May 30, 1939. G. P. SCHMITT 2,160,002

LIGHTER

Filed Dec. 27, 1935 2 Sheets-Sheet 1

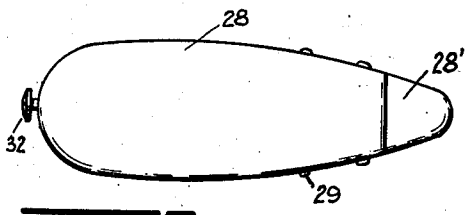


Fig. 2.

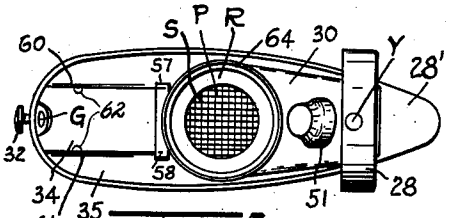


Fig. 3.

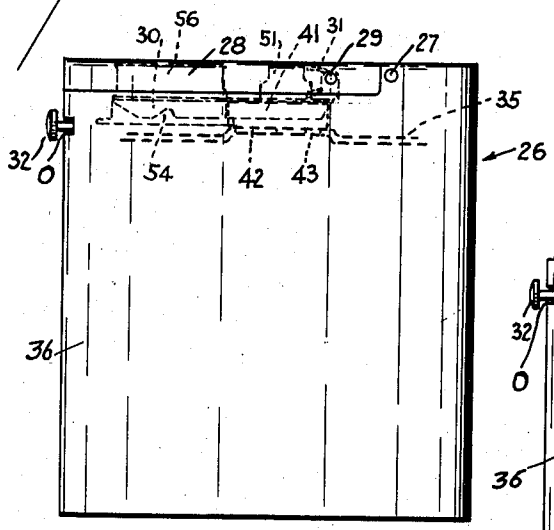


Fig. 1.

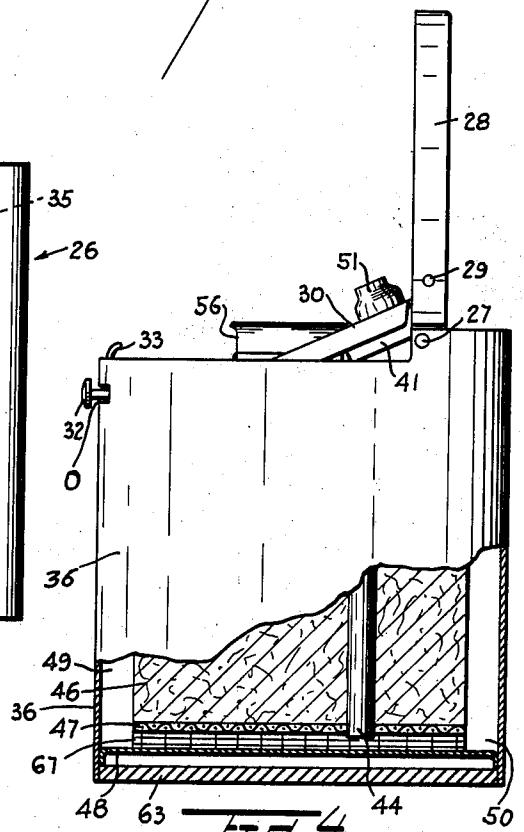


Fig. 4.

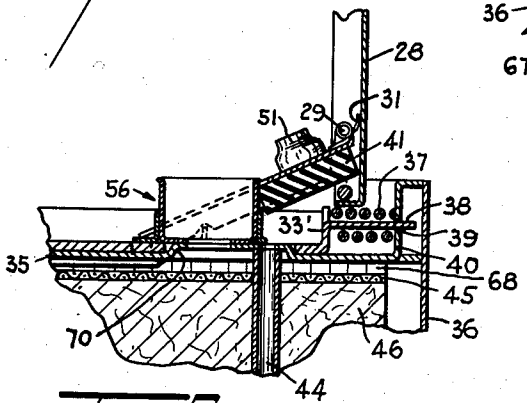


Fig. 5.

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Filed Dec. 27, 1935 2 Sheets-Sheet 2

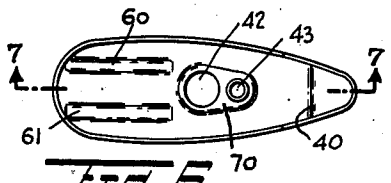


Fig. 6.

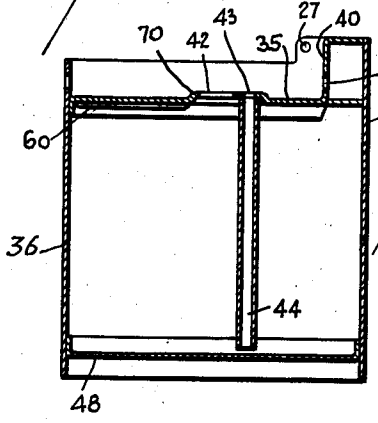


Fig. 7.

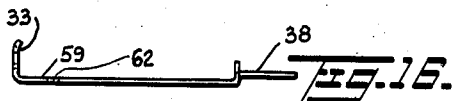


Fig. 16.

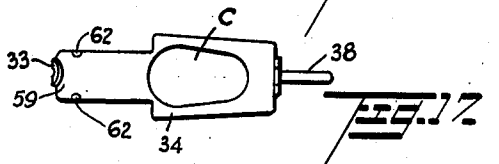


Fig. 17.



Fig. 18.



Fig. 19.

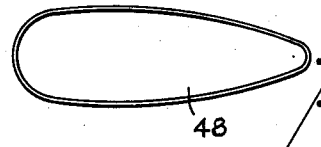


Fig. 20.



Fig. 8.



Fig. 9.

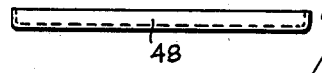


Fig. 21.

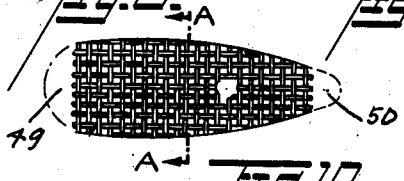


Fig. 10.

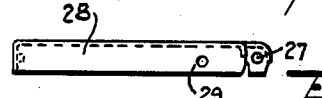


Fig. 22.

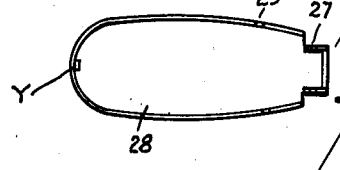


Fig. 23.



Fig. 11.



Fig. 12.

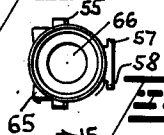


Fig. 13.

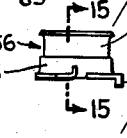


Fig. 14.

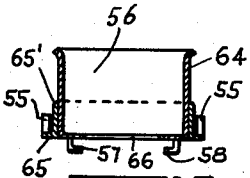


Fig. 15.

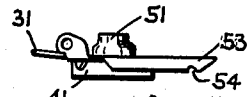


Fig. 24.

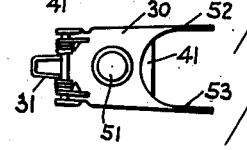


Fig. 25.

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Patented May 30, 1939 2,160,002

UNITED STATES PATENT OFFICE

2,160,002

LIGHTER

George Philip Schmitt, New York, N. Y., assignor to Platinum Products Corp., New York, N. Y., a corporation of New Jersey

Application December 27, 1935, Serial No. 56,309
In Great Britain February 20, 1935

23 Claims. (Cl. 67—7)

This invention relates to lighters which employ a catalyst for igniting cigaretttes 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.

In catalytic lighters it has been found that if the catalyst is held in the presence of fuel vapor for a prolonged period, the lighter being closed, the confined vapor will condense upon the catalyst and render it inactive until said catalyst has been dried out. This condensation is aggravated by the fact that the atmospheric air which is mixed with the fuel vapor carries a certain amount of moisture. It has been further found that failure of catalytic lighters to function satisfactorily is attributable in no small measure to inability of the suction applied through the cigarette to draw sufficient or proper mixture of fuel vapor and air for contaction with the catalyst.

Therefore my improvements, comprised in this application, which is a continuation in part of my application Serial No. 54,215, filed December 13, 1935, include the provision of means, operable by the closing of the cover of the lighter, to isolate or remove the catalyst from communication with the fuel vapor and to seal the fuel egress opening and air admission vent, to the end that in the inoperative state of the lighter, no opportunity may be presented for the collection upon the catalyst of condensation from the fuel vapor. Further my improvements include the provision of a passageway for conducting atmospheric air from the vent to the base of the fuel chamber and in the provision of means for localizing the fuel carrying absorbent material to produce a vapor space substantially completely surrounding the latter and communicating with the air passageway so that suction applied at the top of the lighter will induce a flow of air to enter the passageway and commingle with the fuel vapor in the vapor space, the mixture to be drawn to the catalyst to incandesce the same.

An object of the invention includes the arrangement of a lighter comprising a fuel chamber with a fuel egress opening, and an air admission passageway to the fuel chamber, over which fuel egress opening a catalyst holder is situated when the lighter is in use and wherein the catalyst holder is isolated from the fuel opening when the lighter is in its inoperative condition. In this arrangement the catalyst holder is disposed to be slidable over the fuel opening by a connecting arm between the catalyst holder and a hinged cap or cover which is adapted when opened to bring the catalyst into connecting with the fluid opening but which cap or cover on being closed, removes the chamber from this position and at the same time, seals the fuel chamber and air admission passageway, the association between the catalyst and the connecting arm being such that the catalyst holder may readily be removed upon opening of the cover or cap for the purpose of filling the fuel chamber through the fuel opening.

A further object of the invention resides in the provision of a vapor space surrounding the fuel carried absorbent material, whereby the air drawn in through the passageway readily commingles with the vapor in the said space for coaction with the catalyst in the catalyst holder, when the cigarette or the like is drawn upon. And for this purpose means are provided for confining or localizing the said absorbent material. Another object includes the provision of means for hermetically sealing the bottom of the fuel chamber or casing.

In the accompanying drawings I show what I now consider to be a preferred form falling within the scope of the invention as hereinafter claimed. The disclosure is not to be regarded as restrictive but rather to illustrate an embodiment of my invention, which it is understood may take many other detail forms.

Referring now to the drawings:

Fig. 1 is a side elevational view of a lighter embodying the invention and showing in dotted lines the position of the gasket with relation to the fuel and air vents and also the catalyst chamber when the cover is closed.

Fig. 2 is a top plan view of Fig. 1, the cover being closed position.

Fig. 3 is a top plan view similar to Fig. 2 but showing the cover opened and the device in operative position.

Fig. 4 is a side elevational view of same partly in section, with the cover opened and the device in position ready for use.

Fig. 5 is a sectional view of part of the device showing important parts of the device, the cover being in opened position.

Fig. 6 is a top plan view of the shell of the lighter without the cover.

Fig. 7 is a sectional view along lines 7—7 of Fig. 6.

Fig. 8 is a plan view of the bottom member.

Fig. 9 is an end elevational view of Fig. 8.

Fig. 10 is a plan view of a type of screen used at the top and bottom of the container.

Fig. 11 is a diagrammatic sectional view along line A—A of Fig. 10 showing the curvature of the top screen.

Fig. 12 is a diagrammatic sectional view along line A—A of Fig. 10 showing the curvature of the bottom screen.

Fig. 13 is a top plan view of the catalyst chamber member.

Fig. 14 is a side elevational view of Fig. 13.

Fig. 15 is an enlarged sectional view along lines 15—15 of Fig. 14.

Fig. 16 is a side view of the slideway member.

Fig. 17 is a top plan view of the slideway member.

Fig. 18 is a detail view of the thumbknob attached to the slideway member.

Fig. 19 is a detail view of the compression spring for the slideway member.

Fig. 20 is a top plan view of the inner bottom.

Fig. 21 is a side elevational view of Fig. 20.

Fig. 22 is a side elevational view of the cover.

Fig. 23 is a bottom plan view of Fig. 22.

Fig. 24 is a side elevational view of the pusher arm.

Fig. 25 is a top plan view of Fig. 24.

The numeral 26 indicates the wall of a fuel chamber or casing which may be of stream-lined or other suitable shape in cross-section, and adapted to contain a vaporizable fuel vehicle. The lighter has a cap or cover 28 hinged to wall 26 at 27 which together with the member 28' completes the closure means. A top plate 35 forming the upper wall of the casing or container has a fuel opening 42 and an air duct or vent 43. Extending from vent 43 to near the bottom 48 of the casing is a tube or passageway 44. Within the casing is a wick which acts as an absorbent for the fuel which may be alcohol fed into the casing through opening 42. Upon the top plate 35 a combined catch plate and slideway 34 is superimposed, one end of which has an upright member 33 carrying a stud or release button 32 extending through an opening O in wall 26 and the other end of which has another upright member 33' engaging an expansion spring 37. Spring 37 is arranged so that normally the button 32 protrudes through opening O in the position shown in Figure 1 but so that by pressing the button 32 inwardly against the force of spring 37 an opening G in the raised end 33 of plate 35 may be caused to release or engage a stud or pin Y on the cap or cover 28. The slideway 34 has a cutaway part in its centre forming an opening C so that in any position it does not obscure the opening 42 or 43. Expansion spring 37 is located around an extension arm 38 of slideway 34, which arm passes through an opening 39 in the upright portion 40 of the fixed cover portion 35.

The catalyst P which may be composed of a suitable spongy platinum composition or the like is housed in a chamber or holder 56 which consists of a base plate or slide 65 having a collar 65' and a cup 64 having an opening 66. Slide 65 is press fitted onto cup 64. Catalyst P is located in cup 64 over opening 66. A perforated plate or screen S of heat resisting material is placed over catalyst P which is held in position by a retainer ring R. Another perforated plate or screen (not shown) may be positioned on the bottom of the cup covering opening 66 below the catalyst. Slide 65 has two catches 55 which project upwardly. The cover or cap 28 is hinged to wall 26, and pivoted or hingedly secured at 29 to the cover is an arm or pusher 30 of which one end is bifurcated, the extremities of each limb 52, 53 having a detent or notch 54 which may be shaped as shown in Figure 24 and engaging the catch 55 of slide 65. A spring 31 presses on the arm or pusher 30 and against cover 28 so as to effect the engagement of 54 and 55 and also acts as means to swing or force open cover 28 when release button 32 is pressed inwardly. The base plate or slide 65 is provided with two channel members 57, 58 which guide the shank portion 59 of slideway or catch plate 34 and when the cover 28 is open, i. e., in the operative position shown in Figs. 3, 4 and 5 the catalyst holder 56 lies vertically above the fuel opening 42. In closing and opening cover 28, pusher 30 will cause holder 56 to slide forward and backward over opening 42, and when the cover 28 is closed the holder 56 will slide away from opening 42 to an inoperative position. Two grooves 60, 61 are provided in top plate 35 to clear the guides 57, 58. The arm 30 carries on its underside a gasket 41 which may be a pad of rubber composition or the like and a stud or button 51 projects from the upperside of arm 30. When the cover is open pad 41 is clear of the fuel opening 42 and air opening 43, but when the cover is closed arm 30 moves holder 56 to the position shown in broken lines in Figure 1, and the pad 41 is brought into a position over the openings 42, 43, the cover 28 exerting a slight pressure on the stud 51 to ensure that the pad effectively seals said openings.

To localize the wick or absorbent material 46 to provide a vapor space there surrounding an upper screen or perforated plate 45 and a lower screen or perforated plate 47 are provided which are spaced from the top and bottom respectively of the casing to provide the respective fuel vapor and air passages 68, 67. Screens 45, 47 are preferably arched as shown in Figs. 11, 12 to facilitate maintainance of respective vapor spaces 68, 67. The wick 46 is, and screens 45, 47 may be, confined within the casing so as to provide the fuel vapor and air passages 49, 50 communicating with passages 68, 67. Tube 44 passes through the screens 45, 47. A complete circuitous path is thereby provided on either side of tube 44 for the commingled fuel vapor and air to reach the catalyst P.

It will be seen from the above that when cover 28 is closed the fuel chamber is sealed and the catalyst holder or chamber 56 is removed from the fuel opening 42 whereas on opening cover 28 the holder 56 is brought into an operative position. A cigarette or the like held against the screen S of the catalyst holder 56 will be lighted if suction be applied by drawing upon the cigarette, owing to vapor and air (entering the casing through duct 43) mixing in the passages in the casing and entering the catalyst holder in the presence of the catalyst incandescing the latter.

The container may be refilled at any time by removing holder 56 from pusher 30 and slideway 34. This is accomplished by sliding holder 56 away from pusher 30 along slideway 34 (in which case catches 55 leave the notches 54) and detaching holder 56 from slideway 34 by passing the guides 57, 58 through the notches 62 in slideway 34. The holder may thus be removed from opening 42 into which the fuel may be poured. Replacement of holder 56 is readily effected by slidingly engaging the holder with slideway 34 through notches 62 and by sliding the catches 55 under the detents 54. The portion of top plate

35 surrounding openings 42, 43 is raised as indicated at 70 to prevent the fuel from escaping between the plate 35 and holder 56 when the latter is in operative position.

In order to maintain a seal tight joint at the bottom of the casing 26, a plate or auxiliary bottom 48 is soldered or welded to wall 36. The casing is then finished off for ornamental purposes by press fitting a false bottom plate 63 within wall 36 below plate 48.

I desire it understood that the invention is not to be confined to the particular form shown and described, the same being merely illustrative, and that the invention can be carried out in other ways without departing from the spirit thereof, and therefore I claim broadly the right to employ all equivalent instrumentalities coming within thescope of the appended claims, and by means of which objects of my invention are attained and new results accomplished, as it is obvious that the particular embodiment herein shown and described is only one of many that can be employed to attain these objects and accomplish these results.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. A lighter comprising a fuel chamber having a top plate with a fuel opening, a cover hinged to said chamber, a member mounted contiguous said plate and adapted to slide thereover, an arm pivoted to said cover, a catalyst container in communication with said opening when in operative position, said container being in slidable engagement with said member and connected to said arm whereby the closure of the cover moves the container from said operative position, and means carried by said member and adapted to engage or disengage said cover to permit actuation of said cover.

2. A lighter comprising a container having a cover, a slideway near the top of the container and having an air vent, a slide fitting the slideway and containing a piece of catalytic material for ignition purposes, said slide being hingedly connected to said cover, said slideway having a fuel vapor opening over which the slide extends whereby the material can be alternatively placed at the fuel opening or removed therefrom upon respective opening and closing of the cover, resilient means operable by said cover adapted to seal said fuel opening and said vent when said cover is closed, and means operative by the closing of said cover to press against said former means.

3. A lighter comprising a container having a cover, a slideway near the top of the container and having an air vent, a slide fitting the slideway and containing a piece of catalytic material for ignition purposes, said slide being hingedly connected to said cover, said slideway having a fuel vapor opening over which the slide extends whereby the material can be alternatively placed at the fuel opening or removed therefrom upon respective opening and closing of the cover, and means operable by said cover adapted to seal said fuel opening and said vent when said cover is closed.

4. A lighter comprising a container having a hinged cover, a slideway near the top of the container, a slide fitting the slideway and containing a piece of catalytic material for ignition purposes, said slide being connected to said cover, said slideway having an opening for providing a fuel vapor outlet over which the slide extends whereby the material can be alternatively placed at the outlet or removed therefrom upon respective opening and closing of the cover.

5. In a lighter, a container for fuel having a fuel opening, a cover for said container, a receptacle for housing a catalyst, said receptacle being slidable with relation to said container, means pivotally and removably connecting said cover and said receptacle, said means positioning said receptacle above said fuel opening when said cover is in open position and removing said receptacle from said fuel opening upon closing of said cover, and a member carried by said means adapted to cover said fuel opening when said cover is closed.

6. In a lighter, a container for fuel having a fuel opening and an air vent, a cover for said container, a receptacle for housing a catalyst, said receptacle being slidable with relation to said container, means pivotally connecting said cover and said receptacle, said means positioning said receptacle above said fuel opening when said cover is in open position and removing said receptacle from said fuel opening upon closing of said cover, and a member operable by said cover adapted to cover said fuel opening and said vent when said cover is closed.

7. In a lighter, a container for fuel having a fuel opening and an air duct, a cover for said container, a chamber for housing a catalyst, said chamber being longitudinally slidable with relation to said container, an arm pivoted in said cover and removably engaging said chamber, said arm positioning said chamber vertically above said fuel opening when said cover is in open position, said arm removing said chamber from said fuel opening upon closing of said cover, a member carried by said arm adapted to cover said fuel opening and said duct when said cover is closed, and means for pressing said member against said opening and duct when said cover is closed.

8. In a lighter, a container for fuel having a fuel opening and an air vent, a cover hinged to said container, a chamber for housing a catalyst, said chamber being longitudinally slidable with relation to said container, an arm pivoted in said cover and removably engaging said chamber, said arm positioning said chamber vertically above said fuel opening when said cover is in open position, said arm removing said chamber from said fuel opening upon closing of said cover, a resilient member carried by said arm adapted to cover said fuel opening and said vent when said cover is closed, and means operative by the closing of the cover to press said member against said opening and vent when said cover is closed.

9. In a lighter, a container for fuel having a fuel opening and an air vent, a tube extending from said vent to within said container, a cover hinged to said container, a chamber for housing a catalyst, said chamber being longitudinally slidable with relation to said container, an arm pivoted in said cover and removably engaging said chamber, said arm for positioning said chamber vertically above said fuel opening when said cover is in open position, said arm removing said chamber from said fuel opening upon closing of said cover, a depressable member carried by said arm adapted to cover said fuel opening and said vent when said cover is closed, and means operative by the closing of the cover to press said member against said opening and vent when said cover is closed.

10. In a lighter, a container for fuel having a

fuel opening and an air vent, a cover hinged to said container, a holder for housing a catalyst, said holder being longitudinally slidable with relation to said container, an arm pivoted in said cover and removably engaging said holder, said arm for positioning said holder vertically above said fuel opening when sair cover is in open position, said arm removing said holder from said fuel opening upon closing of said cover, and means carried by said arm for sealing said fuel opening and said vent when said cover is closed.

11. A lighter comprising a casing having a cover, a slideway in the upper part of the casing, an air duct extending within said casing, absorbent material within said casing, means localizing said material providing a passage surrounding said material and communicating with said duct, and a slide associated with said slideway and containing a catalyst for ignition purposes, said slide being hingedly connected to said cover, said slideway having a fuel vapor opening communicating with said casing and over which said slide extends whereby said catalyst may be alternatively placed at said fuel opening or removed therefrom upon respective opening and closing of said cover.

12. A lighter comprising a casing having a cover, a slideway in the upper part of the casing, an air duct extending within said casing, absorbent material within said casing, means localizing said material providing a passage surrounding said material and communicating with said duct, a slide associated with said slideway and containing a catalyst for ignition purposes, said slide being hingedly connected to said cover, said slideway having a fuel vapor opening communicating with said casing and over which said slide extends whereby said catalyst may be alternatively placed at said fuel opening or removed therefrom upon respective opening and closing of said cover, and means operable by said cover to seal said fuel opening and said vent when said cover is closed.

13. A lighter comprising a casing, a cover hinged thereto, a slideway in the upper part of the casing, an air duct extending within the casing, absorbent material within said casing, means localizing said material providing a passage surrounding said material and communicating with said duct, a slide associated with said slideway and containing a catalyst for ignition purposes, said slideway having a fuel vapor opening communicating with said casing and over which said slide extends, and a member hingedly connected to said cover and attached to said slide whereby said catalyst may be alternatively placed at said fuel opening or removed therefrom upon respective opening and closing of said cover, said slide being removable from said member for filling the casing through said fuel opening upon opening said cover.

14. In a lighter, a container for fuel and having a fluid tight top plate provided with a fuel opening and an air vent, a tube extending from said vent to near the base of said container, a cap hinged to said container, a chamber, for housing a catalyst, said chamber having a plate slidably fitting within said container and provided with a pair of upward projections, a bifurcated arm pivoted in said cap, co-operative means on the bifurcations of said arm and said projections for removably engaging said chamber with said arm, resilient means for urging mutual engagement between said projections and said bifurcations, said arm positioning said chamber vertically above said fuel opening when said cap is in open position, said arm removing said chamber from said fuel opening upon closing of said cap, a resilient member carried by said arm adapted to cover said fuel opening and said duct when said cap is closed, and an auxiliary plate sealed in said container providing a fluid tight bottom for the container.

15. A lighter comprising a fuel container having a fluid tight top plate provided with a fuel opening and an air duct, a cap hinged to said container, a slideway superimposed upon said top plate, a stud carried by one end of said slideway and extending through an opening in a wall of said container, means engaging said slideway normally urging said stud outward, means on said cap lockingly engageable with said slideway when said cap is in closed position and disengageable therefrom by pressing said stud inwardly, a catalyst, a chamber housing said catalyst, said chamber having a slide in slidable engagement with said slideway and provided with a pair of upward projections, a bifurcated arm pivoted in said cap, each of the bifurcations removably engaging said projections, a spring associated with said arm urging engagement of said bifurcations with said projections, said arm for positioning said chamber vertically above said fuel opening when said cap is in open position, said arm removing said chamber from said fuel opening upon closing of said cap, a resilient member carried by said arm adapted to cover said fuel opening and said duct when said cap is closed, and an auxiliary plate sealed in said container providing a fluid tight bottom for the container.

16. In a lighter, a container for fuel having a fuel opening and an air vent, a cap hinged to said container, a chamber for housing a catalyst, said chamber slidably fitting within said container and provided with a pair of projections, a bifurcated arm pivoted in said cap the bifurcations engaging said projections, said arm for positioning said chamber vertically above said fuel opening when said cap is in open position, said arm removing said chamber from said fuel opening upon closing of said cap, a member carried by said arm adapted to cover said fuel opening and said vent when said cap is closed, and means operable by the closing of the cap to press said member against said opening and vent.

17. In a lighter, a container for fuel having a fuel opening and an air duct, a cap hinged to said container, a chamber for housing a catalyst, said chamber being longitudinally slidable with relation to said container, an arm pivoted in said cap, said chamber and said arm having mutual engaging means, said arm for positioning said chamber vertically above said fuel opening when said cap is in open position, said arm removing said chamber from said fuel opening upon closing of said cap, a member carried by said arm adapted to cover said fuel opening and said duct when said cap is closed, a wick within said container, and means localizing said wick providing a passage surrounding said wick, and communicating with said duct.

18. In a lighter, a container for fuel having a fuel opening and an air duct, a cap hinged to said container, a chamber for housing a catalyst, said chamber being longitudinally slidable with relation to said container, an arm pivoted in said cap, said chamber and said arm having mutual engaging means, said arm positioning said chamber vertically above said fuel opening when said cap is in open position, said arm removing said

chamber from said fuel opening upon closing of said cap, a resilient member carried by said arm adapted to cover said fuel opening and said duct when said cap is closed.

19. In a lighter, a container for fuel having a fuel opening and an air duct, a cover for said container, a receptacle for housing a catalyst, said receptacle being slidable with relation to said container, and means pivotally connecting said cover and said receptacle, said means positioning said receptacle above said fuel opening when said cover is in open position and removing said receptacle from said fuel opening upon closing of said cover.

20. In a lighter, a container for fuel having a fuel opening, a cover for said container, a receptacle for housing a catalyst, said receptacle being slidable with relation to said container, means pivotally connecting said cover and said receptacle, said means positioning said receptacle above said fuel opening when said cover is in open position and removing said receptacle from said fuel opening upon closing of said cover, and a member carried by said arm adapted to cover said fuel opening when said cover is closed.

21. A lighter comprising a container having a cover and a plate near the top of the container forming a slideway and having an air duct, a slide fitting in the slideway and containing a piece of catalytic material for ignition purposes, said slide being hingedly connected to said cover, said plate having a fuel vapor outlet over which the slide extends whereby the material can be alternately placed at the outlet or removed therefrom upon respective opening and closing of the cover, and means adapted to cover said outlet and said duct when said cover is closed.

22. A lighter comprising a fuel chamber having a top plate with a fuel egress opening, a cover hinged to said chamber, a catch plate mounted contiguous said top plate and adapted to slide thereover, an arm pivoted to said cover, a catalyst container connected to said arm whereby the closure of the cover moves the container from an operative position in which the container is in communication with the fuel opening, a catch member on said cover, a catch carried by said catch plate and adapted to engage or disengage said member to permit actuation of said cover.

23. A lighter comprising a fuel chamber with a fuel egress opening, a cover, an arm pivoted to said cover, a catalyst container connected to said arm whereby the closure of the cover moves the container from an operative position in which the container is in communication with the fuel opening, the connection between said container and said arm being such that said container may be slidably removed from said arms by a relative lateral movement between said container and said arm for filling the chamber through said opening upon lifting of the cover.

GEORGE PHILIP SCHMITT.