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I. DORFMAN

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LIGHTER

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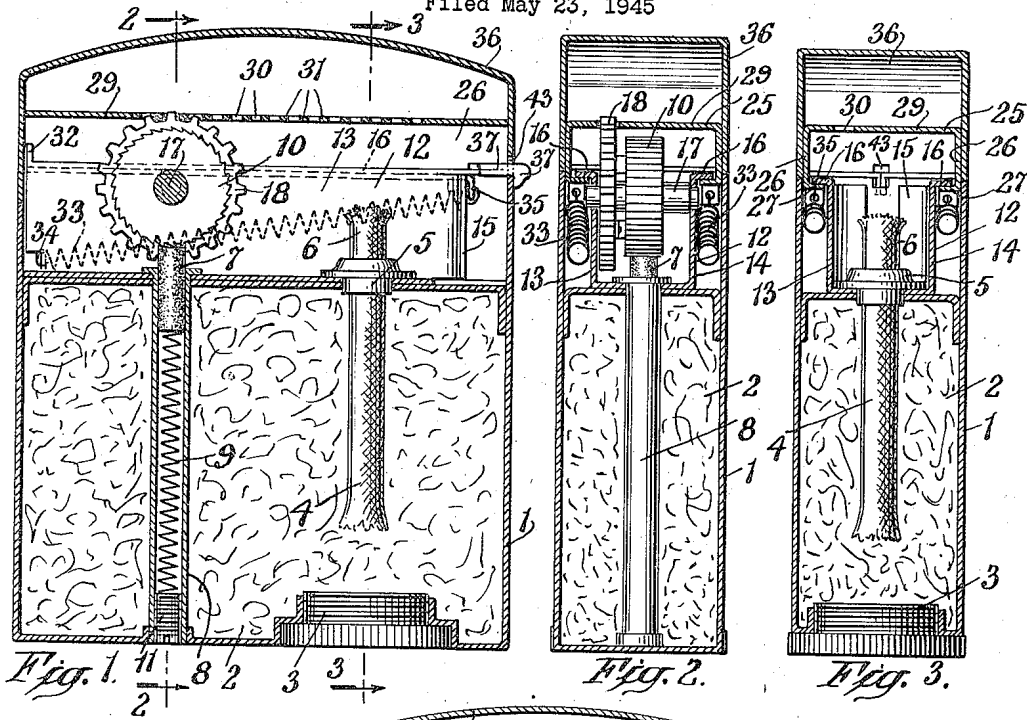


Fig. 1.

Fig. 2.

Fig. 3.

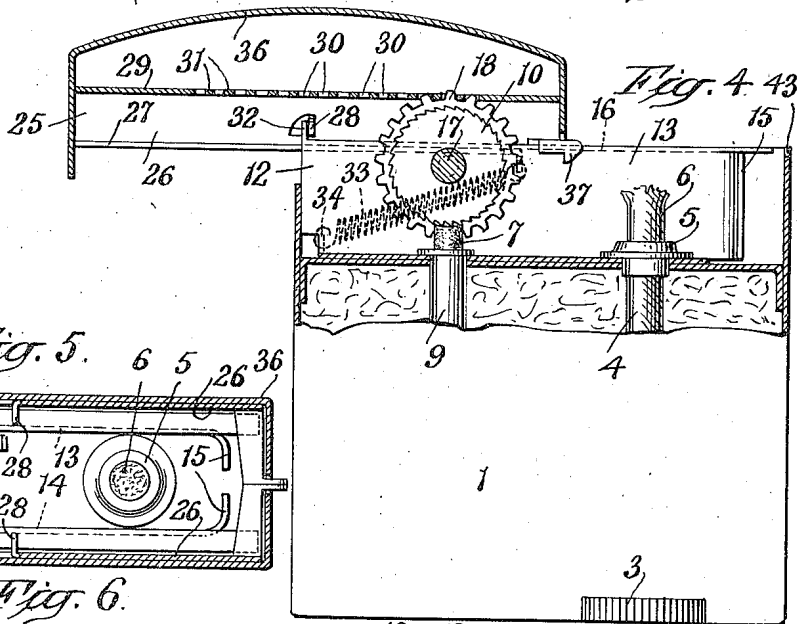


Fig. 4.

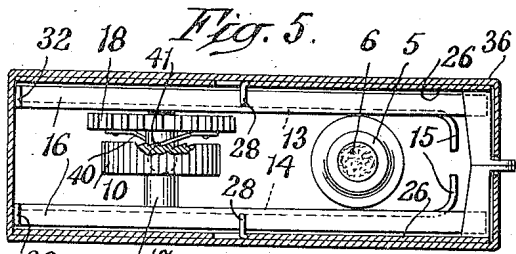
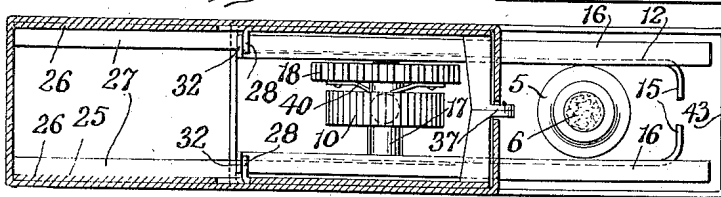


Fig. 5.

Fig. 6.



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## UNITED STATES PATENT OFFICE

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LIGHTER

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2 Claims. (Cl. 67-7.1)

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This invention relates to pyrophoric lighters, such as are used for lighting cigars and cigarettes, and has for its primary object the provision of a device of this character which will be of simple and effective construction capable of long and hard usage.

In many lighters in this general class, a number of deficiencies are present. Primary among such deficiencies is the inability of the so-called "automatic" or semi-automatic lighting means to rotate the striking wheel to a sufficient degree to insure certain ignition each time that the device is operated. The result is that many of these lighters are required to be actuated a number of times before they will light.

A second deficiency found in many lighters is the exposure of one or more of the operating parts of the structure to the flame, with the result that deterioration and destruction of the parts occurs prematurely through contact of such parts repeatedly with the flame, rather than by frictional wear. This is particularly true of springs used in these lighters or other tempered elements which, because of their locations, are often more or less in the path of the flame and thus soon lose their temper and become ineffective, if not altogether inoperative.

An object therefore, of the present invention, is to provide a lighter in which the above deficiencies are obviated; in which the striking wheel is rotated to a sufficient extent to insure positive lighting action on the sliding stroke of a cover member. The invention further contemplates the provision of means by which the operative sliding stroke of the cover member is attained by springs which are so located and disposed that the same are wholly out of the path of the flame and the heat generated thereby, so that the effective life of the springs is thus materially increased.

The invention includes the provision of a sliding cover member caused to be urged through an operative sliding stroke upon the release of a catch, whereby the cover member, on its sliding movement, will rotate the striking wheel to cause the wick to be ignited.

The invention further includes the provision of numerous structural features herein set forth and pointed out in the claims appended hereto and which result in an improved, smoothly-working device.

In the accompanying drawing, wherein an illustrative embodiment of the invention is disclosed, Fig. 1 is a vertical sectional view of a lighter constructed in accordance with the invention; Fig. 2 is a sectional view on the line 2-2 of

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Fig. 1, looking in the direction of the arrows; Fig. 3 is a sectional view on the line 3-3 of Fig. 1, looking in the direction of the arrows; Fig. 4 is a sectional view of the top portion of the lighter, showing the same in open position; Fig. 5 is a horizontal sectional view through the cover, showing the lighter in closed position, as in Fig. 1, and Fig. 6 is a similar sectional view, showing the lighter as in Fig. 4, or in open position.

In the drawings, 1 indicates the casing or body of the lighter constituting the fuel reservoir of the lighter, and which may be of any convenient shape, but is preferably of the flat and compact form shown, and contains a quantity of absorbent material 2, such as cotton, saturated with the usual inflammable liquid or so-called "lighter fuel." The reservoir is filled through an opening provided by the removal of the threaded filler plug 3. At 4 is shown the wick which is held in a guide 5 and has its lower portion located within the reservoir to be thereby impregnated by the lighter fluid with which the absorbent material 2 is saturated. The upper end of the wick 4 projects out of the guide 5 above the top of the reservoir as shown at 6 in Fig. 1.

The pyrophoric material from which the igniting sparks are produced, is shown at 7, the same being mounted in the tubular holder 8 extending through the fuel reservoir. A spring 9, located within the tubular holder 8, urges the pyrophoric material 7 upwardly and into constant contact with the roughened or serrated periphery of a striking wheel 10, so that when the wheel 10 is rotated, as hereinafter described, sparking will occur and the sparks will be directed onto the exposed end portion 6 of the wick to thereby ignite the same. The spring 9 is held in place by a removable plug 11 which permits the removal of the spring and the insertion of a new section of pyrophoric material 7 when it is necessary to renew said material in the holder 8.

Mounted on the top of the fuel reservoir is a shield or frame member 12 of channel-shaped formation, as clearly seen in Figs. 2 and 3, said frame extending around the wick and igniting device, and being provided with a pair of upstanding side walls 13 and 14 and in-bent wings 15, said wings being located at one end of the frame and constituting a shield for the flame generated by the lighter. Each of the upstanding walls 13 and 14 is provided with a laterally bent flange 16, and said walls constitute bearings for a shaft 17 on which the striking wheel 10, as well as a pinion 18 is mounted. In the arrangement shown, the pinion 18 is loosely mounted on the shaft 17 and

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carries on one of its faces, fingers 40 which engage with ratchet teeth 41, as shown in Fig. 5 to thereby cause the striking wheel 10 to be rotated in one direction by rotation of the pinion 18, and to be free of rotation when the pinion is rotated in the opposite direction. As an alternative of this construction, the striking wheel 10 might be free on the shaft 17 and the pinion 18 fixed thereon. With either construction, the striking wheel is rotated in one direction only, by rotative movement of the pinion 18. The arrangement just described is such that when the pinion 18 is rotated in one direction, or counter-clockwise as viewed in Figs. 1 and 4, it will rotate the striking wheel 10 and cause sparks to be projected onto the wick-portion 6 to thereby ignite the same.

The means for rotating the pinion 18 consists of a slide 25 of channel formation, which fits over the open top of the shield or frame 12 and is slidable thereon. The slide 25 has side walls 26 having their lower ends terminating in inwardly-bent flanges 27 which take under the flanges 16 on the walls 13 and 14 of the shield or frame 12. Wings or lugs 28, punched out of the side walls 26 of the slide 25, ride on top of the flanges 16, so that said flanges 16 are thus confined between the flanges 27 of the slide 25 and the wings 28 also formed on said slide.

Integrally connecting the side walls 26 of the slide 25 is the top wall 29 provided with a line of uniformly spaced apertures 30 resulting in the production of cross-bars 31 between them and which mesh with the pinion 18, so that the slide 25 is thus a toothed rack serving to rotate the pinion 18 and cause actuation of the igniting means when said rack is urged in a given direction by spring means to be presently described.

The slide or rack member 25 is shown in Figs. 4 and 6 at the end of its operative stroke, at which point it will be noted that the sliding movement of the member 25 has been halted by the abutment of the wings 28 against upstanding lugs or stops 32 provided at one end of each of the flanges 16 on the frame 12.

The means for moving the slidable rack member 25 through an operating stroke consists of two springs 33, each of which is secured at one end, as shown at 34, to a suitable anchorage on the fuel reservoir, and at its other end to one end of the slidable rack 25, as shown at 35. This disposition of the coil springs 33 is such that the springs are stretched when the cover member to which the slide 25 is attached, is in closed position, so that the springs normally tend to pull the slide member 25 into open position, as shown in Figs. 4 and 6 as soon as a catch for the cover is released. The movement of the cover and the slide member 25 carried thereby, to open position, or that shown in Figs. 4 and 6, serves to cause rotation of the pinion 18 which in turn rotates the striking wheel 10 to thereby generate sparks for the ignition of the wick. It will be noted that the springs 33 are so located that the side walls 13 and 14 of the frame 12, as well as the body of the slidable rack member 25 are interposed between the flame from the wick and the springs whereby the springs are protected from the flame as well as the heat created thereby and the life of these springs is thus immeasurably increased.

The slidable rack member 25 is provided with a cover member 36 fitted over and secured to the rack member, or possibly forming an integral part of the same, said cover, when in closed position, covering and concealing all of the operative parts of the device, and when in open posi-

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tion, as shown in Figs. 4 and 6, exposing only the wick and the flame therefrom. At one of its ends, the cover member 36 is provided with a catch member 37 of resilient form, and arranged for snap engagement over the edge of the aperture 43 provided in the body of the case, to thereby hold the cover in closed position against the pull of the springs 33.

From the foregoing, the operation of the lighter will be clear. In normal position, or when the lighter is being carried in the pocket, the cover 36 is closed as shown in Fig. 1, the same being maintained in such position by means of the catch member 37. To strike a light, it is merely necessary to release the catch member with the finger, thus causing the springs 33 to at once become effective to slide the cover to open position and to move the rack member 25 through an operative stroke. As the rack member 25 is thus moved, it will rotate the pinion 18 which spins the striking wheel 10 to thereby cause sparks to be generated to ignite the wick. The cover, and the rack member 25 carried thereby, are shown at the end of the operating stroke in Figs. 4 and 6 wherein it will be observed that the wings 28 on the rack member 25 have contacted with the stop lugs 32 on the flanges 16 and the slidable movement of the rack member 25 has been halted by the contact of the several stop lugs. It will be further observed that the sliding movement of the cover 36 serves to uncover or expose the wick-end 6 so that the flame therefrom is available for the lighting of the cigar or cigarette. To snuff out the flame merely requires that the cover 36 be slid back to closed position until the catch member 37 locks to hold the cover member closed.

It will be clear that the operation of the lighter is simple and effective and that the ignition is caused automatically by simply releasing the catch member to allow the springs 33 to move the sliding cover and rack through an operating stroke. The disposition of the parts of the device is such that they are maintained clear of the flame so that the life of these parts is materially increased. The use of a sliding rack for rotating the striking wheel, permits the wheel to be rotated to such an extent as to cause sparking of such magnitude as to insure lighting of the wick on each sliding stroke of the cover.

While I have shown and described one embodiment of the invention, it is obvious that the same is not to be restricted thereto but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. In a lighter, a fuel reservoir provided at the top with a channel-shaped shield, a wick within said shield, striking means between the walls of the shield, said means including a rotative pinion, a slidable cover member fitted over and normally closing the top of the channel-shaped shield, said cover member carrying a rack in engagement with the pinion, the channel-shaped shield having vertical side walls spaced inwardly of parts of the sides of the fuel reservoir to thereby provide a chamber at each side of the fuel reservoir between the side walls of the shield and the sides of the fuel reservoir, a spring contained in each of said chambers, said springs each having an end anchored in its chamber and another end attached to the slidable cover, and means for holding the cover in position over the top of the fuel reservoir against the force exerted by the springs.

2. In a lighter, a casing provided at the top

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with a channel-shaped shield, a wick and igniting means within the shield, the shield having spaced, vertically disposed side walls located inwardly from the side walls of the casing whereby a pair of chambers extending for substantially the length of the casing is provided between the walls of the casing and the side walls of the shield, a slidable cover member fitted over the top of the channel-shaped shield, said cover member being provided with an apertured plate constituting a rack, the igniting means including a pinion in engagement with the rack, a spring being contained in each of the chambers, said springs each having an end anchored in its chamber and another end attached to the slidable member, said springs tending to normally draw the cover member to open position, and means for holding the cover in closed position over the top of the casing

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and shield against the force exerted by said springs.

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