SPRAY APPLICATION SYSTEM COMPONENTS COMPRISING A REPELLENT SURFACE & METHODS

Background

As described for example in WO98/32539, spray application systems for spraying liquids (e.g. paints, garden chemicals etc.) are generally known. Such systems generally comprise a reservoir to contain a liquid and a spray gun through which the liquid is dispensed. The liquid may be fed from the reservoir under gravity and/or it may be entrained in a stream of pressurized liquid, for example air or water, which is supplied to the gun from an external source.

As also described in WO98/32539 disposable liners have been used with (e.g. re-usable) liquid reservoirs. The liner may aid in disposal of the contents; protect the reservoir or its contents; as well as facilitate or even eliminate the cleaning of the reservoir.

Summary

With current spray (e.g. paint) application systems, a portion of the liquid (e.g. paint) is retained within the liquid reservoir or liner after dispensing the liquid. Depending on the size of the liquid reservoir or liner, the amount of retained paint may range from about ½ to 1 ounce. In the case of relatively expensive liquids, such as colored automobile base coat paints that can cost $3-$6 per sprayable ounce, the cost of such wasted retained (e.g. paint) liquid can be substantial. Thus, industry would find advantage in minimizing the amount of paint or other liquid that is retained on components of spray application systems.

Presently described are components of a spray application system. At least one component comprises a liquid repellent surface (e.g. layer).

In one aspect, there is provided a component of a spray application system, wherein the component is a liquid reservoir or a liquid reservoir liner comprising a liquid repellent surface such that the receding contact angle with water ranges from 90 degrees to

135 degrees and the liquid repellent surface repels water-based paint having a water soluble volatile organic solvent of at least 10 g/liter.

In some embodiments, the liquid repellent surface comprises a fluoropolymer or a (e.g. non-fluorinated) binder and a fluorochemical material. In another embodiment, the liquid repellent surface (e.g. layer) comprises a porous layer and a lubricant impregnated into pores of the porous layer. The component is typically a liquid reservoir, a liquid reservoir liner, a lid for a liquid reservoir

What is claimed is:

1. A component of a spray application system, wherein the component is a liquid reservoir or a liquid reservoir liner comprising a liquid repellent surface such that the receding contact angle with water ranges from 90 degrees to 135 degrees and the liquid repellent surface repels water-based paint having a water soluble volatile organic solvent of at least 10 g/liter.

2. The component of claim 1 wherein the liquid repellent surface comprises a surface layer of a fluorochemical material.

3. The component of claims 1-2 wherein the liquid repellent surface layer further comprises a non-fluorinated organic polymeric binder.

4. The component of claims 2-3 wherein the fluorochemical material comprises a compound having the formula:

$(R_f\text{-}L\text{-}P)_nA$

R_f is a fluorinated group;
L is independently an organic divalent linking group;
P is a catenary, divalent heteroatom-containing carbonyl moiety, such as -C(O)O-;
A is a hydrocarbon moiety;
and n typically ranges from 1 to 3.

5. The component of claim 4 wherein R_f is $CF_3[CF_2]_3$- for at least 50 wt.-% of the fluorochemical material.

7. The component of claims 1-2 wherein at least the liquid repellent surface of the component comprises a thermally processible polymer and a fluorochemical material melt additive.

8. The component of claim 1 wherein the liquid repellent surface layer comprises a porous layer and a lubricant impregnated into pores of the porous layer.

9. The component of claim 1 wherein the component comprises a thermoplastic polymeric material.

10. The component of claim 1 or 9 wherein the component is a removable liquid reservoir liner.

11. The component of claim 1, 9 or 10 wherein the component is a collapsible liquid reservoir or liner.

12. The component of claim 1 wherein the water soluble volatile organic solvent comprises one or more alcohols.

13. The component of claim 1 wherein the water soluble volatile organic solvent comprises an alkylene glycol alkyl ether.

14. The component of claim 1 wherein the water soluble volatile organic solvent comprises 2-butoxyethanol, butoxypropan-2-ol, 2-(2-butoxyethoxy)ethanol, and mixtures thereof.

15. The component of claims 7-11 wherein the repellant surface layer has a mass of retained water-based paint of no greater than 0.01 g/cm^2 after use of the spray application system.

12. The component of claims 1 to 11 wherein the liquid repellent surface exhibits a receding contact angle with a solution containing 10% by weight of 2-n-butoxyethanol and 90% by weight deionized water of at least 40 degrees.

13. The component of claims 1-12 wherein a drop of paint slides off the liquid repellent surface when orientated vertically.