March 26, 1935. A. F. REILLY 1,995,899

LIGHTER CONSTRUCTION

Original Filed May 27, 1931 2 Sheets-Sheet 1

Fig. 1.

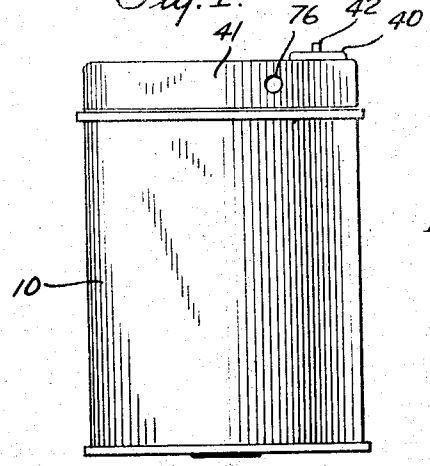
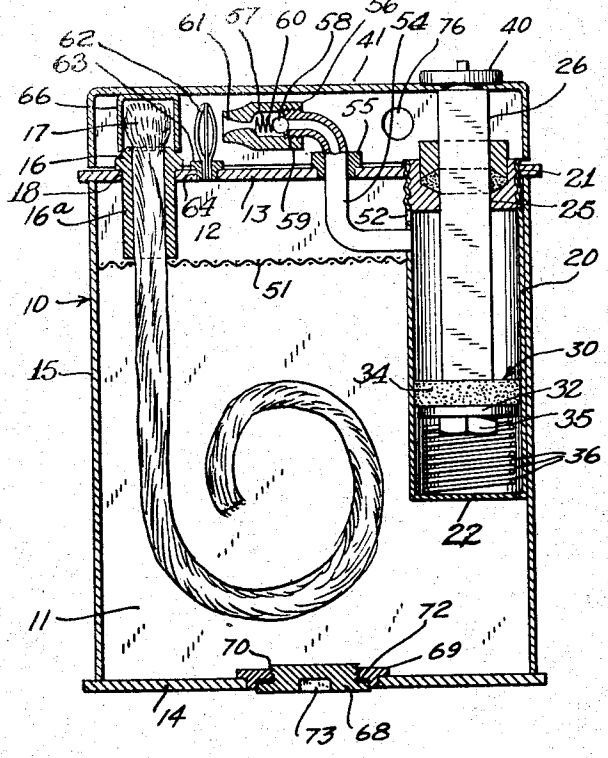


Fig. 2.



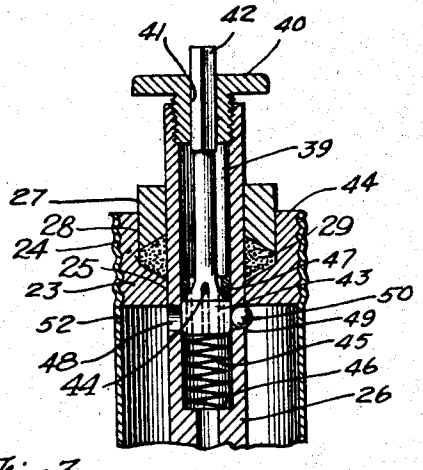


Fig. 3.

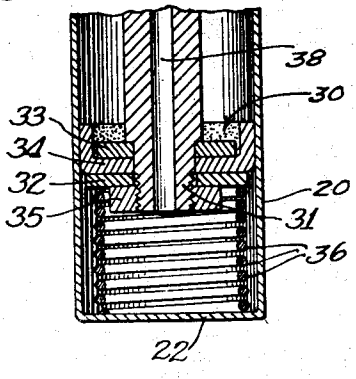
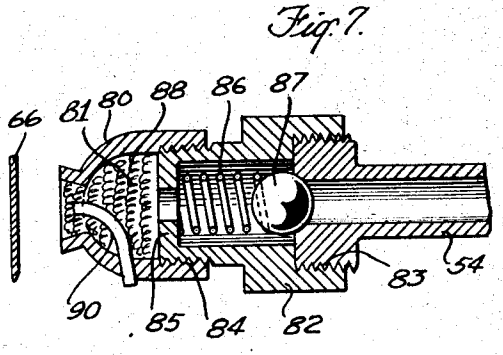


Fig. 7.



INVENTOR

Alfred F. Reilly

BY his ATTORNEYS

Janney, Blair & Curtis

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Fig. 4.

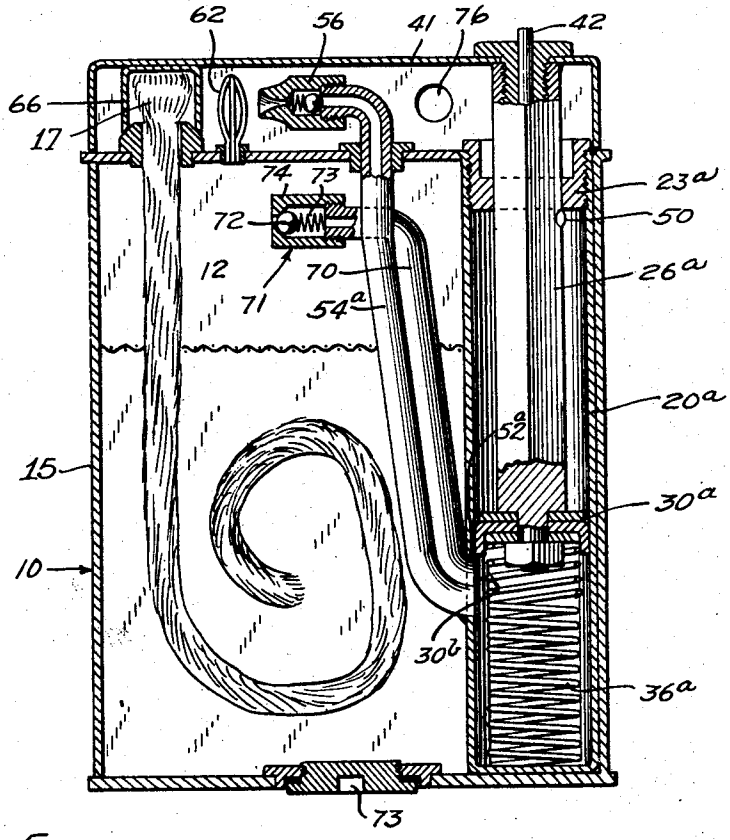


Fig. 5.

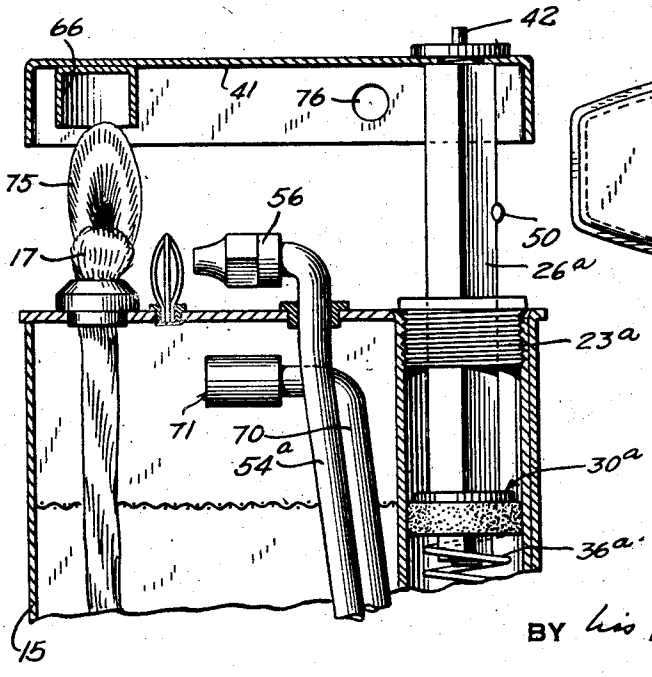
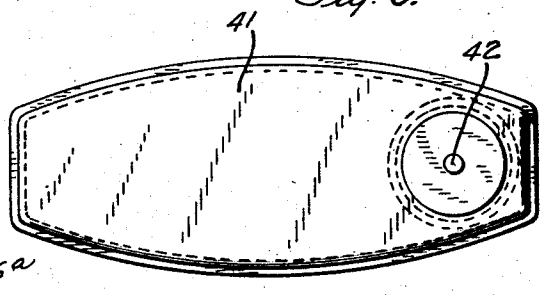


Fig. 6.



INVENTOR
Alfred F. Reilly
BY his ATTORNEYS
Janney, Blair & Curtis

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UNITED STATES PATENT OFFICE

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LIGHTER CONSTRUCTION

Alfred F. Reilly, North Attleboro, Mass., assignor to Evans Case Company, North Attleboro, Mass., a corporation of Massachusetts

Application May 27, 1931, Serial No. 540,239
Renewed February 3, 1934

14 Claims. (Cl. 67—7)

The invention relates to lighters and, in regard to its more specific features, to pocket lighters.

One of the objects of the invention is to provide a practical lighter of simple construction. Another object of the invention is to provide a lighter that is noiseless in operation. Another object of the invention is to provide a lighter having few or no parts that are subject to wear or which need replacement. Another object of the invention is to provide a lighter that shall be dependable under practically all conditions. Another object of the invention is to provide a lighter to operate which requires very little effort. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts, all 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 drawings, in which is shown one of various possible embodiments of the mechanical features of this invention,

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

Figure 2 is a vertical sectional view of the lighter;

Figure 3 is a vertical sectional view on an enlarged scale of the pump and associated parts;

Figure 4 is a vertical sectional view, similar to Figure 2, showing a modified construction;

Figure 5 is a view of the modification of Figure 4 showing the cover partially raised;

Figure 6 is a plan view of the lighter constructed according to either modification; and

Figure 7 is a longitudinal sectional view on an enlarged scale of a modified form of nozzle containing the catalytic agent.

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

Referring first to Figure 1, I provide a receptacle 10 for liquid fuel which may be a hydrocarbon and is preferably highly volatile. This receptacle 10 contains the liquid fuel and also the pump which will be hereinafter described, and the receptacle is of convenient shape and size so that it may be readily carried in the pocket. Referring now to Figure 2, the receptacle 10 contains absorbent cotton 11 which does not entirely fill the receptacle, leaving a space 12, preferably near the top wall 13 of the receptacle, in which gas can collect for a purpose which will be hereinafter clearly set forth. Besides the top wall 13 the receptacle 10 has a bottom wall 14, the top and bottom walls 13 and 14 being secured as by soldering to a shell 15 constituting the side and end walls of the receptacle, which shell is desirably formed from a single piece of metal. By this method of construction the receptacle 10 is gas-tight except for certain openings which will be hereinafter pointed out.

Referring now to Figure 2, on the top wall 13 of the receptacle 10, and preferably near one end thereof, is located a tubular wick holder 16. A wick 17 passes through said wick holder, one end thereof projecting slightly above the wick holder and the wick passing through a hole 18 in the top wall 13, which hole underlies the bore of the wick holder 16; as shown in Figure 2, the wick 17 extends into the absorbent cotton 11 and thus comes into intimate contact with the liquid fuel in the receptacle 10. Preferably the wick 17 fits with rather a tight fit inside of the tubular wick holder 16 so as to allow the liquid fuel to rise through said wick by capillary attraction but to prevent the ingress of air into the receptacle 10 or the escape of gas therefrom by way of the wick and wick holder.

Still referring to Figure 2, a cylinder 20 is located in the receptacle 10. The cylinder 20 may be seamless pressed steel if desired, and in order that its upper open end shall be available for the insertion of a piston and piston rod to be described it passes through a hole 21 in the top wall 13 and is affixed to said top wall 13 as by soldering, the top wall 13 thus constituting the support for the cylinder 20. The cylinder 20 has an integral bottom 22 and, except for certain orifices and the top opening, is entirely gas-tight.

The upper end of the cylinder 20 is screw threaded, and a cylinder head 23 having screw threads 24 is screwed thereon sealing the top of the cylinder 20 except for a central hole 25 which is square in cross section. In the central hole 25 is located a piston rod 26 which is square in cross section and which fits closely in the central hole 25 so that the piston rod 26 cannot turn with respect to the cylinder head 23.

Referring now particularly to Figure 3, the cylinder head 23 is counterbored, and a bushing 27 is located in the counterbore 28 fitting therein with a press or drive fit. Between the bushing 27 and the bottom portion of the cylinder head 23 is a packing or washer 29 of leather or other suitable substance constituting a stuffing box. In assembling the parts the packing is first placed in position in the counterbore 28 of the cylinder head 23 and the bushing 27 is started into said

counterbore, whereupon the piston rod 26 is passed through both the bushing 27 and the cylinder head 23 and then the bushing 27 is driven into the counterbore 28 as far as it will go and this makes a tight stuffing box. Preferably the packing or washer 29 should be impregnated with grease, and after the piston rod 26 and cylinder head 23, including the bushing 27 and packing 29 are assembled, these parts should be relatively reciprocated until friction is reduced to a small amount.

Referring now to Figure 2 for the view thereof in elevation, and to Figure 3 for the details of construction and assembly, the bottom of the piston rod 26 has secured thereto a piston, generally designated by the numeral 30. The lower end of the piston rod 26 is turned down and screw threaded to form an integral stud 31 and on this stud 31, between a pair of metal washers 32 and 33, is a leather washer 34, all three of the washers being secured in place by a nut 35, this assemblage constituting the piston 30.

The cylinder 20 and piston 30, together with associated parts just described, constitute a pump for pumping gaseous fuel from the space 12 in the receptacle 10 for a purpose which will presently appear. This pump is actuated in one direction by finger pressure and in the other direction by a spring 36 located in the bottom of the cylinder 20 and pressing against the lower end of the piston 30. According to certain features of the invention, the upstroke of the piston is the active stroke, and the portion of the bore of the cylinder 20 above the piston 30 constitutes the cylinder space that is used for pumping, this space being sealed by the stuffing box 29, already described, and by any suitable sealing compound which is inserted between the screw threads of the cylinder head 23 and the cylinder 20 when said cylinder head is screwed into position as shown in the drawings.

Referring now to Figure 3, the piston rod 26 has a longitudinal bore 38 therethrough extending from the lower end of said piston rod and merging into a bore 39 of larger diameter which extends through to the top of the piston rod, the two bores constituting a continuous passage from the top to the bottom of the rod. As the piston 30 is reciprocated air flows back and forth in the bores 38 and 39, and they thus serve to prevent the locking of air in the bottom of the cylinder 20.

Still referring to Figure 3, the bore 39 contains mechanism adapted to lock the piston 30 and piston rod 26 in the position shown in that figure, which represents the closed or inoperative position of the device. The upper end of the bore 39 is threaded and a nut 40 is screwed into it, the nut 40 serving to hold in place a cover 41 (shown in Figure 2). Through the nut 40 is a bore 41 which is circular in cross section, and located in the bore 41 is a pin 42 which is square in cross section, thus allowing air to pass freely through the bore 41. The pin 42 extends downwardly through the bore 39, the portion thereof below the nut 40 being cylindrical if desired, and a piston portion 43 is formed on the bottom of the pin 42. In order that passage of air through the bore 39 shall not be prevented by the piston 43, a series of bores 44 extend through said piston portion 43.

Underneath the piston portion 43 and urging it upwardly is a spring 45 the lower end of which reacts against the shoulder 46 constituting the place where the bores 38 and 39 merge. The piston portion 43 is prevented from rising beyond the position shown in Figure 3 by means of a press fitted washer 47 in the bore 39.

Still referring to Figure 3, a transverse bore 48 is drilled through the piston rod 26 but the drill is not allowed to emerge at the far side, so that a lip 49 is formed there, or said lip may be formed by any other suitable method. A sphere 50 is located in the bore 48 but cannot emerge therefrom on account of the lip 49, nor can it, when the piston portion 43 is in the position shown in Figure 3, move into the bore 39. Consequently the sphere 50, when it is held outwardly as in Figure 3, constitutes an abutment engaging the bottom of the cylinder head 23, preventing the piston rod 26 and piston 30 from rising under the influence of the spring 36. Whenever, however, the pin 42 is depressed, the piston portion 43 is lowered below the sphere 50, and the sphere is then free to move into the bore 39, which it does on account of the pressure exerted against it by the reaction of the cylinder head 23 against it due to the pressure of the spring 36, and the piston rod 26 and piston 30 rise in the cylinder 20 under the influence of the spring 36. The pin 42 is adapted to be forced down by finger pressure, and when this is done the piston and piston rod rise as described; when it is desired to lock the parts again in the position shown in the drawings, the piston may be forced downwardly by finger pressure exerted against the nut 40 and pin 42, and the finger slid away from the pin still holding the finger against the nut 40 or cover 41, whereupon the piston portion 43 springs upwardly under the influence of the spring 45 forcing the sphere 50 outwardly again and locking the parts with the piston 30 depressed in the cylinder 20.

Referring again to Figure 2, as heretofore stated the space 12 above the absorbent cotton 11 contains volatilized fuel when the absorbent cotton 11 is saturated with liquid fuel. Desirably a metal screen 51 is provided to keep the absorbent cotton 11 in position, preserving a substantial space 12 for the gas. There is a hole 52 in the side of the cylinder 20 near the top thereof, and when the piston 30 is depressed gaseous fuel is drawn into the cylinder 20. There is another hole in the upper portion of the cylinder 20 leading to a pipe 54 which extends upwardly through the top wall 13 of the receptacle 10, being held in position by molded metal 55 such as a solder or other lead alloy which effectively seals the receptacle 10. The upper end of the pipe 54, which is bent over as shown in Figure 2, is threaded and a nozzle 56 is secured thereto. The nozzle 56 contains a spring 57 which normally holds a ball valve 58 against a seat 59 on the end of the pipe 54. The spring 57, ball 58 and seat 59, together with the chamber 60 of the nozzle 56, thus constitute a check valve allowing gas to be expelled from the nozzle 56 but preventing gas or air being sucked through the pipe 54 into the cylinder 20, and preventing escape of gas from the receptacle 10 when the device is not in use.

The chamber 60 of the nozzle 56 has a nozzle opening 61 adapted to direct gas expelled from the cylinder 20 onto a plurality of wires of a catalytic agent such as platinum black. The wires 62 of platinum black or similar substance are embedded in a piece of metal 63 which is secured to the top wall 13 of the receptacle 10 in any suitable manner, as by forming screw threads on said piece of metal 63 and screwing it into a

threaded hole 64. In this way the catalytic agent may be readily replaced.

The catalytic agent such as platinum black, when supplied with such gases as a volatilized hydro-carbon, heats up rapidly and glows with a red heat. When the wires 62 of catalytic agent are supplied with a draft of volatilized hydrocarbon, they glow and ignite the gas, which obtains a supply of oxygen from the surrounding atmosphere. As shown in Figure 2, a snuffer 66 covers the wick 17 when the piston 30 is down, said snuffer 66 being secured, as by soldering, to the cover 41 and pressing against the wick holder 16, thus sealing the fuel in the receptacle 10. When the piston 30 rises under the influence of the spring 36, after the latching mechanism has been released, the snuffer 66 rises above the wick 17 and the draft of gas from the nozzle 56 extends to the wick 17, and when the platinum wires 62 glow red enough to ignite the gas, a flame follows the draft of gas to the wick 17 igniting the wick. Sufficient gas is contained above the upper side of the piston 30 to cause the catalytic agent 62 to glow hot enough to ignite the draft of gas and thus to ignite the wick 17 as described, so that the depression of the pin 42 and release of the mechanism causes the wick 17 to be lighted.

In order to allow the lighter to be filled a plug 68 is provided which may be conveniently located in the bottom wall 14 in a seat 69, there being a threaded engagement 70 between the plug and the seat. The seat 69 may be soldered to the bottom wall 14 in order to make the connection tight, and preferably a washer 72 of leather is provided between the plug 68 and the seat 69 for the same purpose. A screw slot 73 is desirably provided to screw and unscrew the plug 68, and, as a matter of convenience for the average user, this slot 73 fits a coin, such as a one cent piece.

It will be noted that the inside of the receptacle 10 is completely sealed when the cover 41 is closed except for the entrance 52 into the cylinder 20, but the cylinder is at that time closed by the ball 58. When the piston 30 is moved downwardly a partial vacuum is created in the cylinder 20 which cannot be filled through the nozzle 56 on account of the check valve. The liquid fuel in the receptacle 10 rapidly volatilizes and fills the cylinder, so that the piston may be moved up and down despite the absence of any way for air to enter the receptacle 10. This insures the discharge of almost pure gas from the nozzle 56 which increases the heat of the wires 62 beyond the temperature which would result were a large proportion of air mixed with the gaseous fuel. In order to reduce the content of air in the receptacle 10 as much as possible the wick holder 16 has a long depending portion 16*a*, as shown in Figure 2, and preferably the wick 17 fits in the wick holder 16 with as tight a fit as is practicable.

Referring now to Figure 1, the article when closed has a very finished appearance, none of the operating parts being visible except the pin 42, which projects slightly above the top of the nut 40. The cover 41 may be made to completely enclose the nozzle 56 and other parts on the top wall 13 of the lighter, and the cover 41 thus protects the gas absorption element 62 from injury. When it is desired to operate the lighter the user simply presses downwardly the pin 42 with a finger and allows the cover 41 and other parts to rise. As the parts rise as described, a draft of gaseous fuel is directed against the catalytic agent 62 which ignites near the top of the stroke of the piston 30, and when it ignites a flame follows the path of the escaping gas to the wick 17, and the wick thereafter burns. When a cigar, cigarette or pipe, or other thing which it was desired to light, has been lighted, the user may close the lighter and extinguish the flame by pressing downwardly the cover 41, placing his finger upon the pin 42 so as to allow the ball 50 to be forced inwardly as it passes the cylinder head 23 and bushing 27.

If one upward stroke of the piston does not cause the catalytic agent 62 to glow hot enough to ignite the gas, a second or a third stroke of the piston 30 may be effected by the user, gaseous fuel thus being drawn into the cylinder 20 and expelled therefrom. It will be noted that the pump constituted by the cylinder 20 and piston 30 is a completely operative pump having but a single check valve, which is located in a removable part that is readily accessible. This not only facilitates manufacture of the article and reduces its cost but permits ready inspection of it and easy replacement of the check valve, although its simple construction renders its disarrangement unlikely.

Referring now to Figure 4, a modified construction is shown in which the down stroke of the piston is the active stroke that directs the draft of gas against the platinum wires or other catalytic agent 62. The cylinder 20*a* in the construction of Figure 4 is desirably of the same form as the cylinder 20, except that it may be slightly longer, as shown. The piston rod 26*a* is likewise of similar construction, but the bore 38 is omitted. The piston rod 26*a* is not shown in cross section because so far as the means for operating the ball lock 50 is concerned such means may be constructed substantially as shown in Figure 3. A cylinder head 23*a* closes the upper end of the cylinder 20*a*, but in this case no stuffing box is provided and the passage through the cylinder head 23*a*, although desirably square and thus fitting the piston rod 26*a*, is preferably not a close fit, some tolerance being provided, or else grooves being formed at any place except in the path of the ball 50 to prevent the entrainment of air above the piston 30*a*. This piston 30*a* differs from the piston 30 only in being faced in the opposite direction.

In the modified construction a nozzle 56 is provided, as already described, and this nozzle contains the check valve parts already set forth. The pipe 54*a*, however, leads to the lower portion of the cylinder 20*a* as clearly shown in Figure 4. The orifice 52*a* is connected by a pipe 70 to a check valve 71 located in the space 12, this check valve 71 comprising a ball 72, a spring 73 and a closure 74 screwed on to the end of the pipe 70.

In operating the modified form of lighter shown in Figure 4, the pin 42 (which in this modification need not be square in cross section) is depressed, thus releasing the ball lock 50, whereupon the piston 30*a* moves upwardly under the influence of the spring 36*a*. This action draws volatilized fuel through the check valve 71 into the lower part of the cylinder 20*a*. When the cover 41 has risen to its extreme limit, the user pushes the cover downward, thus ejecting gas through the nozzle 56 and causing the wick 17 to be ignited, as already described. The parts are shown in igniting position in Figure 5, and after the wick 17 has lighted the cover 41 may be released, whereupon it will move upwardly again well clear of the flame 75, and thereupon such

use of the flame may be made as is desired. In order to clear the inside of the cover 41 of vapor which may enter thereinto as the result of the closing of the lighter, vent holes 76 may be provided in the sides thereof, and for general safety purposes such vent holes 76 are desirably also provided in the construction shown in Figure 2.

Certain advantages result from the construction shown in Figure 4, among them being that the user can more completely control the active movement of the pump, and furthermore the danger of the lighter lighting in the pocket of the user is altogether eliminated because the opening movement is the inactive stroke of the pump. It should not be inferred, however, that there is any considerable danger of the lighter of Figure 2 igniting in the pocket, because the lock shown in Figure 3 is reliable. Certain advantages will follow from the use of the second check valve 71 in connection with the construction shown in Figure 2, and the check valve should in that event be connected to the orifice 52. It is noted, however, that in the construction shown in Figure 2 a certain amount of gaseous fuel may be forced up through the wick 17 upon upward movement of the piston 30, which not only makes the wick 17 easier to light but also increases the amount of gas around the catalytic agent 62, and thus makes it glow brighter.

A modified form of nozzle is shown in Figure 7, this nozzle 80 including a catalytic agent in the form of platinum sponge 81. A pipe connection 82 having internal threads 83 at one end and external threads 84 at the other end has a front flange 85 against which bears a spring 86 that presses a ball 87 against the end of the pipe 54 which is shaped to form a seat. The connection is screwed onto the threaded end of the pipe 54, as shown, and by means of the threads 84 the nozzle 80 is secured to the connection 82. It is noted that the catalytic agent, such as sponge platinum 81, is located partly in the nozzle orifice 88, so that as the sponge heats up it will ignite the gas as it emerges from the nozzle, and an aspiration pipe 90 is preferably used to insure a full supply of oxygen at the point of ignition. When using the form of nozzle shown in Figure 7, which of course may be used with either of the modifications shown in Figures 2 and 4, the wires 62 need not be used. Desirably the nozzle 80 of Figure 7 is located very close to the snuffer cap 66, one side of which is shown in broken lines in Figure 7.

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

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

I claim:

1. In a device of the class described, in combination, a receptacle for liquid fuel, a wick on the top of the receptacle, a snuffer for the wick, a snuffer member holding the snuffer and comprising a cover substantially closing the top of the receptacle, means to project said cover vertically upward, a pump connected to said cover and operated when said cover is moved vertically upward, a nozzle associated with said pump through which the gas discharged thereby passes, and a catalytic agent adjacent to said snuffer.

2. In a device of the class described, in combination, a wick, a catalytic agent adjacent said wick, a nozzle to direct gas against said catalytic agent and said wick, a pump, a manually operable member on the top of said device adapted upon downward movement to actuate said pump to force gas through said nozzle, and a snuffer carried by said manually operable member to cover said wick when the lighter is not in use.

3. In a lighter, a fuel receptacle, a wick extending into said fuel receptacle and having an exposed portion outside of said fuel receptacle, pump means to direct gas from inside of said receptacle towards said wick, a catalytic agent in position to be acted upon by said gas and ignite the same thus igniting the wick, a snuffer for the wick adapted to extinguish the flame and substantially seal the exposed end of the wick, operating means for the pump, and connections between said operating means and the snuffer whereby they may be operated together.

4. In a lighter, a fuel receptacle, pump means for pumping gas out of said fuel receptacle, a passage for gas between said receptacle and said pump means, the receptacle being otherwise closed, a wick extending into said fuel receptacle and having a portion outside thereof, and a nozzle to direct the gas onto said wick said nozzle having a check valve therein.

5. In a lighter, a fuel receptacle, a wick extending into said fuel receptacle and having a portion outside of said receptacle, means including a piston to direct gas against said wick, a catalytic agent to ignite said gas, a snuffer, and a member directly connected to said piston and carrying said snuffer, whereby the snuffer moves upwardly when the piston is raised.

6. In a lighter, a fuel receptacle, a nozzle on top of said fuel receptacle, pump means for directing gas through said nozzle, a wick extending into said receptacle and having a portion adjacent said nozzle, a catalytic agent in operative relation to said nozzle to ignite the gas and thereby the wick, and a cover for the top of the receptacle adapted to cover the nozzle the catalytic agent and the wick to conceal these parts when not in operation.

7. In a lighter, a fuel receptacle, a nozzle on the top of said fuel receptacle, pump means for directing gas through said nozzle, a wick extending into said receptacle and having a portion adjacent said nozzle, a snuffer to cover said wick, a catalytic agent between said snuffer and said nozzle, and a cover for the top of the receptacle supporting said snuffer and adapted to cover the nozzle the catalytic agent and the wick to conceal these parts when not in operation.

8. In a device of the class described, in combination, a wick, a catalytic agent adjacent said wick, a nozzle to direct gas against said catalytic agent and said wick, a pump, spring means to operate said pump, and a manually releasable member on the top of said device connected to the movable element of said pump and which when released causes said spring to move said releasable member and to force gas through said nozzle.

9. In a cigarette lighter, a receptacle for liquid fuel, a tubular member, a mass of gas absorption platinum catalytic material in said tubular member, one end of said tubular member being connected to said receptacle, a cap or cover for said receptacle mounted thereon for upward

rectilinear movement the other end of said tubular member being exposed when the cap is raised, means acting concurrently with the raising of said cap or cover to direct gas from said receptacle upon said mass of gas absorption platinum catalytic material, and an opening in the side of said tubular member to convey air to said mass of gas absorption platinum catalytic material.

10. In an ignition device a pair of tubular members connected together in axial alignment, a receptacle, a mass of absorbent material in said receptacle, connections to convey vapor from said absorbent material through said tubular members, a mass of gas absorption platinum catalytic material in one of said tubular members, a cap or cover for said receptacle mounted thereon for upward rectilinear movement, the end of the tubular member which has the gas absorption platinum catalytic material being exposed when the cap is raised, means acting concurrently with the raising of said cap or cover to direct gas from said absorbent material upon said platinum material and an opening in the side of one of said tubular members to convey air to said platinum material.

11. In a cigarette lighter, an outer casing, a mass of absorbent material in said casing, a pair of tubular members in axial alignment connected together, a dividing wall separating the interiors of said tubular members but having an orifice therein for the passage of gas from said absorbent material, a mass of gas absorption platinum catalytic material in one of said tubular members extending across substantially the entire area thereof and in a position to receive gas from said orifice, a cap or cover for the casing normally covering said tubular members mounted for removal from the casing to expose said tubular members, a chamber connected to said orifice, means acting concurrently with the raising of said cap or cover and including a spring to direct gas from said absorbent material to said chamber, and an opening in the side of one of said tubular members to convey air to said mass of gas absorption platinum catalytic material.

12. In a cigarette lighter, means forming a cup-shaped container, a mass of gas absorption platinum catalytic material extending across substantially the entire area of said cup-shaped container and having a surface adjacent the free or open end of said cup-shaped container, there being an orifice in the bottom of said cup-shaped container, a pipe mechanically connected to said cup-shaped container and pneumatically connected to deliver gas to said orifice, pump means, including a pair of relatively slidable interfitting members and a spring for the actuation thereof in one direction to direct gas through said pipe, a mass of absorbent material for liquid fuel, and means to hold said last named absorbent material adjacent said pump means to deliver gas to said pipe when said pump means is operated.

13. In a cigarette lighter, means forming a cup-shaped container, a mass of gas absorption platinum catalytic material extending across substantially the entire area of said cup-shaped container and having a surface adjacent the free or open end of said cup-shaped container, there being an orifice in the bottom of said cup-shaped container, a pipe mechanically connected to said cup-shaped container and pneumatically connected to deliver gas to said orifice, pump means, including a pair of relatively slidable interfitting members and a spring for the actuation thereof in one direction, to direct gas through said pipe, a cap or cover for the lighter, releasable means to hold said cap or cover over said container, said means also normally holding said relatively slidable interfitting members against relative movement in response to pressure of said spring and release of which permits the pump means to operate, a mass of absorbent material for liquid fuel, and means to hold said last named absorbent material adjacent said pump means to deliver gas to said pipe when said pump means operates.

14. In a cigarette lighter, means forming a cup-shaped container, a mass of gas absorption platinum catalytic material extending across substantially the entire area of said cup-shaped container and having a surface adjacent the free or open end of said cup-shaped container, there being an orifice in the bottom of said cup-shaped container, a pipe mechanically connected to said cup-shaped container and pneumatically connected to deliver gas to said orifice, pump means, including a pair of relatively slidable interfitting members and a spring for actuation in one direction, to direct gas through said pipe, there being an orifice for the admission of air to mix with the gas, a mass of absorbent material for liquid fuel, and means to hold said last named absorbent material adjacent said pump means to deliver gas to said pipe when said pump means is operated.

ALFRED F. REILLY.