Aug. 5, 1952 H. LEWIS 2,605,634

FLUID CONTENT INDICATOR FOR CIGARETTE LIGHTERS

Filed July 24, 1950

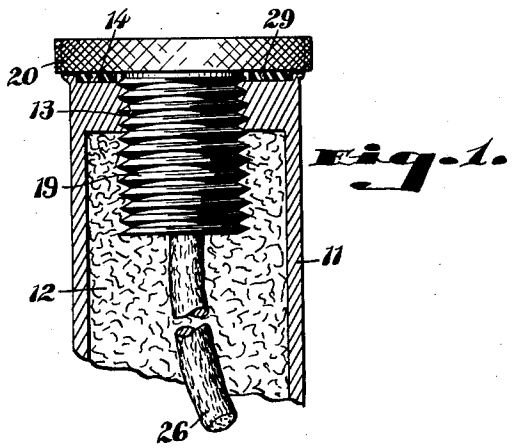


Fig. 1.

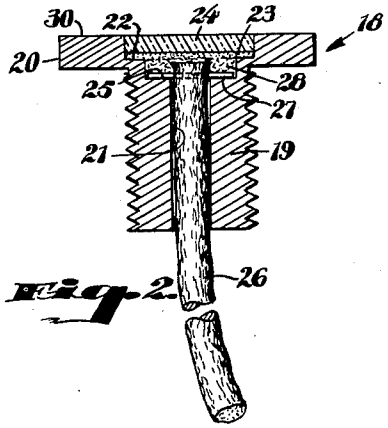


Fig. 2.

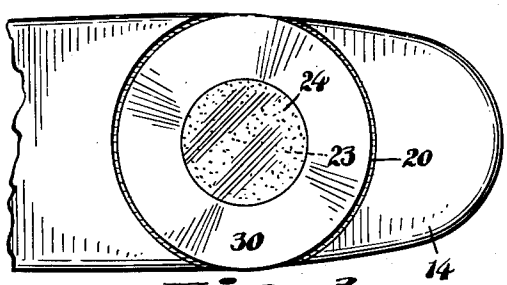


Fig. 3.

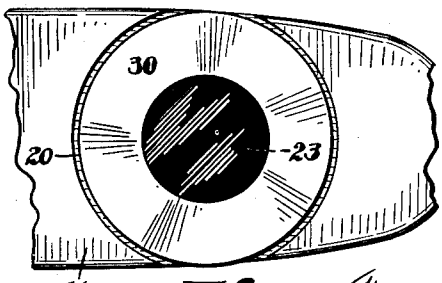


Fig. 4.

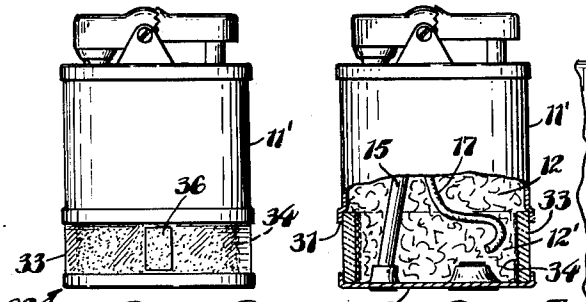


Fig. 6.

Fig. 7.

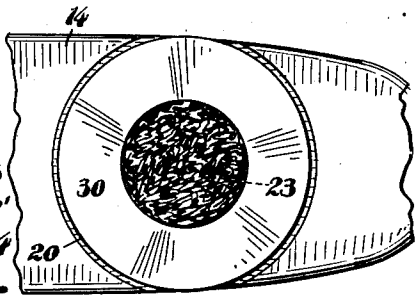


Fig. 5.

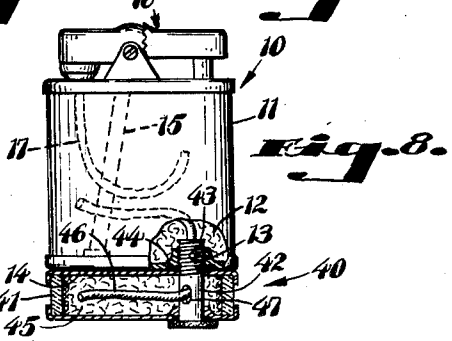


Fig. 8.

INVENTOR.
HAROLD LEWIS,
BY: Harold B. Wood
ATTORNEY.

Patented Aug. 5, 1952 2,605,634

UNITED STATES PATENT OFFICE

2,605,634

FLUID CONTENT INDICATOR FOR CIGARETTE LIGHTERS

Harold Lewis, Indianapolis, Ind.

Application July 24, 1950, Serial No. 175,620

11 Claims. (Cl. 73—73)

1

A major objection to the conventional type of liquid-fuel cigarette lighter, which is coming more and more widely into use, is the fact that, as the supply of fuel in the reservoir approaches exhaustion, no change in the operation of the lighter occurs; but suddenly, and without previous warning, the lighter refuses to operate because the supply of fuel is completely exhausted. It is the primary object of the present invention to provide indicator means which will show to the user of such a lighter the fact that the supply of fuel is nearing exhaustion, so that the reservoir may be refilled before failure of the lighter for lack of fuel.

A further object of the invention is to provide means which may be built into a conventional lighter and which will thus indicate approaching exhaustion of the fuel supply.

A further object of the invention is to provide an auxiliary case, readily assemblable with a conventional lighter, and carrying an indicator device constructed in accordance with my invention.

A still further object of the invention is to provide a simple, very inexpensive indicator device which can be sold to owners of conventional lighters at a minimum cost, and which, when substituted for a standard part of such a conventional lighter, will serve the indicating function.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the forms illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific constructions illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is an enlarged, fragmental sectional view of the reservoir portion of a conventional cigarette lighter having associated therewith an indicator constructed in accordance with the present invention;

Fig. 2 is a section, drawn to the scale of Fig. 1, and showing the internal construction of the indicator unit illustrated in Fig. 1;

Fig. 3 is a fragmentary bottom plan view, to the scale of Fig. 1, of a conventional lighter with the indicator unit of Fig. 1 associated therewith, and showing the condition of the indicator when dry;

Fig. 4 is a similar view, but suggesting the appearance of the indicator unit when the fuel supply of the lighter is adequate;

2

Fig. 5 is a similar view suggesting the appearance of the indicating unit when the fuel supply is approaching exhaustion, and should be replaced;

Fig. 6 is a side elevation of a conventional lighter modified by the incorporation therein of a different form of indicator unit constructed in accordance with my invention;

Fig. 7 is a similar view, partially in section, to illustrate the novel features of the assembly; and

Fig. 8 is a similar view of a conventional lighter having associated therewith a still further form of indicator unit shown in section, parts of the conventional lighter being broken away for clarity of illustration.

A well known form of cigarette lighter comprises a housing defining a chamber, the chamber being filled with an absorbent body such as a mass of cotton. A wick, having a portion of its length embedded in the absorbent body, is led to a point of cooperative association with a sparking device carried on the housing outside the chamber. Through the liquid-exchange relation between the absorbent body and the wick, the exposed portion of the wick is kept saturated with liquid fuel which ignites when a spark is thrown against the wick by the sparking device.

While I have shown but one form of this type of lighter, numerous forms are known, all embodying the features and operating upon the theory as above-described; and my invention is readily applicable to any known form of this type of lighter.

Thus, I have shown a lighter indicated generally by the reference numeral 10 and comprising a housing 11 suitably stuffed with an absorbent body 12, an internally threaded filling opening 13 being formed in the bottom wall 14 of the housing. In the illustrated form of lighter, a tube 15 extends from a further port in the bottom wall 14 to a point near a sparking wheel (not shown) and pyrophoric flints are adapted to be held, in the tube 15 by spring means (not shown) in cooperative relation with the said wheel. In the form of lighter chose for illustration, mechanical means 16' is provided for turning the wheel against the flint to throw sparks against the exposed end of a wick 17 the major portion of whose length is embedded in the body 12.

Conventionally, the filling opening 13 is closed by a plug (not shown) having an externally threaded shank adapted to be seated in the opening 13, and a knurled or kerfed head whereby the plug may be manipulated. According to the pre-

ferred form of the present invention, an indicator unit, indicated generally by the reference numeral 18, is substituted for such conventional plug.

The unit 18 comprises a threaded shank 19 proportioned and designed for liquid-tight reception in the opening 13, and a knurled head 20, whose diameter is substantially equal to the transverse dimension of the bottom wall 14 of the housing 11. It will be understood that Figs. 1 to 5 are drawn to an enlarged scale, Figs. 6 to 8 being approximately full size.

A passage 21 extends axially through the unit 18, its outer end being enlarged to define an outwardly-opening pocket 22 whose diameter will be as large as may be conveniently possible. As shown, the diameter of the pocket 22 is substantially equal to the diameter of the shank 19. A mass of material of characteristics later to be described, indicated generally by the reference numeral 23, is disposed in the pocket 22 and is retained therein by a transparent closure plug 24 suitably permanently secured in the outer end of the pocket 22, the mass of material 23 being visible, through the plug 24, from the outer end of the unit 18.

A reduced extension 25 of the pocket 22 will preferably be substantially filled with cotton 28 or other similar material, forming a support for a part of the mass 23. A wick 26 is disposed in the passage 21, having one end in liquid-exchange relation with the mass 23, the other end of said wick projecting beyond the inner end of the passage 21. A pin 27 transversely penetrates the wick 26 adjacent its first-named end, and rests upon the floor of the extension 25 to retain the wick against movement, axially of the passage 21, away from the mass 23.

It will be seen that cotton 28, or the like, acts to enlarge the area of liquid-exchange relation between the wick 26 and the mass 23.

The mass 23 will be material characterized by the fact that it is capable of receiving and holding liquid fuel in interstitial spaces thereof; by the fact that its affinity for the fuel is less than that of the absorbent body 12; and by the fact that its appearance, when wet, differs from its appearance when approaching dryness. I prefer to use, for the mass 23, a colored material whose shade changes, between a wet condition and a dry condition, and in which some change in shade is noticeable as the mass approaches dryness.

Many materials are useful in the present invention, having the above characteristics in greater or lesser degrees. My original experiments were made with colored blotting paper which operates reasonably satisfactorily to perform the intended function of the invention; but I have found that most of the blotting papers with which I have experimented do not attain the shade of substantial dryness until the fuel in the body 12 is so nearly exhausted that lighter failure may occur before the shade change in the indicator is noticed by the user.

I have experimented, also, with various pulverous materials, and, as a general rule, find that almost any pulverous material, which is insoluble and chemically unchanged by contact with liquid fuels, will operate somewhat more satisfactorily than blotting paper, or the like. Some such pulverous materials are characterized by the fact that their individual particles tend to absorb liquid fuel. Such materials, while they give up their moisture to the wick somewhat more readily than blotting paper or the like, still do not begin

to change their appearance, as the fuel supply nears exhaustion, early enough to perform their function to my satisfaction.

Therefore, I prefer to use a pulverous, discrete material characterized by the fact that its individual particles are completely impervous to liquid fuels, by which I mean that the particles do not themselves absorb any of the liquid, but the mass being capable of receiving and retaining, within its interstitial spaces, liquid fuel carried thereto by the wick 26. One such material which I consider to be optimum is a finely ground molded plastic, such as acrylic resin, or vinylite, though these plastics are mentioned illustratively rather than limitatively. While water-white plastic can be used and will change its appearance between a moist condition and approaching dryness, I prefer a colored plastic in a comparatively light shade, such as pink, light blue, light green and the like, because I find that the change in shade between a moist condition and a dry condition is more readily apparent when such colored plastic is used. In one embodiment of my invention which I have used and tested, I mixed ground red acrylic resin with ground white acrylic resin in substantially equal proportions to produce a pink mass which, when holding a substantially saturated quantity of water-white liquid fuel in its interstitial spaces, appears to be dark red and which, as it approaches dryness, attains a mottled appearance having spots which are such a light pink as to appear almost white.

Figs. 3, 4 and 5 suggest these three different appearances of the indicating mass, Fig. 3 suggesting the uniform, light pink appearance of the dry mass, Fig. 4 indicating the dark red appearance of the saturated mass, and Fig. 5 indicating the mottled appearance which the mass assumes as it approaches dryness.

In use, the unit 18 will be substituted for the conventional filler plug (not shown) ordinarily supplied with a lighter of the type illustrated. As the unit 18 is entered in the filling opening 13, by screwing its shank 19 thereinto, the wick 26 embeds itself in the absorbent body 12 within the chamber defined by the housing walls, thereby assuming a liquid-exchange relation with such body. The outer end of the wick being held in liquid-exchange relation with the mass 23, a liquid-exchange relation is thus established between the body 12 and the mass 23. Preferably, a sealing gasket 29 will be sleeved on the shank 19 to establish a liquid seal between the head 20 of the unit 18 and the bottom wall 14 of the lighter housing.

If, at the time of so seating the unit 18, the body 12 is substantially saturated, the appearance of the indicator mass 23 will rather rapidly change from that suggested in Fig. 3 to that suggested in Fig. 4, by liquid transfer from the body 12 through the wick 26, to the mass 23.

As the lighter is used, liquid fuel absorbed in the body 12 is drawn through the wick 17 and is gradually exhausted at the exposed end of that wick. When the supply of fuel approaches exhaustion, but a considerable time before such complete exhaustion as will cause the lighter to fail to operate, the indicator mass 23 begins to develop the mottled appearance suggested in Fig. 5; thus drawing the user's attention to the fact that the lighter should be refilled at the earliest opportunity.

Refilling, of course, is effected by withdrawing the unit 18 from the opening 13, and introducing further liquid fuel to the body 12 through that

opening. The secure retaining means, comprising the pin 27 in the illustrated embodiment of the invention, is important in order that the wick 26 may not be pulled away from its liquid-exchange relation with the mass 23 as the wick is withdrawn from the body 12.

The body 12 having been thus re-saturated with liquid fuel, when the unit 18 is reintroduced into the position illustrated in Fig. 1, the indicator mass will again assume the appearance suggested in Fig. 4.

The indicator device thus far described is intended for separate or independent sale to owners of conventional lighters, through retail outlets such as drug stores, ten cent stores, and the like. The purchaser of such a unit merely removes the conventional filler plug from his lighter, discards it, and substitutes the unit 18.

In Figs. 6 and 7 I have illustrated a modified embodiment of my invention intended for original inclusion in the lighter structure by the lighter manufacturer. In this form of the invention, the bottom of the housing 11' is formed to provide an open mouth 31 with which is permanently assembled an indicator unit 32 whose vertical walls (or some portion thereof) may be made of molded, transparent plastic, as indicated at 33. The upper end of the unit 32 is open and is telescopically assembled with the mouth 31 of the housing 11', the unit 32 enclosing a body 12' of absorbent material contiguous with, or in liquid-exchange contact with, the body 12 in the housing 11'. The wick 17 may preferably continue into embedded relation in the body 12'.

A mass of material 34, analogous to the material 23, will be located against the inner surface of the transparent wall 33 (or the transparent portion thereof) and such mass will preferably be discrete, pulverous material, held in place by the body 12' and, of course, in liquid-exchange relation therewith. I presently believe that, alternatively, the mass 34 may comprise such pulverous material mixed with a binder and applied to the inner surface of the transparent wall as a coating.

The lower end of the unit 32 may be closed by a wall 35 penetrated by the usual plug filler opening and the usual plug opening for the flint tube 15.

If desired, a patch 36 may be applied to the wall 33, the patch 36 being colored to correspond to the appearance of the mass 34 when that mass is dry, or substantially so, in order that the user may have a reference area to compare with the current appearance of the mass to assist him in determining whether or not the lighter should be refilled. Of course, optionally the surface 30 of the head 20 of the unit 18, or some portion thereof, may be similarly colored.

The operation of the embodiment illustrated in Figs. 6 and 7 will, of course, be analogous to that described above. As the mass 12' approaches such dryness as will prevent satisfactory operation of the lighter, the mass 34 will change its appearance to call the user's attention to the need for refueling.

In Fig. 8, I have illustrated a further embodiment of my invention comprising an extension unit 40 for removable association with a conventional lighter 11, the vertical walls 14 (or some portion thereof) of the unit 40 will be made of transparent molded plastic, and the inner surface of the transparent wall will be abutted by an indicator mass analogous to the mass 34. Penetrating the end walls of the unit 40, and journalled for rotation with respect thereto, is a tubular fitting 42 whose inner end is threaded, as at 43, for threaded reception in the filling opening 13, a gasket 44 preferably being sleeved on said fitting. The chamber within the fitting is stuffed with cotton 45, or the like, and a wick 46 has one end embedded in the body 45, extends through a radial opening 47 in the fitting 42 and thence axially through the fitting, and has its opposite end embedded in the body 12.

The entire unit 40 will be secured to the lighter 11 by means of the fitting 42, and it is proportioned and designed to merge with the lines of the housing 11, so that, when in place, it appears to be an integral extension of said housing.

I claim as my invention:

1. For use with a cigarette lighter or the like comprising a housing defining a chamber, absorbent material housed within said chamber, a sparking device, and a wick in liquid-exchange contact with such absorbent material and having a portion disposed in cooperative association with said sparking device, the invention comprising means providing a physically-closed transparent window forming a part of a wall of said chamber, and a mass of pulverous material located, with respect to said window, to be visible therethrough from outside said wall, the particles of such pulverous material being impervious to liquid fuel but said mass being capable of receiving and temporarily holding such a fuel in the interstitial spaces between such particles whereby the appearance of such mass is changed between a dry condition and a wet condition, such mass being disposed in liquid-exchange relation with such absorbent material.

2. The device of claim 1 in which said first-named means comprises an element adapted to be seated in an opening through a wall of said housing, said element being formed to provide an outwardly-opening pocket and a passage leading from said pocket and opening through the inner portion of said element into communication with said chamber when said element is so seated, said mass of pulverous material being discrete and being confined in said pocket, a transparent plug closing the outer end of said pocket, and a wick contacting such mass, extending through said passage, and projecting from the open inner portion thereof for intimate contact with such absorbent material in the chamber when said element is so seated.

3. An attachment for cigarette lighters and the like of the type utilizing an absorbent body for liquid fuel retention, comprising an element having a transparent wall, a discrete mass of pulverous material carried by said element and visible through said transparent wall, the particles of such pulverous material being impervious to liquid fuel but said mass having the capacity of receiving and holding such a fuel in the interstitial spaces between such individual particles whereby the appearance of said mass is changed between a wet condition and a dry condition, and means embodied in said element for physically attaching said element to a cigarette lighter or the like to establish a liquid-exchange relation between the absorbent body of such lighter and such mass of material carried by said element.

4. The attachment of claim 3 in which the affinity of said mass of pulverous material for such a fuel is less than that of such absorbent body.

5. For use with a cigarette lighter or the like comprising a housing defining a chamber, an absorbent body housed within said chamber, a sparking device, and a wick in liquid-exchange contact with said absorbent body and extending into cooperative relation with said sparking device, said housing being provided with an opening through a wall thereof leading to such absorbent body, the invention comprising a hollow element having a portion proportioned and designed for liquid-tight reception in such opening with its inner end in contact with such absorbent body and its outer end visible exteriorly of said housing, a mass of pulverous material retained in said hollow element in liquid-exchange relation with said absorbent body, such pulverous material having a capacity for receiving and retaining liquid fuel in the interstitial spaces between its particles, such capacity, however, being less than the capacity of a conventional lighter wick of the type herein referred to, and the appearance of said mass of pulverous material when wet differing from its appearance when dry, and a transparent window in the outer end of said element, said mass of pulverous material being visible through said window.

6. For use with a cigarette lighter or the like comprising a housing defining a chamber, an absorbent body housed within said chamber, a sparking device, and a wick in liquid-exchange contact with said absorbent body and extending into cooperative relation with said sparking device, said housing being provided with a filling opening interiorly threaded and opening through a wall of said housing into the interior of said chamber, the invention comprising a hollow element having a portion exteriorly threaded for liquid-tight reception in the threaded filling opening of such a housing with its inner end disposed in said chamber and its outer end visible exteriorly of said housing, a mass of pulverous material retained in said hollow element adjacent the outer end thereof, and a transparent plug closing the outer end of said element to retain said mass, said mass being visible through said transparent plug, said pulverous material being in communication with such absorbent body when said element is so received, and having a capacity for receiving and retaining liquid fuel in the interstitial spaces between its particles, such capacity, however, being less than the capacity of a conventional lighter wick of the type herein referred to, and the appearance of said mass of pulverous material when wet differing from its appearance when dry.

7. The device of claim 6 in which said element comprises a shank and an enlarged head, the threading being formed on said shank and said head being formed with an outwardly-opening pocket communicating with a bore extending through said shank, said mass of pulverous material being located in said pocket, and said transparent plug being seated and retained in the outer end of said pocket and bearing on said mass to retain the same.

8. The device of claim 7 including a wick having an end in liquid exchange relation with said mass, extending through said bore and projecting outwardly therebeyond, and establishing a capillary flow path between such absorbent body and said mass of pulverous material when said shank is threadedly seated in the filling opening of such a housing, said pocket having transverse dimensions at least as great as the diameter of said shank and being provided with an axially-inwardly projecting extension having transverse dimensions less than such diameter, and a pin transversely penetrating said first-named wick end and sustained against the floor of said pocket extension to retain said wick against movement axially of said bore away from said mass.

9. As an article of manufacture, an element comprising a threaded shank having an axially-extending passage therethrough, a transparent closure for one end of said passage, a mass of pulverous material disposed within said passage near said closure and visible through said closure, and a body of liquid-absorbent material disposed in said passage, in liquid-exchange relation with said mass and extending to the opposite end of said passage, said mass being characterized by the fact that its color when wet differs from its color when dry.

10. The article of claim 9 in which said mass is made up of discrete particles individually impervious to liquid fuel but capable of receiving and retaining such fuel in the interstitial spaces between such particles.

11. The article of claim 9 in which said passage is tubular and said body of liquid-absorbent material is a wick extending substantially beyond said opposite end of said passage.

HAROLD LEWIS.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,454,872	Harris	Nov. 30, 1948
2,521,181	Morse	Sept. 5, 1950

FOREIGN PATENTS

Number	Country	Date
936,162	France	Feb. 16, 1948