Aug. 25, 1936. A. F. REILLY 2,052,111

CATALYTIC LIGHTER

Filed Oct. 21, 1933

Fig. 1.

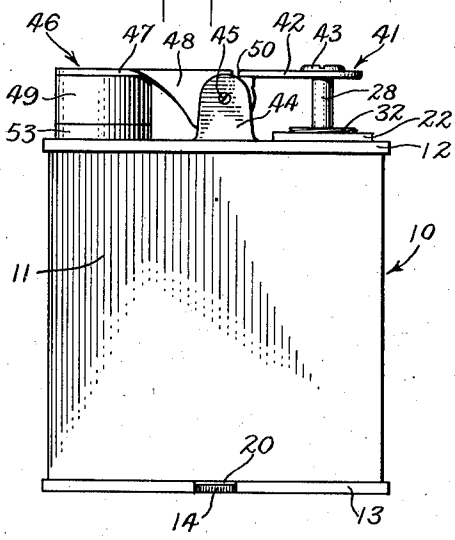


Fig. 2.

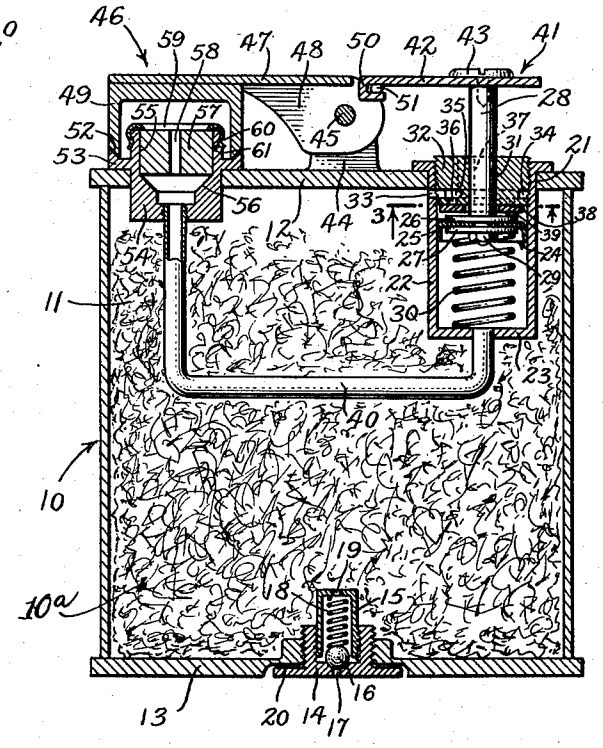


Fig. 3.

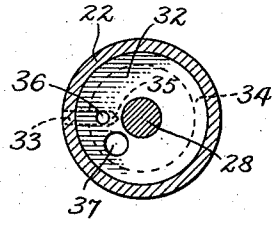
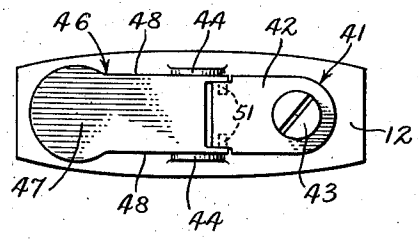


Fig. 4.



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CATALYTIC LIGHTER

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12 Claims. (Cl. 67—7)

The invention relates to lighters and, with regard to its more specific features, to catalytic action lighters.

One object of the invention is to provide a pocket lighter which can be operated with one hand and which can be used in a gale of wind to light a cigarette. Another object of the invention is to provide a reliable and efficient catalytic lighter. Another object of the invention is to provide a catalytic lighter which may be operated in the same manner as an automatic pyrophoric lighter. Another object of the invention is to provide a catalytic action lighter having a large reserve of fuel. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which is shown one of various possible embodiments of the mechanical features of this invention.

Figure 1 is a side elevation of a lighter constructed in accordance with the invention;

Figure 2 is a vertical sectional view of the lighter;

Figure 3 is a horizontal cross-sectional view taken on a line 3—3 of Figure 2; and

Figure 4 is a plan view of the lighter.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Referring first to Figure 1, I provide a fuel receptacle 10 in which may be inserted cotton 10a or other suitable absorbent for the retention of a liquid fuel, for example a hydrocarbon fuel. As better shown in Figure 2 the fuel receptacle 10 may be formed by joining together a pair of struck shells 11 to form side and end walls, the side and end walls being closed by a top wall 12 and a bottom wall 13. In the bottom wall 13 is a screw threaded closure cap 14 which may be removed in order to fill the lighter. Formed in the screw closure cap 14 are internal screw threads holding a screw threaded hollow member 15. A hole extends through the cap 14 and a ball 16 is received in the member 15 this ball being forced against the hole 17 by a spring 18, thus constituting a check valve for the admission of air into the hollow member 15 which is connected with the inside of the fuel receptacle 10 by a hole 19. Thus air can enter the fuel receptacle 10, but neither air nor vapor can escape therefrom by way of the cap 14. Preferably a washer 20 is provided between the bottom of the wall 13 and the upper side of the closure cap 14 to eliminate leakage at this point.

In the top wall 12 of the lighter is an orifice 21 in which fits a flanged cylinder 22 having a closed bottom 23. The cylinder 22 may be secured in place by soldering. In the cylinder 22 is a piston 24 comprising a cup shaped piece of leather 25 which is secured between a pair of washers 26 and 27 fastened to a piston rod 28 by a nut 29. A spring 30 urges the piston 24 and piston rod 28 upwardly.

The piston rod 28 passes through a close fitting bore 31 in a cylinder head 32 which is screw threaded in order that it may be secured in the cylinder 22. There is a hole 33 in the side of the cylinder 22 just under the top wall 12 and there is an annular groove 34 in the cylinder head 32 which registers with this hole 33. Comparing now Figures 2 and 3, the cylinder head 32 has a bore 35 extending inwardly from the groove 34 which meets a bore 36 extending upwardly from the bottom of the cylinder head. Through the cylinder head 32 is another bore 37 which extends from the top to the bottom of the cylinder head.

A leather washer 38 having a hole for the passage of the piston rod 28 without interference therewith is adapted to close both bores 36 and 37. The leather washer 38 may be secured to the under side of the cylinder head 32 by means of a rivet 39.

Downward movement of the piston 24 forces whatever is in the cylinder 22 outwardly through a pipe 40 connected to the closed bottom end of the cylinder 22. At the same time the washer 38, which acts as a flap valve, is withdrawn from the bores 36 and 37 allowing air to enter the cylinder 22 on the upper side of the piston 24 and allowing vaporized fuel to enter through the hole 33, annular groove 34, bore 35, and bore 36. The relative sizes of the bore 37 on the one hand, and the bores 33, 35, and 36 on the other hand, regulate the mixture taken into the cylinder 22. Upward movement of the piston 24 forces by pneumatic pressure the washer 38 against the bores 36 and 37, whereupon the mixture on the upper side of the piston 24 passes to the lower side thereof by action of the cup shaped piece of leather 25. By reason of the fact that the gas is sealed in the upper side of the cylinder there is very little tendency to suck air or anything else through the pipe 40 upon upward movement of the piston 24.

Piston 24 is operated through the piston rod

28 by means of a finger piece member 41 secured to the top of the rod 28. This finger piece member may comprise a flat member 42 secured in place by a head screw 43 which screws into the piston rod 28.

Extending upwardly from the top wall 12 of the lighter are a pair of ears 44. Extending between the ears 44 is a shaft 45 screw threaded on one end to fit in corresponding screw threads in one of the ears 44, there being a suitable flange on the shaft to keep it from loosening once it is secured in place. Journaled on the shaft 45 is a snuffer member 46 which comprises a top portion 47 having a pair of downwardly extending sides 48, 48 fitting inside the ears 44, 44 and through which the shaft 45 passes. On the front end of the top portions 47 and on the under side thereof is secured a snuffer cap 49.

The flat portion 42 of the finger piece member 41 is bent over at the front part 50 thereof to embrace a pair of inwardly extending lugs 51, 51 of the downwardly extending portions 48. This constitutes a sliding connection between the finger piece member 41 and the snuffer member 46. When the finger piece 41 is depressed the snuffer member 46 is turned to raise the snuffer cap 49.

The snuffer cap seats firmly against an annular seat 52 of a flange 53 provided on a tubular member 54. Tubular member 54 has a cylindrical chamber 55 in the bottom of which is an opening 56. The bottom part of the opening 56 is screw threaded and receives one end of the pipe 40.

The cylindrical chamber 55 receives a catalytic member 57 which may be formed of a composition of platinum black and some porous ceramic material or the like, being in the form of a plug fitting the chamber 55 and preferably having a central bore 58 therein. Removably securing the catalytic member 57 in place is an annular cap 59 which has resilient sides having one or more inwardly pressed portions 60 to snap in place into a groove 61 in the member 54. The member 54 passes through and is secured to the top wall 12 forming a tight seal therewith.

When the parts are in the position shown in the figures, fuel is sealed in the fuel receptacle 10 as all openings are closed. Depression of the finger piece 41, however, raises the snuffer cap 49 and at the same time forces a mixture of hydrocarbon vapor and air through the pipe 40 into the cylindrical chamber 55 and thus into the catalytic action member 57. This causes the member 57 to heat up and glow, whereupon a cigarette or cigar or the like may be lighted by merely placing the end of it against the member 57 and drawing in air.

It will thus be seen that there has been provided by this invention an apparatus in which the various objects hereinbefore set forth, together with many practical advantages, are successfully achieved.

As many possible embodiments may be made of the above invention, and as many changes may be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:—

1. In a lighter, a fuel receptacle having elongated top and bottom walls, a removable fuel plug in the bottom wall, a check valve in the fuel plug for the admission of air preventing the escape of vapor, a cylinder depending from the top wall near one end thereof and into the fuel receptacle, a piston in said cylinder arranged to force gas downwardly but not upwardly, a cylinder head closing the top of the cylinder and having a passage extending from the inside of the cylinder to the outside of the lighter, a passage connecting the top of the cylinder with the inside of the fuel receptacle, a spring in the cylinder underneath the piston, a container for catalytic material at the other end of the top wall, a rim associated with said container having a seat formed thereon, a snuffer cap arranged to rest against said seat, a pipe connecting the container for catalytic material with the bottom of the cylinder, a snuffer arm mounting said snuffer, said arm being pivoted on a horizontal axis on the top of said receptacle, a piston rod for said piston, a finger piece member mounted on the top of said piston rod, and a connection between said finger piece member and said snuffer arm whereby depression of said finger piece member raises said snuffer.

2. In a lighter, a chamber for catalytic material, a separate chamber for fuel, a third chamber for mixing vaporized fuel and air, means to draw air and vaporized fuel into said third chamber and to expel the mixture from said third chamber into the first named chamber, a snuffer normally covering said first chamber, a finger piece to operate both said air and fuel drawing and expelling means, and connections whereby said finger piece also operates said snuffer.

3. In a lighter, a fuel receptacle, a catalytic material holder at one end of the top of said fuel receptacle, a mixing chamber on the other end of the top of said fuel receptacle, communicating means between said mixing chamber and said holder, and operating means to expel the mixture from said mixing chamber into said holder.

4. In a lighter, a fuel receptacle, a catalytic material holder at one end of the top of said fuel receptacle, a mixing chamber on the other end of the top of said fuel receptacle, communicating means between said mixing chamber and said holder, operating means to expel the mixture from said mixing chamber into said holder, a snuffer for said catalytic material holder, and connections between said operating means and said snuffer whereby when said operating means is operated said snuffer is lifted from said catalytic material holder.

5. In a lighter, a fuel receptacle, an elongated top wall to said fuel receptacle, a cylindrical chamber for catalytic material mounted on said top wall, a cylindrical disc of catalytic material substantially filling said chamber, a snuffer mounted on a horizontal pivot on said top wall, a finger piece mounted for downward movement on said top wall, and connections between said finger piece and said snuffer.

6. In a lighter, a fuel receptacle having a top wall, a snuffer mounted for upward movement on said top wall, a finger piece mounted for downward movement on said top wall, connections between said finger piece and said snuffer whereby downward movement of said finger piece raises said snuffer, a holder for catalytic material having a circular top of a size to receive a standard cigarette and in position to be closed by said snuffer, and a passage for the admission of vapor to said catalytic material.

7. In a lighter, a chamber for catalytic material, a fuel chamber, a pump chamber, a check

valve for the fuel chamber to admit air thereto, passages for the admission of both air and vaporized fuel to said pump chamber, one way valve means controlling said passages, and conducting means between said pump chamber and said catalytic material chamber.

8. In a lighter, a fuel receptacle having a top wall, a pump mounted on said top wall, a finger piece to operate said pump, a catalytic material holder also mounted on said top wall, communicating means between said holder and said pump, and valve means cooperating with said pump to cause said pump to direct a mixture of fuel vapor and air against the catalytic material in said holder and preventing said pump on the reverse stroke from effecting suction of air back through said holder.

9. In a lighter, a pump cylinder, a piston comprising also a valve, a check valve at one end of said cylinder, a fuel receptacle, a passage between said fuel receptacle and said check valve, a passage between said check valve and the outside air, a separate check valve to admit air to the fuel receptacle, a holder for catalytic material, and a passage between said holder and said cylinder at the opposite end of said cylinder from said first named check valve.

10. In a lighter, in combination, a fuel receptacle, a mass of absorbent material in said receptacle adapted to hold a quantity of volatile fuel, a holder located at one end of said receptacle, means forming a vapor path between the interior of said holder and the interior of said receptacle, a mass of catalytic material in the interior of said holder, a cover pivotally connected to said receptacle and shaped to close over said holder, means forming an air passageway from the outside atmosphere into said receptacle, a valve adapted to close said passageway, a reciprocating member operably related to said valve, means connecting said member and said cover so that said valve closes said passageway when said cover is closed over said holder and movement of said cover to its open position moves said member to cause said valve to open said passageway, and spring means disposed to press against said member to urge said member and said cover in one direction of interrelated movement.

11. In a lighter, in combination, a fuel receptacle, a mass of absorbent material capable of holding volatile fuel disposed in said receptacle, a holder located at one end of said receptacle, a mass of catalytic material in said holder, means forming a separate chamber within said receptacle and in communication with said receptacle, means forming an air passageway from said end of said receptacle to said chamber, a valve adapted to cut off said passageway and prevent the flow of air therethrough to said chamber, a cover pivotally connected to said end of said receptacle and adapted to pivot down and close over said holder, a reciprocating member operably related to said valve, and means interconnecting said member and said cover so that said member causes said valve to open said passageway to said chamber when said cover pivots to uncover said holder.

12. In a lighter, in combination, a fuel receptacle, a mass of absorbent material capable of holding volatile fuel disposed in said receptacle, a holder located on said receptacle, a mass of catalytic material in said holder, means forming a separate chamber within said receptacle and in communication with said receptacle, means forming an air passageway from the exterior of said receptacle into said chamber, a valve adapted to open and shut said passageway to control the flow of air therethrough to said chamber, a cover pivotally connected to said receptacle and adapted to close down over said holder, a reciprocating member operably related to said valve, said member and said cover being interconnected so that said member causes said valve to open said passageway to said chamber when said cover pivots to uncover said holder, and a spring acting against said member normally urging said member and said cover in one direction of interrelated movement.

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