CONTAINER FOR DILUTING AND DISPENSING MATERIAL

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ABSTRACT

A container for diluting and dispensing materials in liquid form that consists of a primary vessel, e.g., a bottle, adapted to contain a diluent such as water and a replaceable cartridge mounted removable in the mouth of the bottle. The cartridge is provided with a laterally projecting circular flange which lies in contact with the edge of the bottle mouth. The cartridge contains a relatively small amount of a chemical concentrate that is to be diluted. A dispensing mechanism composed of a pump with a bottle cap at its lower end is used to withdraw the contents of the container. A dip tube that extends downwards from the cap is introduced into the bottle by thrusting its free end through the cartridge thereby perforating the same and in this way allowing the chemical material in the cartridge to drain into the primary container. The cap is then screwed onto the neck of the bottle. When empty, the cartridges are thrown away and replaced.

3 Claims, 3 Drawing Figures
CONTAINER FOR DILUTING AND DISPENSING MATERIAL

Multicompartmented containers have been previously proposed in which a first compartment was provided for a material to be diluted with a liquid stored in a second compartment. In one container of this kind a bellows is provided with a pointed piercing lug for rupturing the wall of one of the compartments. This allows the material stored in the compartment to fall into the solution located beneath it. In another container of this kind, material is expelled by a pressurized gas. Just before being used, a vertically disposed tube which is held in a pressurized compartment above the diluent is forced downwardly through the lower wall of an upper compartment thereby causing the liquids stored in separate compartments to be mixed prior to use. The first of these containers is not capable of distributing the material as a spray. Thus, there is no way to dispense the material in spray form over a wide area as needed, for example, in applying detergent to walls, mirrors, windows, etc. These problems are remedied in the second design mentioned above but at a substantially increased cost. Moreover, gas-pressurized containers can be used.

The present invention is particularly concerned with the dispensing of liquid detergents. In the case of products of this kind, it is particularly important to be able to dilute a concentrated solution to a precisely determined degree without the product getting on the hands. In the past, dilution usually involved mixing and pouring. These operations are both time-consuming and provide a chance for the concentrate to come in contact with the hands.

In view of these and other shortcomings in the prior art, it is one object of the present invention to provide an improved and reusable dilution and dispensing container in which a concentrate can be first diluted and then dispensed in spray form.

Another object of the invention is the provision of an improved dispenser container of the type described including a replaceable cartridge between the dispensing pump and the dilution container and a provision for reliably preventing leakage between the pump and the concentrate cartridge.

A further object of the invention is the provision of an improved dispenser container of the type described including a dilution container or dispensing pump mechanism connected to the top of the dilution container, a concentrate cartridge between the dispensing pump and the dilution container and a provision for reliably preventing leakage between the pump and the concentrate cartridge.

A further object of the invention is the provision of an improved package of the kind described with a piercing instrument and a provision for centering the dispensing tube as it is thrust through the hands.

A further object of the invention is the provision of a dilution bottle including a removable concentrate cartridge and a screw-on cap adapted to fit over the cartridge with a provision for a gasket to form a seal between the cap and the bottle as well as to center the cartridge in the neck of the bottle.

These and other more detailed and specific objects will be apparent in view of the following specification and drawings wherein:

FIG. 1 is a side elevational view of the package before the dispensing mechanism is placed in the operating position.

FIG. 2 is a partial vertical sectional view showing the dispensing mechanism with the dispensing tube in the operating position, and

FIG. 3 is a partial enlarged cross sectional view of the upper portion of the container.

Briefly, the present invention provides a dispensing package having a removable concentrate cartridge mounted within relatively large dilution container in which is stored a diluent such as water. A dispensing pump mounted upon the dilution container includes a dip tube which when introduced through the cartridge pierces the cartridge and allows the contents thereof to drain into the dilution container. The pump is then operated to dispense the diluted material in spray form.
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dispensing nozzle 44 having an outlet opening 46 through which a spray 48 is expelled when the plunger 42 is depressed by moving the lower end of a lever 50 toward the right in the figures. The cylinder in which plunger 42 is mounted communicates through a duct with the dip tube 28. The lower end of tube 28 is preferably cut at an oblique angle to provide a sharp point 54 which acts to perforate the cartridge 20 as will be described below. The lower end of the dip tube is also provided with longitudinally extending radially projecting cutting flanges 56 that allow the concentrate 22 to drain readily into the container 12.

The operation of the container will now be described. It will be assumed that the primary container 12 has been filled to the appropriate level with the diluent liquid 24 (normally water). A fresh cartridge 20 containing the proper amount of concentrate 22 is then placed in the mouth of the opening 14 with the flange 22 resting on the upper surface 34 of the opening at the top of the bottle 12. In this position, the dome-shaped wall 30 extends downwardly into the container 12. The operator then grasps the pump and places the tip 54 of the dip tube 28 in the center of the upper part 36 of the cartridge 20. To simplify centering the tip, a target or other appropriate marking can be imprinted on the upper surface of sheet 36. The pump and the dip tube are then thrust downwardly with sufficient force to pierce both the sheet 36 and the bottom 30 of the cartridge 20. This will produce a torn opening 60 in the sheet 36 and will tear away a piece 62 of the bottom sheet 20.

As soon as this is done, the concentrate 22 will drain into and mix with the diluent 24. The spraying pump can now be operated by depressing plunger 42.

It was found that the cartridges 20 could be shipped economically and were easily removed and inserted from the top of the bottle 12 when replacement was required. The target in the center of the top wall 36 of the cartridge assisted in centering the dip tube for piercing and the downwardly and centrally inclined walls of the bottom portion 30 of the cartridge were found effective in guiding the tip tube toward the center of the cartridge in the event the operator inadvertently misaligned the dip tube as it was being inserted. The flange 34 was effective in sealing the area between the cap 16 and the upper 34 of the container 12 against leakage. Because the bottle 12 and dispensing mechanism 26 could be used repeatedly, the cost of the container over its useful life was a minor factor.

I claim:

1. A dilution and dispensing container comprising a container body having a connecting means comprising an opening for receiving a concentrate cartridge, a removable and replaceable concentrate cartridge, said cartridge having a frangible top and a frangible bottom said container body having a diluent compartment, a dip tube adapted to pierce the top and bottom of the concentrate cartridge and allow the contents thereof to mix with the diluent, a cap means for closing the opening and for retaining removable cartridge in place within the connection means in the container body, the dip tube extending through the openings thus pierced in the cartridge into the diluent compartment, and a pump means communicating through the dip tube for withdrawing the diluted concentrate from the compartment.

2. The apparatus of claim 1 wherein the cartridge is provided with a laterally extending normally horizontally disposed flange having an appropriate diameter to extend over and abut against the upper surface of the diluent compartment and the means for retaining the cartridge in place includes a flat inner surface located in abutting relationship with the upper surface of the flange for pressing the flange in sealing relationship with the upper surface of the diluent compartment to seal the same.

3. The apparatus of claim 1 wherein the cartridge comprises a pouch having a relatively brittle and frangible dome-shaped section and a piece of substantially flat sheet material sealed across the open end of the dome to provide a hermetically sealed capsule for the concentrate, said flange being defined by the sealed section between the substantially flat sheet and the dome-shaped sheet.