July 13, 1948. G. P. SCHMITT 2,444,956

LIGHTER

Filed May 12, 1944

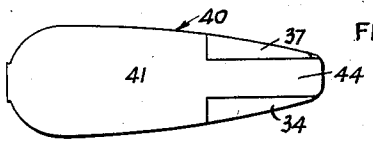


FIG.2.

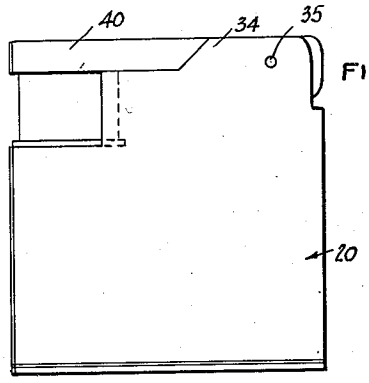


FIG.1.

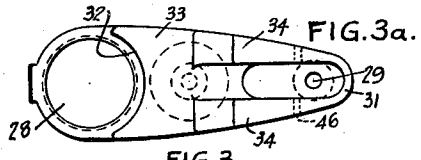
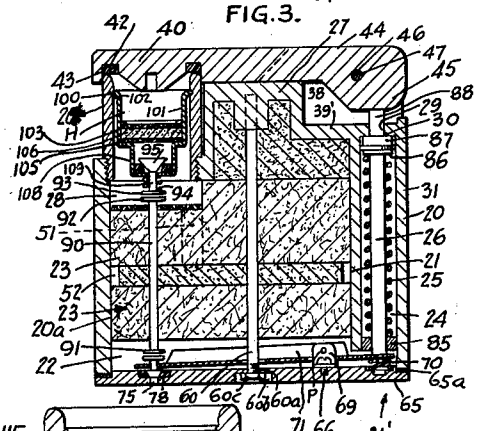


FIG.3a.


FIG.3.

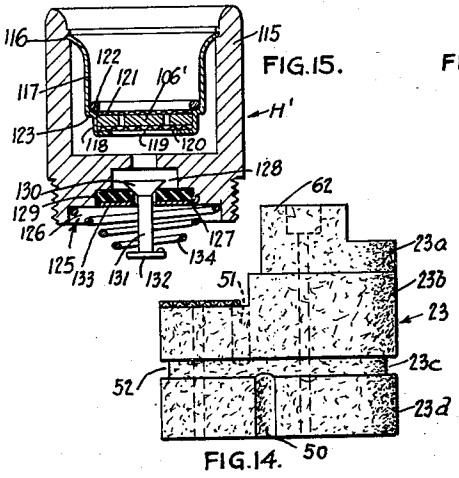


FIG.15.

FIG.14.

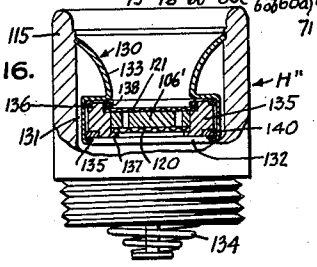


FIG.16.

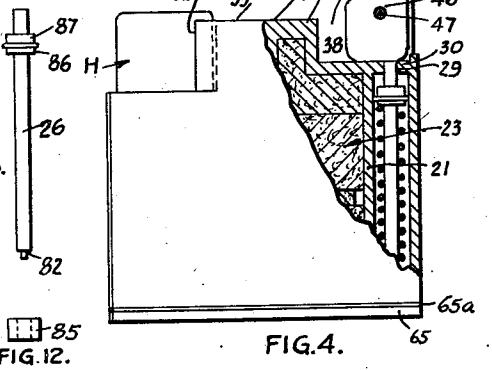


FIG.4.

FIG.13.



FIG.11.

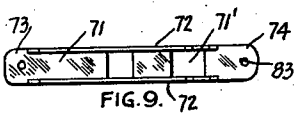


FIG.9.

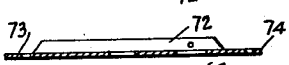


FIG.8.



FIG.10.



FIG.7.

FIG.6.

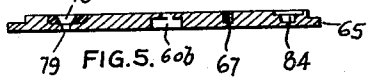


FIG.5.

FIG.12.

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LIGHTER

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9 Claims. (Cl. 67—7)

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This invention relates to a lighter adapted for igniting cigarettes and the like and which employs a catalyst made of spongy platinum composition or similar catalytic substance, in which lighter the vapor of alcohol or other suitable vaporizable liquid carried by absorbent material is employed for effecting such action upon the catalyst (as by its absorption by 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.

It is an object of the present invention to provide an improved, practical, efficient and economical catalytic lighter of the flameless type for igniting cigarettes and the like.

It is a further object of the present invention to provide a catalytic lighter having a cover and in which the lighter is made operable and ready for use by the opening of the cover.

It is a still further object of the present invention to provide a catalytic lighter of the flameless type having a hinged cover, with a removable head within which the catalyst and a valve are disposed, the valve being made operable through leverage means by swinging the cover open to permit atmospheric air and vapor fuel to come in contact with the catalyst.

Yet another object of the present invention is to provide an improved head or catalyst unit for a catalytic lighter of the flameless type.

A further object of the present invention is to provide a novel fuel absorbent reservoir for a lighter.

These and other objects and certain advantageous features are accomplished by the novel and practical construction, combination and arrangement of parts hereinafter disclosed and illustrated in the accompanying drawing, constituting an essential part of the disclosure, and in which:

Fig. 1 is a side elevational view of a catalytic lighter made in accordance with the invention;

Fig. 2 is a top view thereof;

Fig. 3 is a vertical sectional view of Fig. 1;

Fig. 3a is a top view of the lighter casing, the lid and parts being removed;

Fig. 4 is a view similar to Fig. 1, but showing the lighter partly in section and with the cover or lid in open position;

Figs. 5–13, inclusive, are detailed views of parts incorporated in the lighter seen in Fig. 3;

Fig. 14 is a side elevational view of the wick sections forming the fuel absorbent reservoir;

Fig. 15 is a sectional view of a catalyst head or unit employable in the invention;

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Fig. 16 is a sectional view of a catalyst head or unit in modified form and employable in the invention.

Referring now more particularly to the drawing, there is disclosed a casing 20 having therewithin a partition 21 dividing the casing into two longitudinal compartments, the larger one indicated by the numeral 22 being employed to hold the fuel absorbent material or wick generally indicated by the numeral 23, and the smaller one indicated by the numeral 24, being employed to enclose helical spring 25 and as a passageway for vertically movable pin or shaft 26, the latter being embraced by the former.

Casing 20 is provided at its front portion with a cutout 20' and a threaded circular opening 28 communicating with compartment 22 and which is adapted to receive the substantially cylindrical threaded head or catalyst unit H. Compartment 24 which is somewhat longer than compartment 22 is provided with a top opening 29 which is smaller than the cross-sectional opening of compartment 22 and by which a wall or abutment 30 is formed.

Between opening 28 and the rear end 31 of casing 20 and except for the opening 29, casing 20 is provided with an irregularly shaped closed top portion comprising upright wall 32 (preferably arcuate in section to accommodate the curvature of the cylindrical wall of the head H), flat portion 33, and a pair of spaced raised ears 34 which extend rearwardly from portion 33 and which are provided with perforations 35. Flat portion 33 extends for a short distance between raised ears 34 as indicated at 37. The raised ears 34 also extend upwardly from the body of casing 20.

A cut-out or recess 38 is formed by the extended ears 34 and rear vertical wall 39 at the extremity of extension 37, which recess is open at the rear end 31 of the casing as well as at the top thereof between ears 34. Opening 29 of compartment 24 perforates the bottom wall 39' of recess 38.

Cover or lid 40 is made to conform with the top of casing 20 and to sealingly close the top of head H. Lid 40 is therefore provided with a forward portion 41 having an annular recess 42 within which is seated a gasket 43 contactable with head H; and a reduced rearwardly directed portion 44 having a downward extension 45 and provided with a transverse perforation 46. Rear portion 44 with its extension 45 is received in recess 38 between ears 34, perforations 45 and 46 being in register and receiving the pivot pin 47. When the lid 40 is in closed position the flat part of cover

portion 41 abuts against closed portion 33 of casing 20, and the substantially conical projection 48 extends within the hollow of head H, the gasket 43 within recess 42 affording a tight seal against the rim of head H.

Although wick 23 may be made in one piece, it is illustrated as comprising sections 23a, 23b, 23c and 23d. The bottom absorbent piece 23d is provided with a vertical channel or groove 50; absorbent piece 23b is also provided with a vertical channel or groove 51, but located in a side opposite to that wherein channel 50 is located. Absorbent piece 23c which set between pieces 23b and 23d is smaller in area than either of these pieces producing a perimetric channel or groove 52 communicating with grooves 50, 51. The purpose of these grooves will be described later on.

The closed top portion 27 of casing 20 fixedly receives one end of the elongated pin 60 which passes through the absorbent sections 23a, 23b, 23c, 23d, as clearly seen in Fig. 3, the other end of pin 60 being threaded as indicated at 60a.

In the example illustrated in the drawing, the inner wall of closed top portion 27 of casing 20 is provided with a recess having therein two spaced depressions 61 adapted to respectively receive the protruding parts 62 of absorbent section 23a.

Casing 20 is provided with a removable bottom 65 which substantially conforms in contour or shape to that outlined in Fig. 2, casing 20 also being of such shape in section. The threaded end 60a of pin 60 is received in an opening 60b in bottom 65 and engages a nut 60c by which bottom 65 is secured to the shell 20a of casing 20. A conventional seal tight gasket 65a is provided between shell 20a and bottom 65.

Fixed to bottom 65 intermediate its center and rear end 31 as by means of a screw 66 engaging the threaded opening 67, is a substantially U-shaped member 68 having the perforated upstanding ears 69. Also fixed to bottom 65, but near its rear end 31' is a spring member 70. Disposed over bottom 65 is a lever 71 having upstanding perforated walls 72 intermediate its ends 73, 74, and further having a hole 71' to accommodate the member 68; the perforations in walls 72 and the ears 69 being in register and accommodating a transverse pin P providing a fulcrum or axis about which lever 71 may be made to swing in a manner hereinafter described. The spring 70 always tends to urge the rear end 74 of lever 71 upwards away from bottom 65, and, consequently, the front end 73 of lever 71 downwards toward bottom 65.

The front end 73 of lever 71 supports an air admission valve 75, for which purpose, lever end 73 is provided with a perforation through which the valve 75 projects. Valve 75 comprises a pin 76 having at its upper portion and above lever 71 a flanged member 81, and at its lower portion and below lever 71 a conically-shaped valve member 77 adapted to engage the conically-shaped and perforated valve seat 78 provided in a recess of bottom 65. The perforation in seat 78 registers with the perforation 79 in bottom 65, whereby to accommodate the extension 80 of valve 75, below valve seat 78. It is evident that if a downwardly directed pressure is applied at the rear end 74 of lever 71, the front end 73 of the lever will rise lifting valve 75 from its seat 78 and thereby permitting atmospheric air to enter the casing 20, through bottom opening 79, for mixture with fuel vapor, as explained later on.

The pin or shaft 26 has a reduced lower extremity 82 passing through the perforation 83 provided at the rear end 74 of lever 71, through a perforation provided in spring 70 and fitting into a recess 84 in bottom 65; said recess 84 being widened at its upper portion to provide a seat for spring 70.

Within compartment 24 there is disposed a spacer or washer 85 through which passes and with which slidably engages shaft 26. The lower end of spring 25 abuts against spacer 85, while its upper end abuts against the shoulder 86 of circular flange 87 formed on pin 26, said flange 87 bearing against abutment 30 when spring 25 is in normal expanded condition. Shaft 26 projects above its flange 87 through opening 29, its upper end 88 being in engagement with the extension 45 at the pivoted end of lid 40.

Projecting through absorbent sections 23b, 23c and 23d and in slidable engagement therewith is a shaft 90 having at its lower end an enlargement 91 engageable with enlargement 81 of valve 75, and at its upper end an enlargement 92 engageable with enlargement 93 at the end of valve stem 94 of valve 95 in head H.

It is now evident that by raising cover or lid 40, shaft 26 will shift downward, impelling lever 71 so that its end 74 will move downward and its end 73 will move upward. This upward movement of lever end 73, will raise valve 75 from its seat 78 and permit atmospheric air to enter chamber or compartment 23, and also will raise shaft 90 and thereby valve 95.

Referring to the catalytic head or unit H disclosed in Fig. 3, the same is seen as comprising an outer shell 100 preferably made of plastic composition and provided with threads for threaded engagement with the casing 20. Within shell 100 there is disposed a metal cup or holder 101, the same having an outwardly turned rim 102 embedded in shell 100. Holder 101 has upper portion 103 and a reduced lower portion 104, the latter providing a vapor chamber. On the flange formed by the juncture of the upper and lower portions 103, 104, there rests a perforated plate or screen 105, and on screen 105 is seated the catalyst 106 which may comprise spongy platinum composition or the like. Above catalyst 106 is disposed another perforated plate or screen 107. Resting on the perforated bottom of holder 101 is a perforated valve seat 108 cooperating with the valve 94, the latter being maintained in closed position by action of spring 109 disposed between the underface of the bottom of holder 101 and enlargement 94.

The lighter is supplied with liquid fuel by removing head H and pouring the liquid fuel through opening 28 in the casing. This liquid will be absorbed by the wick portions 23a, 23b, 23c and 23d making up the fuel reservoir 23. Any excess of liquid fuel may be poured out of opening 28 or will be drained through the air admission valve 75 which is open because cover 41 is open. Head H is then replaced.

To utilize the lighter for igniting a cigarette, cover 41 is opened and the tip of the cigarette is inserted in head H. Opening of cover H depresses shaft 26 causing lever 71 to swing on its axis P and raise the forward end 73 of the lever. This action of forward end 73 raises air admission valve 75 off its seat permitting atmospheric air to enter the casing and be admixed with the fuel vapor therein. At the same time the forward end 73 of the lever raises shaft 90 which in turn raises valve stem and valve 94, 95 permitting the air and vapor fuel mixture to contact catalyst

106 and incandesce the same when the cigarette is drawn upon thus igniting the latter.

By providing the grooves or channels 50, 51, 52, the admitted air and gathering fuel will travel a circuitous path to the catalyst. Further, when filling the lighter with the fuel, the fuel flowing in the grooves 50, 51, 52 is made to travel a circuitous path and will be absorbed by the absorbent mass, until the latter becomes saturated and the excess will then flow out through the air admission valve 75.

Referring to the catalyst-containing head H' shown in Fig. 15, the shell 115 which is preferably made of plastic composition is provided with an annular groove 116 by which is suspended the flared cup 117. Metallic holder or cup 117 has a reduced lower portion 118 having a bottom opening 119 on which rests a perforated plate or screen 120. Over screen 120 is disposed the perforated catalyst 106' and above the latter nests a perforated plate or screen 121. The screens 120, 121 and catalyst 106' are within portion 118 of cup 117 and are retained therein by a ring 122 disposed on the ledge or flange 123 formed at the upper extremity of portion 118.

It is evident that the only contact between shell 115 and holder or cup 117 is at the annular groove 116, thus minimizing the transfer of heat from cup 117 to shell 115.

The lower portion of shell 115 at and adjacent its bottom is provided with a recess 125 having concentric but progressively reduced openings 126, 127, 128. Within opening 127 is disposed a rubber washer 129 acting as a valve seat for valve head 130 secured to valve stem 131 extending through the bottom opening of shell 115 and terminating in a disk 132 for a purpose similar to that described with respect to disk 93 of Fig. 3. Washer 129 is held in place by a metal washer 133. A helical spring 134 retained by disk 132 and the upper wall of opening 126 always urges valve head 130 in sealing engagement with valve seat 129.

Referring to the catalyst-containing head H'' shown in Fig. 16, the metallic cup or holder 130 is so shaped as to provide a hollow base 131 having a bottom with an opening 132 and a flared portion 133. The lower extremity of flared portion 133 is narrower than the diameter of base 131 and is of such diameter as to accommodate the tip of a cigarette. Resting on the bottom of base 131 within the hollow thereof is a fibre or other heat insulated ring 140. Seated on ring 140 is a washer 135 made of ceraminous material. Washer 135 is cut out at its bottom to accommodate ring 140 and is also cut out at its top to accommodate a like fibre ring 136. The opening in washer 135 is so shaped and designed as to receive the screens 120, 121 and catalyst 106' therebetween, screen 120 being seated on a flange 137 of washer 135 and screen 121 being seated on a cut-out portion of washer 135. Above screen 121 is disposed a retainer ring 138 retaining the screen and catalyst assembly within the opening of washer 135. The retainer ring 138, which is usually of metal, is spaced from the wall of cup or holder 130 and as there are no metallic parts in contact with the latter the heat from the catalyst, when in operation, will not be transferred to holder 130.

It is understood that changes and modifications may be made by skilled persons without departing from the true spirit and scope of the invention as outlined in the appended claims.

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

1. A lighter comprising a casing, a holder at the upper portion of said casing, said holder being open at its top for receiving therein the tip of a cigarette or the like, a catalyst fixed in said holder, a cover for said holder swingably attached to said casing, said casing adapted to hold vaporizable fuel, valve means below said catalyst for controlling the flow of vaporized fuel to the catalyst, air-admission means below said valve means enabling atmospheric air ot enter said casing to mix with said fuel, and means for operating said valve means and said air-admission means, said operating means comprising a movable instrumentality and a slidable member, said slidable member being contactable at one end with said instrumentality and having its other end adjacent said cover whereby to be slidably operable by the opening of said cover to actuate said instrumentality.

2. A lighter comprising a casing, a holder attached to said casing, said holder being open at its top for receiving therein the tip of a cigarette, a catalyst fixed in said holder, a compartment in said casing, means in said compartment for holding vaporizable fuel, valve means below said catalyst for controlling the flow of vaporized fuel to the catalyst, air-admission means below said valve means enabling atmospheric air to enter said casing to mix with said fuel, a second compartment in said casing, and means for operating said valve means and said air-admission means, said operating means comprising a movable instrumentality and means extending through said second compartment for actuating said instrumentality.

3. A lighter comprising a casing, a holder at the upper portion of said casing, said holder being open at its top for receiving therein the tip of a cigarette or the like, a catalyst fixed in said holder, a cover for said holder swingably attached to said casing, a compartment in said casing, means in said compartment for holding vaporizable fuel, valve means below said catalyst for controlling the flow of vaporized fuel to the catalyst, air-admission means below said valve means enabling atmospheric air to enter said casing to mix with said fuel, a second compartment in said casing, and means for operating said valve means and said air-admission means; said operating means comprising a movable instrumentality, and a device having ends and being slidable in said second compartment, said device being contactable at one end with said instrumentality and having its other end adjacent said cover whereby to be operable by the opening of said cover to actuate said instrumentality.

4. A lighter comprising a casing, a holder at the upper portion of said casing, said holder being open at its top for receiving therein the tip of a cigarette or the like, a catalyst fixed in said holder, a cover for said holder swingably attached to said casing, a compartment in said casing, means in said compartment for holding vaporizable fuel, valve means below said catalyst for controlling the flow of vaporized fuel to the catalyst, air-admission means below said valve means enabling atmospheric air to enter said casing to mix with said fuel, a second compartment in said casing, and means for operating said valve means and said air-admission means; said operating means comprising a movable instrumentality, a stem slidable within said material and disposed between said valve means and said instrumen-

tality and contactable with said valve means and by said instrumentality, and a device having ends and being slidable in said second compartment, said device being contactable at one end with said instrumentality and having its other end adjacent said cover whereby to be operable by the opening of said cover to actuate said instrumentality.

5. A lighter comprising a casing, a holder removably attached to said casing, said holder being open at its top for receiving therein the tip of a cigarette, a catalyst fixed in said holder, said casing adapted to hold vaporizable fuel, valve means below said catalyst for controlling the flow of vaporized fuel to the catalyst, air-admission means below said catalyst enabling atmospheric air to enter said casing to mix with said fuel, means for operating said valve means and said air-admission means, said means including a lever fulcrumed in said casing, means operable from the top of said casing for actuating said lever, and means engageable with said lever for actuating said valve when said lever is actuated.

6. A lighter comprising a casing, a holder attached to said casing, said holder being open at its top for receiving therein the tip of a cigarette, a catalyst fixed in said holder, said casing adapted to hold vaporizable fuel, valve means below said catalyst for controlling the flow of vaporized fuel to the catalyst, air-admission means below said valve means enabling atmospheric air to enter said casing to mix with said fuel, means for operating said valve means and said air-admission means, said means including a lever fulcrumed in said casing, means operable from the top of said casing for actuating said lever, and means engageable with said lever for actuating said valve when said lever is actuated.

7. A lighter comprising a casing, a holder at the upper portion of said casing, said holder being open at its top for receiving therein the tip of a cigarette or the like, a catalyst fixed in said holder, a cover for said holder swingably attached to said casing, said casing adapted to hold vaporizable fuel, valve means below said catalyst for controlling the flow of vaporized fuel to the catalyst, air-admission means below said valve means enabling atmospheric air to enter said casing to mix with said fuel, means for operating said valve means and said air-admission means, said operating means including a lever fulcrumed in said casing, means operable by the opening of said cover for actuating said lever, and means engageable with said lever for actuating said valve when said lever is actuated.

8. A catalyst unit for a lighter of the flameless type, comprising a shell, a holder in said shell, a heat-insulating ring at the bottom of said holder, a ceraminous element seated on said ring, a heat-insulating member separating said element from the walls of said holder, said element having a central opening, a catalyst in said opening, and a retainer member in said opening retaining said catalyst in said opening.

9. A catalyst unit for a lighter of the flameless type, comprising an outer shell, a holder in said shell, said holder having an open top portion and a compartment below and communicating with said portion, a ceraminous member in said compartment, said member having a central opening, a catalyst in said opening and perforated elements in said opening above and below said catalyst, and heat-insulating means separating said ceraminous member from said holder.

GEORGE PHILIP SCHMITT.

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