Jan. 2, 1951 E. E. PEARCY, JR 2,536,855

PYROPHORIC LIGHTER

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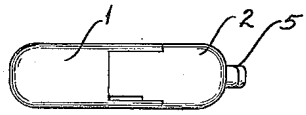

FIG. 1.

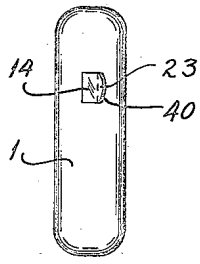

FIG. 3.

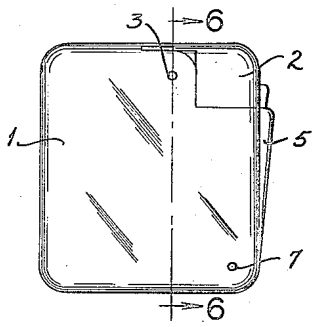

FIG. 2.

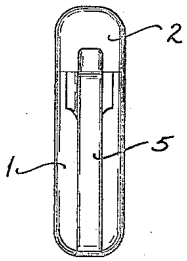

FIG. 4.

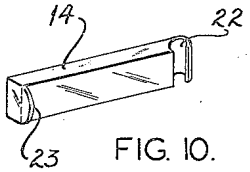

FIG. 10.

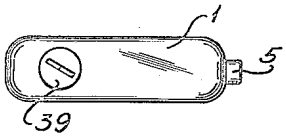

FIG. 5.

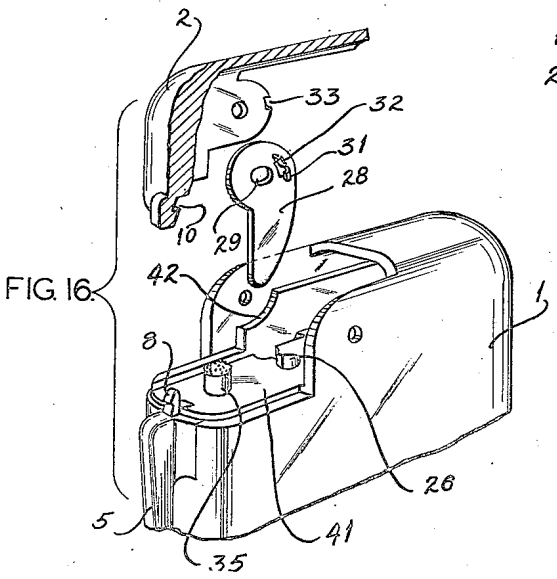

FIG. 16.

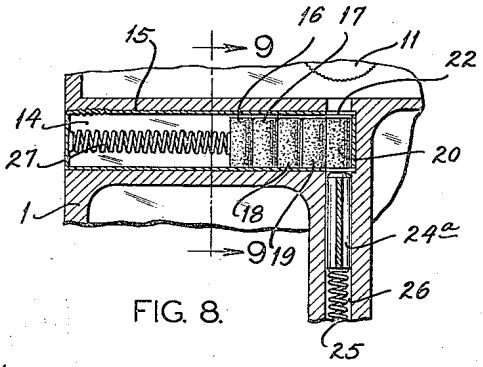

FIG. 8.

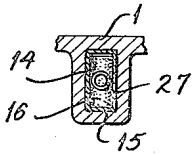

FIG. 9.

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PYROPHORIC LIGHTER

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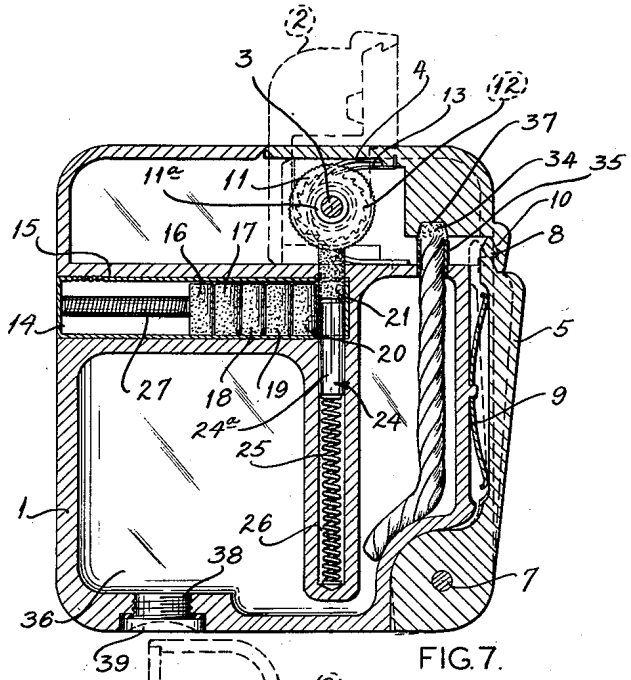

FIG. 7.

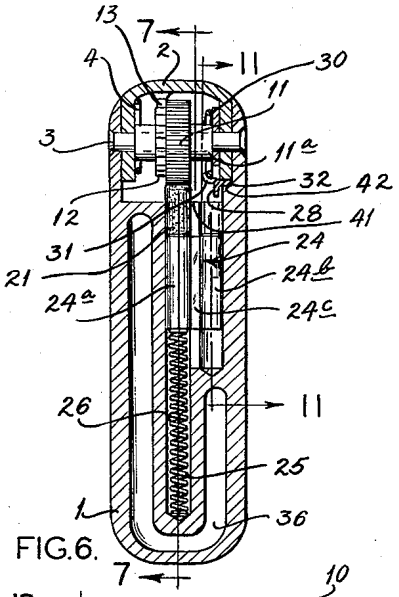

FIG. 6.

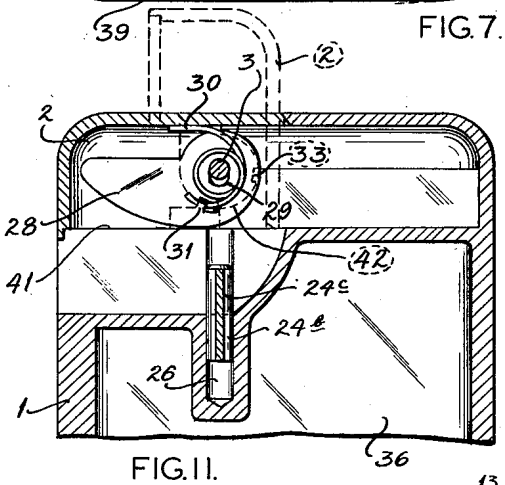

FIG. 11.

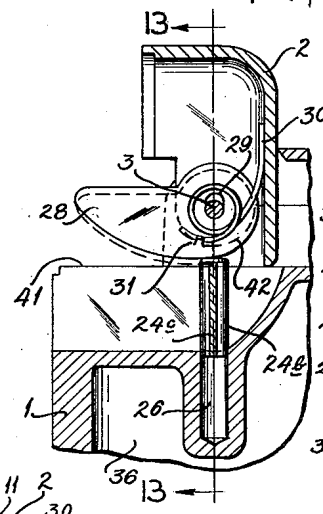

FIG. 12.

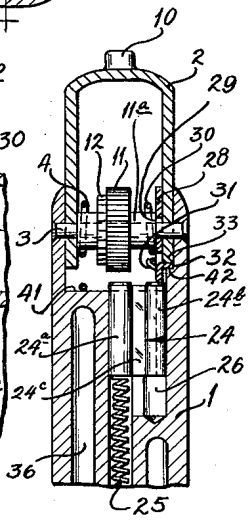

FIG. 13.

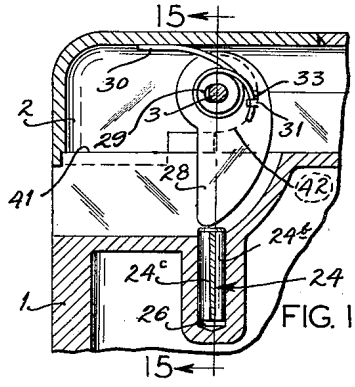

FIG. 14.

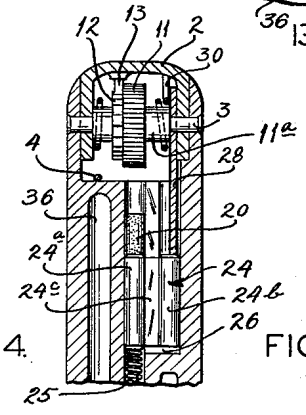

FIG. 15.

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UNITED STATES PATENT OFFICE

2,536,855

PYROPHORIC LIGHTER

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Application March 27, 1946, Serial No. 657,360

7 Claims. (Cl. 67—7.1)

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The invention relates to lighters and more particularly to portable lighters for igniting cigars and cigarettes.

One object of the invention is to provide a lighter which requires infrequent servicing and operates for long periods of time with no adjustment or repair.

The main object is to include in the lighter a plurality of striking elements or flints, one element being in operative position and the remainder in storage position, and to replace automatically the operative striking element by another from storage when the operative element is worn too small to be effective.

These and other detail objects of the invention, as will appear below, are attained by the structure shown in the accompanying drawings, which structure is intended to be illustrative and not exclusive of other arrangements embodying the general inventive principle. In these drawings:

Figure 1 is a top view of a lighter constructed according to the invention.

Figure 2 is a side view.

Figure 3 is an end view.

Figure 4 is an end view opposite to Figure 3.

Figure 5 is a bottom view.

Figure 6 is a detail transverse vertical section drawn to an enlarged scale and taken approximately on line 6—6 of Figure 2.

Figure 7 is a detail longitudinal vertical section taken approximately on line 7—7 of Figure 6.

Figure 8 is a partial detail longitudinal vertical section similar to Figure 7 showing a new striking element being moved into operative position.

Figure 9 is a detail vertical section taken approximately on line 9—9 of Figure 8.

Figure 10 is a perspective of a magazine for striking elements.

Figure 11 is a detail longitudinal vertical section taken approximately on line 11—11 of Figure 6 and looking in the direction opposite to the direction of Figure 7.

Figures 12 and 14 are detail longitudinal vertical sections similar ot Figure 11 showing the parts in successive positions assumed when a new striking element is being moved into operative position.

Figures 13 and 15 are detail transverse vertical sections taken approximately on line 13—13 and 15—15 of Figures 12 and 14, respectively.

Figure 16 is an exploded view showing the mechanism for automatically moving a new striking element to operative position.

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The lighter comprises a body 1 and a cover 2 hinged thereto by a pin 3. A spring 4 urges cover 2 to open position. Cover 2 is held in closed position on body 1 by a catch 5 mounted pivotally at one end 7 on the body and having a hook 8 at the opposite end urged by a bowed spring 9 into engagement with cover 2 at a notch 10 therein. The cover may be opened by pushing inwardly against pressure of spring 9 on catch 5 to release hook 8 from notch 10 whereupon cover 2 is opened by spring 4 (Figure 7).

Mounted rotatably on pin 3 substantially centrally thereof is a rotor 11 which may be made of steel or other suitable material and preferably has its circumferential surface roughened or knurled. Rotor 11 includes a toothed wheel 12 fastened rigidly thereto and arranged for engagement by a ratchet arm 13 attached to the inside of cover 2. When cover 2 is moved from closed to open position by spring 4 after manually releasing catch 5, ratchet arm 13 engages toothed wheel 12 and rotates rotor 11 substantially through an angle of 90°, and when cover 2 is moved manually from open to closed position, ratchet arm 13 slides over toothed wheel 12 (Figure 7). Thus, rotor 11 always rotates in the same direction so that all parts of the circumferential surface wear substantially uniformly.

In a magazine 14 (Figure 10), positioned in a chamber 15 in body 1, are a plurality of cylindrical striking elements 16, 17, 18, 19, 20 and 21, preferably of flint or other suitable substance adapted to produce sparks when the circumferential surface of rotor 11 rubs the surface thereof (Figure 7). Magazine 14 comprises a rectangular container having an arcuate lip 22 at one end through which the striking elements are ejected one by one and moved to operating position (Figure 10). Magazine 14 is held frictionally in chamber 15 and has a finger tab 23, positioned in a recessed portion 40 of body 1 to permit easy removal of the magazine therefrom (Figure 3). Striking element 21 is in operating position and is urged longitudinally into engagement with rotor 11 by a plunger 24 actuated by a spring 25 positioned in a cavity 26 in body 1. Plunger 24 comprises members 24*a* and 24*b* joined rigidly together by a web 24*c* (Figure 15). Striking elements 16, 17, 18, 19 and 20, in storage position in magazine 14, are urged laterally by a spring 27 toward member 24*a* and striking element 21, substantially at right angles to the longitudinal axis of member 24*a*, and are adapted to be moved automatically one by one

into engagement with rotor 11 when the preceding striking element is worn to predetermined size by the rotor.

To automatically shift striking elements one by one from storage position to operative position when the preceding element is worn to a predetermined size there is mounted loosely on pin 3 a cam 28, alongside of a side wall of cover 2 and having an elongated bearing 29 to permit movement laterally on pin 9. Movement of cam 28 longitudinally of pin 3 is restrained by cover 2, by hub 11a of rotor 11 and by wall 41 of body 1. A tension spring 30, having one end attached to a lip 31 on cam 28 and the other end engaging cover 2, tends to keep cam 28 in normal lowermost position, laterally of pin 3, as shown in Figure 11. When striking element 21, in operative position, is worn to a predetermined size, upon opening cover 2, striking element 21 is swept out of cavity 26 by rotation of rotor 11 permitting spring 25 to urge member 24b of plunger 24 into engagement with cam 28 and move the cam to uppermost position on pin 3, as shown in Figures 12 and 13. With cover 2 in fully open position, an outwardly extending projection 32 on a lateral face of cam 28 enters a notch 33 in cover 2 (Figure 16). When the cover is moved manually to closed position, projection 32 moves over curved surface 42 of body 1 and maintains the engagement of elements 32 and 33 and cam 28 rotates on pin 3 with cover 2 and moves plunger 24 downwardly in cavity 26 out of the path of striking element 20 and compresses spring 25 (Figures 14 and 15). Striking element 20 then is urged by spring 27 into cavity 26 in alignment with member 24a.

As cover 2 moves from closed to open position, member 24b is released from cam 28 as the cam pivots with the cover, and member 24a is urged by spring 25 into engagement with striking element 20 which is urged yieldingly into engagement with rotor 11. When cover 2 is in fully open position, cam 28 is urged by spring 30 to normal lowermost position on pin 3 (Figure 11). Cam 28 remains in this non-operative position until striking element 23, now in operative position, is worn small enough to be swept out of cavity 26 by operation of rotor 11, when a new striking element is moved into operative position by cam 28, as described above. When all the striking elements in magazine 14 have been used, the magazine can be removed from body 1 and be replaced by another when cover 2 is in closed position, cam 28 holding plunger 24 out of registry with arcuate lip 22 of magazine 14.

In ordinary operation, when catch 5 is released from engagement with cover 2, the cover is moved to open position by spring 4 and ratchet arm 13 engages toothed wheel 12 and rotates rotor 11 which generates sparks by its engagement with striking element 21 (Figures 6 and 7). The sparks ignite a wick 34 protruding from a tubular recess 35 in body 1 filled with an inflammable substance, such as naptha, which impregnates wick 34. When cover 2 is closed, the flame is snuffed out as wick 34 enters a cavity 37 in cover 2. The supply of naptha in chamber 36 of body 1 may be replenished through an opening 38 in the bottom thereof closed by a threaded cap 39.

A lighter of the kind described requires infrequent service and operates for long periods of time with no repair or adjustment. The lighter includes a plurality of striking elements, one being in operative position and the remainder being in storage, and, when the operative element wears two small to be effective, it is replaced automatically by another from storage merely by closing and opening the cover.

The details of the invention described and illustrated may be varied without departing from the spirit of the invention, and the exclusive use of those modifications coming within the scope of the claims is contemplated.

What is claimed is:

1. A lighter comprising a body, a cover hinged thereto, a spring urging said cover to open position, a rotor operated by said cover as it moves from closed to open position, a plurality of striking elements, a spring, a plunger engaged by said spring and urging one of said striking elements longitudinally into engagement with said rotor, a magazine containing the remaining striking elements, a spring urging the remaining striking elements toward said plunger, the remaining striking elements being arranged to move one by one into rotor engaging position as the preceding rotor engaging striking element wears to a predetermined size, a cam operated by movement of said cover when said rotor engaging striking element is worn to a predetermined size and adapted to move said plunger and to compress said first-mentioned spring so that said second-mentioned spring moves one of the remaining striking elements into longitudinal alignment with said plunger, further movement of said cover moving said cam to a position to release said first-mentioned spring and said plunger whereby said first-mentioned spring and plunger urge a new striking element to operative position into engagement with said rotor.

2. A lighter comprising a body, a cover hinged thereto and having a recess, a rotor rotatably supported by said body, a plurality of striking elements, a spring, a plunger actuated by said spring to urge one of said striking elements into engagement with said rotor, a magazine containing the remaining striking elements, a spring urging the remaining striking elements toward said plunger, a rotatably mounted cam having a lip for engaging said recess to lock said cam thereto for rotation therewith, yielding means normally disengaging said cam lip from said cover when a striking element engages said rotor, said plunger being urged by said first mentioned spring into engagement with said cam when the rotor engaging striking element wears to a predetermined size and thereby causing said lip to engage said cover whereby movement of said cover causes said cam to rotate and move said plunger out of the path of the remaining striking elements further movement of said cover releasing said cam and plunger.

3. In a lighter, a body, a pin thereon, a cover pivotable on said pin, a rotor rotatable on said pin with said cover, a cam having an opening slidable transversely of said pin, a plunger in cooperating relation with said rotor to move a striking element into contact with the latter, an extension on said plunger in alignment with said cam, interengageable parts on said cam and cover, a spring thrusting said cam on said pin to disengage said parts, and a spring thrusting said plunger and extension towards said rotor and cam to engage said parts when a striking element between said rotor and plunger is shorter than a predetermined distance, whereby subsequent pivoting of said cover will rotate said cam to move said extension away from said pin and move said plunger away from said rotor.

4. In a lighter as described in claim 3, a magazine for striking elements having a discharge

opening aligned with the plunger and having a spring to thrust striking elements in the magazine towards said opening.

5. In a lighter, a body, a cover having a side wall, a pin extending transversely of said wall and pivotally mounting the cover on the body, a rotor on said pin and movable with said cover, a cam alongside said wall and having an elongated opening receiving said pin, opposing parts on said cover and cam disengaged when said pin is at one end of said opening and engageable when said pin is at the other end of said cam opening so as to rotate said cam with said cover, a spring-pressed plunger movable transversely of said pin and aligned with said rotor so as to thrust a striking element towards said rotor, an extension on said plunger aligned with said cam and arranged to move said cam on said pin to the other end of said opening when the plunger moves close to said rotor, thereby engaging said parts, the contact of said cam and extension holding the plunger out of contact with said rotor, and the swinging of said cam and cover moving said extension and plunger away from said pin and rotor.

6. A lighter comprising a body, a cover hinged thereto, a rotor, a plurality of striking elements, a yielding support to urge one of said striking elements into engagement with said rotor, a cam, elements on said cam and cover arranged to be connected, a part associated with said support and engaging said elements with each other when

said striking element is worn to a predetermined length and said cover is swung on its hinge, said cam when pivoted by said cover moving said support away from said rotor to accommodate the insertion of a new striking element between said support and rotor.

7. A lighter as described in claim 6 which includes a magazine for the striking elements and means in the magazine for thrusting successive elements into the space between the rotor and the support when the latter has been cammed away from the rotor a predetermined distance.

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