Oct. 30, 1956 A. K. RYCROFT 2,768,641

FILLER PLUG FOR CIGARETTE LIGHTERS

Filed July 14, 1954

Fig 1

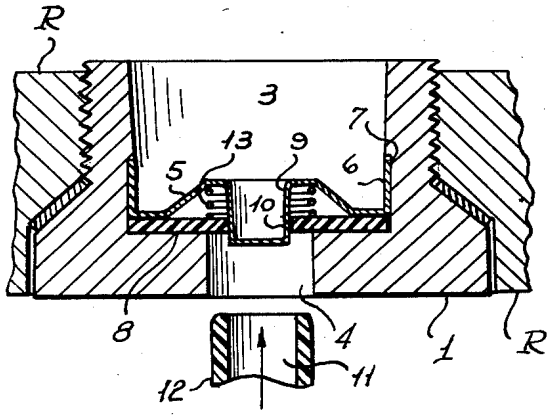
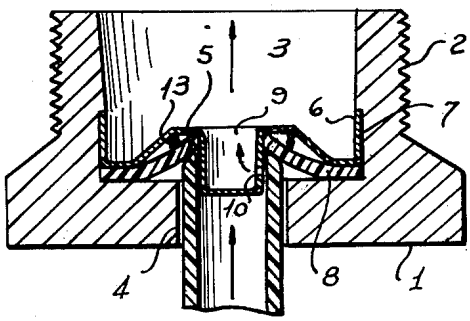


Fig 2



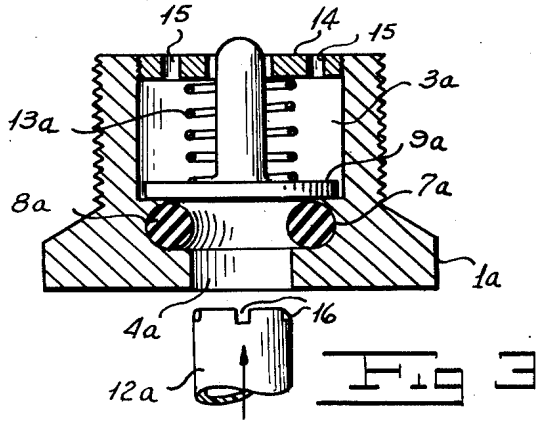


Fig 3

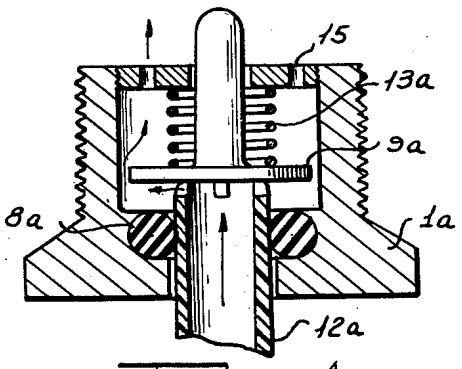


Fig 4

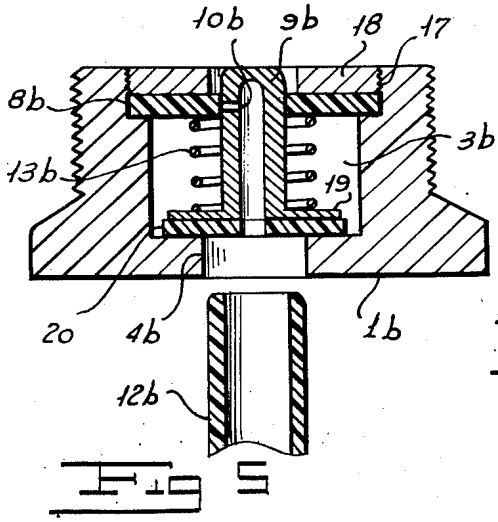


Fig 5

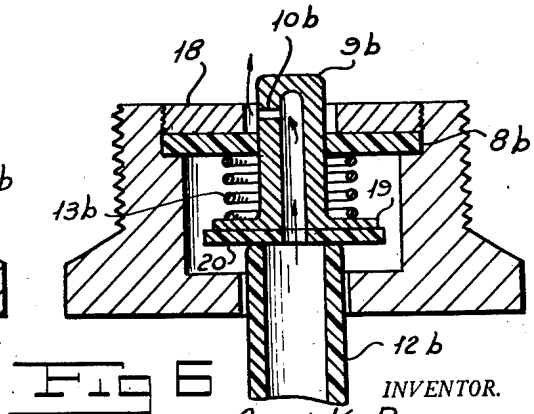


Fig 6

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United States Patent Office 2,768,641 Patented Oct. 30, 1956

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FILLER PLUG FOR CIGARETTE LIGHTERS

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Application July 14, 1954, Serial No. 443,274

5 Claims. (Cl. 284—18)

The most common form of cigarette lighter now in vogue is that wherein the fuel reservoir is sealed by a screw plug which, when removed, and the lighter inverted, will permit the gravity flow of liquid fuel into its reservoir from the funnel-like spout of the can or bottle of lighter fluid. Such filling of the lighter requires the use of a screw driver, coin or some equivalent instrument to remove and replace the plug of the reservoir. Moreover, under this practice, the lighter must be inverted while being filled with the result that the fuel from the reservoir generally seeps through the wick passage and wets the friction wheel and "flint," leaving the lighter completely inoperative until these parts dry out and producing a dangerous condition in the interim.

I have conceived the possibility of supplying liquid fuel to the reservoir of a lighter from an aerosol container of lighter fluid. Such a procedure would have many advantages but the ability to do so presents several problems. In the first place, aerosol containers generally must be discharged while in upright position. Consequently the lighter would have to be held upright which is an advantage because this would preclude gravity seepage through the wick passage but, inasmuch as the liquid would have to be delivered into the reservoir against gravity, it would tend to run from the reservoir as fast as it was delivered thereto. However, I have, as a result of numerous experimentations and tests, conceived means whereby the outlet of the aerosol supply container may be sealed to the inlet of the lighter reservoir in such manner as to preclude leakage at this point, thus enabling the charging of the reservoir from an aerosol supply container in an easy and expeditious manner and without leakage or loss of fuel and without wetting the flint or friction wheel.

In accordance with this invention, the lighter reservoir is provided at its bottom with a valved inlet. This inlet is normally sealed by a valve which is so constructed that, when the outlet of an aerosol fuel container is pressed against the valve in such manner as to release fuel from the dispenser, it will simultaneously open the inlet valve to the lighter reservoir and contemporaneously effect a fluid tight seal between the interior of the aerosol container and the interior of the reservoir.

In practice, I prefer to mount the inlet valve of the reservoir upon a screw plug of such size that it may be substituted for the usual fuel plug of the conventional lighter and the invention is thus adapted for use on any such conventional lighter without directly incorporating the sealing valve into the reservoir construction.

Features of the invention other than those specified will be apparent from the following detailed description when read in conjunction with the accompanying drawings.

These drawings illustrate different practical forms of the present invention which are to be understood as illustrative only and not as defining the limits of the invention.

In said drawings,

Fig. 1 is a transverse section of a filler plug embodying the present invention with the valve of said plug in its normally sealed condiiton.

Fig. 2 is a like view but showing manner in which the valve of the plug is unsealed by pressure exerted upon it by the outlet of an aerosol fuel dispenser can to permit the flow of fuel from the can to the interior of the plug and thus to the interior of the lighter reservoir.

Figs. 3 and 5 are sectional views similar to Fig. 1 but showing modified forms of the invention.

Figs. 4 and 6 illustrate the forms of Figs. 3 and 5 with the valves unsealed to permit charging of the associated reservoirs.

Referring first to Figs. 1 and 2, **1** designates a circular plug having a threaded shank **2** adapted to be screwed into the filler hole of a reservoir R of a conventional lighter. This plug is chambered as shown at **3** and has a central inlet passage **4**. Within the chamber **3** of the plug is positioned a holding member in the form of a stamping **5** which may be conveniently made of sheet metal. It has a peripheral upstanding flange **6** seated in an undercut channel **7** in the lateral wall of the chamber so as to be permanently mounted therein. Between the stamping **5** and the base of the chamber is a resilient elastic gasket **8** provided with a central opening adapted to closely embrace a hollow cup-like boss **9** formed centrally of the stamping **5**. The gasket **8** may be of synthetic rubber or some equivalent material which will not deteriorate in contact with lighter fluid and the opening in its center is preferably formed of slightly less diameter than the outside diameter of the boss **9** so that the inner periphery of such gasket closely hugs the boss.

Under normal conditions the gasket occupies the flat position shown in Fig. 1 wherein its inner periphery registers with and forms a seal for one or more port perforations **10** in the wall of the boss. By so doing, it seals the interior of the plug so that the lighter fluid within the reservoir of the lighter cannot leak out at this point.

The boss **9** is preferably circular in horizontal section and has an outside diameter sufficiently small to fit into the central passage **11** of the outlet **12** of an aerosol dispenser and most aerosol dispensers are so constituted that downward pressure upon the outlet **12** will release the contents of the dispenser.

With the parts arranged as shown in Fig. 1, it is possible to introduce the outlet **12** of the dispenser through the opening **4** and, by pressure of this outlet against the gasket **8**, the gasket may be upwardly stressed or deflected into the position shown in Fig. 2. When this is done, the upper end of the discharge outlet **12** will seat tightly against the under side of the gasket which, being of elastic material, will form a leakproof seal therewith, while the deflection of the gasket, as shown, will uncover the inlet orifice perforation **10** so that fuel delivered through the passage **11**, as a result of the application of counteracting pressure against the outlet **12**, will pass through the perforation **10** into the chamber **3** interiorly of the plug and thus into the interior of the lighter reservoir. The operation described may be readily accomplished by holding the lighter in upright position in one hand while the other hand forces the aerosol dispenser into the position described. Fluid will be fed into the reservoir until the reservoir is filled. This will be indicated by a perceptible showing of moisture at the wick end and when this is noted, the aerosol dispenser should be withdrawn so as not to flood the lighter and cause overflowing at the wick passage.

The gasket **8** may be made sufficiently resilient to form a tight seal in the manner described and yet return from the position of Fig. 2 to the position of Fig. 1 and seal the perforations **10** as soon as the outlet of the dispenser is withdrawn. However, in order to make this closing sure over protracted periods and after the gasket may

have become somewhat weakened by repeated filling operations, I preferably place a spring **13** back of the gasket to insure the return of the gasket to normal sealing position. In Figs. 1 and 2, the boss **9** serves as a valve seat while the gasket **8** serves as the sealing member of the valve.

The modified form of plug **1***a* of Figs. 3 and 4 is provided with an inlet passage **4***a* as in the preceding figures. However, the valve is constructed in a somewhat different manner. Its cavity **3***a* is provided at its base with an undercut channel **7***a* adapted to receive and hold a rubber O-ring **8***a*. This O-ring forms a seat member for a sealing member **9***a*, normally held in engagement with said seat member by a spring **13***a* interposed between the sealing member **9***a* and a disk **14** screwed into the inner end of the chamber **3***a*. This disk is perforated at **15**.

The interior diameter of the O-ring **8***a* is such that it will have a tight fit and form a leakprof seal with the discharge outlet **12***a* of an aerosol liquid fuel dispenser but in this case the end of the outlet **12***a* is preferably notched as indicated at **16** so that, when this outlet is pressed against the under side of the sealing member **9***a*, liquid may be delivered from the dispenser through the notches **16** into the cavity **3***a* above the O-ring **8***a*, from whence it may pass about the periphery of the sealing member **9***a* and upwardly through the perforations **15** into the reservoir of the lighter, as indicated by the arrows in Fig. 4.

In the construction of Figs. 5 and 6, the plug **1***b* has an inlet passage **4***b* and is chambered at **3***b*. The upper portion of the chamber **3***b* is counterbored and threaded as shown at **17** and a resilient gasket **8***b* of rubber or the like seats on the shoulder of the counterbore and is clamped in place by screw plug **18**. This gasket is the sealing member of this valve. The hollow dome **9***b*, which is the seat member of the valve, is provided at its base with a peripheral flange **19** resting on a perforated elastic gasket **20**. The dome **9***b* is provided with orifice perforations **10***b* which, when the dome is in the position of Fig. 5 are located within the opening of the gasket **8***b* so as to seal these perforations **10***b*. A spring **13***b* acting against the under side of the gasket **8***b* and the upper face of the flange **19**, normally serves to maintain the parts in the position shown in Fig. 5 for the purpose of sealing the reservoir of the lighter with which the plug is associated.

To introduce fuel from an aerosol dispenser into a lighter equipped with plug of Figs. 5 and 6, the outlet **12***b* of the dispenser is introduced into the passage **4***b* of the plug and pressed against the under side of the elastic gasket **20** with sufficient force to unseal the aerosol dispenser and at the same time lift the dome **9***b* sufficiently to move the perforations **10***b* above the upper surface of the gasket **8***b* and thus establish communication between the interior of the dispenser and the interior of the lighter reservoir. Fig. 6 shows the parts in position to feed the lighter fluid into the reservoir of the lighter along the path indicated by the arrows in this figure. Here it will be noted that the elastic gasket **20** will form a liquid seal between the passage through the outlet **12***b* and the passage in the interior of the dome **9***b* and thus preclude leakage at this point.

It will be apparent from the foregoing that while the invention may partake of different practical forms, in all of them there is, during fueling operation, a liquid tight seal between the dispenser outlet and the passage through the plug so that there can be no leakage at this point. Moreover there is a sealed passage through the

plug into the lighter reservoir so that there is no chance of spilling of the fluid during the filling operation. In the structure of Figs. 1 to 4, the elastic and resilient gaskets **8** and **8***a* serve two purposes, first, they constitute one of the valve elements and second, they serve to form a liquid tight seal with the outlet of an aerosol fuel dispenser.

The structures of this invention are relatively simple. They are highly efficient in their operation and they permit of expeditious supplying of fuel to a lighter without spilling or flooding of the external lighter parts. The present invention is thus safer to use than is the old gravity filling practice to which I have hereinbefore referred and there is less waste of fuel.

The foregoing detailed description sets forth the invention in its preferred practical form but the invention is to be understood as fully commensurate with the appended claims. I wish it particularly understood that the plug of this invention may have a detachable connection with the reservoir as hereinbefore described so that the advantages of this invention may be incorporated in lighters already made, or said plug structure may be integrally built into new lighters without departing from this invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A filler plug for a cigarette lighter provided with a chamber having an inlet passage of a size to admit the discharge outlet of an aerosol dispenser, and a valve embodying a sealing member in the form of a flexible resilient disk with a central opening, and a seat member of cup-like form projecting through the opening in said disk and having within the confines of said opening a port sealed by the disk when the wall of the opening in said disk is in registration therewith and unsealed when the disk is stressed out of registration with said port by the introduction of the discharge outlet of such a dispenser into the inlet passage.

2. A filler plug according to claim 1 wherein the cup-like seat member is alined with the inlet passage of the plug and is of a size to be received into the discharge outlet of the dispenser.

3. A filler plug according to claim 2 comprising a spring bearing against the disk to normally maintain it in registration with said port.

4. A filler plug for a cigarette lighter provided with a chamber having an inlet passage through the base thereof, a flexible resilient disk seated in the base of the chamber and having a central opening registering with said inlet passage, and a holding member bearing against the margin of the disk to form a peripheral hermetic seal therewith, said holding member having a cup-like boss projecting snugly through the central opening of the disk and perforated in the plane of the disk with the perforations normally sealed by said disk but adapted to be unsealed when the disk is axially deformed by the introduction of the discharge outlet of a fuel dispenser into said inlet passage.

5. A filler plug according to claim 4, comprising a spring introduced between the disk and the holding member to normally retractably hold the disk in sealing position.

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