March 15, 1938. L. V. ARONSON 2,111,524

LIGHTER

Filed Jan. 12, 1937

Fig. 1.

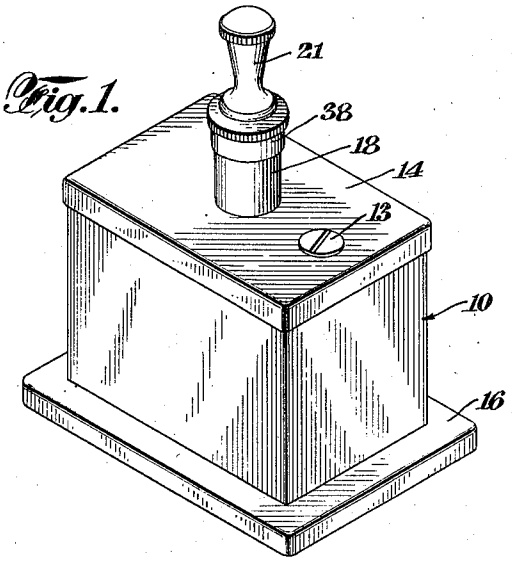


Fig. 6.

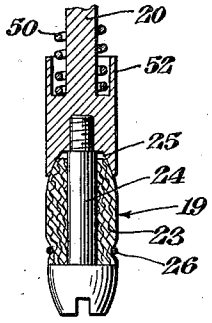


Fig. 2.

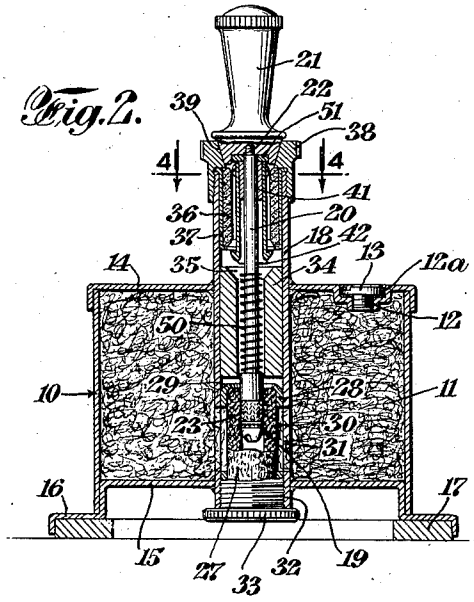


Fig. 3.

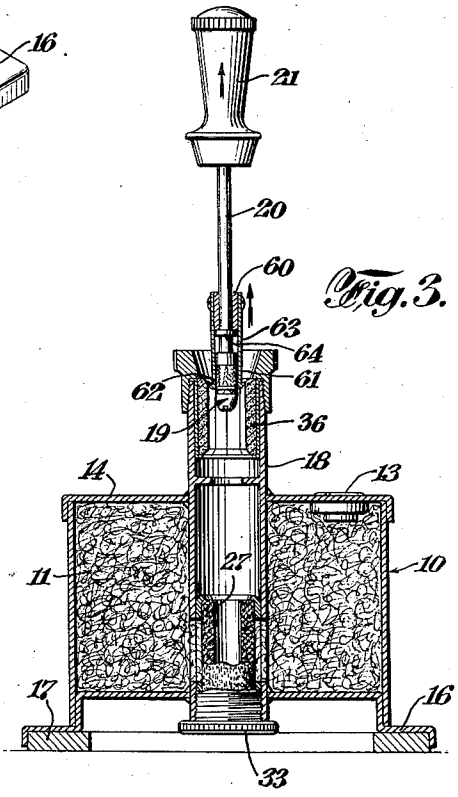


Fig. 4.

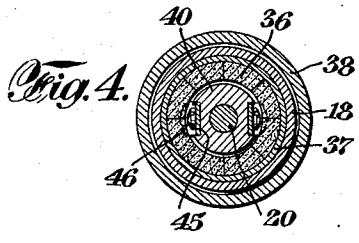
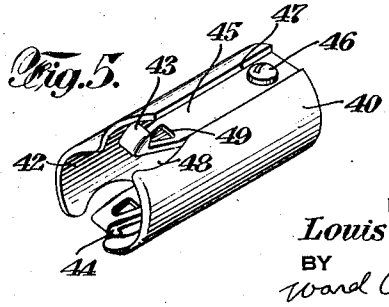


Fig. 5.



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2,111,524

LIGHTER

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Application January 12, 1937, Serial No. 120,161

10 Claims. (Cl. 67—4.1)

This invention relates to pyrophoric lighters and more particularly to lighters of this type embodying torch means mounted on a rod or the like adapted to be deposited, for example, in a fuel receptacle, the torch being caused to ignite upon withdrawal of the supporting rod from the receptacle.

The objects of the invention include the provision of an unusually simple, inexpensive, and highly dependable lighter of the above indicated type, and a lighter which may be used for relatively long periods of time without refilling with fuel and without renewal of the pyrophoric material.

According to preferred embodiments of the invention, either the fuel receptacle or the torch supporting rod may be provided with pyrophoric material, adapted to be engaged by abradant means so arranged that during the initial part of the movement of withdrawing the rod and attached torch from the receptacle, the abradant means will not immediately scratch over the pyrophoric means, but after the withdrawal movement has become accelerated, then the abradant means is vigorously and very rapidly scratched along the pyrophoric material, with the result that ignition of the torch is assured upon its leaving the receptacle.

Various further and more specific objects, features and advantages will clearly appear from the detailed description given below, taken in connection with the accompanying drawing which forms a part of this specification and illustrates merely by way of example, certain preferred forms of the invention. The invention consists in such novel features, arrangements and combinations of parts as may be shown and described in connection with the devices herein disclosed.

In the drawing, Fig. 1 is a perspective view of a lighter embodying the invention;

Fig. 2 is a central vertical sectional view of a lighter embodying the invention in one of its forms;

Fig. 3 is a view similar to Fig. 2, but showing the torch member of the lighter partially removed and illustrating a somewhat different embodiment of the invention;

Fig. 4 is a horizontal sectional view taken substantially along the line 4—4 of Fig. 2;

Fig. 5 is an enlarged perspective view of the abradant means of the type used in the device of Fig. 2; and

Fig. 6 is an enlarged detailed view partly in section and partly broken away, showing the inflammable torch element which may be used with the invention, and the adjacent portions of a rod for supporting the torch.

Referring to the drawing in further detail, the lighter there shown may comprise a relatively large receptacle 10 for containing a mass of absorbent material such as cotton 11, which may be saturated with inflammable liquid introduced, for example, through a filling opening as at 12. The filling opening as shown is located in the top wall of the receptacle, although it may be located in any other wall of the receptacle at a point where it will not interfere with any decorative features thereon. The filling opening may be normally kept closed as by a screw plug 13. The screw plug may have an enlarged head adapted to be received in an enlarged upper portion 12a of the filling opening. When the screw plug is out, the enlarged portion 12a of the opening may serve in effect as a small funnel to aid in introducing the fuel.

The receptacle 10 may be provided with a cover or top wall 14 permanently sealed on to the casing and a bottom wall 15, also permanently sealed in respect to the casing walls. The bottom wall 15 may be flanged downwardly and then outwardly, for example, as indicated at 16, to provide an enlarged supporting base area for the device. The base or flanged edges thereof also if desired may be attached to a relatively heavy weight or ring as at 17, formed for example of lead. Thus a weighted base of large area is provided insuring stability of the device during its operation as it rests on a table or other support.

Within the receptacle 11, preferably at or adjacent its central portion, a tube 18 may be mounted and sealed through the top and bottom walls of the receptacle. This tube provides a cavity for slidably receiving a torch member 19 carried by a longitudinally movable rod 20. The upper end of the rod 20 may be provided with a handle 21 threaded as at 22 or otherwise substantially permanently secured to the rod.

As shown in Fig. 6, the torch member 19 may comprise a short length of hollow braided wick material or the like as at 23, surrounding a screw member 24, threaded into the lower end of the rod 20. The lower end of the rod 20 may be suitably concaved as at 25 to receive the upper ends of the wick piece 23 and thereby preventing fraying of the edges of the wick. The lower edges of the wick piece 23 may be suitably secured in respect to the screw member 24 as by an encircling wire or the like 26.

As the torch member normally rests within the lighter receptacle, it may be received within a

hollow cylinder or cylinders as at 27, formed of absorbent felt or the like and having internal diameters such as to closely embrace the wick piece 23. The felt cylinder pieces 27 may be mounted within a cylinder of sheet metal as at 28 closely fitting the interior of the lower end of the tube 18. The upper edges of the metal cylinder 28 may be turned over as at 29 to secure the felt against upward displacement. The side walls of the cylinder 28 may be perforated at one or more areas as at 30 and the adjacent portions of the walls of the tube 18 may be similarly perforated as at 31 whereby fuel from the absorbent cotton 11 may be gradually transferred to the felt cylinder members 27 and thence to the wick piece 23 on the torch 19, so that the supply of fuel on the torch is replenished while the torch rests within the receptacle.

The lower end of the cylinder 28 may be provided with a threaded engagement as at 32 with the lower end of the tube 18 and the lower end of the cylinder 28 may be provided with a bottom wall flanged and knurled at its periphery as at 33 to enable the user to screw out the cylinder 28 and the enclosed felt for inspection, cleaning or replacement of the felt from time to time. With the cylinder 28 removed from the lighter receptacle, the felt cylinders may be readily removed through the upper end of the cylinder 28 by flexing same past the retaining flange 29.

Within the central portion of the tube 18, a restricted cylindrical guiding sleeve or cylinder may be fixed as indicated at 34. It will be noted that the cylinder 34 has a central aperture just large enough to permit the torch to readily pass therethrough. This aperture is in alignment with the central apertures in the felt members 27, so that the torch member is guided into the latter and the upper ends of the felt members are protected against wear or dislocation by the insertion of the torch. At the same time, the insertion of the torch when lighted, into the guide member 34, serves to extinguish the flame before it can be brought adjacent the felt cylinder members which are saturated with the fuel. The upper end of the opening in the member 34 may be suitably flared as at 35 to permit the torch to be more readily inserted.

A plurality of vertically extending strips of pyrophoric material as at 36 may be mounted around the interior walls within the upper end of tube 18. Or in some cases it may be possible to provide a mass of pyrophoric material in the form of a hollow cylinder closely fitting within the upper end of the tube 18. In either event the pyrophoric material preferably comprises substantially a complete ring encircling or extending around the opening within the upper end of tube 18. This substantially complete ring of pyrophoric material insures that as the abradant means carried by the rod 20, as hereinafter described, is removed, the abradant means will scratch over the surface of at least one or more sectors or segments of the pyrophoric material regardless of how the abradant means happens to be turned about the rod 20, when the latter is resting in the lighter receptacle ready for operation. The provision of the pyrophoric means in the form of a cylinder or ring also enables a relatively large amount of this material to be positioned in a small space so that there will be ample pyrophoric material available for using the lighter over a period many times longer than possible with the usual lighter, without replacing the pyrophoric element. The strips of pyrophoric material if desired may be carried as a unit within a thin sheet metal cylinder 37 suitably flanged at its upper and lower ends as shown and adapted to be quickly inserted or removed from the upper end of the tube 18. The pyrophoric strips may be secured to the interior of the cylinder 37 either by adhesive or by reason of the flanged construction of the cylinder 37 and associated parts acting in cooperation with the sector shaped strips.

The upper end of the tube 18 may be formed for threaded engagement with a removable ferrule 38, knurled at its upper outer edge and adapted to be removed to permit inspection, repair or replacement of the pyrophoric members or other parts within the tube 18. The ferrule 38 may have its central opening somewhat flared as at 39 to receive a correspondingly tapered lower end portion of the handle 21 for thus effectively sealing the upper end of the tube 18 against the escape of evaporated fuel. The flared opening 39 also permits the torch member to be more readily inserted.

The form of abradant means carried by the rod 20 as illustrated in Fig. 2, is shown in further detail by the perspective view of Fig. 5. This form may comprise a metal cylinder 40 drilled at its upper end at 41 to closely but slidably receive the rod 20. The lower end of the member 40 may be hollow as indicated at 42. The abradant means per se may comprise one or more relatively sharp steel scraping members as at 43 and 44, preferably integrally formed with spring steel supports as at 45, which supports in turn may be fixed at their upper ends to the member 40 as by screws 46. As shown in Fig. 5, each of the abradant members as at 43 and its integral yieldable supporting arm may be received within a slot as at 47 extending longitudinally of the member 40. Upon the withdrawal of the member 40 from its normal position within the ring of pyrophoric material, the members 43 and 44 scrape along the surfaces of the pyrophoric material under yielding pressure, with the consequence that glowing particles of the pyrophoric material fly off in directions generally radially inwardly of the member 40, so that the torch when within or adjacent the member 40, will become ignited. In order to give the sparks thus produced, more ready access to the torch when within the cavity 42, the side walls of member 40 adjacent the members 43 and 44 may be cut away as at 48 and if desired, apertures as at 49 may be cut through the spring supports 45.

With the embodiment of the invention shown in Fig. 2, a coil spring 50 may be mounted on the rod 20 between the torch and the member 40 for a purpose hereinafter explained in connection with the description of the operation of the device. This spring will serve to yieldably limit longitudinal movement of the abradant means along the rod 40 in a direction toward the torch. Longitudinal movement of the abradant means in a direction toward the handle 21 may be limited by the handle itself or by a resilient washer 51 formed of fiber or rubber and secured within the base of the handle around the rod 20. This resilient washer 51 will serve to prevent any noise from occurring due to striking of the member 40 against the lower end of the handle 21.

As shown in Fig. 6, the enlarged lower end of the rod 20 may be provided with an upwardly extending flange as at 52 if desired, for surrounding the lower end of the coiled spring 50 and

thereby protecting the spring against the flame from the torch.

In operating the device of Fig. 2, the user will grasp the handle 21, whereupon he may pull the rod 20 and the attached torch freely upwardly until the upper end of the spring 50 extends into and engages the member 40. Thereupon further upward movement of the handle 21 will serve to substantially compress spring 50, since the member 40 will tend to remain in its initial position because of the engagement of the sharp abradant members 43 and 44 with the pyrophoric material. However, after the spring 50 becomes sufficiently compressed to overcome this engagement, the member 40 will quickly spring upwardly under the influence of the spring 50, with the result that the scraping action of the abradant members 43 and 44 against the pyrophoric members will be initiated with a snap action and carried through with a motion more rapid than the motion of the hand of the user in lifting the torch. This will insure that a shower of sparks will be created within the cavity 42 of the member 40 at substantially the same moment that the wick piece 23 of the torch arrives at or adjacent this cavity. Consequently as the torch is removed from the upper end of the tube 18, it will be ignited. The lighter torch will then provide a convenient means for lighting cigars, cigarettes or pipes. The wick piece 23 is of sufficient size to carry a limited amount of fuel sufficient so that the torch with each operation, may be used to more effectively carry out all of the usual purposes of a lighted match, yet the flame is kept away from the fingers of the user and at an exposed point for convenient application to the material to be lighted. After the torch has been used, it may be extinguished by simply thrusting it back into normal position in the lighter receptacle as shown in Fig. 2.

In the embodiment of the invention illustrated in Fig. 3, all of the parts except for the abradant means and its associated parts, may be similar to those of Fig. 2. The abradant means may comprise a collar 60 freely slidable on the rod 20. A pair of abradant elements as at 61 and 62 may be mounted upon spring supports as at 63 attached as by screws to collar 60. The rod 20 at a point adjacent its lower end near the torch, may have a collar 64 fixed thereto for operating the abradant means when the torch is removed from the lighter. When the parts of Fig. 3 are in normal position, ready for operation, the handle 21, rod 20 and the torch will be in positions corresponding to those shown in Fig. 2. At the same time the collar 60 and the attached abradant or scraping members will be down within the ring of pyrophoric material. In operating the device of Fig. 3, the user grasps the handle 21 as with the device of Fig. 2. Thereupon the torch rod 20 may be pulled upwardly freely with increasing acceleration. When the user's hand and the torch have thus acquired considerable momentum, the collar 64 will engage between the spring supports 63 tending to spread them apart, causing the scraping members 61 and 62 to more firmly engage the pyrophoric material and thereafter almost immediately causing the scrapers and collar 60 to be quickly drawn up out of the ring of pyrophoric material. Thus the abradant elements are firmly held against the pyrophoric material as they are quickly scraped thereover with the momentum of the user's hand and the torch, and hence as the torch leaves the top of the tube 18, its ignition will be assured. After the torch has been used, it may be reinserted as with the device of Fig. 2, whereupon the wick piece 23 will again come into engagement with the felt cylinder members 27 to renew the supply of fuel on the torch and the abradant members will again rest within the pyrophoric ring ready for the next operation.

It will be understood that with both examples of the invention shown in Figs. 2 and 3, as the device is used from time to time, the abradant members will be reinserted in various angular positions with respect to the ring of pyrophoric material so that the wearing of the pyrophoric material will be distributed among the various sectors or segments thereof and consequently the device may be used for very long periods of time without renewing the pyrophoric elements. However, when it becomes necessary or desirable to renew these elements, this may be quickly and conveniently done upon screwing off the ferrule 38. The life of the pyrophoric means may be even further extended if desired by omitting one of each pair of the scraping or abradant members. Also if the wick piece 23 of the torch member should become deteriorated or worn, it may be quickly replaced upon removal of the screw member 24. Furthermore, the felt cylinder members 27 for contacting with the wick may also be quickly replaced or cleaned when necessary after long periods of use, upon screwing out the member 33. Since all of the parts which may become worn or deteriorated after long use may be thus readily cleaned or replaced, and since the device embodies no rotatable bearings or other parts subject to any material wear, it will be apparent that the device will be suitable for use for many years.

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 a casing, a body of fuel absorbent therein, said casing having a cavity extending from said absorbent to the exterior of the casing, an elongated torch member received in said cavity and longitudinally removable therefrom, a body of pyrophoric material mounted within said cavity at a point between said absorbent and the outlet of the cavity, abradant means for engaging said pyrophoric material, a yieldable support for urging said abradant means against said pyrophoric material, said support being carried by said torch member and slidable longitudinally thereon as a result of the engagement of the abradant means and pyrophoric material when the torch member is slidably moved in the cavity, and means on said torch member for limiting the slidable movement of said support in each direction along said member.

2. A lighter comprising a casing, a body of fuel absorbent therein, said casing having a cavity extending from said absorbent to the exterior of the casing, an elongated torch member received in said cavity and longitudinally removable therefrom, a body of pyrophoric material mounted within said cavity at a point between said absorbent and the outlet of the cavity, abradant means for engaging said pyrophoric material, a

yieldable support for urging said abradant means against said pyrophoric material, said support being carried by said torch member and slidable longitudinally thereon as a result of the engagement of the abradant means and pyrophoric material when the torch member is slidably moved in the cavity, and means for yieldably limiting the slidable movement of said support toward the inner end of the torch member.

3. A lighter comprising a torch, a supporting rod therefor, fuel receptacle means for slidably receiving said torch and rod, interengaging spark producing means on said rod and receptacle, including a pyrophoric element and an abradant member, and a spring on said rod arranged to first apply yielding pressure to a portion of said spark producing means as the rod is withdrawn from the receptacle, and for then suddenly causing rapid relative movement of said member in respect to a surface of said element, as the rod and torch leave the receptacle.

4. A lighter comprising a torch, a supporting rod therefor, fuel receptacle means for slidably receiving said torch and rod, a pyrophoric element on said receptacle, an abradant member mounted for slidable scraping engagement with said element, and a spring on said rod arranged to first apply yielding pressure tending to move said abradant member as the rod is being withdrawn from the receptacle, and for then suddenly causing rapid scraping movement of said member over a surface of said element, as the rod and torch leave the receptacle.

5. A lighter comprising a torch, a supporting rod therefor, fuel receptacle means for slidably receiving said torch and rod, a pyrophoric element on said receptacle, an abradant member slidably mounted on said rod and adapted for slidable scraping engagement with said element, and means on said rod permitting the rod and torch to be partially withdrawn from the receptacle without substantial resistance and for then causing said scraping engagement, as the rod and torch leave the receptacle.

6. In a lighter construction, a fuel receptacle, a substantially tubular member extending upwardly from a region in said receptacle where fuel is contained, the upper end of said member being adapted to slidably receive a torch member, fuel absorbent means within said member at said region and adapted to receive the torch and transfer fuel thereto from the receptacle, said means comprising a felt-like socket member for embracing the torch when deposited therein, and removable means for sealing the lower end of said tubular member and for also removably retaining said felt-like member therein.

7. In a lighter construction, a fuel receptacle, a substantially tubular member extending upwardly from a region in said receptacle where fuel is contained, the upper end of said member being adapted to slidably receive a torch member, fuel absorbent means within said member at said region and adapted to receive the torch and transfer fuel thereto from the receptacle, said means comprising a cartridge-like member removable from the lower end of said tubular member and containing a removable felt socket member for embracing the torch when deposited within the tubular member.

8. In a lighter, an upright tubular member for receiving a torch through its upper end, means within its lower end for transferring fuel to the torch, comprising a socket of fuel absorbent material, and a cartridge-like container for said socket threaded into and removable from the lower end of said tubular member.

9. A lighter comprising in combination a fuel receptacle, a removable torch member, a socket in said receptacle for receiving said torch member and transferring fuel thereto, pyrophoric means for lighting the torch, said torch member including a supporting rod, a screw member extending axially of said rod and having threaded engagement with the lower end thereof, a wick piece comprising a length of tubular fabric material extending axially of said screw member and surrounding said screw member between its head and the lower end of the rod, the lower end of said rod being recessed to receive the adjacent edges of the wick piece, and means provided at the head of the screw member to embrace the adjacent edges of the wick piece.

10. In a lighter construction, a fuel receptacle, substantially tubular means extending upwardly from a region in said receptacle where fuel is contained, the upper end of said tubular means being adapted to slidably receive a torch member, pyrophoric spark producing means comprising a plurality of bars of ferro-cerium material extending substantially axially of said tubular means at the upper end thereof, means on said torch member for effecting scraping engagement with said material upon withdrawal of the torch member, a tubular shell upon the interior walls of which said bars of material are secured, said shell being telescopically received within the upper end of said tubular means, and means for removably retaining said shell within the upper end of the tubular means whereby said spark producing means may be removed and replaced as an assembled unit.

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