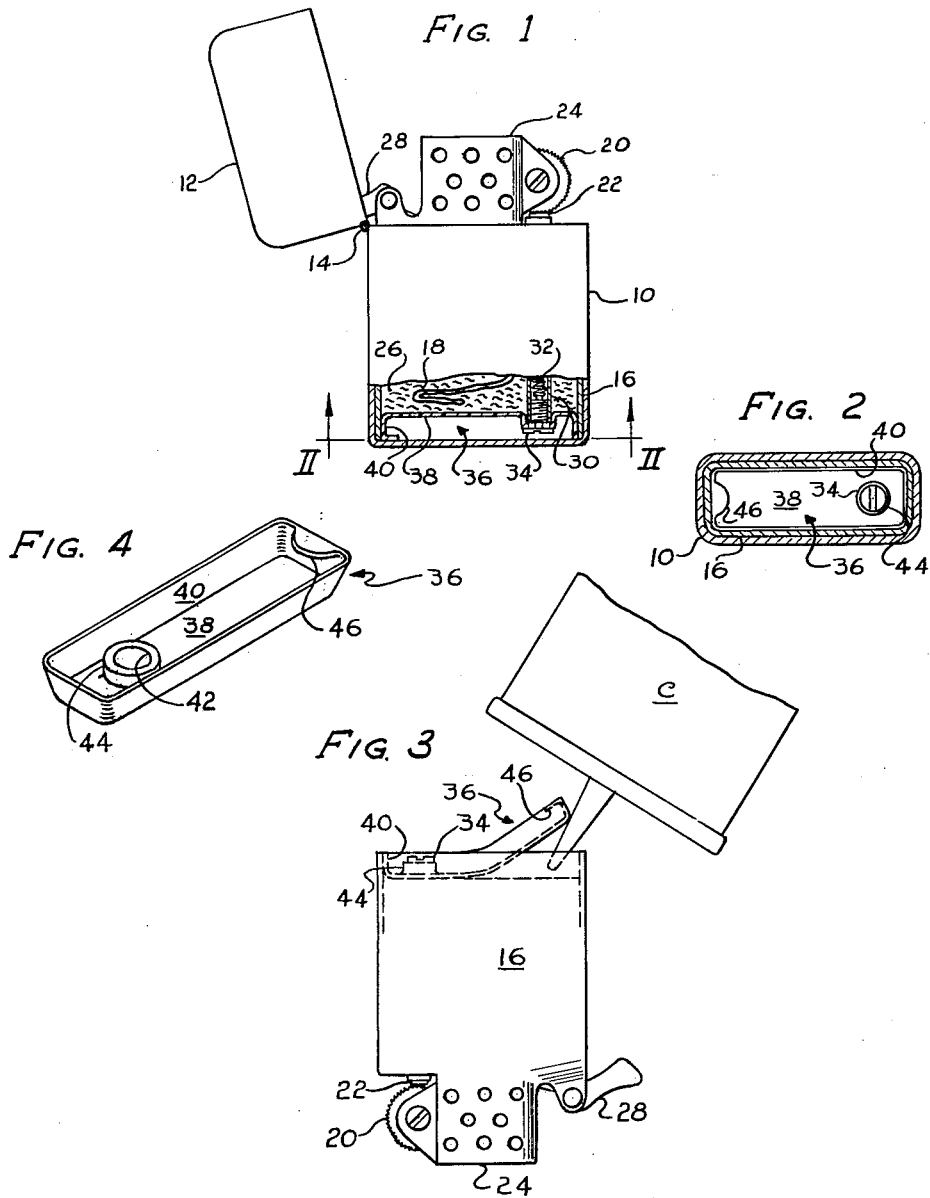


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PYROPHORIC DEVICE  
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**PYROPHORIC DEVICE**

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The present invention relates to pyrophoric devices and more particularly to that class of devices commonly used for igniting cigars, cigarettes and the like and which comprises an open bottom fuel tank telescopingly received by an outer casing.

Such devices are commonly referred to as lighters and are usually of a small size and weight so that they may conveniently be carried in a person's pants pockets or jacket or in a woman's purse. This means that the capacity of the fuel tank is limited and requires frequent refilling. While the inconvenience of frequent refilling is directly related to the small size of the fuel tank, evaporation of the fuel is equally important if not of greater importance in causing the inconvenience of frequent refilling.

It will also be noted that the manufacture of lighters of this type is now highly competitive particularly since there are no longer any patents dominating the essential flame producing mechanism therefor. This situation influences the objects of the invention which are to minimize the inconvenience of frequent refueling lighters of the type referred to by the provision of low cost means for minimizing the loss of fuel by evaporation and to accomplish such ends without adding appreciably to the weight of the lighter.

The above and other related objects as well as the novel features of the invention will be apparent from a reading of the following description of the disclosure found in the accompanying drawing and the novelty thereof pointed out in the appended claims.

In the drawing:

FIG. 1 is an elevation partially in section of a lighter embodying the improvements of the present invention;

FIG. 2 is a section taken on line II—II in FIG. 1;

FIG. 3 is an elevation showing the lighter fuel tank seen in FIG. 1 removed and inverted for filling with lighter fluid; and

FIG. 4 is a perspective view of a novel sealing element seen in the other figures.

The overall appearance of the lighter seen in FIG. 1 is functionally equivalent to a well known lighter construction which is well known under the trademark "Zippo" but is now available from many different manufacturers. The main elements of this lighter construction may therefore be briefly noted without going into any great amount of detail.

An outer casing 10 is provided with a cover 12 which is hingedly connected thereto at 14. A fuel tank 16 is telescoped within the casing 10, with the flame producing elements being mounted on the upper end of the fuel tank 16. These elements include a wick 18, a rotatable spark wheel 20 and a flint 22. The upper end of the wick is surrounded by a perforated, open top wind screen 24 and extends downwardly into the interior of the fuel tank 16 where it is supplied with lighter fluid primarily by reason of being surrounded by saturated cotton waste 26 packed within the fuel tank. The spark wheel 20 may be rotated against the spring urged flint 22 to ignite the wick 18.

The cover 12 is swingable to cover over the flame producing elements when the lighter is not in use. A spring urged latch 28 is arranged to maintain the cover 12 in either its open or closed position.

A tube 30 depends from the upper wall of the tank 16 with the flint 22 projecting therefrom and bearing against

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the spark wheel 20. A spring 32, disposed with the tube 30, urges the flint 22 into such engagement and is maintained in said tube by a headed screw 34 threaded into the lower end of said tube. The head of screw 34 terminates just above the bottom of the tank 16.

It will be noted that the cover 12 is conventionally of the same cross section as the casing 10 so that in its closed position the matching edges thereof tend to compositely form a closed container preventing the free escape of lighter fluid vapors. At best this sealing effect is not perfect which means that rate of loss of lighter fluid is dependent on the rate of escape of vapors from the fuel tank itself. The only opening in the top of the tank is closed off by the wick and surprisingly enough is not as great a source of vapor loss as from the bottom of the fuel tank. In commercial lighters today the bottom of the fuel tank is left open, and the seal therefor is thus dependent on the telescoping fit between the casing and the fuel tank. Practical manufacturing techniques are not adapted to economically producing a good seal between the tank and the case into which it is telescoped so that a very considerable amount of fluid evaporation loss is from the imperfect sealing of the bottom of the fuel tank.

The present invention overcomes such difficulties by the provision of a novel sealing gasket 36 which is preferably and economically formed by injection molding of a flexible plastic, such as polyethylene, or other synthetic or natural plastic materials. The gasket 36 is integrally formed and comprises a sealing plate 38 having an outline substantially matching the inner surfaces of the lower end of the fuel tank 16. The gasket 36 further comprises an outwardly flared peripheral skirt 40 depending from the plate 38 (FIG. 4). When the gasket 36 is in place, FIG. 1, the plate 38 is spaced above the lower end of tank 16 and the skirt 40 is in sealing engagement with the lower inner surfaces of the tank 16 at least substantially throughout the entire area of the skirt. The skirt, being outwardly flared, yieldingly presses against the tank 16 to give a more effective vapor seal and also is sufficiently flexible to accommodate non-linearities in the surfaces of the tank against which it is engaged.

Another feature to be noted is that the plate 38 maintains the cotton waste 26 in place.

The gasket 36 is preferably maintained in place by the provision of an aperture 42 which extends through the plate 38 and is further defined by an integral annular rim 44. The aperture 42 is disposed adjacent one end of the gasket 36 for receiving the lower end of the tube 30. The gasket 36 is secured in the tank by the head of screw 34 engaging the lower surface of rim 44 which in turn is, preferably, spaced above the bottom of the skirt 40.

The sealing gasket, just described and illustrated in sealing position in FIGS. 1 and 2, effectively seals the bottom of the tank 16 and materially decreases the frequency with which the tank requires refilling. It will also be noted that the sealing gasket 36 is extremely light in weight and requires little plastic material so that it may be economically manufactured in a molding operation. Further, no modification of the existing lighter construction is required to mount this novel sealing gasket. Thus the gasket may be readily adapted to present lighter manufacturing processes, replaced if damaged, or added to existing lighters.

It is also a simple matter to replenish the fuel supply by first removing the tank 16 from the casing 10 and inverting same as seen in FIG. 3. An inward, integral finger tab 46 is provided for raising the end of the flexible gasket 36 remote from the tube 30 out of the tank 16 to permit insertion of the filling spout of a fluid can C as indicated in FIG. 3. After filling the gasket 36 is pushed back into

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the tank 16 which is then telescoped into the outer casing 10 and the lighter is ready for use.

Having thus described the invention what is claimed as novel and desired to be secured by Letters Patent of the United States is:

In combination with a flame producing lighter comprising an open bottom fuel tank having a spark wheel and a flint mounted on the upper end thereof in cooperative relation for producing a spark, a tube depending from the upper end of said tank and interiorly thereof and terminating adjacent and above the lower end of said tank, said flint being disposed at the upper end of said tube with a spring therein urging the flint against the spark wheel, and a headed screw having a diameter greater than that of the tube threaded into the lower end of said tube and an outer casing into which at least the lower end of the fuel tank is telescoped; a sealing gasket integrally formed of flexible, resilient plastic material and including a relatively thin plate portion having an outline generally matching that of the bottom of the fuel tank, an outwardly flared peripheral skirt depending from said plate portion, said plate portion being apertured to snugly receive the lower end of said tube with the aperture being defined by a depending annular rim projecting below said plate portion, said

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gasket being mounted in said fuel tank with the said tube received by said aperture and with the headed screw bearing against the bottom of said rim to position the plate portion above the bottom of said fuel tank with the plate portion generally parallel thereto, and with the outwardly flared skirt depending from said plate portion and deflected into sealing engagement with the inner walls of said tank in a peripheral sense to seal off the bottom opening of said fuel tank, said gasket further having a tab projecting inwardly from the lower end of said peripheral skirt at a point remote from said aperture to provide means for removing one end of said gasket from said bottom opening to facilitate replenishing of fuel in said tank.

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