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SPRAYER

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Fig. 1.

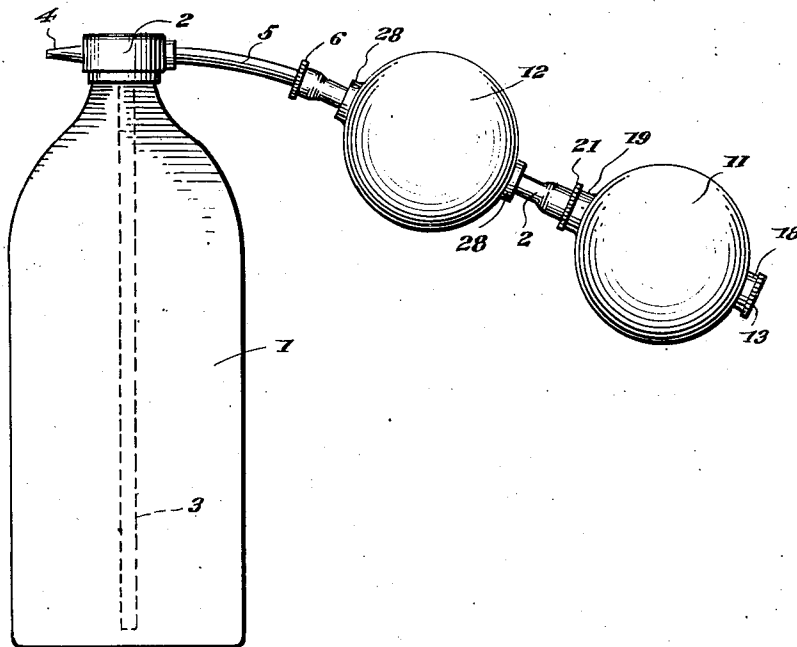
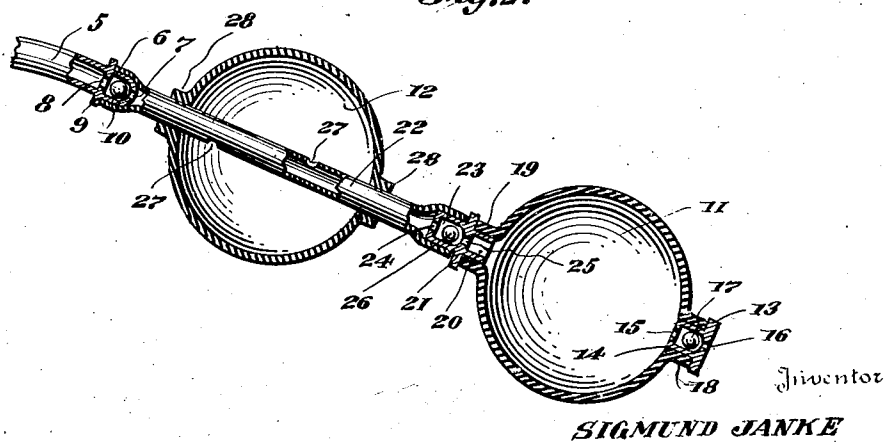


Fig. 2.



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SPRAYER

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6 Claims. (Cl. 299—88)

This invention relates to a sprayer of the atomizer type and, while it is particularly adapted for use in barber shops for spraying face lotions, pomades, and the like, it is to be understood that it may be used for spraying window cleaning liquids, or other liquids which are to be applied in a fine spray when used.

At the present time, it is customary to provide atomizers and similar spraying devices with a single bulb from which air is forced into a bottle or other container for creating pressure in the container and causing the liquid contents thereof to be discharged from a spray head in the top of the container.

Such spraying devices are not entirely satisfactory as use of a single bulb causes intermittent increases of pressure and corresponding discharges of sprayed liquid from the sprayer. Therefore, one object of the invention is to provide a sprayer having a pair of bulbs, one constituting a compression bulb for forcing air into a second bulb which is an expansion bulb and from which air flows in a constant stream into the container from which liquid is to be sprayed.

Another object of the invention is to provide a sprayer wherein the expansion bulb is disposed about a perforated portion of a tube or flexible hose leading from the compression bulb to the inlet of the spray head, check valves being provided at ends of the tube so that air may be spasmodically forced from the compression bulb through the perforated tube into the expansion bulb and then flow as a steady stream from the expansion bulb to the inlet of the spray head.

Another object of the invention is to provide a sprayer having an improved arrangement of bulbs mounted in tandem formation and operated by squeezing pressure applied only to the outer bulb which serves as a compression bulb.

In the accompanying drawing:

Fig. 1 is a side elevation of the improved sprayer.

Fig. 2 is a sectional view taken longitudinally through the bulbs and the tubes.

The container 1 is in the form of a bottle which may be of any desired size and, at its top, carries a spray head 2 of conventional formation having the usual outlet tube 3 extending longitudinally in the container to adjacent the bottom thereof, so that when a charge of compressed air is created in the upper portion of the container, liquid in said container will be forced upwardly through the tube and sprayed out through the nozzle 4. An inlet tube 5 projects from the spray head and through this tube air

is forced into the container to build up the supply of compressed air. This tube or inlet neck is formed of metal and, at its outer end carries a nipple or cage 6 constituting a check valve and provided with an outer opening 7 and an inner opening 8 formed through a partition 9, a valve ball 10 being enclosed in the cage to seat in closing relation to the outer opening 7 and prevent outward flow of air after air has been forced through the pipe or tube 5 into the upper portion of the container. The partition 9 is of greater diameter than the cage and projects radially therefrom to form a circumferentially extending collar, as shown in Fig. 2.

In order to build up a supply of compressed air within the upper portion of the container, there have been provided an outer compression bulb 11 and an inner expansion bulb 12. The bulb 11 is provided at its outer end with an inwardly opening check valve 13 having a cage or housing 14 formed with inner and outer ports 15 and 16 and enclosing a valve ball 17 for closing the inlet opening 16 when subjected to pressure from within the bulb. The neck 18 of the bulb 11 fits tightly about the cage and forms an air-tight seal, as well as firmly holding the check valve in place. The inner end of the bulb 11 is also formed with a neck 19 fitting tightly about the tubular shank 20 of a coupling which not only serves to connect the bulb 11 with a flexible tube 22 but also constitutes an outwardly opening check valve for controlling flow of air from the bulb. The portion 23 of the coupling 21 about which the adjacent end of the tube 22 fits, constitutes a cage for the check valve and is formed with openings 24 and 25, the opening 25 being closed by the valve ball 26 when subjected to pressure from within the tube 22 and the expansion bulb 12 carried by the tube. The expansion tube surrounds the tube 22 for a major portion of the length thereof in enclosing relation to a portion of the tube which is formed with openings 27 and ends of the bulb are formed with necks 28 so that leakage will not occur between the tube and ends of the bulb. The upper end of the tube 22 fits about the cage of the coupling or check valve 6 and, from an inspection of Fig. 2, it will be seen that while air may flow freely from tube 22 into the inlet tube 5 of the sprayer head 2, retrograde flow of air from tube 5 into tube 22 will be prevented by the check valve 6.

When this sprayer is in use, squeezing pressure is applied to the compression bulb 11 by a number of squeezes and, as the bulb is compressed, air will be forced therefrom through the check

valve 21 into the tube 22, air being replenished during expansion of the compression tube by air entering its outer end through the check valve 13. The air forced out of the compression bulb flows through the flexible tube and its openings 27, into the expansion bulb 12, which is distended by air forced into it. A portion of the air pumped into the tube 22 flows directly through it and past the check valve 6 into the inlet tube 5, through which it enters the spray head and accumulates in the container above liquid therein. Surplus air pumped into tube 22 fills and expands the bulb 12 and, after this bulb has been expanded to the desired degree by a few squeezes upon the compression valve or pump 11, the person operating the sprayer stops squeezing the bulb 11. The air accumulated within the expansion bulb will then be expelled as a steady stream from this bulb through tube 22 into the inlet tube 5 and through tube 5 and the spray head into the container, and the liquid will be discharged as a steady spray from the nozzle 4. By intermittently operating the bulb 11, a continuous spray, at substantially steady pressure may be ejected from the nozzle as long as desired. When operation of the bulb 11 is discontinued, the bulb 12 will eventually return to its normal size and discharge of the spray will cease.

Having thus described the invention, what is claimed is:

1. In a sprayer, a container, a spray head at the upper end of said container having an outlet and provided with an inlet tube, an inwardly opening check valve at the outer end of the inlet tube, a flexible tube having an inner end fitting tightly about the valve of the inlet tube, a compression bulb having inner and outer necks, an inwardly opening check valve in the outer neck of said bulb, an outwardly opening check valve mounted in the inner neck of said bulb and having a portion projecting therefrom and fitting tightly within the outer end of the flexible tube, and an expansion bulb fitting about the flexible tube in spaced relation to ends thereof, the portion of the flexible tube passing through the expansion bulb being formed with openings whereby air flowing through the flexible tube may enter and distend the expansion bulb to create a supply of air under pressure within the expansion bulb.

2. In a sprayer, a container, a spray head at the upper end of said container formed with an outlet and having an air inlet tube, a compression bulb, an inwardly opening check valve carried by the compression bulb, an outwardly opening check valve carried by the compression bulb and projecting therefrom, a flexible tube having its ends engaged with the outlet valve of the compression tube and the inlet valve of the inlet

tube, and an expansion bulb surrounding a portion of the flexible tube in air tight engagement therewith, the portion of the flexible tube within the expansion bulb being formed with openings whereby the expansion bulb may be distended by air under pressure entering said bulb from said tube.

3. In a sprayer, a spray head having an outlet and an air inlet, an inwardly opening check valve for the inlet, a compression bulb having inner and outer necks, an inwardly opening check valve in the outer neck, a coupling mounted in the inner neck with a portion projecting therefrom and constituting an outwardly opening check valve, the outwardly opening check valve being surrounded by a collar engaged by the inner neck of the bulb, a flexible tube having one end surrounding the inwardly opening check valve of the inlet of the spray head and abutting the collar thereof, the other end of the tube surrounding the outwardly opening check valve of the compression bulb and abutting the collar thereof, and an expansion bulb surrounding a portion of said tube intermediate the length thereof and in air-tight engagement therewith, the portion of the tube passing through the expansion bulb being formed with openings.

4. In a sprayer, a spray head having an outlet and an air inlet provided with an inwardly opening check valve, a compression bulb, an inwardly opening check valve for said bulb, an outwardly opening check valve for said bulb, a flexible tube extending between and engaged with the check valve of the spray head and the outwardly opening check valve of said bulb, and an expansion bulb surrounding a portion of said tube intermediate the length thereof and having airtight engagement therewith, the portion of the tube surrounded by the expansion bulb having openings formed therein.

5. In a sprayer, a spray head having an outlet and an air inlet provided with an inwardly opening check valve, a flexible tube having an inner end connected with the check valve, means for forcing air under pressure through said tube from the outer end thereof, and an expansion bulb surrounding a portion of said tube, the portion of the tube surrounded by the expansion bulb having openings formed therein.

6. In a sprayer, a spray head having an outlet and an air inlet provided with an inwardly opening check valve, a flexible tube having an inner end connected with the check valve, means for forcing air under pressure through said tube, and an expansible and contractible air chamber surrounding a portion of said tube and communicating with the portion of the tube surrounded thereby.

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