Nov. 6, 1956 C. STORCH 2,769,325

FUELING DEVICE FOR LIGHTERS

Filed July 20, 1955. 2 Sheets-Sheet 1

FIG. 1.

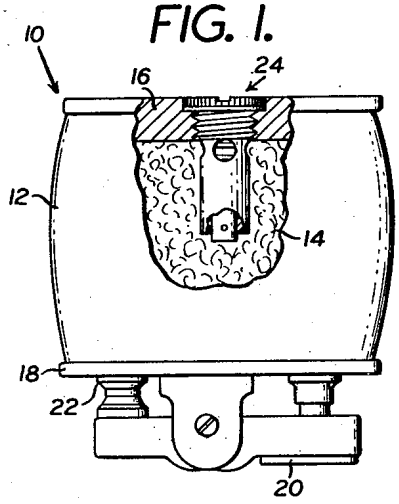


FIG. 2.

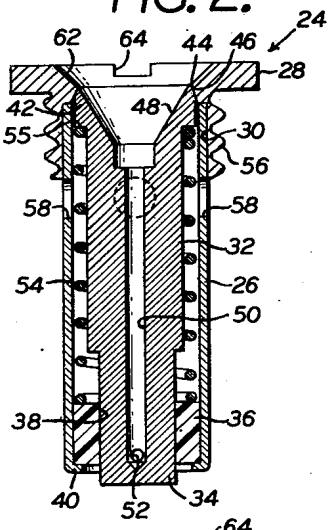


FIG. 3.

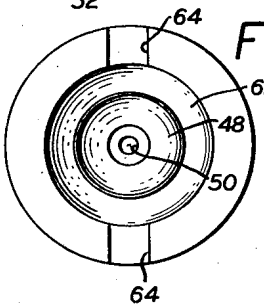


FIG. 4.

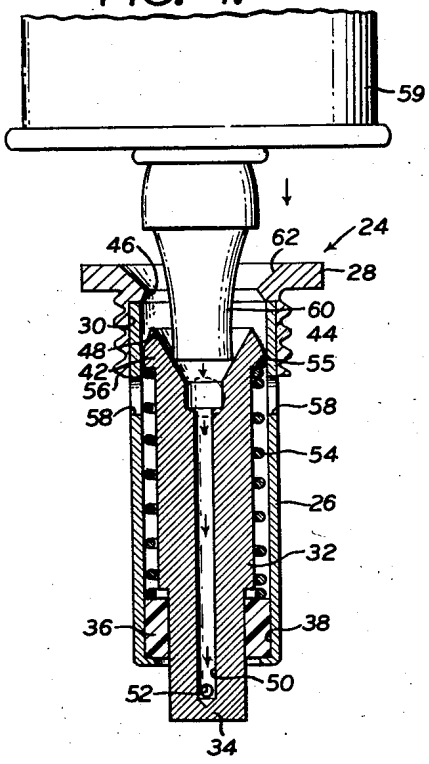
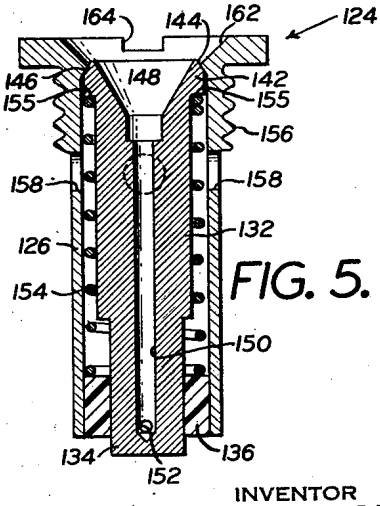


FIG. 5.



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FUELING DEVICE FOR LIGHTERS

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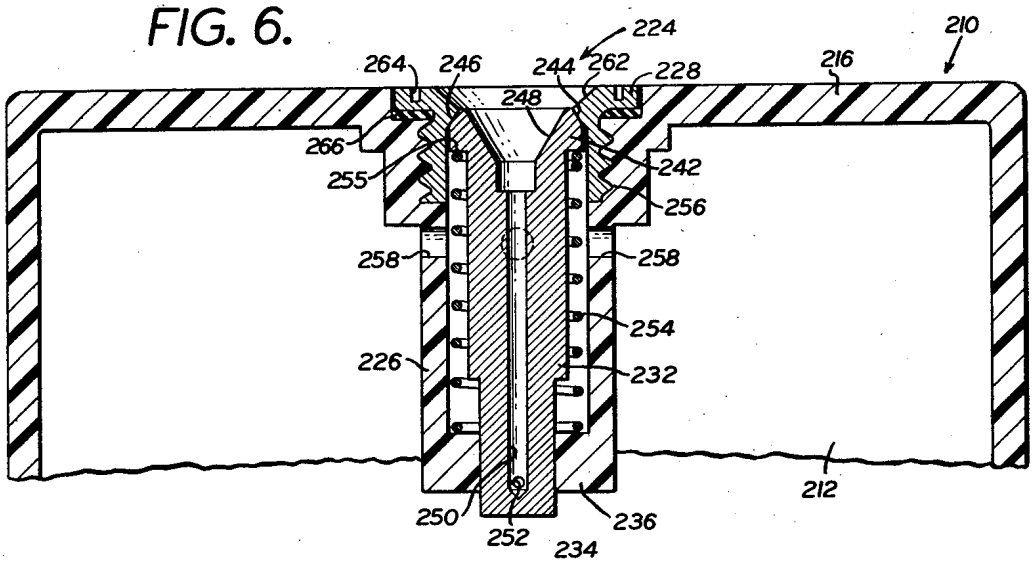
FIG. 6.



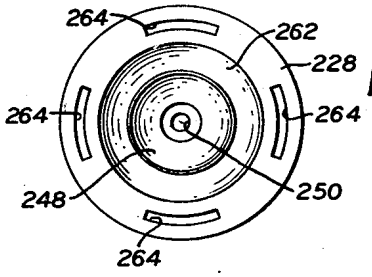
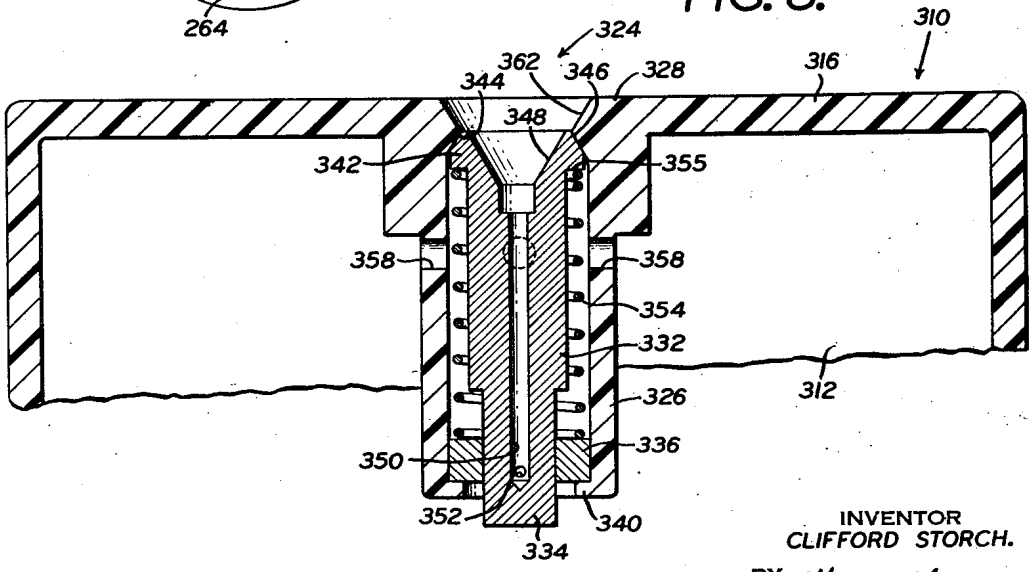


FIG. 7.

FIG. 8.



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United States Patent Office

2,769,325

Patented Nov. 6, 1956

2,769,325

FUELING DEVICE FOR LIGHTERS

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Application July 20, 1955, Serial No. 523,192

3 Claims. (Cl. 67—7.1)

This invention relates to pyrophoric lighter mechanisms and in particular to a novel fueling device which will enable the wick of the lighter mechanism to be saturated and fueled with lighter fluid.

Pyrophoric lighter mechanisms generally include an elongated lighter wick which is coiled and housed within the body of the lighter. In order that the wick be instantly operable, it is necessary that its exposed portion extending beyond the housing of the lighter mechanism, be saturated with lighter fluid. Hitherto, in order to properly saturate the exposed portion of the wick, a screw plug at the other end of the lighter mechanism housing was unthreaded and completely removed from an opening. The removal of the screw plug left an opening through which fluid was poured from a receptacle into the lighter housing body and onto the coiled portion of the elongated wick enclosed therein. It was necessary to pour as much lighter fluid into the body of the lighter mechanism as was necessary to saturate by conduction the exposed wick portion extending beyond the other end of the housing.

Oftentimes, while carrying out this operation of fueling, if the lighter fluid is not poured directly into the plug opening, it will flow down along the sides of the lighter, resulting in a very cumbersome, odorous and messy operation.

The purpose of the present invention is to eliminate the mess, the unpleasant chore and after effects which are associated with fueling of pyrophoric lighters.

An object of the present invention is to provide a fueling device which, when once fixed or secured within the lighter housing, need not be removed therefrom when it becomes necessary to fuel and saturate the wick therein with fluid.

Another object of the invention is to provide a refueling device which is instantly ready for operation and automatically seals the fuel in the body of the lighter, once it has been poured from the fluid receptacle.

A further object of the invention resides in the provision of a fueling device which automatically positions the fluid receptacle with respect to the lighter, to insure that the fluid will flow directly into the lighter and not about the outer sides thereof.

Other and further objects of my invention reside in the structures and arrangements hereinafter more fully described with reference to the accompanying drawings in which:

Fig. 1 is a front elevational view of a lighter mechanism, part of which is broken away to show the concept of the novel fueling device constructed in accordance with the principles of the invention.

Fig. 2 is a sectional side elevational view of a novel fueling device adapted to be employed in the lighter mechanism shown in Fig. 1,

Fig. 3 is a top view of the fueling device shown in Fig. 2,

Fig. 4 is a side elevational view of the novel fueling device shown in Figs. 2 and 3, in fueling position and in cooperation with a fueling can,

Fig. 5 is a sectional side elevational view of another embodiment of a fueling device constructed in accordance with the principles of the invention.

Fig. 6 is a sectional side elevational view of a lighter mechanism and a further embodiment of a fueling device constructed in accordance with the teaching of the invention.

Fig. 7 is a top view of the fueling device shown in the embodiment Fig. 6.

Fig. 8 is a sectional elevational view of a further lighter mechanism, and of still another embodiment of a fueling device constructed in accordance with the principles of the invention.

Referring now to Figs. 1 to 4 of the drawings, and more particularly to Fig. 1 wherein there is shown a lighter mechanism generally identified by the numeral 10. The lighter mechanism 10 may be of any conventional or well-known construction having a wick chamber defined by a cover 12 in which a wick material 14 is enclosed. The bottom end of the lighter mechanism 10 is enclosed by a bottom plate 16 (the lighter 10 being shown in its inverted position in Fig. 1) while the end 18 encloses the top of the wick chamber 12. Secured to the top end enclosing member 18 is a pivoted finger-actuated lever 20 and a wick holder 22 through which one end of the wick 14 projects.

The present invention is concerned with the fueling device generally identified by the numeral 24 provided in the base enclosing plate 16 (Fig. 1). The fueling device 24 comprises a housing which is not numbered but which is formed or composed of two portions, namely a sleeve portion 26 and a seat portion 28. In the embodiment shown in Figs. 1 to 4 inclusive, the sleeve and seat portions 26 and 28 respectively, are separate members which are secured together in an accommodating undercut 30 provided in the inner periphery of the seat member 28. The sleeve member 26, which comprises the sleeve portion of the fueling housing of the fueling device 24, may be secured to the seat member 28 in the undercut portion 30 thereof in any suitable manner, for example, by a sweat fit.

Mounted within the fueling housing of the fueling device 24 is a plug or valve member 32. The plug or valve member 32 has a narrowed lower portion 34 which is guided in a guide member 36. The guide member 36 is provided with a guide opening 38 defined therein which encompasses and accommodates the lower narrowed portion 34 of the plug 32 to accurately guide the same as it moves within and relative to the fueling housing and sleeve portion 26.

From Figs. 2 and 4 of the drawings, it will be noted that the guide member 36 seats on a spun or inturned lip 40 of the lower portion 26. The opposite end of the plug 32 has an enlarged head 42 having a diameter slightly smaller than the inside diameter of the sleeve portion 26 to provide therebetween an air exhaust space (not numbered), the purpose of which will become obvious as the description proceeds.

The outer periphery of the head 42 terminates in a tapered seat 44 which is adapted to cooperate with and seat against a corresponding tapered seat 46 provided on the inner periphery of the seat portion 28.

Defined within the head portion 42 of the plug 32, is a frusto-conical inlet opening 48 which is interconnected by way of a conduit 50 with an outlet opening 52 provided in the lower narrowed portion 34 of the plug 32.

Positioned between the slidable plug 32 and the fueling housing, which includes the portions 26 and 28, is a resilient means or spring 54, one end of which seats

on an end face of the guide member 36, while its other end seats on a shoulder 55 of the enlarged head 42 of the plug 32. The spring 54, being constantly tensioned, normally urges the tapered seat 44 of the enlarged head 42 into seating engagement with the corresponding tapered seat 46 of the seat portion 28 of the fueling housing.

When the plug 32 is so moved into its normal engagement with the seat 46 of the fueling housing, its outlet valve 52 at the lower narrowed portion 34 thereof, covered and closed by the guide member 36. At the same time, the previously mentioned air exhaust space formed between the plug 32 and the fueling housing is closed to the outside of the lighter mechanism 10 by the cooperating seating engagement between the two tapered surfaces 44 and 46.

The fueling device 24 thus described is adapted to be secured in the bottom of the lighting mechanism 10 by threading the threaded portion 56 of the seat 28 into securing cooperation with a corresponding female threaded portion (not numbered) provided in the base plate 16. With the fueling device 24 thus secured to the base 16 of the lighter mechanism 10, the sleeve portion 26 ofthe fueling housing is retained extended into the wick chamber 12. The sleeve portion 26 is provided with at least one or more air displacement apertures 58 which provide communication between the air wick chamber 12 of the lighter mechanism 10 and the aforementioned air exhaust space defined between the slidable plug 32 and the fueling housing.

In order to fuel the wick 14 enclosed within the chamber 12 of the lighting mechanism, a fuel can 59 (see Fig. 4), having a spout 60, is moved toward the fueling device 24 and into cooperation with the inner tapered plug inlet 48 guided by a tapered surface 62 provided at the entrance of the seat portion 28. Continued downward movement of the fuel can 59 and its spout 60 into the frusto-conical inlet 48 of the plug member 32 causes the plug to move downwardly relative to the sleeve portion 26 of the fueling housing against the opposite urging of the resilient means or spring 54.

Such relative movement of the plug 32 causes the outlet 52 at the lower portion 34 thereof, to become uncovered from the guide member 36, while the tapered cooperating seating surfaces 44 and 46 become disengaged to provide an air exhaust passageway (not numbered) therebetween which will communicate with the air exhaust space defined between the movable plug 32 and the sleeve portion 16, and also to communicate with the wick chamber 12 of the lighting mechanism by way of the air displacement aperture or apertures 58 defined in the sleeve portion 26.

The air displacement aperture or apertures 58 communicating with the air exhaust space between the plug 32 and the sleeve portion 26, and the communicating air passageway defined by the disengaging movement of the cooperating tapered surfaces 44 and 46, provide a direct exhaust for the air trapped in the chamber 12 of the lighting mechanism 10.

Thus, as lighter fluid is squeezed or poured from the spout 60 of the fuel can 59, the fluid passes by way of the inlet 48, through the conduit 50 and out through the outlet 52 under forced application into the wick chamber 12, while the air trapped in the wick chamber 12 escapes by way of the air displacement apertures 58, the air exhaust space, and the air passageway created by the downward movement of the plug 32.

Upon removal of the fluid spout 60 from the inlet 48 of the plug 32, the plug will automatically be moved relative to the housing and sleeve portion 26 by the normal urging of spring 54, whereby its tapered surface 44 will once again engage with the tapered seat 46 of the seat portion 28, thereby closing the air exhaust passageway, and as a consequence, the air exhaust space and the air displacement apertures 58 to the outside of the lighting mechanism 10. Simultaneously therewith, the outlet 52 provided in the lower narrowed portion 34 of the plug 32, is covered and closed by the guiding member 36 thereabout.

To facilitate quick or rapid removal of the fueling device 24 from the base 16 of the lighting mechanism 10, there is provided a screwdriver slot 64, which may be manipulated either by a screwdriver, or perhaps by a coin of small width.

In the embodiment shown in Fig. 5 of the drawings, it will be noted that the fueling device generally identified by numeral 124 is very similar in structure to the fueling device 24 above disclosed; the difference being that the sleeve portion 126 and the threaded seat portion 128 which are combined to form the fueling housing, are continuations each from the other. Thus, where, in the prior fueling device 24, the seat and sleeve portions were separate members made integral with each other, the present embodiment generally identified by the numeral 124 (Fig. 5), the sleeve portion 126 is an integral continuation of the seat portion 128, thereby forming a unitary fueling housing (not numbered).

The remaining elements of the fueling device 124 of the present embodiment are of substantially the same structure and function in substantially the same manner as in the previously described embodiment shown in Figs. 1 to 4. There is however, a further slight difference between the prior embodiment and the instant embodiment in that the guide member 136 of the instant embodiment is secured in the lower end of the sleeve portion 126 of the fueling housing, rather than being seated on an inturned or spun lip such as is shown in the fueling device 24. This does not in any manner change the cooperation or operation of the guiding member 136 with the narrowed lower portion 134 of the plug member 132.

In the event the fueling device 124 (Fig. 5) were to be employed with the lighter mechanism 10 disclosed in Fig. 1, the sleeve portion 126 of the fueling housing would be inserted through the bottom plate 16 to extend into the wick chamber 12 wherein the wick 14 is enclosed. The fueling housing and the sleeve portion 126 would be secured to the bottom of the lighter mechanism 10 by threading the threaded portion 156 of the seat portion 128 into cooperation with threads of the bottom plate 16. Once having been secured in the bottom of the lighter mechanism, the fueling device 124 would operate in substantially the same manner as was previously described with respect to the fueling device 24 (Figs. 1 to 4).

That is to say, the plug member 132 would be moved by resilient means or spring 156 into its normal position such as is shown in Fig. 5, wherein its tapered seat 144 will seat and engage against the cooperating tapered seat 146 of the seat member 128. When the plug 132 is in this normal position, the lower narrowed end 134 is so guided by the guide member 136 as to cover and close the outlet 152.

When it is desired to fuel the wick 14 in the chamber 12 of the lighter mechanism 10, the spout 60 of a fueling can 59 (see Fig. 4) is moved toward the fueling device 124 and guided into the frusto-conical inlet 148 of the plug member 132 by the tapered guide surface 162 provided at the entrance portion of the seat portion 128 of the fueling housing. Continued downward movement of the fueling can 59 and the spout 60 will move the plug 132 downwardly in opposition to the normal urging of the resilient means 154 until such time as the fueling outlet 152 at the lower end of the plug member is uncovered from the guide member 136.

At the same time, the tapered seats 144 and 146 are caused to separate to provide therebetween an air exhaust passageway (not numbered) which communicates with the air exhaust space (not numbered) formed between the plug member 132 and the sleeve portion 126

of the fueling housing. The air exhaust passageway formed by the space provided between the tapered seats **144** and **146** thus permits communication between the atmosphere about the lighter **10** and the wick chamber **12** by way of the air exhaust space previously described, and the air aperture or apertures **158** provided in the sleeve portion **126** of the fueling housing.

By thus providing for an escape of air trapped in the wick chamber **12** of the lighter mechanism **10**, the lighter fluid poured from the spout of the fueling can **59** moves under pressure into the inlet **148** of the plug member **132** by way of the conduit **150** and thence out under pressure through the outlet **152** at the lower end of the plug member into the wick chamber **12**, while at the same time, air escapes from the wick chamber **12** by way of the communicating air exhaust aperture or apertures **158**, the air exhaust space between the plug and the fueling housing and by way of the communicating air exhaust passageway defined by the separation of the tapered seats **144** and **146**.

When the spout of the fueling can **59** is removed from the inlet **148** the plug will automatically be moved back to its normal position. The outlet **152** will be covered and closed by the guide **136** while the air communication between the wick chamber **12** and the outside of the lighter **10** will be cut off by the seating of tapered surfaces **144** and **146**.

Referring now to the embodiment disclosed in Fig. 6, it will be noted that the fueling housing (not numbered) of the fueling device **224** comprises a sleeve portion **226** which is formed as a unitary part of the bottom **216** of the lighter mechanism **210**. The sleeve portion **226** is so formed integral with the lighter mechanism **10** as to extend within the wick chamber **212**.

A seat member **228** having an outer peripheral threaded portion **256** is adapted to be threaded into the base **216** of the lighter mechanism **210** to cooperate with the sleeve portion **226** to form therewith portions of the fueling housing (not numbered). Slidably movable and positioned within the fueling housing is a plug member **232** having a frusto-conical tapered inlet **248** communicating by way of passage or conduit **250**, with an outlet **252** at the lower narrowed portion **234**. The plug member **232** is normally guided for its sliding movement by a guide member **236** defined as an integral and unitary part of the sleeve portion **226**.

A resilient means or spring **254** normally seats at its one end against the guide member **236** and at its other end against a shoulder **255** of the head portion **242** of the plug **232**. Resilient member **254** normally urges the plug member **232** upwardly so that a tapered seat **244**, defined on the outer periphery of the head **242**, will seat and cooperate with a cooperating seat **246** defined on the inner periphery of the seat member **228** of the fueling housing.

When the two cooperating seats **244** and **246** are normally in engagement, the plug **232** is in its highest and closed position, such that the outlet **252** is covered and closed by the guide member **236**. To fuel the wick that may be enclosed within the chamber **212** of the lighter mechanism **210**, a fueling can **59** (see Fig. 4) having a spout **60**, is moved toward the fueling device **224**. The spout **60** is guided by the tapered guide surface **262** provided on the seat portion **228** of the fueling housing, into the frusto-conical inlet **248** of the plug member **232**. Continued downward movement of the fueling can **59** will move the plug member **232** in opposition to the normal urging of the spring **254**, thereby separating the two tapered surfaces **244** and **246** and uncovering the outlet **252**.

When the tapered seat **244** is unseated from engagement with the corresponding tapered seat **246** of the fueling housing, an air exhaust passageway is formed therebetween. The air exhaust passageway communicates with an air exhaust space defined between the slidable plug **232** and the fueling housing. The air exhaust passageway, in turn, communicates with the wick chamber **212** by way of air displacement aperture or apertures **258** defined in the sleeve portion **226**.

As fuel is poured from the fueling can into the inlet **248** of the plug member **232**, and thence by way of the conduit **250** and out into the wick chamber by way of the outlet **252**, air normally trapped within the wick chamber **212** is permitted to escape by way of the communicating air displacement aperture or apertures **258**, the air exhaust space defined between the plug **232** and the fueling housing, and thence by way of the air exhaust passageway defined by the separation of the cooperating tapered seats **244** and **246**.

When the fueling operation is completed and the can **59** and spout **60** are removed from the frusto-conical inlet **248** of the plug member **232**, the spring **254** automatically moves the plug back into engagement with the seat portion **228** so that the seats **244** and **246** may once again cooperate to close or block the escape of air from the wick chamber **212** to the outside of the lighter mechanism **210**.

In order to facilitate rapid threading and unthreading of the seat portion **228** of the fueling housing, a plurality of arcuate slots **264** are provided at the top thereof. The arcuate slots may accommodate any convenient spanner wrench. To further insure the sealing of the fueling device **224**, a gasket **266** may be provided between the seat portion **228** and the bottom **216** of the lighter mechanism **210**.

The embodiment in Fig. 8 discloses a lighting mechanism generally identified by the numeral **310** which comprises a wick chamber **312** in which a wick (not shown) is enclosed. In order to fuel the wick enclosed within the chamber **312**, there is provided a fueling device generally identified by the numeral **324**.

The fueling device **324** comprises a unitary fueling housing (not numbered) which includes a seat portion **328** and a sleeve portion **326**. The sleeve and seat portions **326** and **328** respectively, are continuations each from the other to form the unitary housing. From the drawing it will be noted that the unitary fueling housing is in turn formed as a continuation of the base **316** of the lighter mechanism **310**, whereby the sleeve portion **326** extends into the wick chamber **312**.

The remaining structure of the fueling device **324** is substantially the same as the fueling devices **24**, **124** and **224**, previously described. A guide member **336** which is seated on an inturned lip **340** of the sleeve portion **326** guides a plug member **332** for sliding movement relative to the seat and sleeve portions of the fueling housing. As in the previous embodiments, a resilient means or spring member **354** seated at its one end on the guide member **336** and bearing at its other end on a shoulder **355** of the plug member **332**, normally moves the plug member **332** so that its tapered seat **344** will engage with a tapered seat **346** of the sleeve portion **328** of the lighter mechanism. When the plug member **332** is in its normal position as above described, its outlet **352** is covered and consequently closed by the guide member **336**.

Fueling of the wick enclosed within the chamber **312** of the lighter mechanism **310** is carried out in substantially the same manner as previously described. A fueling can **59**, having a spout **50** (see Fig. 4) is moved toward the fueling device **324** with the spout guided by the tapered guide surface **362** to enter into a frusto-conical inlet **348** defined in the plug member **332**. Continued movement of the fueling can **59** will move the plug member **332** in opposition to the normal urging of the spring **354** to separate the seated tapered surfaces **344** and **346** to define therebetween an air exhaust passageway. At the same time, the outlet **352**, defined in the lower narrowed portion **334** of the plug member **332** is uncovered from the guide member **336**.

As lighter fluid is poured from the spout of the can **59** into the inlet **348** and thence conveyed by way of the

conduit 350 and the outlet 352 into the wick chamber 312, air is permitted to escape from the wick chamber 312 to the outside of the lighting mechanism 310 by way of the air exhaust aperture or apertures 358, the air exhaust space defined between the slidable plug 332 and the fueling housing, and thence by way of the air exhaust passageway defined by the separated tapered seats 344 and 346.

After the fueling operation has been completed, and the fuel can 59 is removed from the frusto-conical inlet 348 of the plug member 332, the plug is automatically returned to its normal position by the urging of the resilient means 354. The outer peripheral tapered seat 344, defined on the head 342 of the plug member, is then moved back into its normal seating engagement with the inner peripheral tapered surface 346 of the seat portion 328 of the unitary fueling housing. With the plug member 332 moved back to its normal position the air exhaust permitted during the fueling operation is thus eliminated and, at the same time, the outlet 352 at the lower narrowed portion 334 of the plug member 332 is covered and closed by the guide member 336.

From the above, it will be clear that applicant has invented a novel fueling device for a lighting mechanism in which there is a normally open fueling inlet, and a normally closed fueling outlet, and by way of which, during the fueling operation, the fueling outlet is uncovered and an air exhaust communication is provided between the wick chamber of the lighting mechanism and the outside atmosphere about the lighting mechanism. The communicating air exhausts thereby permit air to freely pass from the chamber of the lighting mechanism to beyond the lighting mechanism, thus allowing fluid to flow under force into the wick chamber and to adequately fuel the wick enclosed therein.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to several preferred embodiments thereof, it will be understood that various omissions and substitutions and changes in the form and details of the devices illustrated and in their operations may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

The body of the lighters shown in the respective embodiments may be made from metal (stamping or casting); plastics; or any other suitable material.

I claim:

1. In a fueling device for a lighter mechanism having a wick chamber, a housing including a sleeve portion and a seat portion having a seat, a plug freely slidable in said housing and radially spaced therefrom to define an air exhaust space therebetween, said sleeve portion having an air aperture defined therein to provide communication between said chamber and said exhaust space, said plug having a normally open fueling inlet and an outlet spaced from said inlet, a conduit in said plug interconnecting said inlet and outlet, and means tensioned between said housing and plug normally operative to freely urge the latter into seating cooperation with said seat portion and to close said fueling outlet, said plug being operable in opposition to the normal urging of said means to further tension the same to open said fueling outlet and unseat said plug to define an air exhaust passageway between said seat and plug communicating with said wick chamber by way of said air exhaust space.

2. In a fueling device as in claim 1, said sleeve portion being a continuation of said seat portion, said seat portion having a threaded means adapted to be threadably secured to the lighter mechanism to retain the sleeve portion extended into said chamber, and guide means mounted within said sleeve portion to guide said plug for sliding movement in said housing.

3. In a fueling device for a lighter mechanism having a wick chamber, a sleeve, a threaded seat member connected with said sleeve to define a housing and adapted to be threadably secured to said lighter mechanism to retain said sleeve extended into said chamber, said seat member having a valve seat, a plug slidable in said housing and spaced therefrom to define an exhaust space therebetween, a guide in said housing to guide said plug therein during the sliding movement of the same, said sleeve portion having an air aperture defined therein to communicate said chamber with said exhaust space, said plug having a normally open fuel inlet, an outlet spaced from said inlet, a conduit in said plug interconnecting said inlet and outlet, and means between said housing and plug normally operative to urge the latter into seating cooperation with said valve seat and to close said fueling outlet, said plug being operable in opposition to the normal urging of said means to open said fueling outlet and unseat said plug to define a passageway communicating with said wick chamber.

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