

Sept. 9, 1930.

J. J. DONOVAN ET AL

1,775,423

FLUID DISPENSER FOR LIGHTERS

Filed Dec. 5, 1928

3 Sheets-Sheet 1

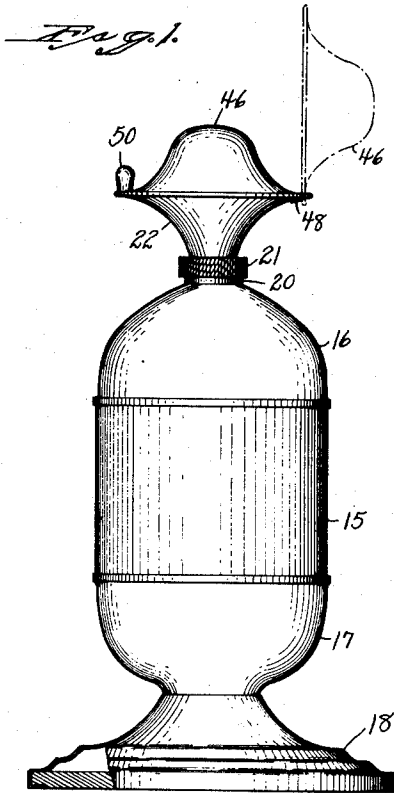
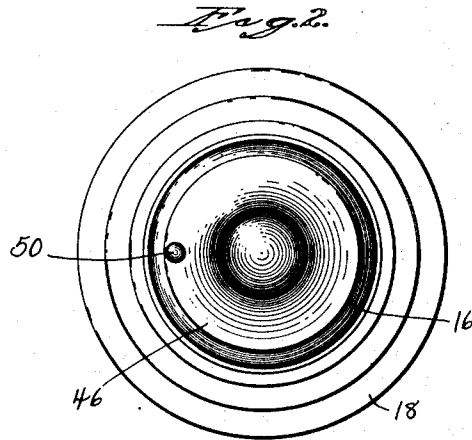
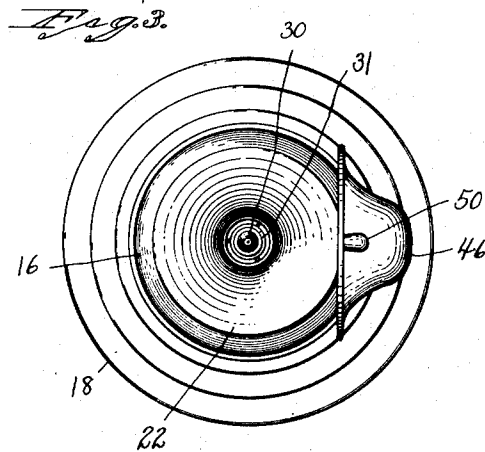


Fig. 10.

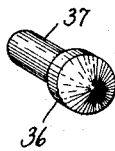
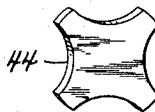


Fig. 11.



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Fig. 4.

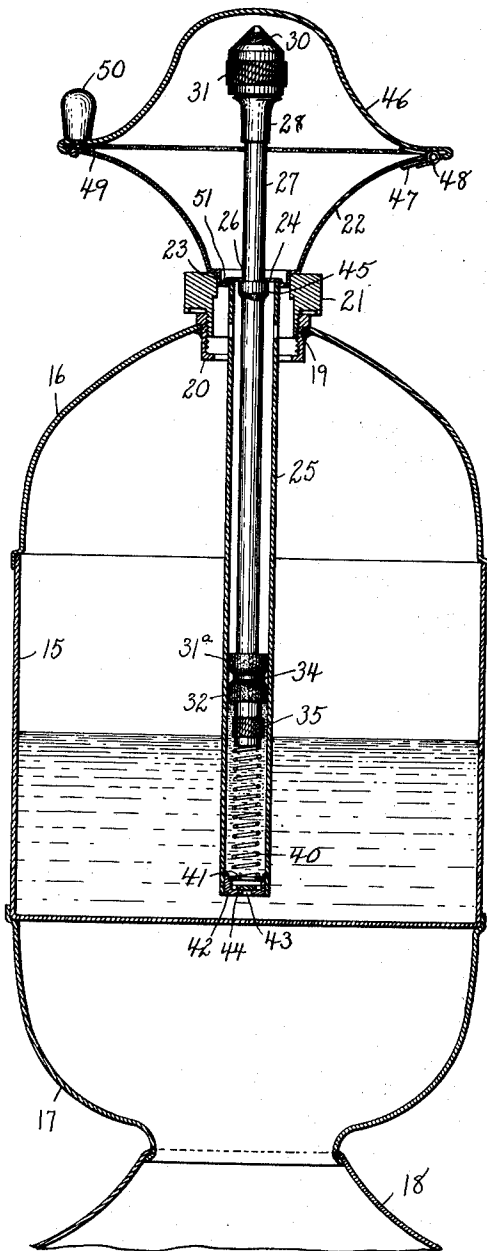
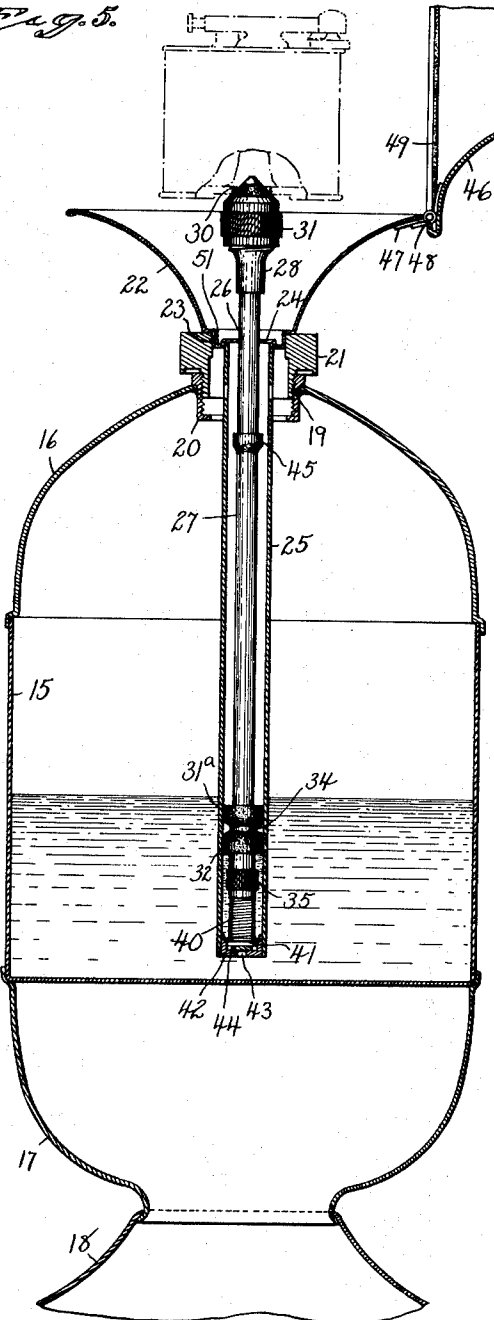


Fig. 5.



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Fig. 7.

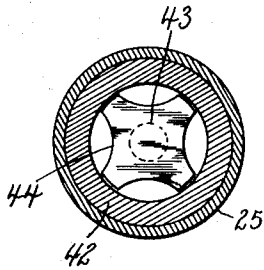
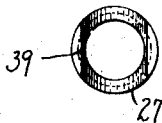
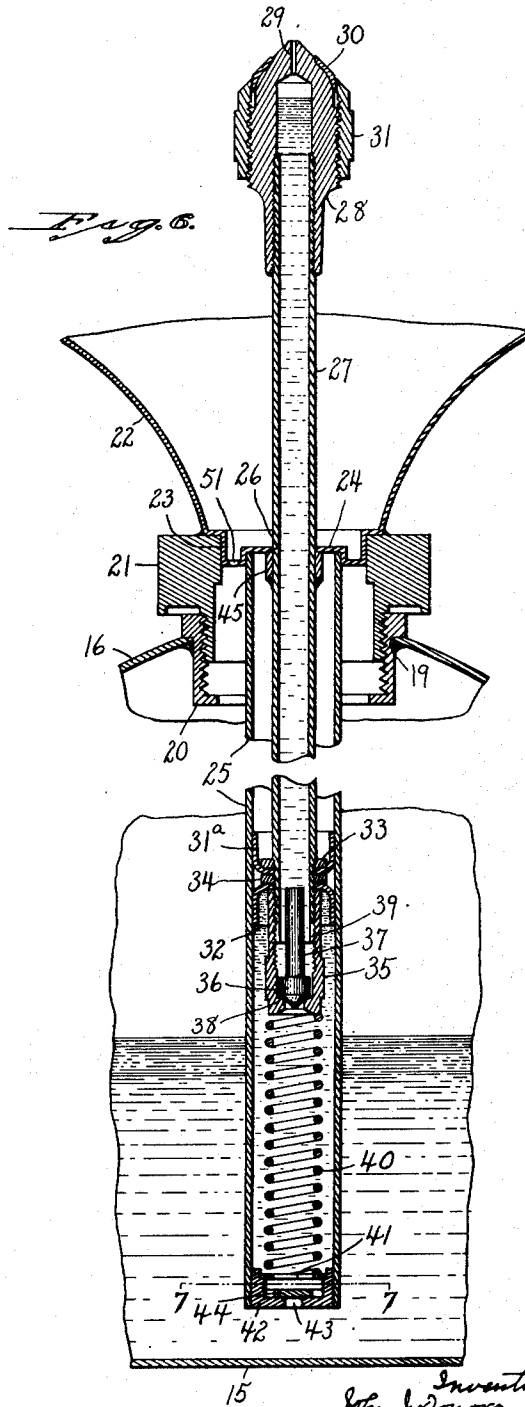


Fig. 8.



Fig. 9.



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UNITED STATES PATENT OFFICE

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FLUID DISPENSER FOR LIGHTERS

Application filed December 5, 1928. Serial No. 323,825.

Our invention relates to an improved fluid-dispenser, for lighters, our object being to produce a simple, safe, convenient and attractive device constructed with particular reference to enabling the users of lighters to refill them with the maximum of convenience and without danger of spilling any of the lighting-fluid or smearing the fingers with the same.

With these ends in view, our invention consists in a fluid-dispenser for lighters characterized by having a font and a vertically arranged yielding plunger located therein and adapted at its upper end to temporarily receive the filling-opening of a lighter which, when pressed downward upon it, depresses it with respect to the font and causes the ejection of a predetermined quantity of fluid therefrom into the lighter.

Our invention further consists in a fluid-dispenser characterized as above and having certain details of construction as will be hereinafter described and particularly pointed out in the claims.

In the accompanying drawings:

Fig. 1 is a view in elevation of our improved fluid-dispenser with its cover shown by broken lines in its open position and one edge of its foot in section;

Fig. 2 is a plan view thereof;

Fig. 3 is a corresponding view with the cover open;

Fig. 4 is an enlarged-scale view in vertical section of the device with its plunger in its normal or charging position;

Fig. 5 is a corresponding view showing the plunger in the position into which it is depressed by downward pressure upon a lighter applied over its self-fitting nozzle;

Fig. 6 is an enlarged-scale broken view in vertical central section of the working parts of the device;

Fig. 7 is a view in horizontal section on the line 7—7 of Fig. 6;

Fig. 8 is a broken detached view of the lower end of the tubular plunger showing one of the ports in its lower end;

Fig. 9 is a bottom view thereof;

Fig. 10 is a detached perspective view of

the upper check-valve which is carried by the plunger; and

Fig. 11 is a corresponding view of the lower check-valve which is located in the lower end of the plunger-casing.

In carrying out our invention as herein shown, we employ a cylindrical fluid-receiving font 15 having a domical cap 16 and setting into a hollow base 17 in turn setting into and supported by a spreading foot 18, the parts above described being of any suitable form and construction.

A circular central opening 19 in the domical cap 16 receives an internally-threaded assembling-sleeve 20 soldered in place and in turn receiving a removable externally-threaded cap-nut 21 which mounts a flaring spill-cup 22 soldered in place and having its contracted lower end formed with a deep concentric shoulder 23 fitting snugly into the upper face of the said nut. The said shoulder 23 is struck upwardly to form an annular recess 24 receiving the upper end of a plunger-casing 25 which is rigidly secured within it and which is concentric with the said font 15. The bottom of the said shoulder is formed with a concentric opening 26 receiving and forming a bearing for a vertically-yielding tubular plunger 27, the lower portion of which is surrounded by the said plunger-casing 25 which is, in effect, the cylinder, of which the plunger is the piston-rod.

At its upper end the said plunger is formed with external threads for the reception of a nozzle 28 made self-fitting by having its upper end tapered and formed with a small discharge-opening 29 which is surrounded by a fibrous gasket 30 held in place by a knurled sleeve 31 internally threaded for application to the external threads of the nozzle. The tapering end of the nozzle is adapted with its gasket in size to fit the various filling-openings of lighters when the same are crowded down over the tapering end of the nozzle and the yielding surface of the gasket 30 so as to form a sufficiently tight joint to prevent the escape of the fluid as it is being injected into the fluid-compartment of the lighter.

Near its lower end the hollow plunger 27 is provided with a double-acting plunger-head

or piston consisting of two cup-shaped washers 31^a and 32 fitting snugly within the plunger-casing 25, in which they face in opposite directions. The upwardly-facing upper washer 31^a is abutted against a stop-collar 33 threaded over the threaded lower end of the plunger 27 and held against it by a spacing-washer 34 also threaded over the plunger and forming an abutment for the downwardly-facing lower washer, which is jammed against it by the upper end of an internally-threaded sleeve-like valve-casing 35 screwed over the threaded lower end of the plunger 27 and depending below the same and, therefore, located below the washers 31^a and 32 aforesaid. The said valve-casing 35 receives a spindle-like check-valve 36 having an up-standing guide-stem 37 and normally resting upon a valve-seat 38 in the lower end of the said valve-casing 35. The lower end of the plunger 27 is formed with lateral fluid-inlet ports 39 (Fig. 8) which provide for the passage of the fluid from the valve-casing 35 into it when the valve 36 is lifted from its seat. The plunger 27 and hence the nozzle 28 are normally sustained in an elevated or charging position by means of a helical operating-or plunger-spring 40 interposed between the lower end of the valve-casing 35 and a ring 41 set into a recess in the upper end of a cup-like plug 42 soldered within the lower end of the plunger-casing 25. The lower end of the plug 42 is formed with a central port 43 which admits the fluid from the font 15 into the plunger-casing 25, the said port 43 being normally closed by a flat scalloped check-valve 44 (Fig. 11).

The spring 40 exerts a constant effort to lift the plunger into and maintain it in its elevated or charging position, as shown in Fig. 4, this upward movement of the plunger being limited by a stop-collar 45 mounted upon the plunger, as clearly shown in Fig. 5.

The spill-cup 22 is provided with a domical cover 46 secured to one edge of it by a hinge 47 and high enough in its domical form to clear, when closed, the nozzle of the plunger when the same is in its charging position. A spring 48 is provided for normally holding the cover in its closed position, in which it is sealed to prevent any evaporation of the fluid by means of a gasket 49 applied to the lower face of its edge and secured in place by turning the same to clinch it. In such position the gasket bears, when the cover is closed, directly upon the upper edge of the spill-cup. A handle 50 secured to the cover opposite the spring 48 provides for opening it. Perforations 51 in the bottom of the spill-cup provide for returning into the font any drops of the fluid that by chance may not be injected into the fluid-compartment of the lighter in charging the same.

In the use of our improved device, the filling-cap of the lighter, to be re-charged, is

removed and the lighter inverted (Fig. 5) and pressed firmly down upon the gasket 30 superimposed upon the tapering upper end of the nozzle, which so far enters the filling-opening of the lighter as to establish a fluid-tight joint between the same and the gasket, which conforms to the taper of the nozzle. If by chance any fluid remains at this time in the lighter it is held in suspension therein by the wicking or other material which fills the fluid-chamber or compartment thereof. At this time, the nozzle being in its elevated or charging position, that portion of the plunger-casing between the two check-valves 36 and 44 contains one charge of the fluid—a predetermined amount thereof sufficient to recharge a lighter of average fluid-capacity. As the lighter, thus inverted, is pressed downward against the nozzle the operating-or plunger-spring 40 yields and the plunger starts to descend in its plunger-casing 25. At the very beginning of this downward movement, the downwardly-facing cup-shaped plunger-head washer 32 develops sufficient pressure in the column of fluid in the lower end of the plunger-casing to seat the lower check-valve 44 firmly upon its seat, whereby the fluid in the plunger-casing is prevented from being forced back into the font, and to simultaneously lift the upper check-valve 36 above its seat 38, whereby the fluid under pressure is permitted to enter the valve-casing 35 and hence through the ports 39 in the lower end of the plunger into the same. The downward pressure exerted through the inverted lighter upon the nozzle 28 against the tension of the spring 40 being continued, the fluid confined in the lower end of the plunger-casing is forced upward through the plunger and nozzle and by the latter injected into the fluid-chamber of the lighter, in which it is taken up by the packing thereof, so that it does not flow back.

The lighter, having been charged as described, is removed from the nozzle, whereupon the spring 40 immediately reasserts itself to lift the plunger, at which time the suction produced by the upper washer 31^a reseats the valve 36 and re-opens the valve 44, whereupon another charge of fluid of predetermined quantity is drawn from the font into the plunger-casing, thus recharging the device for charging another lighter, the upward movement of the plunger being arrested against the lifting power of the spring 40 by the stop-collar 45. As soon as the lighter is removed from the nozzle, the cover 46 automatically closes over the projecting upper end of the plunger and over the nozzle and resumes its position over the spill-cup, from which it excludes dust and air, being sealed thereupon by the gasket 49. The device is thus left in readiness for a reuse, during which the cycle of operations above recited is repeated.

We have herein shown our invention as used for charging a pocket-lighter commonly used for lighting cigarettes, but obviously it is not so limited in use, since any lighter, whether portable or stationary, may be recharged by it if its nozzle and the filling-opening thereof can be brought into operative conjunction.

We claim:

1. In a fluid-dispenser for lighters, the combination with a font, of a downwardly-yielding vertically-movable plunger mounted therein, an externally-threaded nozzle located at the upper end of the plunger and shaped to enter the filling-opening of a lighter, a gasket fitting over the tapered upper end of the nozzle, an internally-threaded clamping-sleeve applied to the said nozzle for retaining the said gasket in place thereupon, a spring for holding the plunger in its normally-elevated charging position, and valves alternately opening and closing as the plunger is depressed and lifted, whereby the fluid is forcibly ejected from the nozzle when the plunger is depressed by downward pressure with its said nozzle entered into the filling-opening of a lighter.

2. In a fluid-dispenser for lighters, the combination with a font, of a downwardly-yielding vertically-movable tubular plunger located therein, a nozzle at the upper end thereof shaped to enter the filling-opening of a lighter, a plunger-casing enclosing the lower end of the plunger, a double-acting plunger-head or piston carried by the plunger and fitting within the said casing, a detachable valve-casing formed independently of the said plunger-head carried by the lower end of the said plunger at a point below the said plunger-head, a check-valve in the said valve-casing, a spring for normally holding the said plunger in its elevated charging position, and a check-valve located between the said casing and the font, the said valves being arranged to alternately open and close respectively as the plunger is depressed and elevated.

3. In a fluid-dispenser for lighters, the combination with a font, of an assembling-sleeve mounted therein, a mounting-nut in the said sleeve, a spill-cup mounted in the said nut, a cover for the said cup, a downwardly-yielding vertically-movable plunger passing through the bottom of the spill-cup into the said font, a nozzle located at the upper end of the said plunger and shaped to enter the filling-opening of a lighter when the same is pressed down upon it, a plunger-casing positioned at its upper end in the bottom of the spill-cup, extending downward into the font, and enclosing the lower end of the said plunger, a double-acting plunger-head or piston carried by the said plunger near the lower end thereof, check-valves respectively interposed between the plunger and its cas-

ing and the said casing and the font, and a spring for normally holding the plunger in its elevated charging position, the said valves being constructed and arranged to alternately open and close as the plunger is depressed and lifted, whereby portions of the fluid are alternately drawn into the plunger-casing from the font when the plunger is lifted and ejected therefrom when the same is depressed.

In testimony whereof, we have signed this specification.

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FRED L. V. SPRING.

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