

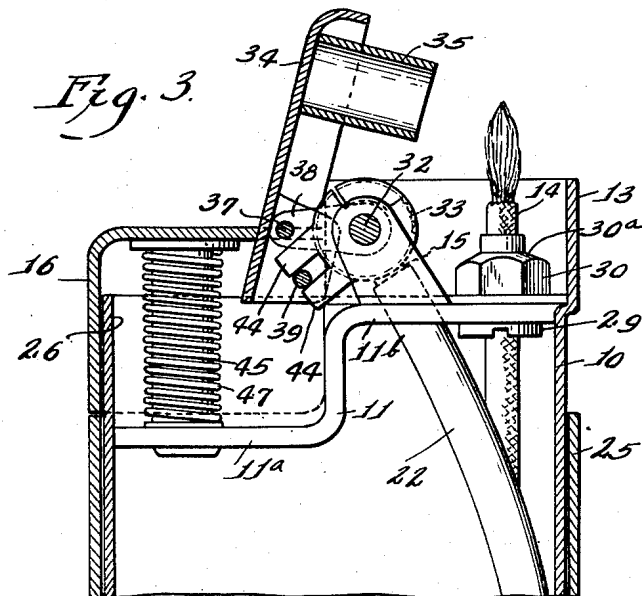
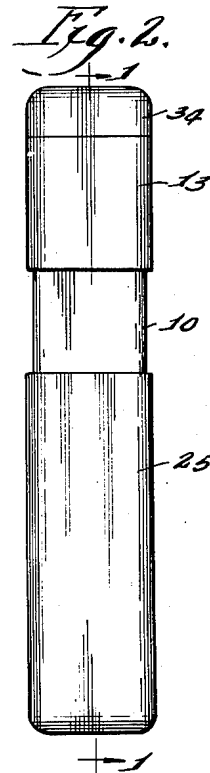
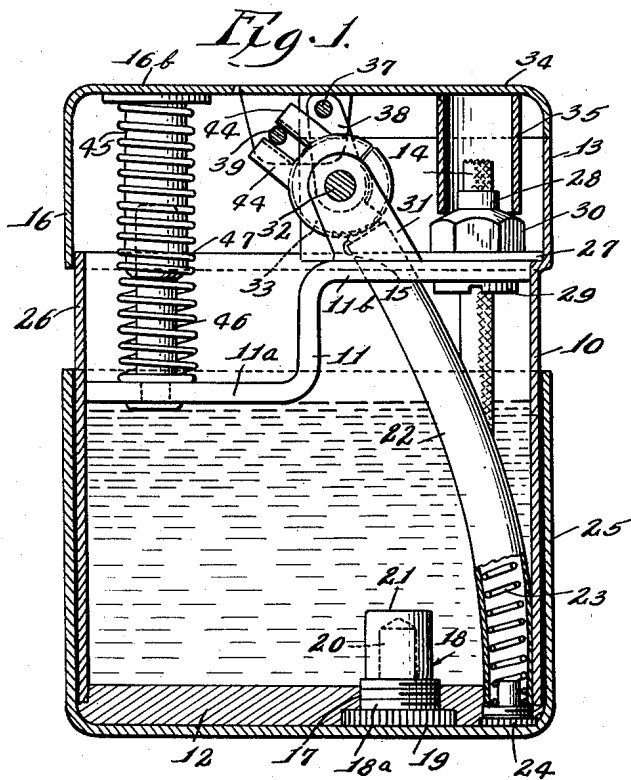
Sept. 26, 1950

F. MARTINDELL  
PYROPHORIC LIGHTER

2,523,511

Filed Feb. 27, 1947

2 Sheets-Sheet 1



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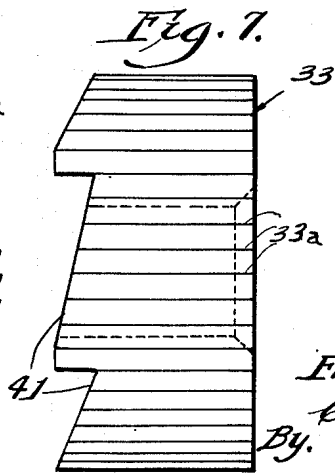
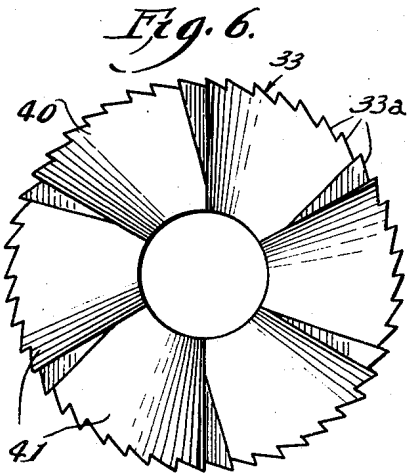
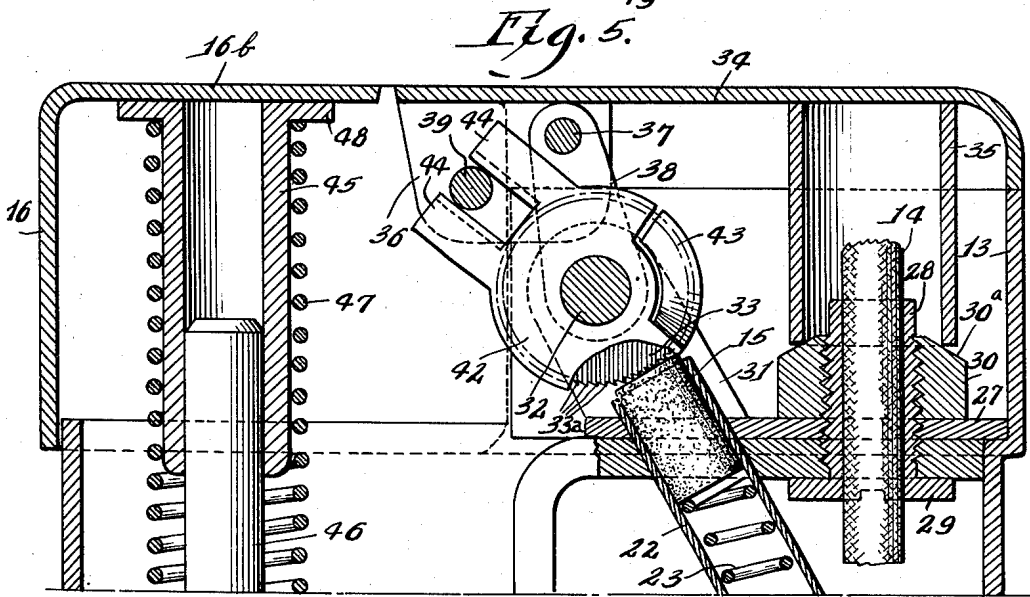
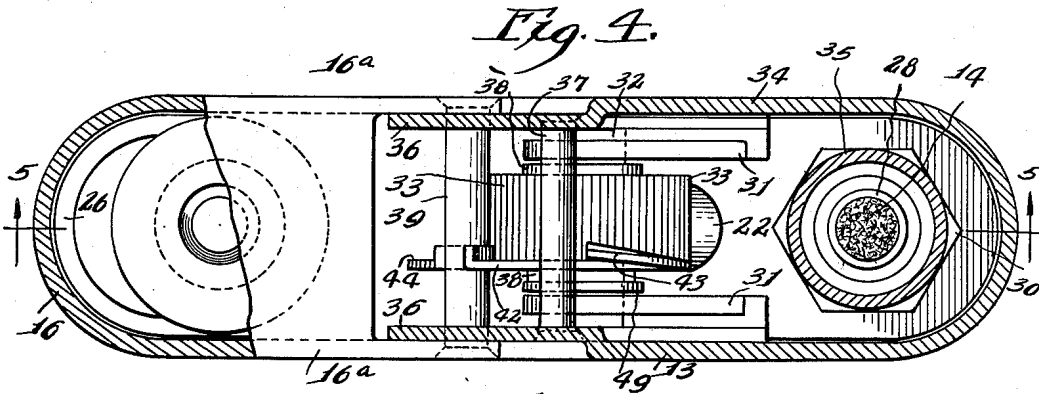
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Filed Feb. 27, 1947

2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

2,523,511

## PYROPHORIC LIGHTER

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Application February 27, 1947, Serial No. 731,175

3 Claims. (Cl. 67-7.1)

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This invention relates to a pyrophoric cigarette lighter, and relates more particularly to such a lighter that is operated by means of a movable member which will cause the wick to be exposed and the pyrophoric means to be actuated when said member is pressed and the wick to be covered when the member is released.

The present invention is directed to a cigarette lighter of the type having a wick saturated with an inflammable liquid and having a flint or other sparking means adjacent the wick together with an abradant wheel contacting the flint adapted to be rotated to direct sparks to the wick. The abradant wheel is rotated by pressing a slidably mounted member having a finger-engageable portion.

One of the features of the present invention is the provision of an improved lighter of the above type that is of pleasing appearance and which is housed in a substantially rectangular casing devoid of protuberances and the like; another feature of the invention is the provision of an improved lighter of the above type having a minimum of moving parts, that is easily operated and which may be quickly disassembled for repair purposes and cleaning, and is constructed of relatively inexpensive and easily fabricated parts. Other features and advantages of this invention will be apparent in the following description and in the accompanying drawings. Of the drawings:

Fig. 1 is a sectional view of one embodiment of the invention taken along line 1-1 of Fig. 2; Fig. 2 is a front elevation of the lighter in closed or inoperative position; Fig. 3 is a fragmentary sectional view similar to the top portion of Fig. 1, but with the lighter being in open or operative position; Fig. 4 is an enlarged plan view of the lighter partly in horizontal cross-section; Fig. 5 is a sectional view taken along line 5-5 of Fig. 4; Fig. 6 is an enlarged elevation of the abradant wheel used in the lighter; and Fig. 7 is an end elevation of the abradant wheel of Fig. 6.

The new lighter, which is the subject of this invention, comprises a casing having a bottom, a top partition for the casing, a wick in the casing extending through the top partition, a bottom cover for the casing having side walls engaging the outer surface of the sides of said casing to form an assembly with the assembly being frictionally held together, and means for igniting the wick at the end extending through the top partition. The bottom of the casing ordinarily contains a filling opening for fluid closed by a removable plug and a mounting for the flint holder. The bottom cover serves to conceal the filling opening and the outer end of the flint holder so that the lighter has a smooth, unbroken appearance. No special latching means are required for holding the bottom cover

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in place on the casing as it is held there merely by friction. The new lighter has a windshield for the top end of the wick formed integrally with the casing. The windshield has an open top portion and is normally closed by a rotatable cover extending across the top portion when the parts of the lighter are in inoperative position. In a preferred form, the cover also includes a wick cover tube which forms a tight seal around the wick when the cover is closed. This cover tube serves to prevent, or materially reduce, evaporation of the inflammable fluid when the lighter is not in use. The cover is mounted so that when it is raised, the end holding the cover tube moves up and the entire cover and tube also moves back. The abradant wheel is located within the windshield and is mounted on a pin extending between a pair of spaced substantially parallel ears also within the windshield and mounted on a bracket plate, which is held on the top surface of the top partition of the casing. The cover for the windshield is also rotatably mounted on this pin by linkage means extending between a second pin on the cover and the pin holding the abradant wheel. The cover is raised and the abradant wheel is turned to strike sparks from the flint by means of a slidably mounted member that is slidable on the casing and movable longitudinally of the casing. The slidably mounted member is so connected to the cover and the abradant wheel that when the member is moved downwardly, the cover is simultaneously rotated and moved out of the way and at the same time the abradant wheel is rotated. The bracket plate which holds the two upstanding ears is mounted on the top partition by means of a single bolt and nut arrangement. The abradant wheel pin is slidably held by the ears with the ends of the pin being adjacent the inner surfaces of the sides of the windshield. Thus, the bracket plate, ears, and abradant wheel may be removed from the assembly as a unit merely by removing the nut. The bolt and nut arrangement which holds the bracket plate and the above assembly preferably also holds the top end of the wick. The bolt in this embodiment is a cylindrical member having a threaded outer surface and a head portion with the head portion ordinarily located beneath the top partition and extending therethrough, with the interior of the cylinder containing the wick. The nut is adapted to engage the threads on the cylinder. The abradant wheel in a preferred form of the invention has at least one side cut away to form a ratchet surface with the teeth being substantially radially aligned with the axis of rotation of the wheel. A pawl is rotatably mounted on the pin that extends between the two ears and has a ratchet engaging portion. Means are provided for rotatably turning the

pawl to rotate the ratchet and strike sparks from the flint. The pawl is operated by the slidably mounted member that serves to raise the cover and expose the wick. As can be seen, the lighter may be easily assembled and disassembled and most of the parts may be made of stamped pieces that are relatively inexpensive.

In the embodiment of the invention shown in the accompanying drawings, the improved lighter comprises a casing 10 having a top partition 11, bottom 12, and top edges 13 forming a windshield, a wick 14 extending through the top partition 11, a flint 15 or other sparking means also extending through the top partition 11, and an abradant wheel 33 in contact with the flint, and a slidable mounted member 16 mounted on the top edge of the casing 10 and serving to operate the abradant wheel 33.

The bottom 12 of the casing is provided with a filling opening 17 through which inflammable fluid may be fed into the interior of the casing 10. This filling opening is normally closed by a closure member 18 comprising a threaded plug 18a provided with a head 19. The inner portion of the closure member has a chamber 20, which may be used to hold spare flints. The plug 18a is separable from the chamber portion 21 so as to provide access to the chamber 20. The bottom 12 also serves to hold the lower end of a flint tube 22 which extends upwardly through the top partition 11. The flint tube holds the flint 15 at its top end and contains a coil spring 23 serving to hold the flint 15 against the abradant wheel 33. The bottom of the flint tube 22 is closed by a removable cap 24. In order to provide a more pleasing appearance, the bottom of the casing 10, including the bottom 12, is normally covered by a bottom cover 25 slidably mounted thereon and held by friction only. This bottom cover serves to conceal the plug 18a and the removable cap 24.

The wick 14, which extends through the top partition 11, is coiled within the casing 10 between the top partition 11 and the bottom 12. This wick is kept saturated with fluid and the fluid may be renewed by removing the bottom cover 25 and inserting fresh fluid through the opening 17.

The top of the casing 10 has an end portion 26 and adjacent side portions arranged on a level lower than the remainder of the top edge. This remainder of the top edge constitutes the windshield 13. The top partition 11 has a corresponding part 11a also lower than the remainder 11b of the partition. On top of the higher portion 11b of the partition 11, there is located a bracket plate 27. The wick 14 extends through the part 11b and the bracket plate 27. The top end of the wick is held within a cylinder 28 having a head 29 beneath the top partition 11 with the cylinder extending through the bracket plate 27. This cylinder is provided with a threaded outer surface which is engaged by a nut 30 on top of the bracket plate. The cylinder 28 not only serves as a wick tube to hold the wick, but also serves as a bolt to hold the bracket plate 27 on the higher portion 11b of the top partition.

The bracket plate 27 is provided with a pair of spaced substantially parallel upstanding ears 31. These ears are located within the windshield 13 adjacent the rear thereof. Extending between the top portions of the ears 31 and loosely held therein is a pin 32. Rotatably mounted on the pin 32 is an abradant wheel 33 having abra-

dant teeth 33a on its peripheral surface with the teeth arranged to contact the flint 15. The ends of the pin 32 are located adjacent the windshield 13 and this serves to hold the pin in place. The entire assembly may be removed by merely removing the nut 30 to release the bracket plate 27. When the bracket plate and attached ears are removed from within the windshield 13, the pin 32 may be easily withdrawn from the ears 31 thereby releasing the abradant wheel 33.

Extending across the top of the windshield 13, is located a cover 34. This cover is somewhat longer than the higher portion 11b of the top partition 11. The cover is provided with a downwardly extending substantially cylindrical wick cover tube 35 which is arranged to press tightly against the top 30a of the nut 30 and extend around the wick 14 to form a tight seal when the cover is closed. This not only serves to snuff the flame burning from the wick 14, but also prevents or materially reduces evaporation of the inflammable fluid.

The end of the cover 34 opposite the cover tube 35 is provided with a pair of downwardly extending ears 36 spaced inwardly from the sides of the windshield 13. Extending between these ears 36 is a second pin 37, with this pin being located above the first pin 32. The first pin 32 and the second pin 37 are connected by a pair of spaced links 38 rotatably mounted on both pins. Also extending between the ears 36 on the cover 34 there is located a third pin 39 spaced rearwardly of the first pin 32 and the second pin 37.

The abradant wheel 33 has one side cut away to form a ratchet surface 40. The ratchet teeth 41 have edge portions substantially radially aligned with the axis of rotation of the wheel. Also mounted on the first pin 32 is a ratchet pawl 42 having a ratchet engaging portion 43 for engaging the teeth 41. The teeth 41 and the ratchet engaging portion 43 are so arranged that when the pawl is rotated in a counterclockwise direction, as shown in Fig. 5, the abradant wheel 33 will also be rotated in a counterclockwise direction.

The pawl 42, including the ratchet engaging portion 43, is made of relatively thin spring steel. The pawl is held in engagement with the ratchet surface 40 by means of a washer 49 arranged between the upstanding ear 31 adjacent the pawl 42 and the corresponding link 38.

The portion of the pawl 42 surrounding the first pin 32 is of substantially annular shape with an edge portion of the annulus being displaced to form the ratchet engaging portion 43. Extending from the annular portion of the pawl 42 are two spaced substantially parallel extended portions 44 forming a bifurcated construction. The third pin 39 is held between these extended portions 44.

In order to rotate the cover 34 and turn the abradant wheel 33, there is located a slidably mounted member 16 on the portion of the casing 10 above the bottom cover 25 and immediately above the lower portion 11a of the top partition 11. This member 16 is provided with sides 16a extending over the ears 36. The third pin 39 has its ends held in these side portions 16a with the pin extending through the ears 36. The slidable member 16 has a finger-engageable top surface 16b by which the member may be pressed down. On the inner surface of this portion 16b, there is located a downwardly extending cylinder 45 with the cylinder engaging the top of a guide rod 46

mounted on the top of the lower portion 11a of the partition 11. The cylinder 45 serves as a slide tube and is axially aligned with the guide rod 46. In order to hold the slidable member 16 in its top-most position, there is provided a coil compression spring 47 extending between the base 48 of the cylinder 45 and the portion of the partition 11 around the guide rod 46.

With this construction, the lighter is operated by pressing the member 16 down. This serves to rotate the cover 34 and the wick cover tube 35 with pin 37 and the links 38 about the pin 32 and move the entire assembly up and back as shown in Fig. 3. It also serves to rotate the pawl 42 and thus the abradant wheel 33 to strike sparks from the flint 15. Upon releasing the slidable member 16, the spring 47 causes the member to be raised to its top position as shown in Fig. 1 thereby lowering the cover 34 together with the wick cover tube 35. The bottom of the wick cover tube forms a seal with the sloping top surface 30a of the nut 30 to snuff the flame and also to seal the area around the wick 14.

The various parts of the new lighter are relatively inexpensive to make and they may be easily assembled and disassembled. When it is necessary to replace or repair the moving parts, all moving parts may be disassembled by merely removing the nut 30 to release the bracket plate 27. The abradant wheel 33, cover 34, slidable member 16, and pawl 42 are all held in place by the bracket plate 27 which in turn is held only by the threaded cylinder 28, and nut 30. The threaded cylinder 28 also serves to hold the wick 14.

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

I claim:

1. A pyrophoric lighter, comprising: a casing; a top partition therefor with the upper edges of the casing extending beyond said top partition; a wick within said casing having its end extending through said top partition, said upper edges serving as a windshield for said end of the wick; an abradant wheel within said upper edges; a first pin upon which said abradant wheel is rotatably mounted; a sparking means engaging the abrading surface of said wheel; a cover for said upper edges; downwardly-extending spaced ears on said cover adjacent said first pin; a second pin extending between said ears and spaced from the first pin; linkage means connecting said first and second pins with the linkage means being rotatably mounted on both said pins; means for depressing the end of the cover adjacent the pins to raise the end adjacent the wick and to rotate the linkage means about the first pin and simultaneously to rotate the cover with the second pin, whereby the cover is simultaneously moved up and back from the wick; and means for turning said abradant wheel to strike sparks from the sparking means with the sparks being directed toward the wick.

2. A pyrophoric lighter, comprising: a casing having one end portion and adjacent side portion of its upper edge on a level lower than the remainder of said upper edge; a top partition for the casing with the upper edges of the casing extending beyond said top partition, said top partition also having a portion lower than the remainder of the top partition with the position of the lower portion of the top partition correspond-

ing to the position of the lower portion of the upper edges; a wick extending through the higher portion of said top partition; an abradant wheel on said higher portion of the top partition; a pin upon which said abradant wheel is rotatably mounted; a sparking means engaging the abrading surface of said wheel; a cover for the higher portion of said upper edge of the casing with the cover extending over the abrading wheel and the wick; downwardly-extending spaced ears on said cover adjacent said first pin; a second pin extending between said ears with the second pin being spaced from the first pin; linkage means connecting said first and second pins with the linkage means being rotatably mounted on both said pins; a member slidably mounted on the portion of the casing above the lower portion of said top partition; a third pin held by said slidably mounted member and rotatably engaging said downwardly-extending ears on the cover, said third pin being located rearwardly of the first and second pins; means urging the slidably mounted member toward its highest position; a finger-engageable surface on said member for depressing said member so that the third pin causes the linkage means to rotate about the first pin and the cover to rotate about the second pin, whereby the cover is simultaneously moved up and back from the wick; and means for simultaneously turning the abradant wheel to strike sparks from the sparking means.

3. A pyrophoric lighter, comprising: a casing; a top partition for said casing; a wick in said casing extending through said top partition; means for igniting the wick at the end extending through said top partition; a movable cover and sealing means for said end of the wick forming a seal around the extending end of the wick when the cover is closed; an elongated linkage means having one end rotatably attached to said cover adjacent the end of the cover that is opposite said wick and the other end operatively and rotatably attached to said casing; and means for depressing the end of said cover opposite said wick and adjacent said linkage means to rotate the linkage means and cover about the end of the linkage means that is rotatably attached to the casing, said cover rotating with the end of the linkage means that is rotatably attached to the cover, so that the end of the cover adjacent the wick is moved up and the entire cover is simultaneously moved back from the wick.

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