

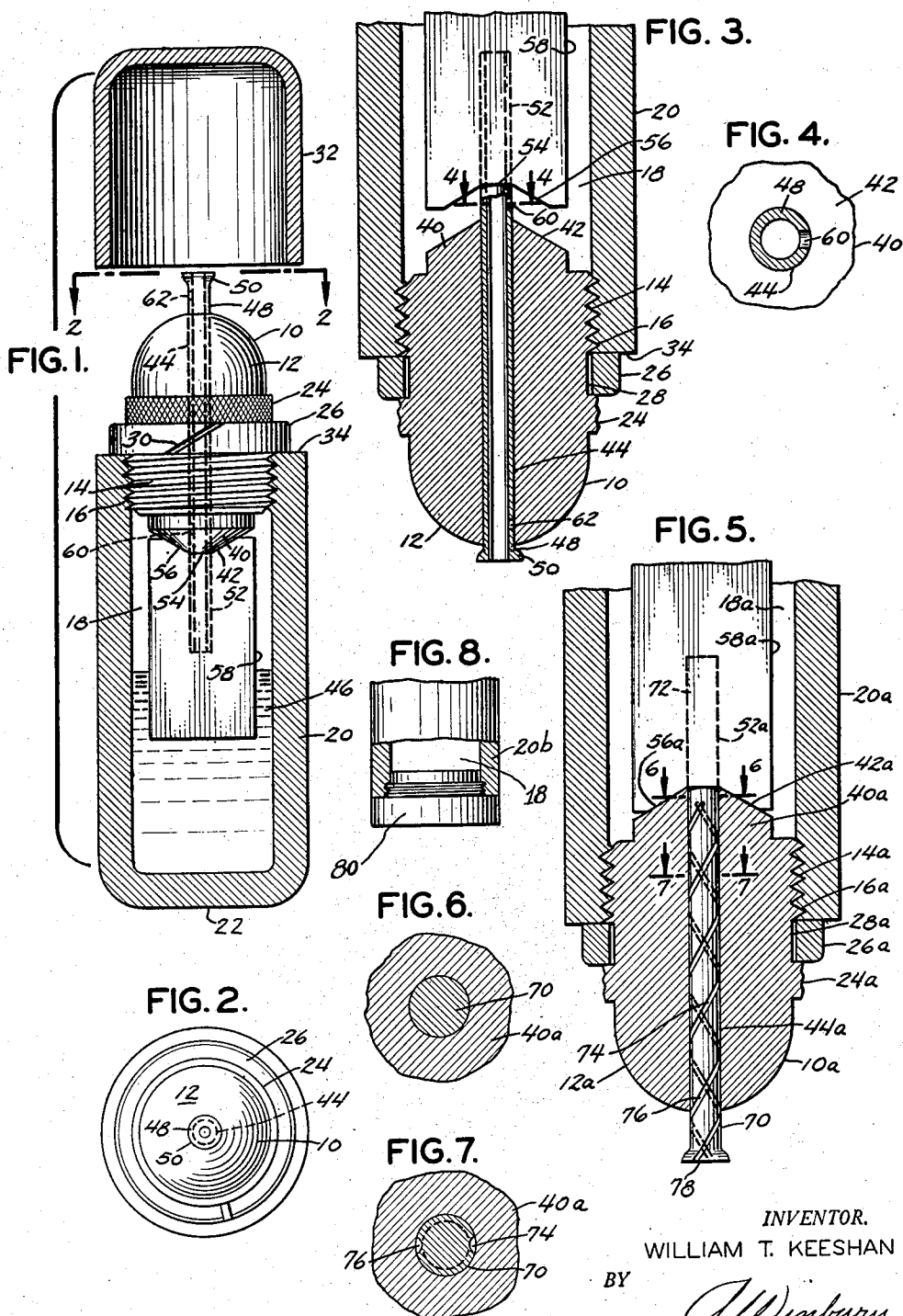
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FOUNTAIN APPLICATOR AND DISPENSER WITH MAGNETIC VALVE

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FOUNTAIN APPLICATOR AND DISPENSER
WITH MAGNETIC VALVE

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This invention relates to fountain applicators and dispensers which may be employed as a means for containing and applying liquid substances. Certain features described but not claimed in this application are described and claimed in my copending patent application Serial Number 12,432, filed March 1, 1948, for Fountain Applicator and Dispenser.

An object of the invention is to provide an improved fountain applicator including a housing adapted to contain a liquid, with fluid outlet means communicating with the inside of the housing, and novel means for maintaining said fluid outlet means in normally closed position so as to retain the fluid therein when not in use.

Another object of the invention is to provide an improvement of the invention disclosed in my copending patent application mentioned above, and including a valve assembly incorporating a relatively stationary member having an opening formed therein, a relatively movable member normally magnetically attracted into contact with the relatively stationary member to block said opening, and a tube carried by said relatively movable member and extending through said opening in said relatively stationary member to conduct fluid therethrough and out of the device for discharge therefrom.

A further object of the invention is to provide a fluid storage and dispensing device incorporating a discharge rod to carry fluid therefrom, and having a plurality of spiral peripheral passageways formed in its surface to conduct said fluid from said device and at the same time to allow air to enter the device to replace the fluid drawn therefrom.

Still another object of the invention is to provide an improved fountain applicator and fluid container, of the type described, which is simple in design, inexpensive to manufacture, normally tightly closed against leakage when not in use, yet easily and readily opened to discharge fluid therefrom by mere placing of the device against the object upon which the fluid is to be discharged.

Other objects and advantages of the invention will become apparent from the following description of a preferred embodiment thereof as illustrated in the accompanying drawings, and in which,

Fig. 1 is a sectional elevation of my improved fountain applicator in closed position, with the protective cap shown disposed thereabove.

Fig. 2 is a plan view taken on plane 2-2 of Fig. 1,

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Fig. 3 is fragmentary sectional elevation similar to that of Fig. 1, but showing the discharge end portion of the applicator in upside-down position and in valve open position.

Fig. 4 is a fragmentary sectional plan view taken on line 4-4 of Fig. 3.

Fig. 5 is a sectional elevation similar to that of Fig. 3, but showing a further modification of the invention, illustrating a solid fluid discharge tube having spiral peripheral grooves in its surface, and parts being in valve closed position.

Fig. 6 is a sectional plan view taken on line 6-6 of Fig. 5.

Fig. 7 is a sectional plan view taken on line 7-7 of Fig. 5, and

Fig. 8 is a fragmentary elevational view, partly in section of the devices illustrated in Figs. 1 to 7.

In the use of dispensing devices, such as those which include a reservoir in the housing thereof for storage of the liquid to be dispensed, various means for discharging the liquid from the reservoir have been devised, all of which are open to objections, particularly when spring biased elements form part of the closures thereof. The use of springs introduces complications, not the least of which are the possibility of leakage as the spring weakens, or getting stuck, and the considerable added cost of manufacture in a field wherein extensive competition exists. My invention presents a solution for these difficulties.

In order to understand clearly the nature of the invention, and the best means for carrying it out, reference may now be had to the drawings, in which like numerals denote similar parts throughout the several views.

As seen in Figs. 1 and 2, and in inverted position in Fig. 3, there is shown an applicator discharge tip 10 the outer surface 12 of which is smoothly rounded as illustrated. The discharge tip 10 is threaded at 14 to fit into matching inside threads 16 lining the inside of the upper end of the axial bore 18 forming the fluid receiving reservoir or chamber of the housing 20. The latter chamber 18 is closed at one end by the end wall or floor 22.

An integral outstanding annular collar 24 forms part of the discharge tip 10, and is externally knurled to provide a firm grip for the fingers in threading the top 10 to the housing 20. A split washer 26 of resilient material encircles the reduced peripheral groove 28 formed in the tip 10 next to the knurled collar 24, the washer being split at 30. A cup shaped cap 32 having an inside diameter slightly smaller than the outside diameter of the washer 26, is shown above

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the tip and housing in Fig. 1, but is actually adapted to seat upon the upper end edge 34 of the housing 20, and to receive inside the cap 32, the tip 10, knurled collar 24, and split washer 26, which yields resiliently upon receiving the cap thereover to hold the cap frictionally in place. The cap is thus easily placed in position and removed without difficulty.

The inner end portion 40 of the tip 10 has a frusto-conical surface 42 as seen best in Fig. 3, and the apex of the surface 42 forms the inner end of an axial bore 44 extending wholly through the tip 10 so as to establish communication between the reservoir 18 containing the liquid 46, and the exterior of the tip 10. In this axial bore 44 I dispose slidably a liquid conducting tube 48, the fit of the tube 48 in the bore 44 being close, but not snug enough to block free movement thereof in the bore under the influence of slight external pressure on its enlarged external end 50.

The inner end portion of the tube 48 extends into and is firmly permanently seated in a recess 52 formed in the floor 54 or apex of the frusto-conical recess 56 of the cylindrical magnetic plunger 58 which is permanently magnetized. The tube 48 is thus movable with the plunger 58. Since the tip 10 is made of metal such as iron or steel which will be magnetically attracted by the magnetic plunger 58, and since the frusto-conical surface 42 of the tip 10 fits closely into and seats upon the frusto-conical recess surface 56 of the magnetic plunger 58, it is apparent that the magnetic attraction between the plunger and the tip will draw them normally together so that, as shown in Fig. 1, communication between the interior chamber 18 and the outside is blocked off.

It will be observed that the tube 48 has an inner opening or vent 60 adjacent or partly within the recess 46 as seen best in Figs. 3 and 4, through which fluid can flow from chamber 18 into the tube 48 and out through its discharge end 50. When in the closed position as in Fig. 1, it is seen that mutual seating of the frusto-conical surfaces 42 and 56 closes the inside vent 60 to block such communication, and preventing leakage of the fluid. There is also an air vent aperture at 62 near the outer end of the tube 48, which is exposed in the position shown in Fig. 1, and blocked in the position shown in Fig. 3.

Fluid, such as perfume and the like, in the reservoir 18, is thus dispensed by merely placing the enlarged outer end 50 of the tube 48 against the surface of the skin, or clothing, and pressing slightly, allowing the fluid to flow through the opening 60, through the tube and out through opening 50. Upon release of the pressure, the magnetic attraction between the magnetic plunger 58 and the tip 10 returns the parts to the closed position of Fig. 1, with the end of the tube projecting outwardly as shown, blocking leakage therefrom.

In Figs. 5, 6 and 7, there is shown a modified form of the invention. Those parts bearing suffixes such as 58a, 20a, 40a, and the like, are all identical with the corresponding parts having the same numbers without suffixes as Figs. 1, 2 and 3, and will not be again described, reference being had to the above description for the details thereof. However, in Figs. 1 and 2, it was seen that the magnetic plunger 58 carried with it a hollow discharge tube 48 through which the fluid passed. In the modified form, I employ a solid cylindrical discharge rod 70 the upper or inner end portion 72 of which is securely seated

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in the recess 52a of the magnetic plunger 58a so as to be movable therewith. In the rest of the discharge rod 70, I form at least two spiral external grooves 74 and 76 which extend all the way to the outer end 78 of the discharge rod and inwardly into the recess 56a.

When in the normally closed position of Fig. 5, it is seen that flow of fluid from the reservoir 18a is blocked, whereas when the outer end 78 of the rod is placed against the skin or clothing the pressure forces the rod inwardly to unseat the frusto-conical surfaces 42a and 56a from each other, allowing fluid to flow from the reservoir through at least one spiral groove 74 or 76 and out upon the skin. Air to replace the fluid may enter through the other of the spiral grooves. Upon release of the pressure, the magnetic attraction draws the parts into the position of Fig. 5, closing the device against leakage.

In the Figs. 1 through 7 forms of my invention, when it is desired to fill the chamber 18 with perfume or other fluid, the tip 10 is unscrewed from the container 20. However, in accordance with my invention, I have provided means whereby the container may be filled without disturbing the assembly of the tip 10 and magnet 58. As shown in Fig. 8 of the drawings, instead of the chamber 18 being closed by the integral bottom wall 22, I omit the said bottom wall 22 and internally thread the open end of the container 20b and threadedly fit therein a removable bottom cap 80, as shown. Any suitable well known packing means (not shown) may be provided to insure against leakage through the cap 80.

Although I have described my invention in specific terms, it will be understood that variations may be made in size, shape, materials and arrangement without departing from the spirit and scope of the invention as claimed.

I claim:

1. A liquid dispensing device comprising a main housing, a liquid storage reservoir disposed in said main housing, a liquid discharge tip of magnetizable material carried on said main housing and having a first outlet formed therein communicating with the said reservoir, a first valve seat formed in the interior surface of said discharge tip, a magnetic plunger disposed movably in said reservoir and having a second valve seat formed therein, a fluid discharge tube carried by said magnetic plunger and extending through said first outlet and having a second outlet aperture formed in said fluid discharge tube near the surface of said second valve seat, whereby said first and second valve seats are brought into seating contact with each other under the influence of the magnetic attraction of said plunger for said liquid discharge tip, to normally block communication between the said reservoir and the interior of said fluid discharge tube through said second outlet aperture, whereby said fluid is retained in said reservoir against leakage therethrough.

2. The construction according to claim 1, characterized further in that said fluid discharge tube has its outer end projecting substantially beyond the outer surface of said tip when in closed position so that pressure upon said outer end presses said tube inwardly to unseat the said two frusto-conical valve seats and to uncover said second outlet aperture, whereby said fluid is free to flow out of said reservoir, through said second outlet aperture, and out through said fluid discharge tube.

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3. The construction according to claim 2, characterized further in that said fluid discharge tube is provided with an air vent formed in a wall thereof near its discharge end, said air vent being normally uncovered when the tube is in valve closed position, and which air vent is normally covered when the tube is in valve open position.

4. A liquid dispensing device comprising a main housing having a liquid storage reservoir formed therein, a magnetically attractable fluid discharge tip threaded into one end of said main housing with the inner end of the tip in communication with the reservoir, said tip having an axial bore extending therethrough to provide communication between the reservoir and the outside of the tip, a first valve seat formed in the inner surface end of the said tip, a magnetic plunger movably disposed in said fluid reservoir, and having a second valve seat formed therein to mate with said first valve seat when said plunger is drawn toward said first valve seat by magnetic attraction, a fluid discharge rod carried by said magnetic plunger and extending through said axial bore in the said tip, and having a plurality of grooves formed longitudinally in its outer surface and extending substantially near said second valve seat, whereby, when said first and second valve seats are in mating engagement passage of fluid through said grooves is blocked, and when pressure is exerted upon the outer end of said discharge rod to displace said plunger inwardly into said reservoir, communication is established between the reservoir and said grooves so that the said fluid therein is free to flow out of the discharge end of said discharge rod.

5. The construction according to claim 4, characterized further in that said grooves in the discharge rod are spiral in curvature.

6. The construction according to claim 4, characterized further in that said first and second valve seats are matingly frusto-conical in shape.

7. The construction according to claim 4, characterized further in that said first and second valve seats are matingly frusto-conical in shape and said grooves in said discharge rod are spiral in curvature.

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8. The construction according to claim 1, characterized further in that said tip is provided with a peripheral groove formed therein, a resilient split washer disposed in said groove, and a cap receivable by said device and adapted for resilient engagement with said split washer to retain the cap in position.

9. The construction according to claim 8 in which said main housing is provided with a removable bottom closure whereby the said reservoir may be filled without removing said discharge tip.

10. A liquid dispensing device comprising a main housing, a liquid storage reservoir disposed in said main housing, a liquid discharge tip of magnetizable material carried on said main housing and having a first outlet formed therein communicating with said reservoir, a first valve seat formed in the interior surface of said discharge tip, a magnetic plunger disposed movably in said reservoir and having a second valve seat formed therein, a fluid discharge member carried by said magnetic plunger and extending through said first outlet, and designed to convey fluid from said reservoir to said last mentioned portion extending through said first outlet, said first and second valve seats being normally adapted to be brought into seating contact with each other under the influence of the magnetic attraction of said plunger for said discharge tip to normally block communication between said reservoir and said fluid discharge member whereby said fluid is retained in said reservoir against leakage therethrough.

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