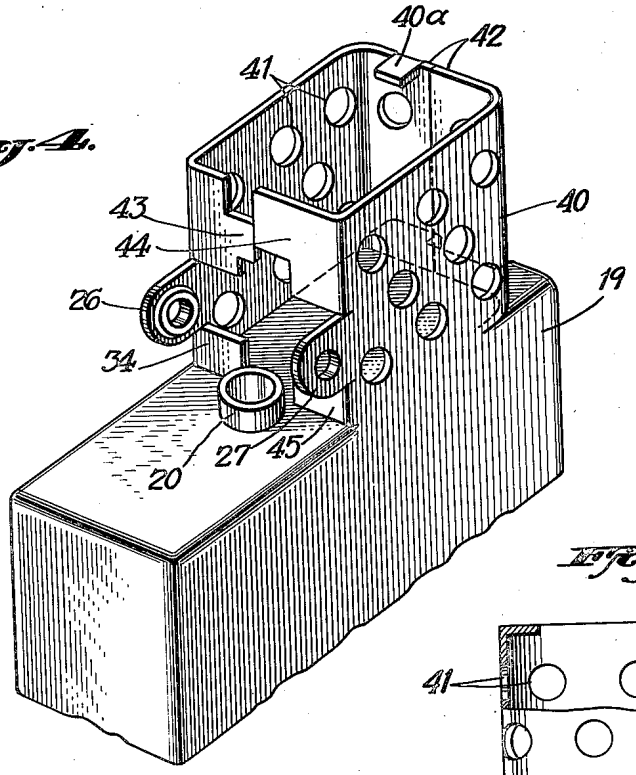


Fig. 6.

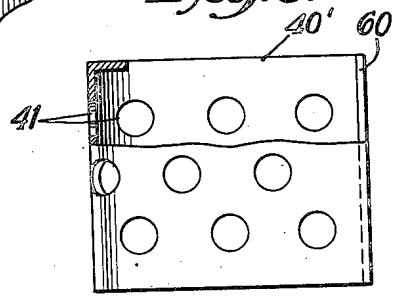


Fig. 5.

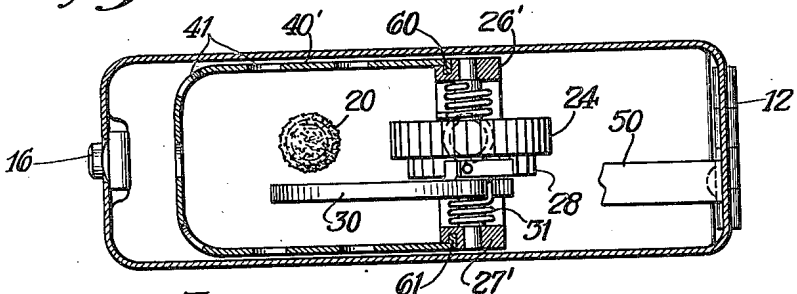
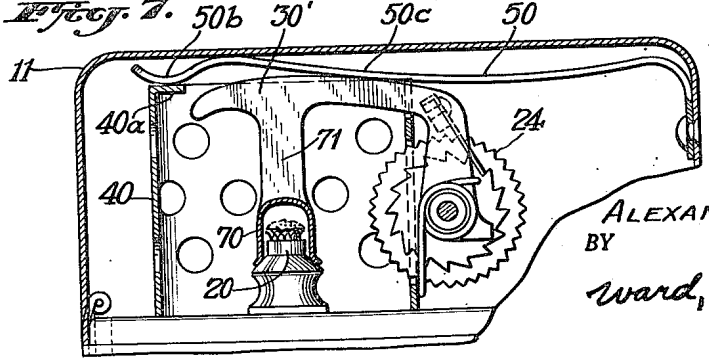


Fig. 7.



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UNITED STATES PATENT OFFICE

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LIGHTER

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Application April 18, 1944, Serial No. 531,563

5 Claims. (Cl. 67—7.1)

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This invention relates to improved cigar or cigarette lighter constructions and the like.

The invention is particularly adapted for use with pyrophoric lighters of the type having a fuel receptacle and wick accompanied by abradant wheel means, the wheel upon release of a spring, being adapted to abrade a piece of sparking metal to cause a shower of sparks to ignite the wick, the entire assembly being contained in a receptacle having a hinged cover held closed by a catch, and so arranged that when the catch is released, the cover is thrown open, accompanied by automatic actuation of the lighter, and the parts being restored to normal position ready for reuse when the cover is closed.

I am aware that various lighters of this general type have heretofore been devised, but many of these have been so cumbersome or uncertain in operation, or expensive, as to prove impractical in use, and the few types of this general type which have gone into some use, have a number of serious disadvantages. In most cases attempts have been made to use a single spring means for throwing open the cover and for at the same time operating the spark-producing mechanism. In that case, in order to operate the mechanism with sufficient abruptness to insure a satisfactory shower of sparks and to overcome any sticking of the abradant wheel, the spring must be very strong and sufficient at the same time to overcome the initial inertia in moving the cover. Yet with a spring strong enough to accomplish these purposes simultaneously, the cover will be thrown back so abruptly as to be unpleasant to the user and may rap the user's fingers, and cause bending or rapid wear of the cover hinge and other parts. Efforts to avoid these difficulties have in general resulted in structures which are too complicated for dependable, certain operation in practice, or too expensive to construct or assemble for ready popular sale.

In accordance with the present invention, I avoid the above noted difficulties with a simple, inexpensive and durable construction which is easy to assemble and convenient in use. According to a preferred form of the invention, a spring operated sparking wheel lighter mechanism is provided, which upon release of the cover, is made free to actuate with the full force of its spring without first overcoming the inertia of the cover. The latter function is accomplished by a separate spring which causes the cover to snap upward from its closed position upon releasing of the catch, thus leaving the lighter mechanism substantially free to operate under the force of its spring without substantial hindrance by the cover. At the same time, the spring which initially raises the cover, is so constructed and arranged that its force is largely spent as soon as the cover is partially raised, so that the final opening movements of the cover are largely due to its inertia, supplemented to a slight degree by the action of the lighter mechanism. Thus the cover does not fly back with such force as to tend to bend or break the hinge as in some previous lighters of this class, and if the cover in its final movements should hit the user's fingers, it would not do so with sufficient force as to be unpleasant or cause injury.

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Various further and more specific objects, features and advantages of the invention will appear from the description given below taken in connection with the accompanying drawings illustrating by way of example preferred forms of the invention. The invention consists in such novel features and combinations as may be shown and described in connection with the apparatus herein disclosed.

In the drawings:

Fig. 1 is a vertical sectional view of the upper portion of a preferred form of lighter embodying the invention;

Fig. 2 is a sectional view taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken substantially along line 3—3 of Fig. 1;

Fig. 4 is a perspective view of a modification of the invention illustrated in Fig. 1 showing a preferred form of windshield construction and associated parts for the lighter;

Fig. 5 is a sectional view corresponding to Fig. 2, but illustrating an alternative embodiment of the lighter having a removable windshield;

Fig. 6 is a side view of the windshield after removal; and

Fig. 7 illustrates portions of another embodiment.

Referring now more particularly to Figs. 1–3, the lighter as shown may comprise a casing 10 having a cover 11 hinged on one side as at 12 and provided with a releasable catch means 13 at the opposite side. This catch means may comprise a leaf spring member 14 riveted as at 15 to the inside of the casing and formed with a finger button 16 extending through an aperture in the wall of the casing. A portion of the upper end of the spring member 14 may be curled around and formed with a hook portion 17 adapted to be releasably received in a cavity formed

in the edge of the cover by striking out a small portion of the metal 18.

The internal parts of the lighter may include a fuel receptacle 19 slidably received if desired within the casing 10 and provided with the conventional form of wick means as at 20, and a tube 21 for receiving a piece of pyrophoric sparking metal as at 22 which is retained as by a spring 23 within the tube, under pressure against an abradant wheel 24.

As best shown in Fig. 3, the abradant wheel 24 may be rotatable upon a reduced portion of a rotatable shaft 25, which shaft is supported for rotation in lug members as at 26, 27 formed in a manner which will be hereinafter described. The abradant wheel 24 may be fixed with respect to a ratchet wheel 28 adapted to be engaged by a spring pawl 29, the latter in turn being secured to an operating arm member 30 which is mounted on shaft 25 and is fixed to oscillate with said shaft. A helical spring 31 is positioned to embrace a collar portion 32 forming a part of the member 30. One end of the spring 31 is fixed as at 33 within an aperture in the member 30, whereas the other end of the spring may be similarly fixed in or pressed against a stationary lug as at 34 struck up from the same metal as the bearing lug 27 (Fig. 2). The spring is initially put under tension in a direction such that it will normally tend to rotate the member 30 from the full line position as shown in Fig. 1, toward the position shown in dotted lines. A supplemental spring 31' may be supplied if desired, at the other end of the shaft. The member 30 may be formed with a stop portion 35 (Fig. 1), adapted to engage lug 34 when the member 30 has reached the dotted line position as shown in Fig. 1. It will be apparent that the arm member 30 in moving from the full line position to the dotted line position, will by reason of the ratchet and pawl connection, cause the abradant wheel 24 to be rotated through an arc of about 90° in the proper direction for causing a shower of sparks from the sparking metal 22 to be projected onto the wick 20 for igniting the latter. Also, when the lever member 30 is moved from the dotted line position back to the full line position, as shown in Fig. 1, due to the action of the ratchet and pawl, the abradant wheel will not be turned in the reverse direction, although the springs 31, 31' will be retensioned ready for the next operation of the lighter.

As shown in Figs. 1 and 2, the area about the wick 20 is preferably surrounded by a windshield portion 40 formed with numerous perforations as at 41 for allowing air for combustion purposes to enter the space around the wick. A preferred form of construction for the windshield 40 is shown in further detail in Fig. 4. In this form it will be noted that the windshield portions are formed integral with sheet metal side walls of the fuel receptacle 19, the side walls being in part simply continued on up to the desired height of the windshield, and portions as at 42 being then bent around so as to meet and form one end wall of the windshield. Other portions may be bent around as at 43, 44 and 45 to form the other end wall of the windshield with suitable areas cut out for clearance with respect to the operating parts above described. The bearing lugs 26, 27 as shown in Fig. 4 may also comprise integral portions of the side walls of the windshield, as may also the lug portion 34 above mentioned for retaining one end of spring 31.

As best shown in Fig. 1, a leaf spring member

50 is provided with one end fixed as by a rivet 51 at a point within the hinged side of the cover preferably on the inside of the end wall of the latter. This spring, as shown in various positions by dotted lines in Fig. 1, is shaped to normally assume a downwardly bowed position and with upwardly directed free end portions as at 50*a*, terminating in a slightly downwardly curled tip portion 50*b*.

It will be noted that when the cover of the lighter is closed, the free end portions 50*a* are generally flattened under compression against the top of the windshield 40 and against an inside top portion of the cover. The downwardly curled tip portion 50*b* is designed to then engage a lug 40*a*, struck inwardly from the top edge of the windshield. At the same time, the middle portion of the spring 50 may press against the top edge of the windshield at 40*b* (Fig. 1). In this position the operating lever 30 is also adapted to bear against the under side of the spring 50 as shown in Fig. 1. Then upon release of the cover, the free end portions 50*a* of the spring 50 at first tend to abruptly assume their normally bowed position with the result that the cover, although it may have considerable inertia against being opened, quite abruptly will be first thrust upwardly on its way toward open position. The force of the spring for this initial thrust may be largely applied against the top of the windshield at portions 40*a* and 40*b*. This will render the lighter operating lever member 30 promptly free of any substantial restraining action by the cover and thus allow the mechanism to be operated by the action of spring 31 without being retarded by any inertia effects. Hence the spring 31 will cause the abradant wheel to quickly snap through an angle of about 90°, insuring effective sparking action. Throughout this movement, if the operating lever 30 is restrained at all by the cover assembly, such restraint will be limited to such slight pressure as may be applied by spring 50 in its substantially untensioned normal position.

The force of the spring 50 in imparting its opening thrust to the cover, may be readily adjusted at any time by bending the spring 50 downwardly or upwardly with respect to its fixed end.

After the lighter has been used, the cover may be manually closed, the spring catch then automatically engaging to retain the parts in closed position. During the closing of the cover, it will be apparent that operating lever member 30 will be engaged quite resiliently, particularly during the initial closing movements, by the spring 50, so that not much closing pressure need be applied until the final closing movements, at which time the cover and body of the lighter may be readily gripped more firmly for tensioning of the spring 31 and the general flattening of the spring 50.

The construction thus affords an abrupt snap action for the lighter mechanism when the catch is released to open the cover, and since the inertia of the cover is initially overcome by a spring independent of the lighter mechanism spring, the latter is free to perform its functions unhampered. Upon closing the movement, a free, smooth closing action is made possible, initially with a quite easy movement and until the cover is in a position to be firmly grasped; the tensioning of the springs being largely accomplished when the cover is being brought to its final closing position, at which time a firm grip thereon is facilitated.

In lighters of this class, if same are provided

with a fixed windshield surrounding the wick area, the wick tube is thereby rendered inaccessible for convenient replacement or adjustment of the wick. Accordingly, it is desirable to provide a removable windshield construction. Such a form of construction is shown in Fig. 5 where the windshield 40' is formed with inturned flanges as at 60, 61, adapted to slidably engage corresponding grooves formed in bearing members 26', 27'. In this case these bearing members may be mounted directly upon the fuel receptacle instead of being integral with the windshield as in the previous form. With the construction of Fig. 5, when it is desired to adjust the wick or to renew the same, the windshield 40' may be readily removed merely by sliding same upwardly. This will also afford convenient access to the areas around and beneath the abradant and ratchet wheels, thereby greatly facilitating cleaning of the mechanism when necessary. In other respects the embodiment of the invention shown in Fig. 5 may be similar, as to construction and operation, to the form shown in Fig. 1.

In the form of the invention shown in Fig. 7, the wick 20 may be provided with a snuffer cap 70 carried by branch arm portion 71, the latter in turn being integrally formed with the lighter operating arm member 30' which is also adapted to be engaged by the spring 50 within the cover, as in the case of Fig. 1. Here the spring 50, instead of being adapted to engage a part of the windshield as at 40b (as in Fig. 1), may be so shaped that when the cover is closed, it will resiliently engage lever arm 30' at 50c, as well as engaging windshield lug 40a at the outer tip 50b. This arrangement affords a convenient means for carrying a snuffer cap in such manner as to positively seal the wick when the cover is closed, and thus prevent evaporation of fuel, the spring engagement at 50c serving to resiliently urge the snuffer cap down in tight sealing relationship with the wick tube. While in prior lighter constructions of this general class with spring-operated covers, it has been well known to provide a snuffer cap attached to a lever which operates the lighter mechanism, in all such cases so far as I am aware, the spring action has been in a direction tending to slightly withdraw the snuffer from the wick when the cover is closed, so that no true sealing action is afforded. With the construction of Fig. 7, however, it will be apparent that the spring 50, when the cover is closed, acts to positively hold the snuffer down in sealing relationship to the wick, as well as performing a second function of initially thrusting the cover toward open position upon release of the cover catch.

While the invention has been described in detail with respect to particular preferred examples, it will be understood by those skilled in the art after understanding the invention, that various changes and further modifications may be made without departing from the spirit and scope of the invention, and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. A lighter comprising in combination, a casing having a cover hinged at one side, a releasable catch at the opposite side of the cover, a spring element fixed at a point within the hinged side of the cover and extending along space within the cover toward the catch side thereof, said spring being shaped to normally assume a downwardly bowed position when the cover is open, said spring also having an upwardly directed free end, means comprising a windshield structure within the lighter for engaging said spring when the cover is closed and for generally flattening under compression the portions of said spring adjacent said free end with respect to inside top portions in the cover, whereby upon release of the catch, the cover is thrown toward open position by the compressed spring portions acting against the windshield structure, and spring operated pyrophoric lighting means releasable for operation upon such opening movement of the cover.

2. A lighter comprising in combination, a casing having a cover hinged at one side, a releasable catch at the opposite side of the cover, a spring element fixed at a point within the hinged side of the cover and extending along space within the cover toward the catch side thereof, said spring having a middle portion shaped to normally assume a downwardly bowed position when the cover is open and having a free end, and means within the lighter for engaging said spring when the cover is closed and for causing said bowed portion to be deflected toward inside top portions in the cover, whereby upon release of the catch, the cover is thrown toward open position by the spring, said latter means including an operating arm for a lighting mechanism, and pyrophoric lighting means including an operating spring therefor controlled by said arm and releasable for operation upon release of said catch.

3. A lighter comprising in combination, a casing having a cover hinged at one side, a releasable catch at the opposite side of the cover, an elongated spring element fixed at one point within the cover and extending along space within the cover, said spring having a portion shaped to normally assume a downwardly directed position, means in fixed position within the lighter for engaging said spring when the cover is closed and for pressing said portion upwardly toward inside top portions of the cover, whereby upon release of the catch, the cover is thrown toward open position by the spring, and pyrophoric lighting means including an operating spring therefor releasable for free operation upon such opening movement of the cover by said first named spring.

4. A lighter comprising in combination, a casing having a cover hinged at one side, a releasable catch at the opposite side of the cover, a leaf spring element fixed at one point within the cover and extending along space within the cover, said spring having a portion shaped to normally assume a downwardly directed position, means including parts of a windshield structure within the lighter for engaging said spring when the cover is closed and for pressing said portion upwardly toward inside top portions of the cover, whereby upon release of the catch, the cover is thrown toward open position by the spring, and pyrophoric lighting means including an operating spring therefor releasable for operation upon such opening movement of the cover by said first named spring.

5. A lighter construction comprising in combination, a fuel receptacle, pyrophoric lighting means thereon, a spring for operating same, a lever arm member constructed and arranged to be depressed to tension the spring in preparation for operating the lighter, a hinged cover, another spring fixed in said cover and having a portion constructed and arranged to slidably engage such lever arm to yieldably depress same upon closing

the cover and to release same to permit actuation of the lighting means, upon opening of the cover, and a snuffer cap carried by said lever arm, said last-named spring being shaped and positioned to resiliently urge said arm downwardly when the cover is closed and to thereby urge said snuffer cap as carried by said arm downwardly in sealing relationship to wick means.

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