

Nov. 11, 1952

M. R. PRUSACK  
LIGHTER CONSTRUCTION

2,617,286

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2 SHEETS—SHEET 1

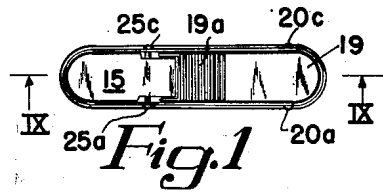


Fig. 1

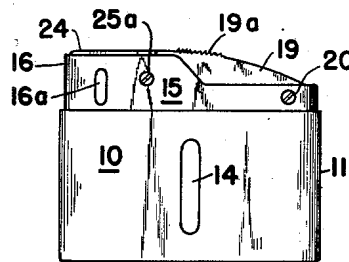


Fig. 2

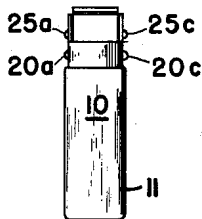


Fig. 3

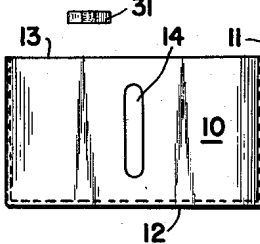
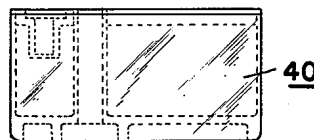
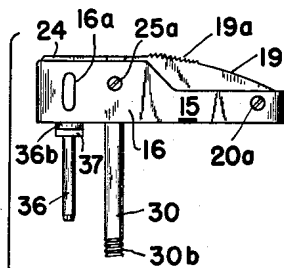


Fig. 4

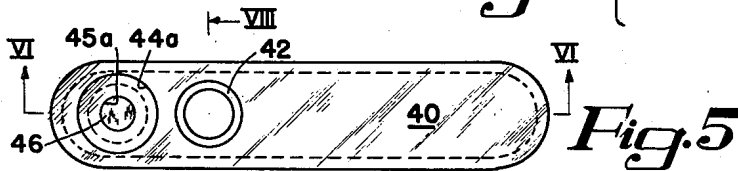


Fig. 5

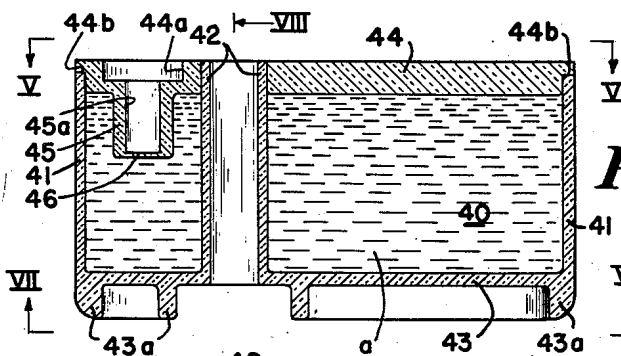


Fig. 6

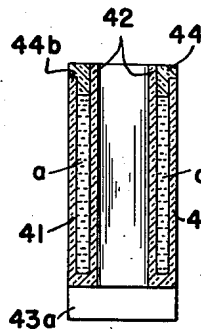
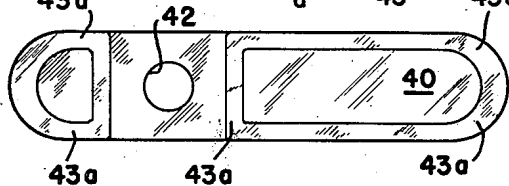


Fig. 7

Fig. 8



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2 SHEETS—SHEET 2

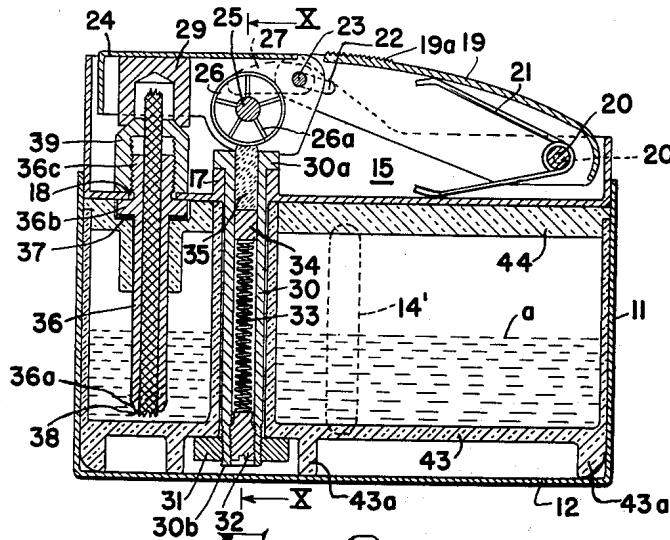


Fig. 9

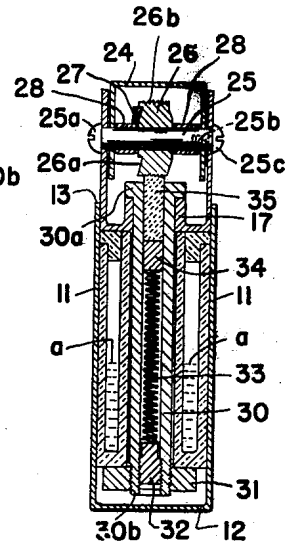


Fig. 10

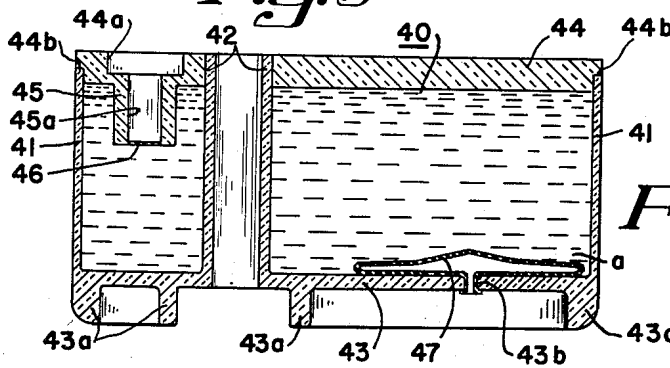


Fig. 11

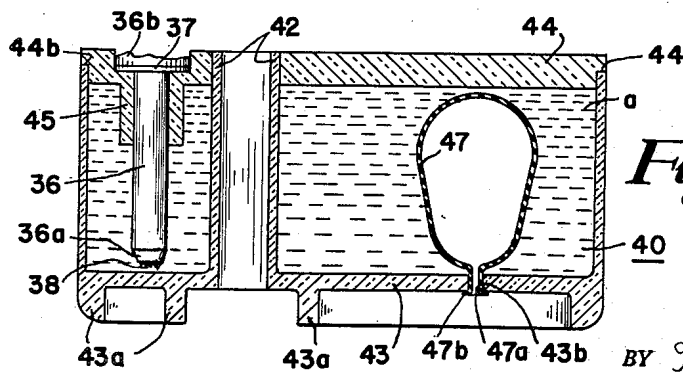


Fig. 12

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# UNITED STATES PATENT OFFICE

2,617,286

## LIGHTER CONSTRUCTION

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Application February 25, 1950, Serial No. 146,228

7 Claims. (Cl. 67-7.1)

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This invention pertains to pyrophoric lighters and particularly, to lighters which employ a flint and utilize a lighting fluid.

An object of my invention has been to devise an improved and simplified type of lighter construction;

Another object has been to devise a three-part lighter construction wherein the parts may be easily assembled and disassembled and a replaceable cartridge of a visible type may be utilized;

These and many other objects of my invention will appear to those skilled in the art from the illustrated embodiments thereof.

In the drawings:

Figure 1 is a top plan view of an improved lighter embodying my invention;

Figure 2 is a side view in elevation and Figure 3 is an end view of the lighter of Fig. 1;

Figure 4 is an exploded side view in elevation of the three principal parts of my construction illustrating how they may be assembled and disassembled;

Figure 5 is an enlarged top plan view of a cartridge part shown in Fig. 4 and is taken along the line V—V of Fig. 6;

Figure 6 is a vertical side section in elevation taken along the line VI—VI of Fig. 5;

Figure 7 is a bottom plan view taken along the line VII—VII of Fig. 6;

Figure 8 is a vertical end section taken along the line VIII—VIII of Fig. 5;

Figure 9 is an enlarged vertical side section in elevation through the lighter unit of Fig. 2, showing the parts thereof in an assembled ready-to-use relationship;

Figure 10 is an end sectional elevation taken along the line X—X of Fig. 9;

Figures 11 and 12 are side sectional elevations similar to Fig. 6, but illustrating a relative-pressure-sensitive element or device that may be used in connection therewith; Fig. 11 shows the shape of the device when it is contracted and Fig. 12 shows the shape of the device when it is expanded.

Referring particularly to Figures 1 to 4, inclusive, the illustrated embodiment of my invention comprises a main housing part or casing 10 which may be of unitary metal construction, an upper housing shell or operating mechanism carrying part 15 which may be of metal construction, and a fluid carrying cartridge part 40 which is shown as of clear plastic. The main housing part or casing 10 is of somewhat oblong shape having a continuous side wall 11, a bottom wall 12, and an open top 13. The side wall

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portion 11 has vertical slits or windows 14 and 14', see Figures 2 and 9, on opposite sides thereof, so that the level of fluid in the cartridge 40 may be easily determined. The upper portion 13 is open to slidably receive the cartridge 40 which frictionally fits therein in a manner illustrated in Figures 9 and 10.

Referring particularly to Figures 1, 2, 3, 4, 9 and 10, the upper or operating mechanism housing part 15 has an integral shell 16 which is adapted to telescope or slidably fit into the upper open end portion 13 of the casing 10. The shell 16 has vertical slits 16a along its opposite sides to permit flow of air to a wick 38 when it is being lighted. An integral bottom wall portion of the shell 16 has an upwardly-extending annular flange 17 which slidably receives a vertically-extending flint mechanism-containing tube 30. As will be noted, an upper, outwardly-extending flange portion or boss 30a of the flint tube 30 rests upon the flange 17 and extends downwardly therefrom. The flint tube 30 is threaded internally at its lower end portion 30b to receive a threaded set screw 32 therein. A tension spring 33 is adapted to extend along the tube 30 to at its upper end press against a slide piece 34 to hold a flint 35 in operative engagement with a knurled peripheral rim 26b of a flint wheel 26. It will thus appear that the set screw 32 can be adjusted to provide a suitable tension of the spring 33 and control its action on the flint 35 and has a slotted head, so that it can be removed to replace any of the flint mechanism parts.

The integral bottom wall portion of the shell 16 also has a slotted portion or opening 18 there-through adjacent the flange 17 to receive a wick tube 36 which extends vertically downwardly therefrom. The wick tube 36 has an annular boss or flange 36b near its upper end which is adapted to abut against the lower surface of the slotted portion or opening 18 and has an integral, externally threaded, upwardly-extending portion 36c that is adapted to receive and threadably engage an internally-threaded wick guide piece or shell 39. It will be noted that the wick guide 39 when tightened down on the boss 36c holds an upper face of the flange 36b in a securely mounted relationship against the bottom wall adjacent the opening 18 of the shell 16. A compression type sealing washer 37 is carried by the tube 36 to abut with the lower face of its flange portion 36b. The lower end 36a of the wick tube is beveled to facilitate its puncture or displacement of a closure means such as a thin membrane or push-out portion 46, cork or removable

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plug in the bore 45a of cartridge 40 (across its seating portion), see Figures 6 and 11.

A depressable actuating or push element 19 encloses an upper portion of the shell 16 and is pivotally mounted at one end on a pin or shaft 20 which at one end has, as shown in Figure 3, a head 20a and at its other end, as shown in Figure 9, has a threaded bore 20b to receive a mounting set screw 20c, see Figures 1, 2 and 3. The push element 19 carries a knurled portion 19a at which depressing pressure may be applied to actuate the flint wheel 26. As shown particularly in Figure 9, a spring 21 is mounted on the pivot pin 20 and abuts against the piece 19 and the bottom wall portion of the shell 16 to normally hold the element 19 in a raised position.

The front end of the element 19 is slotted at 22 to slidably receive a pin 23. This pin is mounted to extend from opposite sides of a flint wheel carrying piece 24. As shown particularly in Figures 9 and 10, the piece 24 has a cap 29 secured thereto as by soldering that extends downwardly therefrom to engage the wick guide 39 to enclose the upper end of the wick 38 when the device is not in use.

A flint wheel shaft 25 has, as shown particularly in Figures 2, 3, 9 and 10, a head portion 25a at one end thereof which mounts it to extend from one side of the shell 16 and has a threaded bore 25b at its other end to receive a set screw 25c that extends through the opposite side of the shell 16. Flint wheel 26 is rotatably mounted on the shaft 25, has a roughened rim 26b that is adapted to strike sparks from a flint piece 35, and has a series of successive cam projections 26a along one side face for periodically actuating it. Sleeves 28 position the wheel 26 in proper alignment with the flint piece 35. A ratchet pawl 27 is secured to one side of the piece 24 for movement therewith and is adapted to successively engage each of the cam faces 26a of the wheel 26 to turn the wheel, strike the flint 35, and light the fluid *a* that is taken up by wick 38.

As will appear from Figure 9, a depressing movement on the knurled portion 19a of the element 19 will cause the piece 24 to pivot about its shaft 25 and raise thereabout. This compresses the spring 21 and causes the pawl 27 to advance the wheel 26 a short distance to strike the flint 35. At such time, the cap 29 is raised off the wick guide 39 to expose the wick to sparks generated and thus it is lit. As soon as pressure is released from the portion 19a, the spring 21 carries the element 19 back to the starting position shown in Figure 9 and causes the pawl 27 to return and engage the next cam projection 26a of the flint wheel 26.

The cartridge 40, as shown particularly in Figures 4 to 8, inclusive, may be press-formed of clear plastic material to provide it with a continuous integral vertical side wall portion 41 and a bottom wall portion 43. It will be noted that positioning and spacer flanges 43a extend downwardly from the wall portion 43, so that when the cartridge is positioned in the casing 10, the flange portions of its bottom wall 43 provide a mounting space for the flint tube 30, see Figure 9. The outer periphery of the lower end 30b of the flint tube 30 is threaded to receive a knurled thumb nut 31 which enables the upper shell 16 and its parts to be secured in an assembled relationship with respect to the cartridge 40. It also holds the washer 37 tightly in compression against a seat 44a to seal off fluid contained within the cartridge 40.

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The cartridge 40 has a centrally-located, integral, continuous, or tubular wall 42 there-through within which the flint tube 30 is adapted to extend. An upper wall 44 is provided having offset edge portions 44b which receive and inset the rim edges of the walls 41. This upper wall 44 may be secured in position after the lower integral portion has been filled with fluid; a suitable cement may be used to secure it and seal it in its mounted position. The tubular wall 42 extends upwardly through the hole in the upper wall 44 and is sealed thereto. The upper wall 44 has a bore portion 44a forming a ledge or seat for the flange portion 36b of the wick tube and receives the washer 37. An annular flange portion 45 extends integrally downwardly from the wall 44 and has a smaller bore 45a adapted to receive the wick tube 36. The inner end of the bore 45a has a thin membrane sealing portion 45 thereacross which is adapted to be punctured by the end 36a of the wick tube when the cartridge 40 is to be used and assembled. If a plug is used, it will be pushed out by the wick tube.

As illustrated particularly in Figures 4 and 9, the subcombinations 10, 15 and 40 may be assembled by first moving the part 15 downwardly into the cartridge 40, mounting the knurled nut 31 on the threaded end 30b, and then pushing this preliminary assembly into the housing or casing 10, so that all of the parts are slidably held in position within the latter, see Figures 9 and 10.

From the above description it will be apparent that the owner of a lighter constructed in accordance with my invention can readily determine the level of fluid within the cartridge 40 through the inspection windows 14 and 14'. After the cartridge has been used up a new cartridge 40 may be mounted as previously described above, or if desired, the old cartridge may be filled up through the punctured hole at the inner end of the bore 45a of the flange 45. Since it is no longer necessary to use absorbent material in the wick chamber, the wick is kept fully saturated at all times and the lighter may be used for a much longer period and more effectively than customary before a refill is required. Also, it will be noted (see Figure 3) that fluid in the chamber of cartridge 40 is free to flow along passageways of the fluid chamber *a* between the wall portion 42 and the outer wall 41 of the cartridge.

In Figures 11 and 12, I have shown a collapsible resilient or rubber pressure-sensitive device 47 which is somewhat diagrammatically illustrated. As shown, the device 47 is of a somewhat balloon shape when expanded and has a neck 47a which is sealed to and extends outwardly through an opening 43b in the bottom wall 43 of the cartridge and which terminates in a sealing flange 47b. Thus, atmospheric pressure is always applied to the inside of the device 47. This device prevents fluid leakage through or along the wick 38 when the pressure of the fluid (the liquid and any air entering along the wick) in the container 40 becomes greater than atmospheric pressure. This may occur at different altitudes or due to expansion of the fluid by reason of an increase in its temperature. Figure 11 shows the device in a collapsed position to take care of a maximum increase of internal pressure and Figure 12 shows it in an expanded position to take care of a maximum increase of external pressure. That is, this device permits the cartridge to breathe without taking up an excess of air and to supply a substantially constant amount of liquid to the wick 38 without leakage.

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If desired, the sides of the cartridge 40 may be of flexible rubber or thin plastic material for the same purpose; in such case, the device 47 may be omitted, see Figure 6.

What I claim is:

1. An improved pyrophoric lighter comprising an upper shell part adapted to carry an operating mechanism, a cartridge part having a chamber adapted to carry lighting fluid, a casing adapted to receive and carry the first two parts therein, said shell part having a wick tube and a flint tube extending downwardly therefrom, said cartridge having a wall portion defining a vertical opening therethrough that is sealed off from the chamber, said flint tube being adapted to extend along and through said wall portion, a nut adapted to be threadably mounted on a lower extending end of said flint tube to secure said shell part on said cartridge part having an upper wall provided with an offset seating portion, a closure means across said seating portion to seal off fluid within the chamber of said cartridge part, said wick tube having an end portion adapted to penetrate said closure means and extend into the fluid within the chamber of said cartridge part, said wick tube having a boss adapted to carry a pressure washer thereon, and said pressure washer being adapted to rest upon the seating portion of said cartridge and to be held in tight engagement therewith when said nut is tightened down.

2. An improved pyrophoric lighter comprising, an upper shell part adapted to carry an operating mechanism, a cartridge part having a chamber adapted to carry lighting fluid, a casing adapted to receive and carry the first two parts therein, said shell part having a wick tube and a flint tube extending downwardly therefrom, said cartridge having a wall portion defining a vertical opening therethrough that is sealed off from the chamber, said flint tube being adapted to extend along and through said wall portion, a nut adapted to be threadably mounted on a lower extending end of said flint tube to secure said shell part on said cartridge part, said cartridge part having an upper wall provided with an offset seating portion, a closure means across said seating portion to seal off fluid within the chamber of said cartridge part, said wick tube having an end portion adapted to penetrate said closure means and extend into the fluid within the chamber of said cartridge part, said wick tube having a boss adapted to carry a pressure washer thereon, said pressure washer being adapted to rest upon the seating portion of said cartridge to be held in tight engagement therewith when said nut is tightened down, said cartridge having spacer portions on its bottom wall adapted to rest on a bottom wall of said casing to provide spacing for the extending end of said flint tube, said cartridge being adapted to slidably fit within said casing, and said shell part being adapted to slidably fit within said casing adjacent its upper end.

3. An improved pyrophoric lighter comprising, an upper shell part carrying an operating mechanism, a separate unitary cartridge part having a sealed-in chamber to carry lighting fluid, a casing to removably receive said cartridge part therein and said shell part therein above said cartridge part, said shell part having a wick tube and a flint tube secured thereto and extending downwardly therefrom, said cartridge part having a wall portion defining a vertical opening therethrough that is sealed off from the chamber, said flint tube being adapted to extend from said shell part along and through said wall portion, said

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cartridge part having an upper wall defining an offset seating bore portion, a closure means across said seating bore portion to normally seal off fluid within the chamber of said cartridge part, said wick tube having an extending end portion to engage and displace said closure means and extend into the chamber of said cartridge part, said wick tube having an offset seating flange portion carrying a pressure washer thereon to rest upon the seating bore portion of said cartridge part when said closure means has been displaced, and a nut threadably mounted on a lower extending end of said flint tube to secure said shell part on said cartridge part and hold said pressure washer in tight engagement between the offset seating flange portion of said wick tube and the offset seating bore portion of said cartridge part.

4. A lighter as defined in claim 3, wherein the extending end portion of said wick tube is beveled to facilitate the displacement of said closure means.

5. An improved filler cartridge adapted to be employed with a lighter having a pair of vertically-extending flint and wick tubes and a casing, wherein said cartridge is of substantially transparent plastic material and has integral bottom, side and top walls defining a fluid chamber therein, a flange wall portion defining a vertical opening therealong and extending downwardly from said top wall adjacent one end of said cartridge and having an offset seating portion to receive a seating flange and pressure washer carried by the wick tube, said flange wall portion having a push-out closure portion at its lower end for displacement by an end of the wick tube when the wick tube is introduced into the fluid chamber, a continuous wall portion extending vertically through said top and bottom walls of said cartridge and defining an open bore to receive the flint tube, said continuous wall portion being located adjacent said flange wall portion and being spaced from at least one side wall of said cartridge to define a fluid passageway along the full transverse extent of the chamber of said cartridge, and said cartridge being shaped to slidably fit within the casing of the lighter.

6. An improved filler cartridge adapted to be employed with a lighter having a pair of vertically extending flint and wick tubes, said cartridge being of clear plastic material and having integral bottom and side walls defining a fluid chamber therein and a top wall interfitting with said side wall and adapted to seal fluid within said chamber, said bottom wall having spacer flanges extending downwardly therefrom to position said cartridge within a lighter casing, an annular flange extending downwardly from said top wall adjacent one end of said cartridge and having an offset seating portion adapted to receive a seating flange and washer carried by the wick tube, said annular flange having a bore therealong and a sealing portion at its lower end adapted to be displaced by the wick tube to permit the introduction of the wick tube into said fluid chamber, a continuous wall portion extending vertically through said top and bottom walls of said cartridge and defining an open bore to receive the flint tube, said continuous wall being located adjacent said annular flange and being spaced from at least one side wall of said cartridge to provide a fluid passageway along the full length of said fluid chamber.

7. An improved filter cartridge as defined in

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claim 6 wherein, said continuous wall portion is integral with the bottom wall of said cartridge.  
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