March 26, 1957 A. SALZER 2,786,743

CIGARETTE LIGHTER

Filed March 29, 1954 2 Sheets-Sheet 1

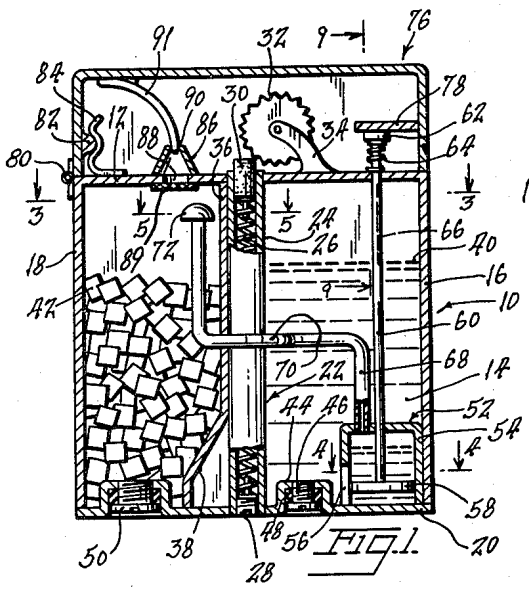

Fig. 1.

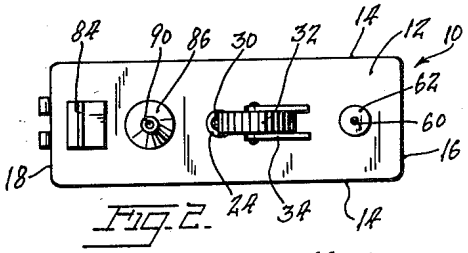

Fig. 2.

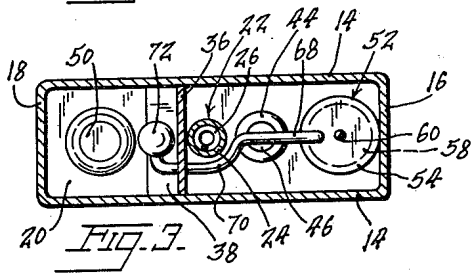

Fig. 3.

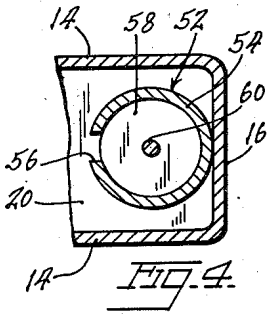

Fig. 4.

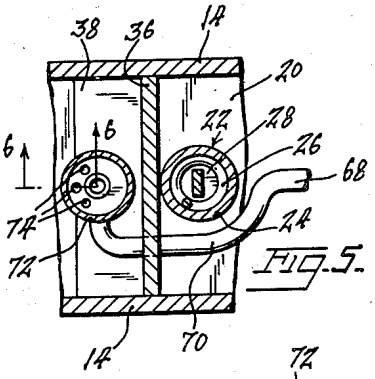

Fig. 5.

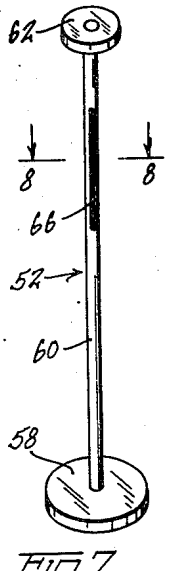

Fig. 7.

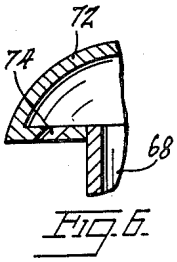

Fig. 6.

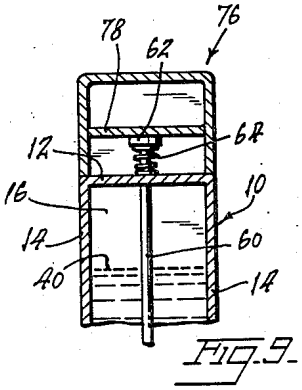

Fig. 9.

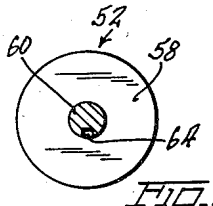

Fig. 8.

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CIGARETTE LIGHTER

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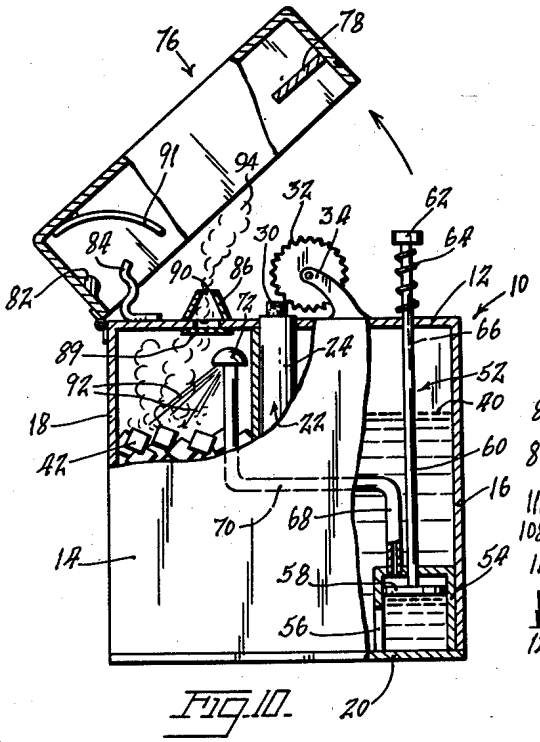

Fig. 10.

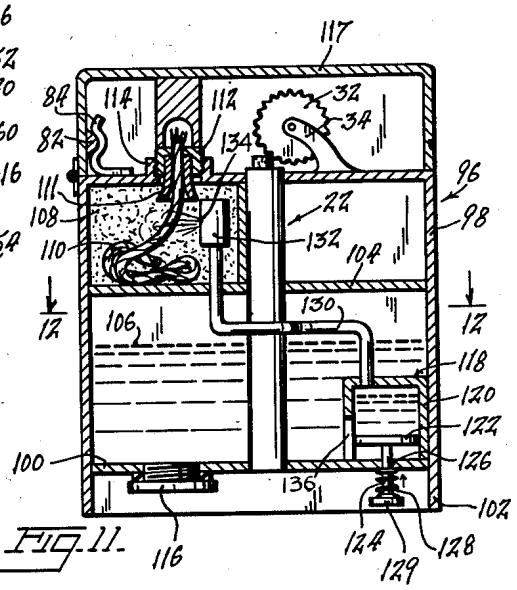

Fig. 11.

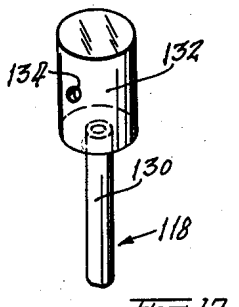

Fig. 13.

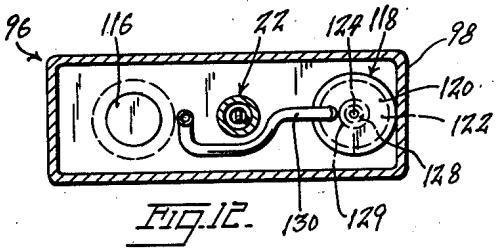

Fig. 12.

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CIGARETTE LIGHTER

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Application March 29, 1954, Serial No. 419,524
2 Claims. (Cl. 48—4)

This invention relates to cigarette lighters. More particularly, the invention has reference to a novelly designed lighter having a controlled means for dispensing, from a reservoir incorporated in the lighter, a measured quantity of fluid used in the creation of ignitable fumes.

It has been observed that in general, cigarette lighters of the type using liquid fuel are generally designed for the employment of highly volatile, flammable liquids such as benzine or similar types of fluids. Most usually, cotton wadding is saturated with the fluid, the most common construction being one in which the wadding is periodically saturated by the user with an indeterminate amount of fluid.

Certain deficiencies are present in conventional construction of the type noted above. For example, there is a high rate of evaporation of the fluid after the cotton wadding in which the wick is disposed is saturated. Further, it is not possible to determine accurately the amount of fluid flowing into the wadding compartment, and as a result, an excessive amount of fluid is sometimes caused to flow into the lighter, causing the lighter to become oversupplied with the fuel.

In view of the above, it is proposed, in one form of the present invention, to provide a cigarette lighter which will use, instead of conventional lighter fluid, calcium carbide in salt or crystal form and water. The water is directed, in accurately controlled, measured amount, into the calcium carbide compartment to create a chemical reaction wherein gaseous, ignitable fumes are caused to accumulate, and to flow through a discharge nozzle into an area adjacent the flint and flint wheel, in which area said fumes will be readily ignited by a spark thrown responsive to rotation of the flint wheel.

An object of importance, in providing a construction as described above, is to cause the measured quantity of water to be directed into the calcium carbide compartment automatically, responsive to elevation of the lighter cover or lid.

Another object of importance is to provide means responding to shifting of the lid to a closed position to recharge the water pumping assembly with a new supply of water in a measured amount, for discharge into the solid fuels compartment on the next elevation of the lid.

Yet another object is to provide means responding to shifting of the lid to a closed position to effectively cap the solid fuels compartment to prevent the further ignition of gaseous fumes therefrom.

A further object of importance is to provide, for transferring the measured quantity of water from the liquid compartment to the solid fuels compartment, a novelly designed pumping assembly which will ordinarily be adapted to prevent leakage of liquids from the first named compartment, but which will, whenever the lid is elevated and said pumping assembly shifts to pumping position, vent the reservoir or liquid compartment to atmosphere, to maintain atmospheric pressure therein.

Yet another object is to provide, in a second form of the invention, a lighter construction wherein conventional lighter fuel, such as benzine, can be used, with said fuel being normally housed in a reservoir that need be replenished only at infrequent intervals, as distinguished from conventional arrangements wherein the wick compartment must be opened with fair regularity for resaturation of the cotton wadding housed therein.

Another object of importance is to provide means accurately controllable by a user for dispensing, from the reservoir in a second form of the invention, the controlled amount of lighter fluid, with said fluid being transferred to the wick compartment for saturation of the cotton wadding.

For further comprehension of the invention and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

On the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a longitudinal sectional view through a lighter formed in accordance with the present invention.

Fig. 2 is a top plan view of the lighter with the cover removed.

Fig. 3 is a transverse sectional view taken substantially on line 3—3 of Fig. 1.

Fig. 4 is an enlarged, fragmentary, detail sectional view taken substantially on line 4—4 showing the pump cylinder and piston.

Fig. 5 is an enlarged, detail sectional view taken substantially on line 5—5 of Fig. 1, showing the discharge nozzle.

Fig. 6 is a detail sectional view taken substantially on line 6—6 of Fig. 5.

Fig. 7 is a perspective view of the piston, per se.

Fig. 8 is an enlarged sectional view taken on line 8—8 of Fig. 7.

Fig. 9 is a fragmentary sectional view substantially on line 9—9 of Fig. 1.

Fig. 10 is a view partly in longitudinal section and partly in side elevation, showing the lighter as it appears immediately prior to ignition of the gaseous fumes.

Fig. 11 is a view similar to Fig. 1 showing a modified form.

Fig. 12 is a sectional view on line 12—12 of Fig. 11.

Fig. 13 is a fragmentary, enlarged perspective view of the discharge nozzle in the form of Fig. 11.

In the form of the invention shown in Figs. 1–10, the reference numeral 10 has been applied generally to a hollow, rectangular casing having a relatively narrow, flat top wall 12 integral along its opposite longitudinal edges with depending side walls 14, and along its front and rear end edges with a depending front wall 16 and a depending back wall 18, the side, front, and back walls being integral with one another and with said top wall. A bottom plate 20 is formed separately from the other portions of the casing, and is fixedly secured to the lower ends of the side, front, and back walls.

Extending vertically between the top and bottom walls 12, 20 is a flint tube assembly 22 including an elongated tube 24 the opposite ends of which are fixedly engaged in aligned openings formed in the top and bottom walls. Housed in tube 24 is a compression spring 26 one end of which is engaged against a plug 28 threaded into the lower end of the tube, the other end of the spring abutting against a flint 30 so as to normally urge said flint 30 upwardly through the open upper end of the flint tube 24, into engagement with the serrated periphery of a flint wheel 32 rotatably mounted between upstanding brackets 34 fixedly secured to the top wall 12.

Within the casing there is provided a partition 36, said partition being fixedly secured at its upper end, and

along its sides, to the top wall and side walls respectively. Partition 36 is formed at its lower end with an offset portion 38, said portion 38 being fixedly secured to the bottom wall 20. The partition 36 thus defines, within the casing, non-communicating, side-by-side compartments for liquid and solid fuel components respectively. The liquid compartment contains water 40, and constitutes a reservoir from which water is to be dispensed in measured amounts into the solid fuels compartment, in which is contained calcium carbide salts or crystals 42.

To facilitate filling of the reservoir and solid fuels compartment, filler openings are provided at the lower ends of the respective compartments. Thus, the reservoir is provided with an annulus extending upwardly within the reservoir, said annulus being internally threaded to receive a complementarily threaded portion of the cap 46, the head of which engages against an inwardly directed flange provided upon the upper end of the annulus, a sealing gasket 48 being interposed between the head portion of the filler cap and said flange of the annulus. A similar filler cap 50 is provided for facilitating replenishment of the solid fuels within the solid fuels compartment.

A pump assembly has been designated generally by the reference numeral 52, and includes a small cylinder 54 fixedly mounted in the lower end of the reservoir. A longitudinal slot 56 formed in the cylinder 54 extends from a location approximately midway between the opposite ends of the cylinder, to the lower end of the cylinder, said slot thus terminating at the bottom plate 20. Working with the cylinder is a piston 58, fixedly secured to the lower end of an elongated piston rod 60, the other end of which has a head 62 secured thereto. Spring 64 is circumposed about the rod 60, and is engaged at one end against the head 62, the other end of the spring abutting against the upper surface of the top wall 12. Formed in the rod 60, adjacent the upper end thereof, is a longitudinal slot 66 (Figs. 7 and 8), the purpose of which will be made presently apparent.

Communicating at one end with the upper end of the cylinder 54 is a water outlet pipe 68. Pipe 68 extends upwardly from the cylinder, and is then extended laterally in the direction of the solid fuels compartment. The laterally extended part of the pipe 68 has an offset portion 70, to clear the flint tube assembly 22.

At its discharge end, the pipe 68 is disposed in the upper end portion of the solid fuels compartment, said pipe extending through an opening formed in the partition 36 so as to terminate in said solid fuels compartment. The outlet end of pipe 68 is extended upwardly within said compartment, and is secured to an outlet nozzle 72. Nozzle 72 is formed with a circular, flat bottom plate having a center opening, in which outlet end the pipe 68 is fixedly engaged, said bottom plate being integral or otherwise made rigid, at its periphery, with a dome of hemispherical formation. Formed in the bottom plate are circumferentially spaced outlet openings for ports 74, said ports 74 being inclined as shown in Fig. 6 for the purpose of directing jets of water to different locations of the exposed surface of the calcium carbide contained in the solid fuels compartment. Thus, in the illustrated example an arcuate series of discharge openings 74 is provided, one of said openings being designed to direct a thin stream of water to the center area of the quantity of calcium carbide, one of the end apertures being angles to direct a similar stream to one side of the fuel, and the other aperture being angles to direct another stream toward the other side of the quantity of fuel.

A lid has been designated generally by the reference numeral 76, and is formed with a depending peripheral flange engaging against the periphery of the top wall 12. Lid 76, at one end, is provided with an internally disposed abutment or ledge 78, fixedly secured within the lid and extending transversely thereof, in position to engage against the head 62 of the piston assembly. At its other

end, lid 76 is hingedly connected to the upper end of the back wall 18, as at 80. Immediately above the hinge connection, a rounded lug 82 is formed upon the inner surface of the lid, and when the lid is closed, is engaged within an offset part of a leaf spring 84 the base of which is anchored fixedly to the top wall 12. Adjacent spring 84, an upstanding, conical nozzle 86 is secured to top wall 12, above a discharge opening 88 of the top wall. A wire mesh 89 is provided below the discharge opening 88 to prevent the calcium carbide salts or crystals 42 from entering the nozzle 86. Nozzle 86, at its upper or smaller end, has a small discharge opening 90, through which gaseous fumes are directed during use of the lighter. Normally, the aperture 90 is closed by the pointed free end of a pin 91, the other end of which is secured fixedly to the top wall of the lid. Pin 91 is of arcuate formation, extending in an arc about the center defined by the hinge axis of the lid. As a result, when the lid is swung to closed position, the free end of the pin will extend into the opening 90 to close the same as in Fig. 1.

In use of the lighter, the parts will normally appear as shown in Fig. 1. Under these conditions, the piston 58 is at the lower end of the cylinder 54. Since the upper end of slot 56 is disposed above the piston 58, water can enter the cylinder and fill same.

The piston 58 will, of course, be kept in the Fig. 1 position whenever the lid is closed, by the abutment 78.

Assuming that the lighter is to be used, one simply flips the lid 76 upwardly to the position shown in Fig. 10. This causes the abutment 78 to swing out of engagement with the head 62. Spring 64 is thus free to expand, and shifts the piston rod 60 upwardly to the position shown in Fig. 10. This causes piston 58 to move upwardly above the slot 56, thus causing a measured quantity of water to be trapped between the upper end of the slot and the upper end wall of the cylinder. Said quantity of water, during the further movement of the piston 58 to the upper end of the cylinder, is forced into the pipe 68, and will be directed in thin streams 92 against the calcium carbide 42, thus causing a chemical reaction resulting in the creation of gaseous, ascending fumes 94 which will flow out of the now open aperture 90, into an area in which they will be ignited by a spark thrown responsive to rotation of wheel 32. Wheel 32, in the illustrated example, is manually rotated. However, it is believed sufficiently obvious as not to require special illustration herein that the flint wheel can be rotated automatically responsive to elevation of the lid, in a manner well known to those skilled in the art. In this way, the flint wheel can be rotated in timed relation to the discharge of water into the calcium carbide compartment.

In any event, when the piston 58 moves upwardly to the Fig. 10 position, the groove 66 will be so disposed as to vent the reservoir to atmosphere, thus to maintain atmospheric pressure upon the surface of the water 40 and facilitate the further dispensing thereof, on the next use of the lighter. Thus, in the closed lid position, the groove 66 is disposed below the top wall 12. In the open lid position, shown in Fig. 10, groove 66 has its mid-length portion registered with the plane of the top wall 12, thus to cause air to enter through the space defined between the wall of said groove 66 and the edge of the opening of the top wall 12 in which the rod 60 is slidably mounted.

Of course, after the desired quantity of gaseous fumes have been created by dispensing the measured quantity of water into the solid fuels compartment, and after said fumes have been ignited, the lid is closed once again, and the piston will again be depressed, to permit refilling of the cylinder 54 pending the next use of the lighter.

In Fig. 10, the gaseous fumes have been designated at 94, and as will be noted, said fumes first fill the solid fuels compartment and then flow outwardly through the conical nozzle 86.

Referring to Figs. 11–13, a modified form of the invention designated generally at 96 includes a casing 98 substantially similar to that shown in the first form. Casing 98, however, has its bottom plate 100 recessed within the lower end of the casing, to define a depending, peripheral skirt 102 at said lower end.

In this form, a partition 104 is horizontally disposed, and defines therebelow a reservoir containing lighter fluid 106 such as benzine or the like. Above the partition there is defined a wick compartment containing cotton wadding 108 in which is housed the main portion of a wick 110. Wick 110, at one end, extends upwardly through a tubing 111 formed integral with and depending from a flanged wick cap 112, having external threads engaging internal threads formed upon an upstanding neck 114 provided on the top wall of the casing about an opening of said top wall, the wick extending through the tubing 111. The exposed end of the wick is normally covered by a sealing cap 116 rigid with and extending downwardly from the top wall of a hinged lid 117.

Contained within casing 98 is a pump assembly 118 including a cylinder 120 in which works a piston 122. In this form of the invention the rod 124 of the piston extends downwardly through and is slidable in an opening 126 formed in bottom plate 100, a spring 128 being held under compression between the bottom plate and a button or head 129 provided upon the lower, depending end of the rod 124. An outlet pipe 130 is in communication at one end with the upper end wall of the cylinder 120, and extends through an opening in partition 104, to terminate within the wick compartment. Within the wick compartment, the discharge end of the pipe 130 is fitted with a nozzle or discharge head 132 having, in the illustrated example, a single discharge opening 134. It will be understood that a number of discharge openings 134 can be provided, as desired.

A slot 136 is formed in the cylinder 120, extending from the midlength location of the cylinder to the bottom plate 100. As a result, under normal conditions the cylinder 120 will fill with a quantity of the volatile fluid 106. Whenever it is desired to saturate the cotton wadding 108, it is merely necessary that the user depress the button 129, to shift the piston in the direction of the arrow shown in Fig. 11. This causes the piston to move to the dotted line position in Fig. 11, thereby trapping a measured quantity of fluid in the upper end of the casing and forcing said fluid out of the aperture 134, to saturate the wadding 108. The button 129 can be depressed whenever desired, even when the lid 117 is closed. It will be understood, however, that if desired, the arrangement shown in the first form of the invention can be employed, to cause the cotton wadding to be automatically charged with a minute, measured quantity of lighter fluid whenever the lid 117 is thrown to an open position.

In both forms of the invention, there is the common desirable characteristic of efficient utilization of fuel components, by dispensing of said fuel components in a measured quantity, whenever needed. Further, a large amount of fuel can be contained within the casing, without enlarging the overall size of the lighter above that found in conventional lighters. Frequently charging of the lighter with fuel thus becomes unnecessary.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

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

1. In a cigarette lighter, a hollow casing including top, front, rear and side walls and a bottom plate, the top wall having an opening at the front thereof, a partition dividing the interior of the casing into a front compartment for holding liquid and a rear compartment for holding solids, said dividing partiton having an opening therein, a housing in the liquid compartment mounted on the bottom plate, said housing having a side opening communicating with the interior of the liquid compartment and having a top opening, a pipe having one end communicating with the interior of the housing, the other end of the pipe extending through the opening in the partition and communicating with the interior of the compartment for holding solids, a piston movable in said housing, a rod extending from said piston through the openings in the top of the housing and in the top wall of the casing to the exterior of the casing, a head on the outer end of the rod, a spring encircling the protruding portion of the rod for urging the rod to outermost position, a cover hinged to the rear wall of the casing and adapted to cover the protruding portion of said piston rod, and an inner ledge carried by the other end of the cover and adapted to engage the head of the rod when in closed position for holding the rod in downward position.

2. In a cigarette lighter, a hollow casing including top, front, rear and side walls and a bottom plate, the top wall having an opening therein at the front and having an opening at the rear, a partition dividing the interior of the casing into a front compartment for holding liquid and a rear compartment for holding solids, said dividing partition having an opening therein, a housing in the liquid compartment mounted on the bottom plate, said housing having a side opening communicating with the interior of the liquid compartment and having a top opening, a pipe having one end communicating with the interior of the housing, the other end of the pipe extending through the opening in the partition and communicating with the interior of the compartment for holding solids, a piston movable in said housing, a rod extending from said piston through the openings in the top of the housing and in the top wall of the casing to the exterior of the casing, a head on the outer end of the rod, a spring encircling the protruding portion of the rod for urging the rod to outermost position, a nozzle extending through the rear opening in the top wall over the compartment for holding solids, a cover hinged to the rear wall of the casing and adapted to cover the nozzle, and a curved pin carried by the cover interiorly thereof and adapted to be moved into the opening in the nozzle upon the closing of the cover.

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