

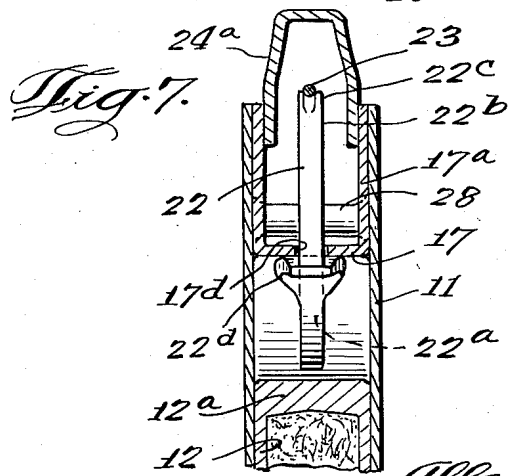
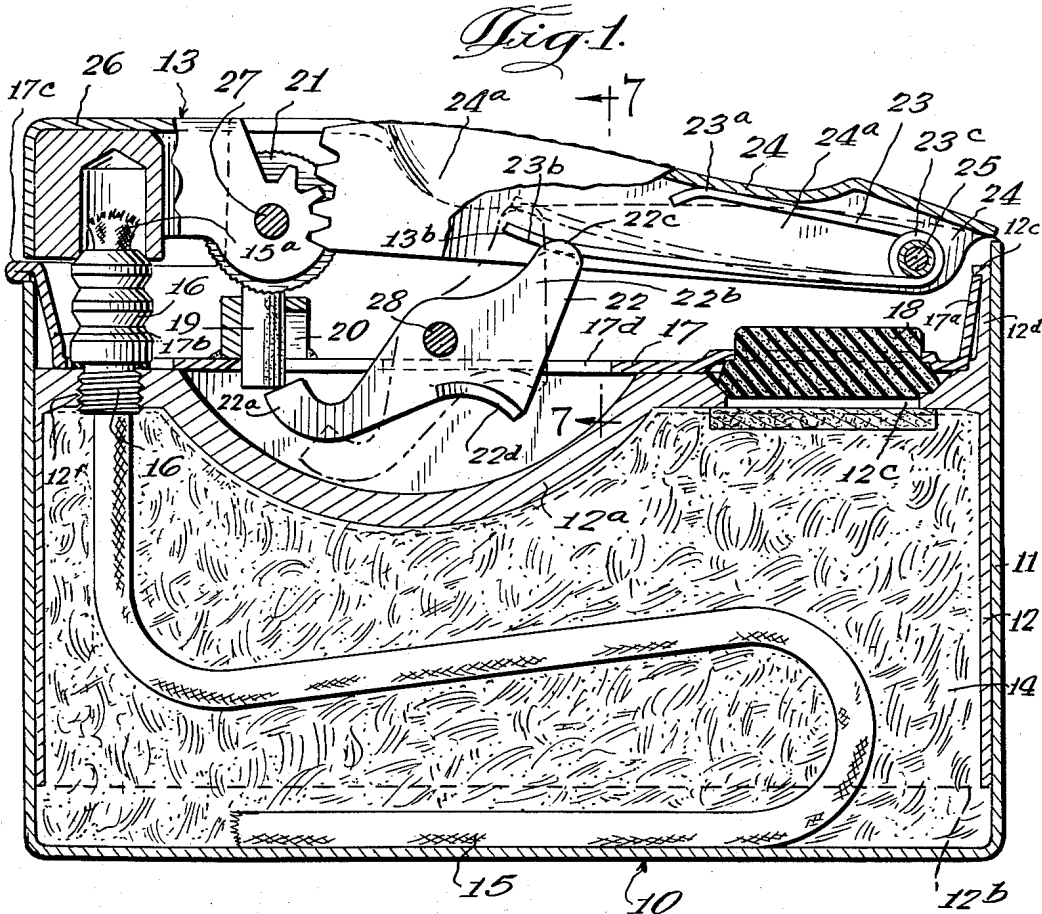
Dec. 23, 1958

A. B. GELLMAN
PYROPHORIC LIGHTER

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2 Sheets-Sheet 1



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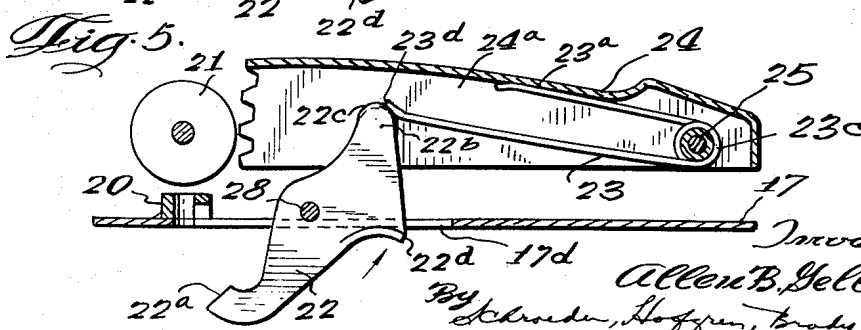
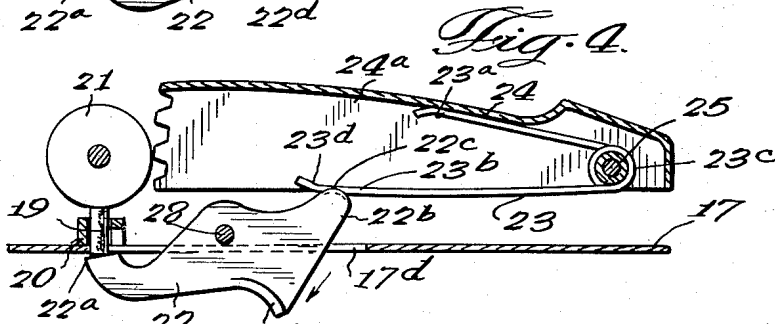
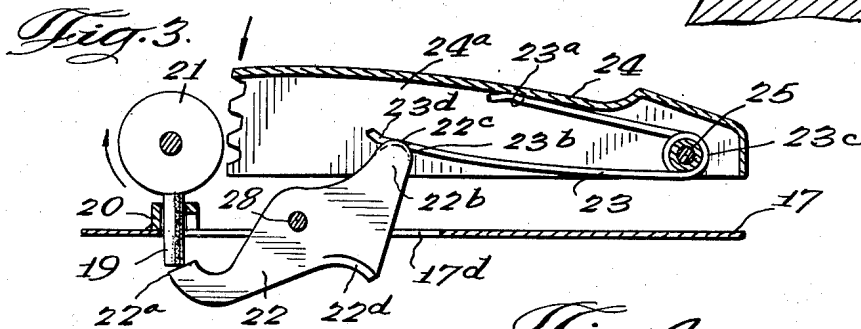
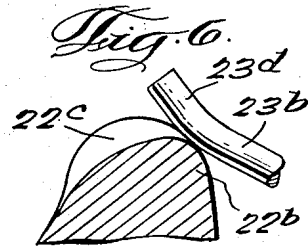
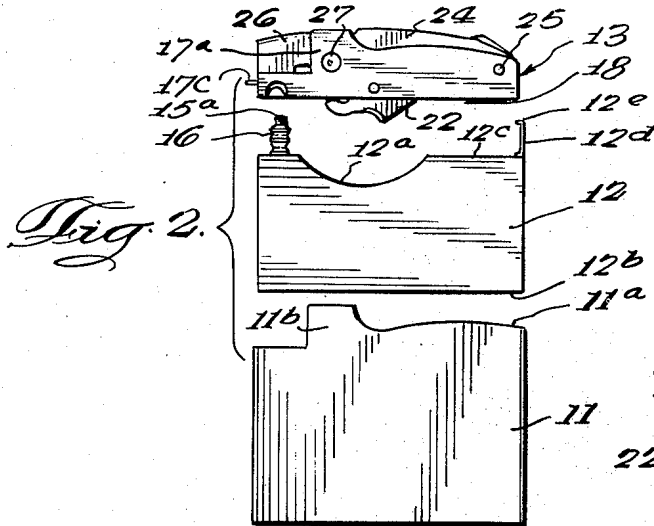
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2 Sheets-Sheet 2



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PYROPHORIC LIGHTER

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Application January 28, 1957, Serial No. 636,819

4 Claims. (Cl. 67—7.1)

This invention is concerned with an improved pyrophoric lighter.

This application is a continuation-in-part of copending Gellman application, Serial No. 543,811, filed October 31, 1955 which is a continuation-in-part of copending Gellman application, Serial No. 444,492, filed July 20, 1954, now Patent Number 2,791,110 issued May 7, 1957.

One feature of this invention is that the lighter includes an abradant wheel and means for rotating the wheel, a pyrophoric element holder adjacent the wheel which is adapted to have a pyrophoric element therein bear against the wheel and a resiliently urged movable lever means having one end normally bearing against the pyrophoric element, the lever means being adapted to be locked out of engagement with the pyrophoric element to facilitate changing the element.

Another feature of this invention is a lighter such as that described above wherein a spring means is arranged to bear against the movable lever means to urge one end of the lever means resiliently against the pyrophoric element, and the spring means is also adapted to lock the lever means out of engagement with the pyrophoric element to facilitate changing the element.

Still another feature of the lighter of this invention is the provision of a flint follower adapted for engagement with the pyrophoric element in the holder and a spring having two end portions and an intermediate point of flexure, one of the end portions bearing against the follower, the other end portion bearing against a surface in the lighter, and the point of flexure being spaced from the pivotal mounting of the follower, said spring arranged to effectively move the area of engagement of the follower with the spring toward the point of flexure as the follower rotates due to wear of the pyrophoric element with resulting yielding of the spring in order to increase the effective leverage of the follower to compensate at least in part for the yielding of the spring.

Yet a further feature of this invention is the provision in a lighter of a mechanical assembly including means for igniting fuel, an intermediate portion arranged to support the mechanical assembly including a means for holding fuel and a means for feeding the fuel to the igniting means, and an outer portion arranged to telescopically receive the intermediate portion in a substantially permanent manner wherein the intermediate portion has a fuel filling opening and another opening arranged to be covered by the outer portion for facilitating the insertion of the means for holding fuel and the means for feeding the fuel.

Modern pyrophoric lighters such as those described in my copending applications have a flint follower which is arranged to be urged under spring pressure against a pyrophoric element or flint to provide the necessary contact of the flint and a rotatable abradant wheel. Thus when the abradant wheel is rotated a spark will be provided which will ignite a fuel source. Naturally, the pyrophoric element tends to wear away as the lighter is

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used making it necessary to change the element from time to time. In such a changing operation, it is necessary to move the flint follower away from the pyrophoric element holder against the spring pressure. It is often somewhat difficult to do this and in fact, may be even painful to the operator because of the relatively small size of the parts. In the pyrophoric lighter of this invention, means are provided for effectively locking the flint follower out of contact with the pyrophoric element thus facilitating the changing of the pyrophoric element.

Moreover, as the pyrophoric element wears away, the rotation of the flint follower causes a relative decrease in the force of the spring. The flint follower of this invention is so arranged that its effective lever arm will be increased during the wearing away thus compensating in part for the decrease in the force of the spring.

Another difficult problem, which faces manufacturers of pyrophoric lighters, is the insertion of an absorbent substance such as cotton for holding the fuel as well as the insertion of a wick in the lighter casing for carrying the fuel. This is so because of its relatively small opening normally available for inserting these necessary components. The pyrophoric lighter of this invention is so constructed that these necessary components may be easily inserted through the open bottom of an inner shell which is then closed by being substantially permanently received in an outer shell.

Further features and advantages of this invention will readily be apparent from the following specification and from the drawings in which:

Figure 1 is a vertical sectional view of a lighter embodying the invention;

Figure 2 is an exploded side elevational view of the lighter shown in Figure 1;

Figure 3 is a fragmentary view of the flint follower and spring shown in Figure 1 showing one position of the follower;

Figure 4 is a view similar to Figure 3 showing another position of the follower;

Figure 5 is a view similar to Figure 4 showing yet another position of the follower;

Figure 6 is an enlarged fragmentary view of the end of the follower and the spring in the position of Figure 5; and

Figure 7 is a fragmentary sectional view taken substantially along the line 7—7 of Figure 1.

Turning now to the drawings, the lighter 10 is constructed in three sections, an outer shell 11, an inner shell 12 and a mechanical assembly 13. For clearness of description, these sections will be considered separately.

The outer shell 11 is constructed of a thin lightweight material such as drawn aluminum. The outer shell is open at the top 11a and is arranged to receive the inner shell 12 therein. The side walls 11b of the outer shell 11 are arranged to extend above the top deck 12a of the inner shell 12.

The inner shell 12 is also constructed of a light-weight material such as drawn aluminum and is carefully dimensioned so that once it is inserted in the outer shell 11 a tight fit will result which will provide a substantially permanent arrangement of these two sections. The inner shell 12 is hollow with an open bottom 12b through which an absorbent fuel carrying material such as cotton 14 may be inserted. A cloth or other type wick 15 may also be inserted through the bottom opening 12a. The end 15a of the wick 15 is drawn through the wick boss 16 which is held firmly in place in the top deck 12a by means of a threaded portion 16a which is screwed in an aperture 12f in the top deck 12a. A fuel filling opening 12c is provided in the top deck 12a which is closed by the mechanical assembly 13 as will be described later. The

rear portion of the top deck 12a is upwardly turned to form a projection 12d having an inwardly struck portion 12e at the top. The projection 12d is used to secure the mechanical assembly 13.

The lighter of this invention is thus simple to assemble. The manufacturer need only insert the wick 15 through the open bottom 12b of the inner shell 12, pulling the end 15a of the wick through the wick boss 16. This is relatively easy to do since the opening 12b is large enough to permit access. Then the cotton 14 is packed in through the opening 12b and arranged to surround the wick 15. This is also simple to do because of the size of the opening 12b.

The filled inner shell 12 is then inserted in the outer shell 11. Since these parts are made to relatively close tolerance, the telescopic fit, one within the other, is snug, thus preventing evaporation of fuel or accidental separation of the shells which is almost never necessary. Fuel may be added, when desired, through the opening 12c.

The mechanical assembly 13 is mounted on a cradle or frame 17 which is provided with upstanding sides 17a preferably conforming with the configuration of the walls 11b of the outer shell. The rear portion 17a of the cradle 17 is turned upwardly for engagement with the portion 12e at the rear of the lighter. The forward end of the cradle 17 is also bent upwardly at 17b and a tab 17c extends forwardly therefrom permitting the user to remove the mechanical assembly by lifting up on the tab. A resilient block 18 is carried by the cradle 17 and seals the filling opening 12c when the mechanical assembly is in place preventing evaporation of the lighter fuel.

A pyrophoric element or flint 19 is carried by a flint block 20 and is urged against abradant wheel 21 by a flint follower 22 under the influence of a spring 23. An elongated operating member 24 is pivotally mounted on a pin 25 at the rear of the cradle. Depression of the operating member causes rotation of the snuffer cap 26 about pivot pin 27, uncovering the end 15a of the wick projecting out of the wick boss 16. A pawl plate (not shown) turns with the snuffer cap 26 effecting rotation of the abradant wheel 21 thus directing a spark from the flint 19 toward the wick end 15a. On release of the operating member 24, both it and the snuffer cap return to the position shown in Figure 1 under the operation of the spring 23. Depressible operating member 24 is U-shaped in cross-section having depending flanges 24a which fit inside the upstanding walls 17a of the cradle. A more detailed disclosure of the above-described mechanical assembly will be found in my copending applications.

The flint follower 22 is an elongated lever pivotally mounted on a pin 28 at a point intermediate the ends of the lever. End portion 22a of the follower is finished at a suitable angle to engage the flint 19. A thumb piece 22d is provided on the bottom of the follower 22 for use in removing the follower from contact with the flint 19. The spring 23, which serves both as the flint spring and also as the operating member return spring, is roughly U-shaped in configuration and has a first end portion 23a which bears against the underside of the operating member 24 and a second end portion 23b which rides in a groove 22c in the end 22b of the flint follower remote from the flint. A point of flexure for the spring 23 indicated generally as 23c is intermediate the ends thereof. The spring is preferably coiled at the point of flexure, the coil being wound about pivot pin 25. Thus as the flint 19 wears away, the spring 23 will tend to straighten about the point 23c (unwinding the coil) and the end 22b of the follower 22 will slide toward the pivot pin 25. This increases the mechanical advantage of the flint follower system and compensates, at least partially, for the decrease in spring force due to the unwinding of the coil at 23c. It should be noted that when the lighter is operated, depression of the operating member 24 compresses spring 23 increasing the force on the flint 19 after

abradant wheel 21 has started to turn. This increases the spark output of the lighter but insures easy starting as the pressure of the flint on the wheel is the least at the start.

The follower 22 is arranged to be locked out of contact with the flint 19 in order to facilitate the changing thereof. This may easily be done by applying an upward force in the direction indicated by the arrow in Figure 5 on the thumb piece 22d thus rotating the follower 22 away from the flint 19 until the direction of force of the spring 23 on the end of the follower 22b passes dead center at which time the follower will be held in the position shown in dotted lines in Figure 1. The thumb piece 22d is constructed so as to be wider than the slot 17d in the cradle 17 through which the follower 22 rotates. The thumb piece 22d thus acts as a stop preventing the follower from being rotated further than is necessary to achieve the desired result and holds it in the dotted position shown in Figure 1. A slightly curved end portion 23d is provided at the end of the spring 23b which rides against the end 22b of the follower to provide an even more secure lock. The used flint 19 may then be removed and a new one easily inserted. In order to place the follower 22 in operating position it is only necessary to apply a slight force on the thumb piece 22b in a direction opposite that of the arrow shown in Figure 5 to snap the follower 22 back against the flint 19.

The progression of positions for the follower 22 is more clearly shown in Figures 3, 4 and 5. Thus Figure 3 shows the position of the follower when the flint is new. Figure 4 shows the follower position as the flint wears away, the arrow indicating its direction of movement, and as the end 22b moves toward the point of flexure 23c of the spring, reducing the length of the spring arm and increasing the length of the lever arm of the follower 22 as the spring force decreases. Figure 5 shows the follower locked out of position.

Having thus described my invention as related to the embodiments shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. A pyrophoric lighter having an abradant wheel comprising: a pyrophoric element holder adjacent said wheel and adapted to have a pyrophoric element therein bear against said wheel; an operating member arranged to be moved manually to rotate said wheel; a rotatable lever having one end normally bearing against said pyrophoric element; and spring means bearing against the other end of said lever and said operating member to hold said lever against said element and said element against said wheel and to return the member to the ready position after use; said lever being adapted to be rotated away from said element beyond the dead center so that the force of said spring means locks said lever out of engagement with said element to facilitate changing said element.

2. A pyrophoric lighter having an abradant wheel comprising: a pyrophoric element holder adjacent said wheel and adapted to have a pyrophoric element therein bear against said wheel; an operating member arranged to be moved manually to rotate said wheel; a follower comprising an elongated lever pivotally mounted at a point intermediate the ends thereof, one end of said follower adapted for engagement with said pyrophoric element in said holder; and a coiled torsion spring having two end portions and an intermediate point of flexure, one of said end portions bearing against the other end of said follower to force said follower against said element, the other end portion bearing against said operating member and adapted to return the member to the ready position after use and the point of flexure being spaced from the pivotal mounting of said follower;

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said follower being adapted to be rotated about said pivotal mounting away from said element beyond the dead center so that the force of said spring locks said lever out of engagement with said element to facilitate changing said element.

3. The pyrophoric lighter of claim 2, wherein said follower includes a stop adapted to abut against a surface in said lighter to limit the rotation of said follower.

4. A pyrophoric lighter having an abradant wheel and means for rotating said wheel, comprising: a pyrophoric element holder adjacent said wheel and adapted to have a pyrophoric element therein bear against said wheel; a follower comprising an elongated lever pivotally mounted at a point intermediate the ends thereof, one end of said follower being adapted for engagement with said pyrophoric element in said holder; and a coiled torsion spring having two end portions and an intermediate point of flexure, one of said end portions bearing against the other end of said follower to force said follower against said element, the other end por-

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tion bearing against a surface in said lighter and the point of flexure being spaced from the pivotal mounting of said follower; said spring arranged to effectively move the area of engagement of the other end of said follower with said spring toward said point of flexure as the follower rotates due to wear of the pyrophoric element with resulting yielding of the spring in order to increase the effective leverage of the follower to compensate at least in part for said yielding.

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