Nov. 20, 1951 A. F. REILLY 2,576,042

CIGARETTE LIGHTER

Filed Dec. 27, 1948

Fig. 1

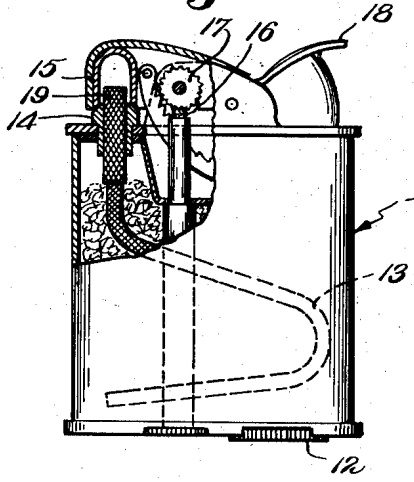


Fig. 2

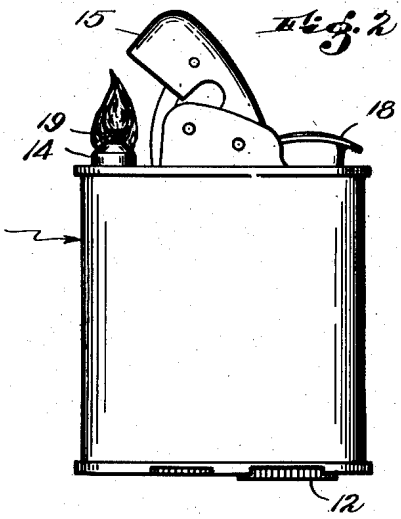


Fig. 3

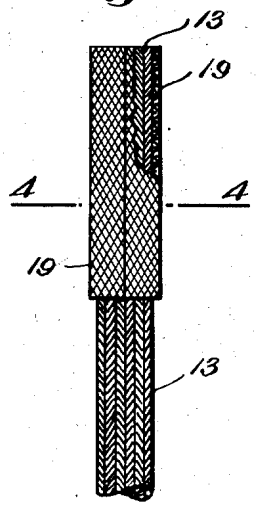
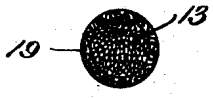


Fig. 4



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CIGARETTE LIGHTER

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1 Claim. (Cl. 67—7.1)

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The present invention relates to lighters and particularly cigarette lighters of the type in which there is a reservoir containing suitable inflammable fluid, a wick extending from the reservoir through an orifice to the exterior, means for producing a spark adjacent the exposed end of the wick and a movable snuffer which encloses the exposed end of the wick when not in use.

In the use of such lighters, difficulty has been experienced from flooding. Under certain conditions the fluid contained in the reservoir flows from the exposed end of the wick, spreading over the adjacent parts of the lighter so that, when lighted, a large flame which is uncontrolled in size and shape is produced. Such a flame may singe the user's eyebrows and eyelashes and even set the hair afire. The expulsion of fluid from the reservoir in excess of that needed for a flame of the desired size wastes fluid so that the lighter has to be filled more frequently than would otherwise be necessary. If flooding takes place when the lighter is not lighted, the lighting fluid tends to creep over the surface of the parts adjacent the wick and to pass out under the edges of the snuffer where it may come in contact with the lining of the pocket or handbag or with articles contained in them. It also wets the flint and wheel. Wetting the flint softens it and causes the formation of sludge which is transferred to the wheel and prevents the production of sparks for a considerable time afterwards. The odor of the evaporating lighting fluid is also objectionable.

It has also been found that when the exposed end of the wick is drawn up from the bushing enough to produce a flame of the proper size, there is a tendency for the wick to break down and spread out and thus to produce a flame of irregular shape. This also varies the distance between the wick and the ignition mechanism in some lighters and makes ignition of the vapor uncertain.

To prevent evaporation and consequent waste of fluid when the lighter is not in use, the exposed end of the wick must be completely and tightly enclosed by the snuffer. Fibers from the frayed end of the wick are likely to extend under the edge of the snuffer and thus prevent the snuffer closing tightly. Carbon also accumulates around the wick and may prevent tight closing of the snuffer. Consequently it has been found necessary to make the snuffer of relatively large diameter which is unsatisfactory or even impractical, particularly with lighters of small size.

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I have now discovered that the foregoing difficulties may be overcome to a considerable degree at least, by interposing between the inside of the bushing and the outside of the wick some device which permits the passage of vapor from the reservoir to the outer air and supports the exposed portion of the wick. In practice I find that this can be accomplished most satisfactorily by surrounding the portion of the wick in the bushing by a tube of woven wire fabric or other foraminous material which extends a short distance above the top of the bushing. While I find a tube made from woven wire most satisfactory, other equivalent arrangements providing support for the exposed end of the wick and permitting passage of vapor from the interior to the exterior of the reservoir adjacent the wick may also be employed. The construction embodying my invention practically eliminates flooding and greatly reduces the deposit of carbon on the bushing around the wick. The flame produced is steadier and more uniform. Also the wick does not tend to fray and spread out. Consequently the flame has a better shape under all conditions of use, and a smaller snuffer may be employed without danger that the edges of the snuffer will not fit tightly.

Referring now to the drawings:

Fig. 1 is a view of a lighter embodying my invention, the casing being broken away and certain of the parts being shown in section.

Fig. 2 is a side elevation showing the snuffer raised.

Fig. 3 is a view partly in section showing the upper end of the wick and the surrounding screen tube, this view being on an enlarged scale, and

Fig. 4 is a section on line 4—4 of Fig. 3.

In the drawings the case of the lighter is indicated at 11, the closure of the filling opening at 12, the wick at 13, the bushing at 14, the snuffer at 15, the flint at 16, the wheel at 17 and the thumb piece at 18. The bushing 14 is forced into an orifice in the top face of the casing 11. The wick 13 is of fiber, preferably such as is commonly employed in cigarette lighters and the end is enclosed in a tube 19 of foraminous material which extends from a point below the bushing 14 to a point above the top surface of the bushing. The tube thus forms a supporting collar for the exposed end of the wick 13. In practice I make the tube 19 of brass wire screen cloth of from 80–100 mesh to permit passage of vapor

from the interior of the reservoir to the outer air, but other sizes of mesh and other devices which permit vapor flow may be used.

It is found that in actual use that flooding is almost completely eliminated; that the evaporation loss is substantially less, perhaps as much as twenty-five percent; and that the flame is of substantially uniform size from the moment when it is first lighted, there being no large burst of flame followed by dying down; that carbonization on the bushing is practically eliminated, and finally that fraying and spreading of the wick is eliminated.

It is not possible to be absolutely certain why the provision of means which permits the passage of vapor from the interior of the reservoir to a point adjacent the point of ignition has so much effect on the behavior of the lighter. I believe, however, that when no such provision is made and when the pressure on the interior of the lighter exceeds that of the atmosphere which may be the result of an increase in temperature or a drop in barometric pressure, fuel in liquid form is forced out through the capillaries in the wick and reaches the surface after which it spreads out over adjacent surfaces of the lighter until it evaporates or the lighter is lighted. In this case the flame spreads over the contaminated surfaces, and the fuel burns with a large uncontrolled and even dangerous flame. This action which tends to expel fluid from the interior of the lighter is repeated with a consequent waste of fuel from time to time as the temperature surrounding the lighter or the barometric pressure changes. On the other hand when the lighter is provided with means adjacent the wick to permit the escape of vapor, changes in vapor pressure inside the reservoir expel only small quantities of vapor and no fuel in liquid form is forced out. Since the amount of fuel composing vapor is very small in comparison with an equal volume of fluid in unvaporized condition, equalization takes place with only the loss of vapor, and the loss due to alternate expansion and contraction of the volume in the reservoir is greatly reduced. Being in vapor form, the fuel is less apt to creep over the adjacent surfaces so that the flame remains uniform in size and shape.

It is also possible that the conduction of the heat from the flame downward by the screen warms the liquid fuel as it approaches the flame, thereby lowering its surface tension and slowing down its flow to the flame while at the same time it promotes the evaporation of the fuel producing

more complete combustion. That this is the fact is indicated by the small amount of soot which is formed, particularly at the tip of the flame. Any vapor which is forced out when the lighter is lighted emerges at the base of the flame and is burned and not wasted.

The foraminous tube or its equivalent holds the exposed end of the wick in definite predetermined position so that it cannot fray and spread out and the snuffer does not have to be made big enough to enclose any frayed ends of the wick. Since there is only a very slight tendency for carbon to accumulate on the bushing, the edge of the snuffer contacts closely with the bushing and consequent loss by evaporation is definitely reduced, particularly after the lighter has been in use for a considerable period of time.

I claim:

A cigarette lighter including in combination flint and wheel igniting mechanism and a flame snuffer operated by said igniting mechanism, a fuel reservoir, a fluid which is vaporizable at room temperature in said reservoir, said reservoir having a wick opening under said snuffer, a bushing in said opening upon the top peripheral surface of which said snuffer seats in closed position, a fibrous wick in said reservoir passing through said bushing to the outside of said reservoir and a metal tube surrounding said wick and extending from the inside of said reservoir between the outside of the wick and the inside of said bushing to a point above the top surface of the bushing, said tube supporting and confining the exposed end of the wick and having vapor passages extending lengthwise thereof, said passages permitting passage of vapor from the interior of the reservoir and thus equalizing the pressure inside and out of the reservoir.

ALFRED F. REILLY.

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