May 9, 1950 J. M. FINCH, JR 2,507,202

PYROPHORIC LIGHTER AND FUEL SUPPLY THEREFOR

Filed Nov. 23, 1948 2 Sheets-Sheet 1

Fig. 1.

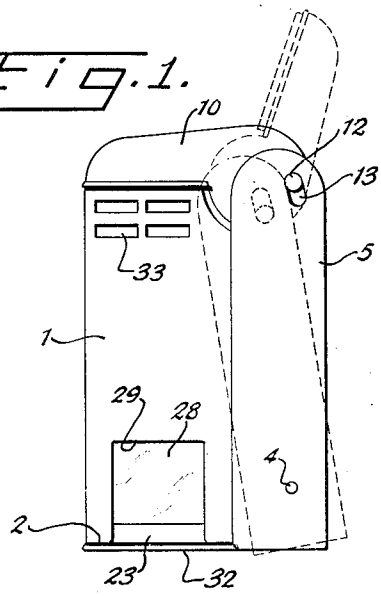


Fig. 2.

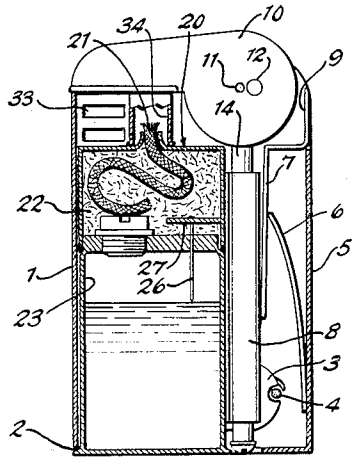


Fig. 3.

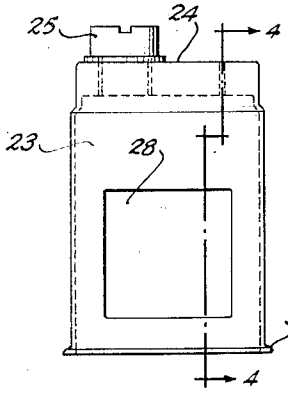


Fig. 4.

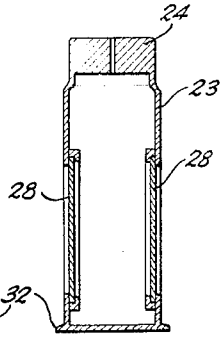


Fig. 5.

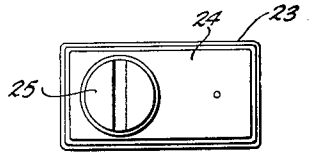


Fig. 6.

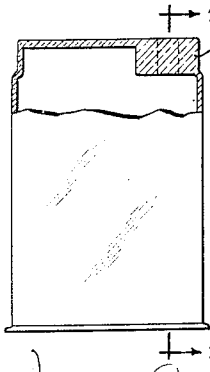


Fig. 7.

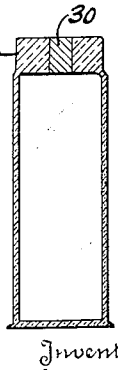


Fig. 8.

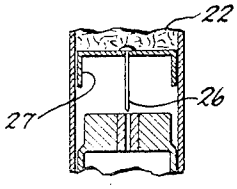
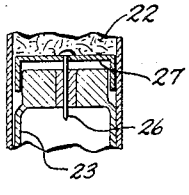


Fig. 9.



Inventor

James M. Finch, Jr.

By Albert H. Kirchner

ATTORNEY

May 9, 1950 J. M. FINCH, JR 2,507,202

PYROPHORIC LIGHTER AND FUEL SUPPLY THEREFOR

Filed Nov. 23, 1948 2 Sheets-Sheet 2

Fig. 11.

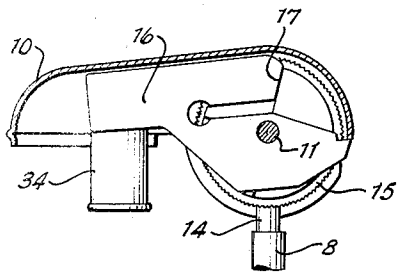


Fig. 12.

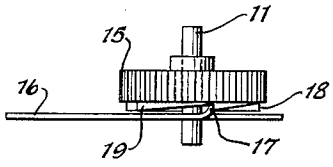


Fig. 13.

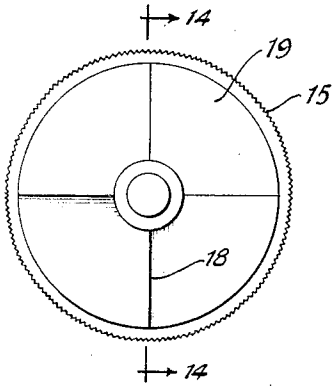
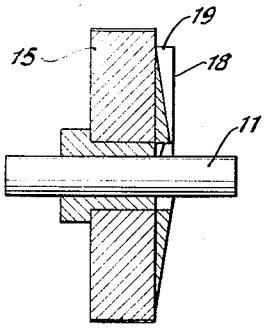


Fig. 14.



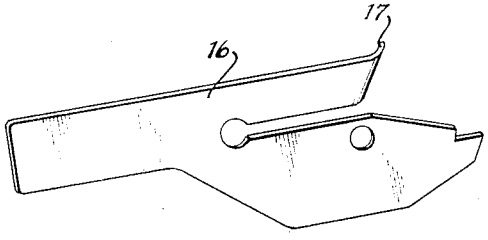
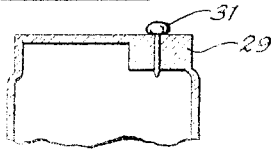


Fig. 15.

Fig. 10.



Inventor

James M. Finch, Jr.,

By Albert M. Kirchner

ATTORNEY

Patented May 9, 1950 2,507,202

UNITED STATES PATENT OFFICE

2,507,202

PYROPHORIC LIGHTER AND FUEL SUPPLY THEREFOR

James M. Finch, Jr., Maysville, Ky.

Application November 23, 1948, Serial No. 61,669

3 Claims. (Cl. 67—7.1)

1

The present invention relates to pyrophoric lighters for cigarettes and the like.

The principal object of the invention is to provide such a lighter with a fuel reservoir of exceedingly high capacity so that the lighter may be operated over an extraordinarily long period of time before the fuel supply needs replenishing.

A related object is to provide a lighter in which the quantity of fuel in the reservoir can be readily ascertained any time so as to avoid the possibility of the supply becoming unexpectedly exhausted.

Other objects are to provide a lighter of the type indicated in which the replenishing of fuel is made a very simple, quick and easy operation involving the use of parts and combinations of parts which are inexpensive to make and will be durable and foolproof in use.

Other and further objects of the invention will, it is believed, be sufficiently evident to those skilled in the art from the illustrations and description forming part of this application for Letters Patent disclosing certain preferred embodiments of the invention which have been reduced to practice and found to give complete satisfaction.

These preferred embodiments are illustrated in the accompanying drawings, in which

Figure 1 is a side elevational view of a complete lighter showing in broken lines the positions of the cap and operating lever when these parts have been moved to lighting position;

Fig. 2 is a generally longitudinal sectional view taken in substantially the median plane of the longer dimension of the casing;

Fig. 3 is a side elevational view on a relatively enlarged scale of one form of fuel reservoir;

Fig. 4 is a longitudinal sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a top plan of the reservoir shown in Figs. 3 and 4;

Fig. 6 is a side elevational view, partly broken away, showing a modified form of fuel reservoir;

Fig. 7 is a longitudinal sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a detail sectional view taken through the lighter shown in Fig. 2 showing the position of the top of the reservoir after it has been partially withdrawn from the lighter casing;

Fig. 9 is a similar view showing the position of the top of the reservoir after it has been pushed to fully inserted position in the case;

Fig. 10 is a detail top longitudinal sectional view of a still further modified form of reservoir;

Fig. 11 is a longitudinal sectional view of the

2

lighter cap and some of the parts carried by it;

Fig. 12 is a top plan view of the striking wheel and the parts carried by it;

Fig. 13 is a side elevational view, on a relatively enlarged scale, of the striking wheel and ratchet wheel;

Fig. 14 is a diametrical sectional view of the striking and ratchet wheels, taken on the line 14—14 of Fig. 13; and

Fig. 15 is a perspective view, on a relatively enlarged scale, of the operating plate which is carried in the cap.

Generally speaking, the invention comprises a lighter casing having an internal chamber the upper portion only of which contains a quantity of the usual wadding for holding liquid fuel by absorption and the lower portion of which receives a cartridge type of reservoir from which liquid fuel may, whenever needed, be discharged to the wadding so as to soak the same and be transferred to the wick which is embedded in the wadding. In addition to the novelty of this general type of arrangement, the present invention is new in providing means for initially opening the cartridge to permit it to be discharged and for subsequently sealing it after discharge. An optional feature of novelty resides in the structure of the cartridge by which the quantity of its liquid fuel contents can be observed at any time.

While the general structure of the lighter by which it is operated to strike a spark forms no part of the invention which is the claimed subject of this application, I have shown the invention embodied in a lighter of the type disclosed and claimed in my co-pending application Serial No. 61,670, filed November 23, 1948. To complete the explanation of the present invention some of the features of the operating structure and mechanism, flint supply, etc., will be referred to; but it is to be understood that the parts constituting the present invention, which relates to the fuel supply, may be incorporated in other and different types of lighters.

As shown in Figs. 1 and 2, the presently preferred form of construction comprises a main casing made in the form of a generally box-like housing 1 having front and side walls and having an opening 2 at its bottom and an open top and rear. The lower portions of the side walls are provided with rearwardly projecting ears 3 journaling a pintle 4 which mounts the side walls of a supplemental casing 5 having a rear wall and a bottom wall. The side walls of the supplemental casing overlap the rear margins of the side walls of

the main casing 1, and the pintle 4 pivots the supplemental casing 5 for rocking movement as a lever to the position shown in broken lines in Fig. 1. A leaf spring 6 is soldered to the inside surface of the rear wall of the supplemental housing and bears against a plate 7 disposed against a flint tube 8 in the rear of the main casing 1 so as normally to maintain the supplemental casing in general parallelism with the main casing, as shown in full lines in Fig. 1. An offset upper portion 9 of the plate completes the closure of the main casing.

A cap 10 is pivoted by a pintle 11 to the upper portion of each of the side walls of the main casing 1 and has a pair of outstanding short trunnions 12 which are engaged in short arcuate slots 13 formed in the side walls of the supplemental casing 5 so that, when the two casings are squeezed together by pressure on their upper portions and the supplemental casing is rocked to its broken line position of Fig. 1, the trunnions will be cammed from the upper end of the slot to the lower end thereof to swing the cap from closed to open position, all as shown in Fig. 1. During this movement the spring 6 becomes tensioned to restore the supplemental casing and the cap to their full line positions of Fig. 1 upon release of the pressure or squeezing force.

A flint 14 is pressed upwardly in the flint tube 8 by the usual coil spring (not shown) against a striking wheel 15 having a serrated periphery for rubbing the flint so as to throw sparks therefrom. A plate 16 is fixed in the cap 10 and has an inturned prong 17 which makes engagement with the radial edges of the inclined teeth 18 of a ratchet wheel 19 secured to a side of the striking wheel 15, or made integrally with it, as suggested in Fig. 14. As shown, these teeth are four in number, and the movement of the cap 10 is somewhat in excess of 90°, so that each time the cap swings to its open position the prong 17 will be sure to engage one of the teeth 18 and rotate the striking wheel 15 through approximately 90°, which is sufficient to throw adequate sparks from the flint to ignite the wick which will now be described along with the arrangement for keeping the wick impregnated with fuel. When the cap moves to closed position the prong slips ratchet-wise along the inclined side face of the tooth next adjacent, in a counterclockwise direction, to the previously engaged tooth, and finally the prong slips axially in front of said next tooth, ready for a repetition of the operation.

The main casing 1 has an internal chamber bounded by the front and side walls of the casing and closed at its top and upper rear portions by a partition member 20. This partition member includes a top wall having an opening through which a wick 21 extends with the bulk of the wick embedded in a relatively small quantity of wadding 22 which fills the upper portion only of the internal chamber. The bottom of the partition member 20 is open so that the undersurface of the small quantity of wadding 22 is uncovered and open to the lower and larger portion of the internal chamber.

It is into this lower part of the chamber that the fuel reservoir cartridge provided by the present invention is insertible through the bottom opening 2 of the main casing 1. The cartridge, which the invention contemplates providing in any of several different forms, is intended to contain liquid fuel, without any wadding, so that its fuel capacity is considerably greater, per unit of volume, than the fuel capacity of the wadding 22 or of any chamber in any conventional type of lighter which is filled with wadding.

The preferred form of cartridge, shown in Figs. 3, 4 and 5, comprises a generally box-like container 23, rectangular in cross-section, adapted to fit snugly and be frictionally held in the lower part of the chamber of the main casing 1, with the bottom of the cartridge closing the opening 2 through which it was inserted. The top wall 24 of the cartridge may be provided with a closure plug 25, screw-threaded in place and removable for filling the cartridge with liquid fuel. A portion at least of this top wall 24 is best made of some soft metal, such as a lead or antimony alloy, or it may be made of a suitable plastic composition, so as to be permeable by a pointed pin 26 which, in the preferred embodiment of the invention, fixedly depends from a small channel-shaped bracket 27 projecting into the chamber from the rear wall of the partition member 20.

The pin 26 extends down into the lower portion of the chamber, below the upper portion which contains the wadding 22. The arrangement is such that when the cartridge is pushed to its limit up into the chamber the pin will puncture the upper wall 24 of the cartridge, as shown in Fig. 2. In this position the pin seals the hole which it has punctured in the cartridge, but this hole can be uncovered by pulling the cartridge from the chamber sufficiently to withdraw it from the pin. With the parts in such position the entire lighter can be inverted and, if necessary, it can be shaken a few times or the projecting portion of the cartridge can be squeezed, so as to discharge some of the liquid fuel onto the wadding 22 until the wadding is sufficiently saturated to supply the wick 21. The cartridge is then pushed into the chamber to fully seated position, in which the pin fills the hole and seals the cartridge. The operation is of course repeated whenever the wadding appears to need more fuel.

The cartridge of Figs. 3, 4 and 5 is refillable through the opening which is closed by the plug 25. Its walls may be made of metal, with a pair of side windows 28 which may be made visible through openings 29 formed in the lower side walls of the main casing 1. Thus the amount of fuel in the cartridge is at all times observable, and the cartridge can be refilled before the fuel supply becomes exhausted.

The cartridge shown in Figs. 6 and 7 is made entirely of a transparent plastic composition and is intended not to be reused but to be discarded and replaced when empty. Its top wall may be thickened at one side, as shown at 29, to increase its strength and provide support for a relatively soft plug 30 which will be easily punctured by the pin 26.

The cartridge shown in Fig. 10 may be made in the same way as those of Fig. 3 or Fig. 6, but this cartridge carries its pin 31 and is intended to be used in a chamber which is not provided with a pin 26. In use, the cartridge of Fig. 10 is fully withdrawn from the chamber, the pin 31 is removed, and the cartridge is squeezed a few times, in the manner in which an oil can is used, to squirt a charge of fuel onto the wadding 22, whereupon the pin 31 is replaced and the cartridge is re-inserted into the chamber.

A number of details of the construction are optional and have no important bearing on the general principles of the invention. However, they are useful in themselves and I prefer to incorporate them in the structure. Thus, the car-

tridge, in whatever form it may be made, frictionally fits in the internal chamber and its penetration into the chamber is limited by a narrow base flange 32 which engages and trims the bottom edges of the main casing 1 which define the opening 2.

The top wall of the partition member 28 may be disposed at the level of the main casing top, but I prefer to arrange this top wall somewhat below that level and to provide air inlet openings 33 in one or both of the main casing side walls, so that the lighter is of the so-called windproof type.

The cap 10 in this case is best provided with a snuffer cup 34 for extinguishing the flame promptly upon the cap snapping to closed position.

It will be appreciated that the parts are all simple and easily made and are arranged for ready assembly and easy soldering, welding or other mode of securing them permanently in position.

It will be recognized also that many details of the several preferred forms of construction which have been described can be modified or eliminated, since not all of such details are essential to the invention. The principles of the invention are defined by the appended claims.

I claim:

1. The combination of a pyrophoric lighter comprising a casing having in its upper portion a wick and a quantity of wadding and having in its lower portion a chamber of substantially rectangular cross-section open at its bottom and having an opening in its side wall, a pointed pin fixed in the casing and projecting down into the chamber, and a replaceable liquid fuel cartridge snugly fitting the chamber and insertible into it by rectilinear sliding movement through said open bottom, said cartridge comprising a generally box-like container having a liquid fuel fill completely sealed therein and including a closed top wall which is permeable by said pin

and having a transparent side wall, whereby the top wall may be punctured and sealed by said pin when the cartridge is seated in the chamber and the hole thus formed may be opened for discharge of liquid fuel onto said wadding when the cartridge is partially withdrawn from the chamber and whereby the liquid fill may be seen through the transparent side wall of the cartridge and the opening in the side wall of the chamber when the cartridge is seated in the chamber.

2. A pyrophoric lighter as claimed in claim 1 in which the pin is positioned asymmetrically with relation to the cross-sectional shape of the chamber and in which the permeable part of the top wall is located at one end portion of the top of the cartridge.

3 A pyrophoric lighter as claimed in claim 1 in which the pin is positioned asymmetrically with relation to the cross-sectional shape of the chamber and in which the permeable part of the top wall is located at one end portion of the top of the cartridge and a removable closure plug is provided in the opposite end portion of the top of the cartridge.

JAMES M. FINCH, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,911,936	Armstrong	May 30, 1933
1,961,577	Aronson	June 5, 1934

FOREIGN PATENTS

Number	Country	Date
10,826	Great Britain	1912
313,927	Germany	June 28, 1919
317,016	Germany	Dec. 10, 1919
603,504	Great Britain	June 17, 1948