Sept. 20, 1955 L. OXAAL ET AL 2,718,133

CATALYTIC LIGHTER

Filed Feb. 23, 1955

FIG. 2

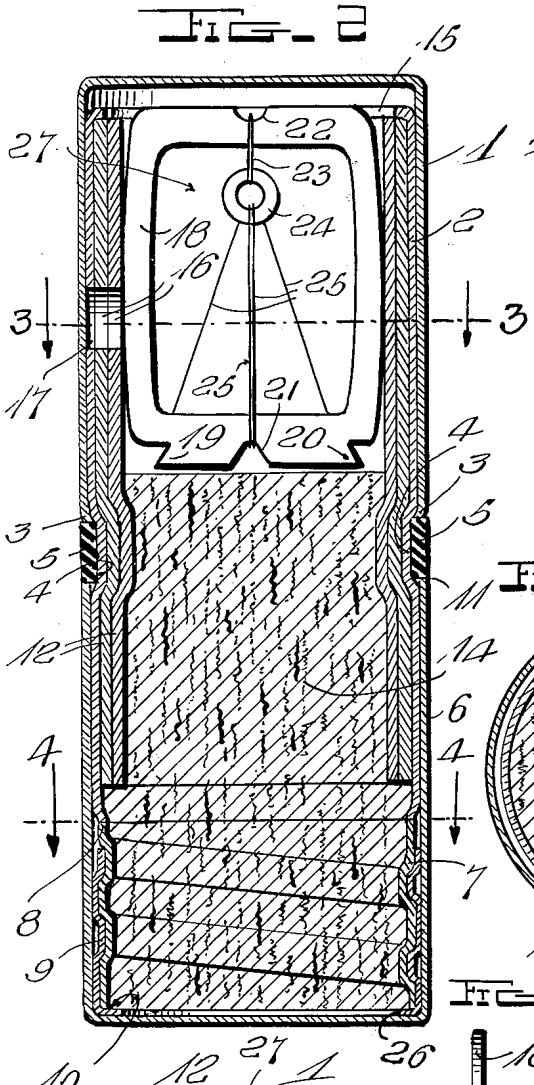

FIG. 1

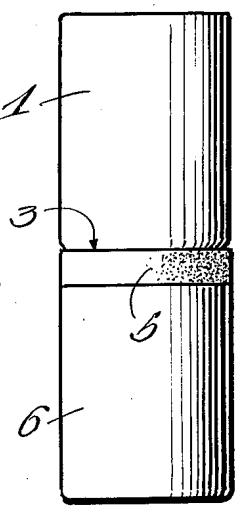

FIG. 5

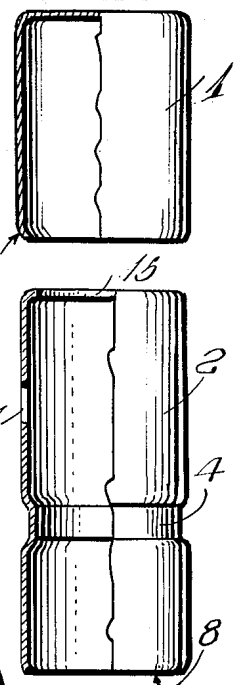

FIG. 4

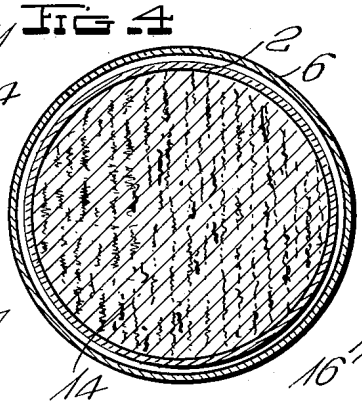

FIG. 6

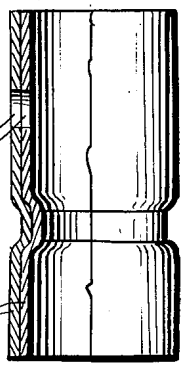

FIG. 10

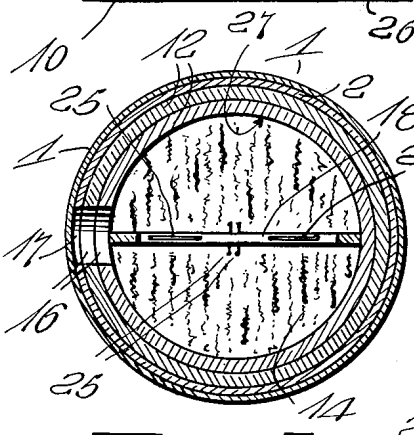

FIG. 7

FIG. 9

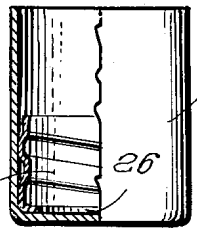

FIG. 8

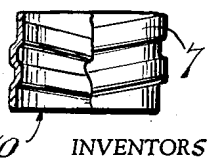

FIG. 3

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United States Patent Office 2,718,133 Patented Sept. 20, 1955

2,718,133

CATALYTIC LIGHTER

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Application February 23, 1955, Serial No. 489,872

1 Claim. (Cl. 67—7)

Our invention relates broadly to catalytic lighters and more particularly to a construction of a catalytic lighter including positive and reliable closure means for sealing the casing of the lighter, cutting off the access of oxygen to the ignition chamber thereof.

One of the objects of our invention is to provide a compact construction of catalytic lighter in which the combustion chamber wholly surrounds the catalyst for insuring quick ignition of the lighter.

Another object of our invention is to provide a construction of smooth walled dual closure cylindrical container and coacting seal for a catalytic lighter in which one closure is removable to permit renewal of fuel for the lighter and the other closure is removable for permitting access of oxygen to the ignition and combustion chamber of the lighter for effecting automatic ignition thereof.

Still another object of our invention is to provide a construction of closure for a catalytic lighter in which a substantially cylindrical shell enclosing a fuel chamber and a catalytic ignition chamber is provided with a screw-threaded extension on one end thereof engageable by a screw-threaded sleeve-like insert forming a liner for a cylindrical closure member insertable over the end of the substantially cylindrical shell wherein the screw-threads of said liner engage the screw-threaded sleeve on said shell for providing a substantially smooth exterior walled closure for the container.

Other and further objects of our invention reside in the construction of a catalytic lighter capable of efficient operation and adapted for mass production inexpensively on a quantity production scale as set forth more fully in the specification hereinafter following by reference to the accompanying drawing, in which:

Fig. 1 is a side elevational view of the catalytic lighter of our invention;

Fig. 2 is an enlarged vertical sectional view through the catalytic lighter;

Fig. 3 is a transverse sectional view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a transverse sectional view taken substantially on line 4—4 of Fig. 2;

Fig. 5 is a side elevational view partially in vertical section showing the upper closure member of the dual closure lighter of our invention;

Fig. 6 is a side elevational view partially in section showing the substantially cylindrical shell of the catalytic lighter of our invention;

Fig. 7 is a side elevational view partially in vertical section showing the asbestos fabric paper tape wick used in the catalytic lighter of our invention;

Fig. 8 is a side elevational view partially in section showing the substantially cylindrical screw-threaded sleeve which forms a continuation of the lower end of the shell of the catalytic lighter of our invention;

Fig. 9 is a side elevational view of the bottom cylindrical closure for the lighter of our invention, the view being partially broken away to illustrate the substantially cylindrical screw-threaded liner within the bottom closure and which coacts with the screw-threaded sleeve extension on the shell; and

Fig. 10 is a side elevational view on an enlarged scale showing the catalyst mounted on the frame which is removably mounted in the ignition chamber of the catalytic lighter.

Our invention is directed to a compact construction of catalytic lighter which is capable of inexpensive manufacture on a mass production scale. We provide a catalytic lighter which has a substantially smooth walled cylindrical exterior contour with a cylindrical closure cap insertable over each end of a double-ended substantially cylindrical shell. A sealing gasket is provided intermediate opposite ends of the shell and the cylindrical closures are insertable over opposite ends of the shell and seat against the intermediately positioned resilient gasket. The external contour of the lighter is that of a smooth cylindrical wall and connection is made between the bottom closure member and the substantially cylindrical shell of the lighter by an internally arranged screw-threaded liner in the bottom closure member which engages a screw-threaded sleeve carried by the lower end of the substantially cylindrical shell. The shell encloses a fuel chamber at its lower end and an ignition chamber at its upper end while providing a mounting means for a sealing gasket intermediate the opposite ends thereof against which the peripheral edges of the dual closure members, which are insertable over opposite ends of the substantially cylindrical shell, are adapted to be seated. The fuel is renewed from time to time by removing the closure member from the bottom of the substantially cylindrical shell. The catalytic lighter is ignited by merely removing the upper substantially cylindrical closure member and permitting access of oxygen to the catalyst suspended in the ignition chamber immediately adjacent the top of the fuel chamber. Provision is made for the quick entry of oxygen through one side of the ignition chamber immediately adjacent the catalyst upon removal of the upper closure member, thereby insuring immediate ignition of the catalytic lighter and the burning of the fuel supplied from the fuel chamber until such time as oxygen is excluded from the catalyst by reinsertion of the upper cylindrical closure over the upper end of the shell into sealing relation therewith.

Referring to the drawing in more detail, reference character **1** designates the cylindrical removable top section of the closure for the catalytic lighter which is slidable over substantially cylindrical shell **2**. The cylindrical top section **2** has a resilient terminating circular edge **3** which is adapted to yieldably grip the periphery of the substantially cylindrical shell **2** and to slide thereon to a sealing position as shown more clearly in Fig. 2. The substantially cylindrical shell **2** contains an annular recess **4** therein in the shape of a relatively wide band in which a resilient gasket **5** is retained in a position intermediate the ends of the substantially cylindrical shell **2**. The relatively wide band recess **4** in the substantially cylindrical shell **2** serves as a seat for the resilient gasket **5** which projects substantially beyond the diametrical limits of the substantially cylindrical shell **2** and serves as a seal with respect to the yieldable peripheral edge **3** of removable top section **1** of the closure around the top peripheral edge of the resilient gasket **5** and as a seal for the edge of the bottom cylindrical section **6** at the peripheral edge **11** thereof around the bottom of the resilient gasket **5**. That is to say, the protruding resilient gasket **5** serves to seal both the top and bottom cylindrical sections with respect to the substantially cylindrical shell **2** for excluding access of oxygen to the interior of the shell when the two closure members **1** and **6** are in position.

The substantially cylindrical shell **2** is provided with a

hollow substantially cylindrical screwthreaded extension **7** which is soldered or welded to the terminating end **8** of the substantially cylindrical shell **2**, forming a substantially cylindrical shell of such length that the top and bottom cylindrical sections **1** and **6** are symmetrical and capable of being produced by the same forming dies, thereby decreasing manufacturing costs.

The interior closed end of the bottom section **6** is provided with a screw-threaded substantially cylindrical insert **9** which is soldered or welded therein, as represented in Fig. 9. The cylindrical insert is open at its lower end thus facilitating the soldering or welding of the insert to the interior of the bottom section **6** around the annular edge **26** thereof. The hollow cylindrical screw-threaded extension **7** on shell **2** is wholly open at the bottom end **10** thereof for the introduction of liquid fuel to the catalytic lighter when the bottom section **6** is removed and the closure is held in up-side-down position. The screw-threads of insert **9** engage the screw-threads of the hollow cylindrical screw-threaded extension **7** and enable the bottom closure section to be revolved to a sealed position with the peripheral edge of section **6** establishing a tight seal at **11** with the bottom edge of resilient gasket **5**.

The inside wall of the substantially cylindrical shell **2** is lined with an asbestos fiber paper tape which is rolled in at least two layers as indicated at **12** in Figs. 2, 3 and 6. The outer layer of the asbestos fiber paper tape is seated against the annular inturned or rolled-over upper protective edge **15** of the substantially cylindrical shell **2** as shown in Fig. 2. The layers of the asbestos fiber paper tape **12** are apertured in one side thereof at **16** and register with aperture **17** in the side wall of substantially cylindrical shell **2**, all of the apertures being closed when the top section **1** is in position and seated against the top of resilient gasket **5**, and the apertures all being open when top section **1** is removed from the substantially cylindrical shell **2**. The lining of asbestos fiber paper tape **12** serves as a holder for filler **14**, constituting an absorbent of 135 to 145 grains per yard. The cotton filler is stuffed into the lower end of the substantially cylindrical shell **2** and the extension **7** thereof and is exposed through the open end **10** of extensian **7** so that when liquid fuel is to be added to the filler it is only necessary to remove the bottom section **6** of the closure, hold the device up-side-down and drip the liquid fuel into the absorbent filler. The cotton filler **14** is stuffed into the substantially cylindrical shell **2** for a distance appreciably over one-half the lineal length thereof leaving the balance of the space within the absorbent fiber paper tape lining **12** open. Into this open section we introduce the catalyst holder **18** in the form of a flat frame having feet **19** and **20** which contact the upper surface of the cotton filler **14**. The catalyst holder occupies a position spaced from the sides of the absorbent fiber paper tape layers **12** within an ignition chamber **27**. The catalyst holder **18** includes an inverted V-shaped bottom recess **21** and a substantially semicircular top recess **22**. A catalyst in the shape of a toroid **24** is suspended by silver wire **23** from recess **22** at the top of the catalyst and through the bottom of the catalyst we pass platinum wires **25** which are stretched around the frame **18** and through the inverted V-shaped recess **21** as represented in Figs. 2, 3 and 10. We prefer to use silver wire at **23** of .0035" diameter, and platinum wire at **25** of .0015" diameter. The catalyst **24** is a toroid of .125±.005" outside diameter, and .047.±005" inside diameter, the toroid having a thickness of 5/64±.005" and the edges of the toroid being formed on radii of .003+.003 or —.000".

We have found the catalyst structure as specified above highly successful in operation but we realize that variations in dimensions may be readily made and that we do not intend our invention to be restricted to the particular

dimensions given; but we do intend that the proportions set forth herein be considered as critical.

The catalyst is wholly surrounded by the ignition chamber **27** and the frame **18** surrounds the catalyst **24** so that when the top section **1** is removed a draught is established through the ignition chamber **27** insuring an immediate supply of oxygen to the catalyst **24** resulting in the incandescence of the platinum wires **25** at a position immediately above the volatilized gases from the fuel in filler **14** which ignites the fuel instantaneously upon removal of the top section **1**. Thus, the device operates as a lighter without mechanical operation of a flint wheel or other mechanical devices. The flame is readily extinguished by returning the top section **1** to a position in which the yieldable edge **3** seals against the upper protruding edge of resilient gasket **5**, thus cutting off the supply of oxygen to the catalyst. As heretofore noted, the liquid fuel is replenished from time to time by reversing the position of the container, removing the bottom section **6**, thus exposing the cotton filler **14** through the open end **10** of the extension **7** of shell **2** and enabling liquid fuel to be poured into the exposed open end of the cotton stuffing at **14**. Upon refilling, the bottom section is restored to position and the lighter is ready for use. The catalyst frame **18** may be readily renewed from time to time by simply pulling the frame out of the top of the substantially cylindrical shell **2** and replacing a new frame therein. The frame **18** is gripped by yielding frictional engagement with the opposite inside walls of the asbestos fiber paper tape lining **12** within the ignition chamber **27**. The top closure section **1** simply has lineal sliding movement with respect to the substantially cylindrical shell **2** while the bottom section **6** has both sliding and screw-threaded rotative movement with respect to the substantially cylindrical shell **2** and the extension **7** thereof.

While we have described our invention in certain preferred embodiments we realize that modifications may be made and we desire that it be understood that no limitations upon our invention are intended other than may be imposed by the scope of the appended claim.

What we claim as new and desire to secure by Letters Patent of the United States is as follows:

A catalytic lighter comprising a substantially cylindrical metallic shell terminating in a screw-threaded end section at the bottom and having a rolled-in annular edge at the top thereof, a central annular recess formed in said shell in a position intermediate the terminating ends of said shell and screw-threaded end section, a resilient gasket set in said annular recess and projecting beyond the diametrical limits of said shell, a wick lining said shell, a filler within said shell and screw-threaded end section, said filler terminating appreciably below the rolled-in annular edge of the top section of said shell and providing an ignition chamber within the upper portion of said shell, a catalyst removably mounted in said ignition chamber, a slidable and rotatable bottom cylindrical closure cap having a screw-threaded insert in the interior of the bottom thereof operative to engage the screw-threaded end section of said shell with the terminating annular edge effecting a seal with respect to the bottom protruding edge of said resilient gasket and a coacting cylindrical closure cap engageable over the upper end of said cylindrical shell and establishing an oxygen-tight seal against the top protruding edge of said resilient gasket.

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