April 1, 1941. G. P. SCHMITT 2,237,117

LIGHTER

Filed March 10, 1937

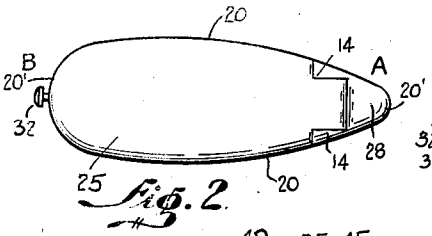


Fig. 2.

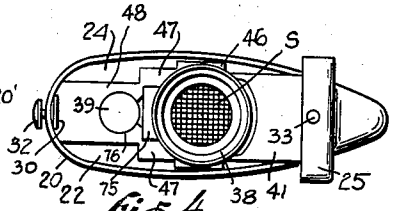


Fig. 4.

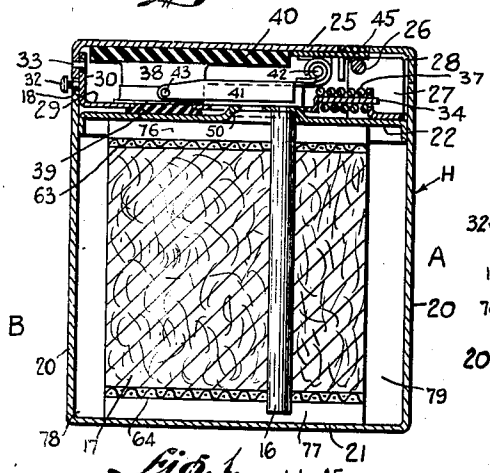


Fig. 1.

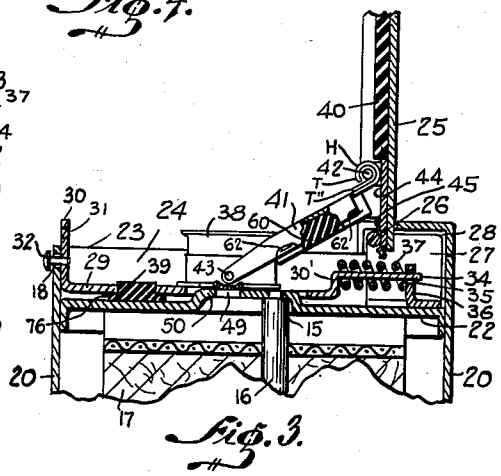


Fig. 3.

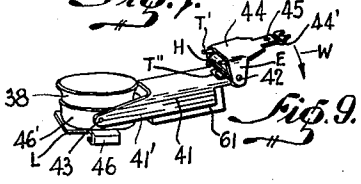


Fig. 9.

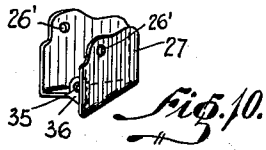


Fig. 10.

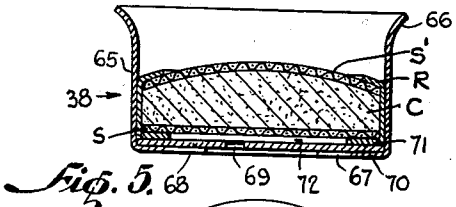


Fig. 5.

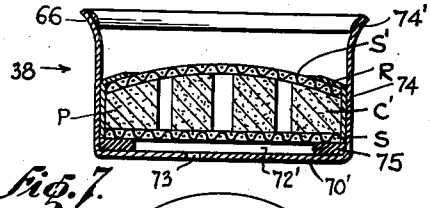


Fig. 7.

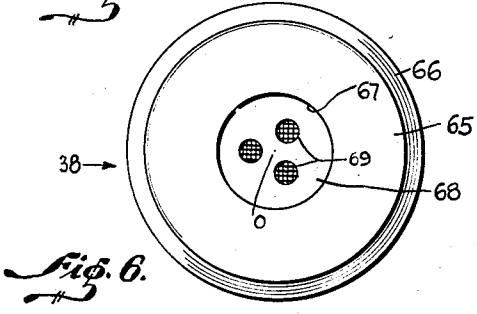


Fig. 6.

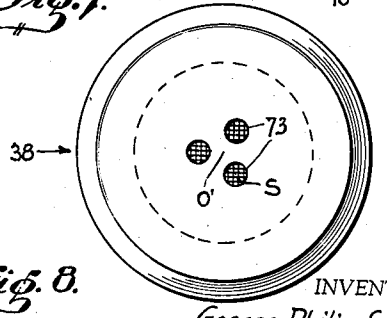


Fig. 8.

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UNITED STATES PATENT OFFICE

2,237,117

LIGHTER

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Application March 10, 1937, Serial No. 130,157

6 Claims. (Cl. 67—7)

This invention relates to lighters which employ a catalyst for igniting cigarettes and the like, wherein the vapor of alcohol or other vaporizable liquid carried by absorbent material is employed for effecting such action upon the catalyst, in the presence of atmospheric air, as will render such catalyst incandescent, so that the cigarette or the like applied thereto and drawn upon, may be ignited.

This invention concerns improvements with relation to the type of lighters disclosed in Patents Nos. 2,189,999 and 2,160,002.

It is an object of the present invention to provide an efficient, practical, and economical catalytic lighter having parts constructed in such manner as to enable the same to be cheaply and expeditiously assembled together to form the complete lighter.

A further object of the present invention is to provide a fluid tight catalytic lighter whereby the fluid may be retained therein for a relatively long time and wherein the catalyst is completely sealed during the inoperative period of the lighter when the cover is closed thus preventing any association of the catalyst with the fuel vapor. This complete sealing and segregation of the catalyst from the fuel during inoperative periods of the lighter has been found to be highly desirable for it is known that if the catalyst remains under the influence of fuel vapor for a prolonged period when the lighter is closed condensation will form on the catalyst and render it inactive until the catalyst has been dried out. The condensation is aggravated by the fact that the atmospheric air which is mixed with the fuel vapor carries moisture.

It is a further object of this invention to provide means for increasing the rate of flow of the fuel charged air to the catalyst when the cigarette is drawn upon by the smoker. This object is accomplished by taking advantage of the theory that (within limitation) the rate of flow increases with a decrease in the size of the opening through which the fuel vapor and air mix is made to flow, and providing a baffle to deflect part of the fuel vapor.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated in the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing:

Fig. 1 is a sectional view of a catalyst lighter in closed inoperative position, the catalyst holder and attached arm being shown in full.

Fig. 2 is a top view of Fig. 1.

Fig. 3 is a fragmentary enlarged view (upper part) of the device shown in Fig. 1 with the cover open and the catalyst unit in operative position.

Fig. 4 is a top view of Fig. 3, but on a reduced scale.

Fig. 5 is an enlarged sectional view of a catalyst and holder employed in the lighter shown in Fig. 1.

Fig. 6 is a bottom plan view of Fig. 5.

Fig. 7 is an enlarged sectional view of a catalyst and holder employing the invention in a modified form.

Fig. 8 is a bottom plan view of Fig. 7.

Fig. 9 is a perspective view of the catalyst arm and holder or retainer.

Fig. 10 is a perspective view of the cover hinge.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Referring to the drawing the embodiment of lighter therein disclosed comprises a housing or casing H having integral side walls 20 and bottom 21; the side walls converge to form the arcuate end walls 20'. Although the casing or housing may assume any desirable shape it is preferable that the same be made "streamlined," as seen in Figs. 2 and 4. The casing may be made of any suitable material, composition or metal and is adapted to contain a vaporizable fuel vehicle.

The lighter has a cover 25 which is hingedly connected at 26' by means of a pin 26 to the ears 14 of the hinge member 27 provided at the tapered end A and which fits under the cap 28 of the lighter. The cover 25 and cap 28 complete the closure means. A top plate 22 forming the upper wall of the casing or fuel chamber has a fuel opening 49 and an air duct or vent 15 provided in its raised portion 50. Top or cover plate 22 is secured to the inside of side walls 20 a predetermined distance below the top edge 23 providing a pocket 24 for the catalyst and its operating mechanism. Plate 22 extends from end to end of the lighter providing a leak-tight compartment therebelow. Extending from vent 15 to near the bottom 21 of the casing is a tube or passageway 16. Within the casing is a wick 17 which acts as an absorbent for the fuel which may be alcohol fed into the casing through open-

ing 49. Upon the top plate 22 a combined catch plate and slideway 29 is superimposed one end of which has an upright lock member 30 carrying a stud or push button 32 extending through an opening 18 in end B of the casing. The other end of slideway 29 has another upright member 30' from which extends a pin or arm 34 which enters a hole 35 in the upright tongue 36 of the hinge member 27.

A helical compression spring 37 encircles the arm 34. Spring 37 is arranged so that normally the button 32 protrudes through opening 18 in the position shown in Figs. 1–4. By pressing the button 32 inwardly against the force of spring 37 an opening 31 in the raised end 30 of plate 29 may be caused to release or engage a stud or pin 33 on the cap or cover 25. The slideway 29 has an opening 75 so that in any position it does not obscure the opening 49 or 15. Slideway 29 has another opening 76 through which projects slightly a resilient gasket 39 which may be in the form of a pad or cushion of rubber or rubber composition or the like secured to top plate 22 near the end "B" of the lighter. The function of this pad 39 is to seal the opening at the bottom of catalyst shell or holder 38 when in an inoperative position as will hereinafter be more evident. Another gasket or pad 40, which may be made of material similar to pad 39, is secured to the inside or underface of the hinged cover 25, which is engageable with the top of the catalyst holder 38 to seal the top thereof when the cover is closed and the lighter is not in use. These two resilient cushions, 39 and 40, by sealing the top and bottom of the catalyst holder 38 prevent any moisture entering or accumulating within the holder 38 or condensation forming on the catalyst C during the inoperative period of the catalyst or lighter. Such moisture or condensation if allowed to exist would considerably slow up the heating of the catalyst and may render the catalyst inoperative.

The catalyst holder 38 is press fitted into or otherwise secured to the band portion 46' of a slide L having the lateral channels 46. An arm or pusher 41 has one end bifurcated, the extremities of each limb 41' being pivotally attached at 43 to the band portion 46' of the slide L.

The other end of the pusher is bent upwardly and inwardly to provide a sleeve or housing H enclosing a helical spring T having its free ends T' bearing against the downwardly-turned lateral ears E of a hinge member 44 pivotally attached to the pusher arm 41 at its sleeve H by means of pins 42. Spring T has a centrally located loop T'' bearing against the top surface of member 41 whereby member 44 is urged downwardly in the direction of arrow W. Hinge member 44 carrying pusher 41 is provided with a longitudinally disposed raised portion 44' and a projection 45. In assembling the member 44 and pusher 41 with respect to cover 25, raised portion 44' is sprung past hinged pin 26 of the cover 25, whereby hinge 26 will grip the member 44 between the raised portion 44' and the projection 45. It is understood that hinge pin 26 is located close enough to cover 25 so as to provide space for the thickness of the metal of member 44, only, thus requiring the raised portion 44' to be sprung past the hinge pin 26. In this manner the member 44 is removably attached to cover 25. Due to the fact that hinge member 44 is attached to pusher 41 in such a manner that spring T will force hinge member 44 downwardly in the direction of arrow W and due further to the novel attachment of member 44 to cover 25, this same spring action will also swing or force open cover 25 when button 32 is pressed inwardly. The two channel members 46 provided on base plate or slide L slidably engage the sides 47 of slideway 29 and guide the slide L upon opening and closing of cover 25.

Referring generally to the catalyst unit indicated in Figs. 5–8 by the numeral 38, the same comprises a shell, cup or holder 65 which may be flared at its top as indicated by the numeral 66.

Fig. 5 shows holder 65 as having an opening 67 surrounded by a flange 70 forming the bottom of the holder. Seated on flange 70 is a disk 68 having the perforations or openings 69 and over this disk is a ring-like spacer or gasket 71 providing a fuel chamber 72. Seated on spacer 71 is a wire screen S made preferably of an alloy of nickel and copper, such as, for example, what is generally known in the trade as "monel" metal. Above this screen is located the catalyst which is here shown as being in the form of a pellet, block or disk C having a slightly curved surface and which may be composed of a suitably spongy platinum composition or the like. Above catalyst C is located a protective front covering or shield S' for the catalyst, which may be in direct contact with the latter. Covering S' is preferably a wire screen made of an alloy of nickel and chromium and which may be of the type known under the trade-mark "nichrome". Covering S' and catalyst C are held in place by means of a retainer ring R preferably made of the metal alloy known as "monel" or the like. For this purpose the retainer ring R which is cup-shaped is inverted and its annular wall press fitted between the side walls of the catalyst and holder. Retainer R has an opening to permit contact of a cigarette with screen S' for igniting purposes. Instead of employing the separate perforated disk 68 the bottom of the holder may be provided with the desired perforations or openings. Such a structure is shown in Fig. 7 where the bottom 70' of holder 74 is provided with the perforations or openings 73, the ring-like spacer or gasket 75 being interposed between the screen S and holder bottom 70' to provide the fuel chamber 72'. Catalyst C' is shown as being provided with perforations P.

In the preferred constructions of the catalyst unit shown in Figs. 5–8, inclusive, three relatively small perforations or openings 69 or 73 are shown, the centers of these perforations defining three points or apexes of a triangle formed by the lines joining the same and surrounding the center 0 of disk or plate 68 or the center 0' of the bottom 70' of holder 74.

It is particularly to be noted that there is no perforation at the respective axial centers 0, 0' of the bottom members 68, 70' of the catalyst unit 38. The advantage of this construction will be made evident as the description proceeds.

When cover 25 is open, i. e., in the operative position the catalyst C lies vertically above the fuel opening 49. In closing and opening cover 25 pusher 41 will cause holder 65 to reciprocate over fuel opening 49, and when the cover 25 is closed the holder 65 will slide away from opening 49 to an inoperative position as seen in Fig. 1.

Arm 41 carries on its underside a gasket 60 which may be conveniently secured by providing the arm with lateral flanges 61 having bent-over fingers 62 embedded in the gasket 60. This gasket may be a pad of rubber or rubber composition or the like. When cover 25 is open pad

60 is clear of the fuel opening 49 and air vent 15, but when the cover is closed arm 41 moves holder 38 to the position shown in Fig. 1, and the pad 60 is brought into a position over the openings 49, 15, the cover, due to pad 40, exerting a slight pressure to ensure that the pad effectively seals said openings.

To localize the wick or absorbent material 17 for providing a vapor space theresurrounding, an upper screen or perforated plate 63 and a lower screen or perforated plate 64 may be provided which are spaced from the top and bottom, respectively, of the casing producing the respective fuel vapor and air passages 76', 77. The wick 17 and screens 63, 64 may be confined within the casing so as to provide the fuel vapor and air passages 78, 79. Tube 16 passes through the screens 63, 64. A complete circuitous path is thereby provided on either side of tube 16 for the commingled fuel vapor and air to reach the catalyst C.

It will be evident from the above that when cover 25 is closed the fuel chamber is sealed and the catalyst unit 38 is removed from the fuel opening 49, whereas on opening cover 25 the unit 38 is brought into an operative position. A cigarette or the like held against the screen S' of the catalyst unit 38 will be lighted if suction be applied by drawing upon the cigarette, owing to vapor and to air (entering the casing through duct 15) mixing in the passages in the casing and entering the chamber 72, 72' in the catalyst unit through the perforations 69 or 73, in the presence of the catalyst, incandescing the latter.

After the fuel vapor flows through the fuel opening 49, it impinges upon the bottom 70' or plate 68, since there is no perforation in the center thereof in line with the fuel opening 49. The bottom 70' or plate 68 at its imperforate center 0 or 0' acts as a baffle and deflects vapor which impinges thereupon. The vapor which is not deflected flows through the perforations 69 or 73 into and fills chamber 72 or 72' contacting the catalyst. Since the rate of flow increases is greater the smaller the opening through which the vapor passes, providing a few perforations in the bottom 70' or plate 68 rather than a relatively large opening therein, considerably increases the efficiency of the device.

Holder 65 may be provided on its inner surface near the top with a band 79 of luminous paint or other suitable luminous material to facilitate guidance of the cigarette into the cup or holder, particularly in the dark.

As heretofore stated the catalyst unit 38 has the slide projections 46 which lockingly engage with the slide rails 47 of slideway 29. Pusher arm 41 and member 44 are relatively urged angularly by the spring T whereby the arm 41 is urged downwardly and the cover is urged outwardly or upwardly. Upon partial closure of the cover 25, the pusher arm 41 will slide the catalyst unit 38 off slide rails 47 onto the narrow portion 48 of the slideway, thereby permitting the catalyst unit 38 and slide arm 41 to be swung upward about the pivot 42 for refilling the container 20 with fuel, the refilling being accomplished by pouring the fuel through opening 49 in the plate 22.

I claim:

1. A lighter comprising a casing having a fuel chamber with an opening for egress of the fuel, a catalyst unit, means for arranging said unit over and removed from said opening, respectively, said unit comprising a catalyst and a holder for the catalyst, said holder having a perforated bottom member adapted for communication with said opening and an open top for admission of the tip of a cigarette or the like; and means for sealing the top and bottom of said holder when the latter is removed from said opening.

2. A lighter comprising a casing having a fuel chamber with an opening for egress of the fuel, a catalyst unit, means for arranging said unit over and removed from said opening, respectively, said unit comprising a catalyst and a holder for the catalyst, said holder having a perforated bottom member adapted for communication with said opening and an open top for admission of the tip of a cigarette or the like; and means for sealing the top and bottom of said holder and said opening when the latter is removed from said opening.

3. A lighter comprising a casing having a fuel chamber with an outlet for egress of the fuel, a catalyst unit, means for arranging said unit over and removed from said outlet, respectively, said unit comprising a catalyst and a holder for the catalyst, said holder having a bottom with an opening adapted for communication with said outlet and an open top for admission of the tip of a cigarette or the like; and a yieldable element to abut against the bottom of said holder in air sealing relation when the latter is removed from said outlet.

4. A lighter comprising a casing having a fuel chamber with an outlet for egress of the fuel, a catalyst unit, means for arranging said unit over and removed from said outlet, respectively, said unit comprising a catalyst and a holder for the catalyst, said holder having a bottom with an opening adapted for communication with said outlet and an open top for admission of the tip of a cigarette or the like; and resilient elements to abut against the top and bottom of said holder in air sealing relation when the holder is removed from said outlet.

5. A lighter comprising a casing having a fuel chamber with an outlet for egress of the fuel, a catalyst unit, means for arranging said unit over and removed from said outlet, respectively, said unit comprising a catalyst and a holder for the catalyst, said holder having a bottom with an opening adapted for communication with said outlet and an open top for admission of the tip of a cigarette or the like; and resilient elements to abut against the top and bottom of said holder and said outlet in air sealing relation when the holder is removed from said outlet.

6. A lighter comprising a casing having a fuel chamber with an outlet for egress of the fuel, a cover for the casing, a catalyst unit, means for slidably arranging said unit over and removed from said outlet, respectively, by opening and closing of the cover, said unit comprising a catalyst and a holder for the catalyst, said holder having a bottom with an opening adapted for communication with said outlet and an open top for admission of the tip of a cigarette or the like, and resilient elements to abut against the top and bottom of said holder and said outlet in air sealing relation when the holder is removed from said outlet.

GEORGE PHILIP SCHMITT.