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Thomas

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[54] **NON-WICKING CONTAINER**

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[52] **U.S. Cl.** ..... **229/48 T**; 229/22; 117/126 GQ

[51] **Int. Cl.**[2] **B65D 5/42**

[58] **Field of Search** ..... 229/22, 48 T, 48 SC; 117/126 GQ, 121

[56] **References Cited**

UNITED STATES PATENTS

2,544,668	3/1951	Goebel et al	117/126 GQ
2,662,835	12/1953	Reid	117/121
3,032,251	5/1962	Jarund	229/48 T
3,092,248	6/1963	Lane et al	229/22 X
3,145,905	8/1964	Moore	229/48 T
3,149,019	9/1965	Skotnicki et al	161/93 X
3,166,226	1/1965	Mobley	229/7 R
3,367,551	2/1968	Wheeler	229/7 R

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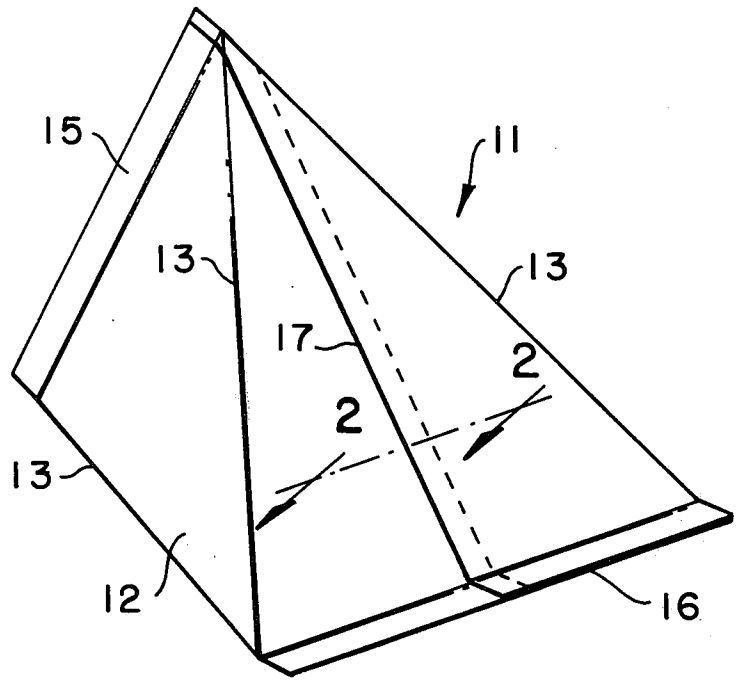
[57] **ABSTRACT**

A method for fabricating a container which comprises coating the edges of a roll of paper with an aqueous composition comprising a vinyl polymer with reactive groups and a halo-metallic Werner type complex, cutting the paper into individual units and sealing each paper unit to form a container. Also, the resulting container.

5 Claims, 3 Drawing Figures



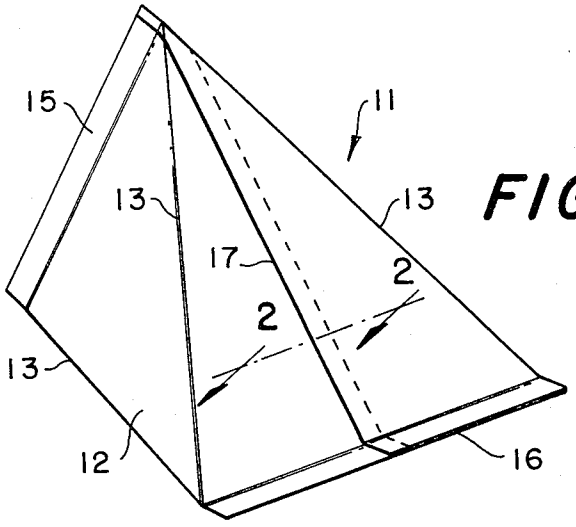


FIG.-1-

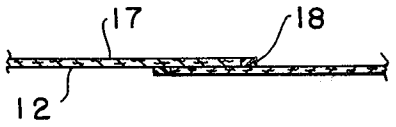


FIG.-2-

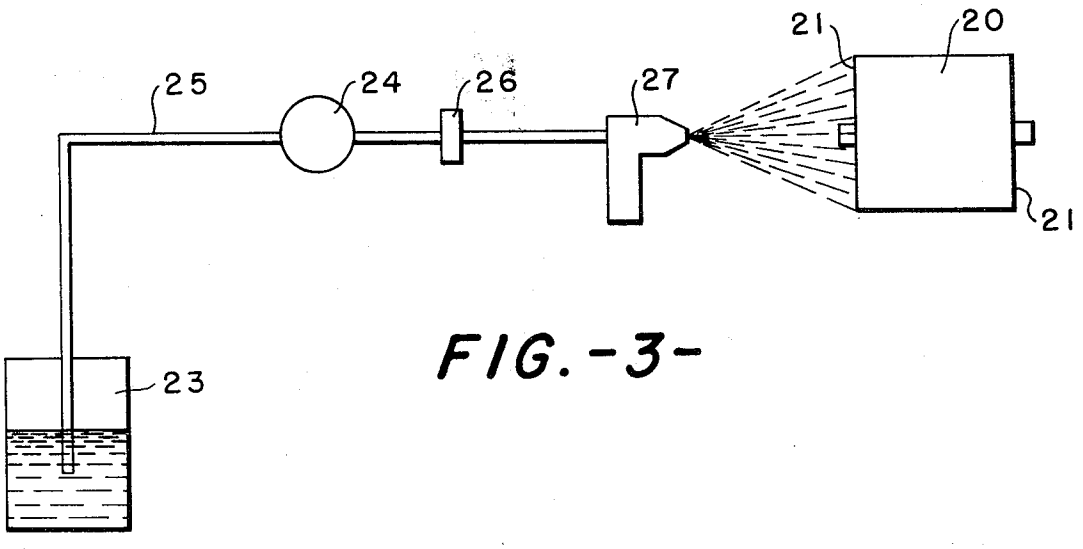


FIG.-3-

NON-WICKING CONTAINER

One of the problems in the manufacture of paper containers for aqueous or fatty materials is the absorption of the contents of the container by the paper or other fibrous material. Such wicking or absorption of the contents discolors and/or weakens the paper and may cause the container to leak.

A wide variety of proposals have been suggested for eliminating or minimizing this problem. For example, it is well known to fabricate a container from paper with surface coatings. Such coatings may eliminate seepage through the paper but usually do not eliminate the wicking at the edges of the paper which are exposed to the contents. It also has been proposed to employ a container with an inner seamless lining. While this may solve the wicking problem, it is not an ideal solution due to the increased cost and the additional steps required in fabricating such a container.

It has been proposed that certain coatings be applied to the edges of paper, for example, U.S. Pat. Nos. **3,187,480** and **3,364,050.** However, these coatings have not been satisfactory due to a lack of resistance to certain liquids, difficulties in application, excessive cost and the like.

The present invention provides a novel method for fabricating a container which minimizes the wicking or absorption of the contents. Moreover, the container of the invention is conveniently fabricated on conventional machinery.

The novel method of the invention comprises coating the edges of a roll of paper with an aqueous composition comprising a vinyl polymer with reactive groups and a halo-metallic Werner type complex, cutting the paper into individual units, and sealing the edges to each other to form a container. Generally, the aqueous composition contains between about **0.5** and **5** percent solids by weight and preferably about **1** to **2** percent.

The aqueous composition employed to coat the edges of a roll of paper in accordance with the invention as pointed out above comprises a vinyl polymer with reactive groups and a halo-metallic Werner type complex. The reactive groups of the vinyl polymer may be hydroxyl, carboxyl, amide, sulfonyl and similar groups. Suitable vinyl polymers include homopolymers and copolymers of vinyl acetal, vinyl acetate, vinyl alcohol, vinyl pyrrolidone, acrylic acid, polyethylene ionomers and the like. Advantageously, the vinyl polymer is polyvinyl alcohol and preferably is a fully hydrolized polyvinyl alcohol.

The halo-metallic Werner type complex employed in combination with the vinyl compound advantageously is a fatty acid compound. Preferably, the complex is a chrome complex and most preferably a chrome complex of a fatty acid. Suitable fatty acids include about ten to twenty carbon atoms.

The vinyl polymer and the Werner type complex react in accordance with the invention to form a film on the edges of the paper which is resistant to oil, grease, water and solvents.

The invention will be described in greater detail with reference to the accompanying drawings in which:

FIG. **1** is one form of container of the invention;

FIG. **2** is a sectional view taken along line **2-2** of FIG. **1**; and

FIG. **3** is a schematic illustration of one form of apparatus for coating paper in accordance with the method of the invention.

As shown in FIG. **1,** a tetrahedron container **11** is formed from a sheet of paper **12** which is folded along lines **13** and sealed at seams **15, 16** and **17.** Seams **15** and **16** are outside seams and seam **17** is an overlapping seam in which coated edge **18** of the paper is exposed to the contents of the container.

In FIG. **3,** a roll of paper **20** is coated on its edges **21** by spraying a composition stored in container **23.** The composition in container **23** is pumped by pump **24** through line **25** and filter **26** to a spray nozzle **27** from which it is expelled onto the edges **21** of paper roll **20.**

The invention will be further illustrated by the following examples in which parts and percentages are by weight unless otherwise specified.

EXAMPLE I

Sixty parts of a fully hydrolized polyvinyl alcohol (PVA) sold by DuPont as Elvanol **71-30** dispersed in **440** parts cold water with agitation and then heated to **90°C** and maintained at that temperature for **15** minutes to dissolve the polymer. Thereafter, **420** parts of cold water are added to the solution and the diluted solution cooled to ambient temperature. Eighty parts of a chrome complex of stearic acid sold by DuPont as Quilon C are added to the solution.

The resulting mixture containing **8%** Quilon C (wet) and **6%** PVA solids is applied to the edges of a roll of **30** lb./**108** lb. laminated paper until the edges are completely covered. The paper roll is then dried in an oven at **250°–300°F.**

The treated paper and an untreated control paper are tested for wicking by dipping strips thereof into a **0.5** percent by volume chloramine blue solution including **1** percent of an ethoxylated nonyl phenol surfactant for a period of **15** seconds. The paper treated in accordance with the invention shows no blue discoloration while the untreated control paper shows a discoloration which extends ¼–½ inch from the edge.

Packages fabricated from the treated paper show no discoloration or weakening of the structure even after ten days' storage when filled with milk, cream, ice cream, grape juice and similar materials.

EXAMPLE II

The procedure of this Example is the same as that of EXAMPLE I except that the composition applied to the edges of the rolls of paper comprises a vinyl acetate polymer sold by Union Carbide as Ucar Latex **15,** Quilon C and sufficient water to provide **6%** solids Ucar Latex, and **8%** Quilon C.

Wicking tests conducted with the treated paper and untreated control paper reveal the same superiority for the treated paper of the invention as the comparison set forth in EXAMPLE I.

EXAMPLE III

The procedure of this Example is the same as that of EXAMPLE I except the composition applied to the edges of the rolls of paper comprises **16** parts of an amide reactive vinyl polymer sold by Monsanto as Monflex **4514, 6** parts (wet) of Quilon C and **78** parts of water.

Wicking tests conducted with the treated paper and untreated control paper reveal the same superiority for the treated paper of the invention as the comparison set forth in EXAMPLE I.

The above description and drawings show that the present invention provides a novel method for fabricating a container which minimizes wicking or absorption of the contents therein which may result in discoloration and/or leaking of the container. Furthermore, the novel container of the invention is conveniently fabricated with conventional production techniques and machinery.

It will be apparent that various modifications in the detailed procedures disclosed above and shown in the drawings may be made within the scope of the invention. For example, different techniques for applying the coating composition to the edges of the paper rolls may be employed, e.g., brush or wiper application, roller coating, etc. Therefore, the invention is to be limited only by the following claims.

That which is claimed is:

1. A container comprising a paper unit with edges sealed to each other and edges located on the inside of the container coated with the reaction product of a vinyl polymer with reactive groups and a halo-metallic Werner type complex.

2. A container according to claim **1** wherein the vinyl polymer is a polyvinyl alcohol.

3. A container according to claim **1** wherein the vinyl polymer is a fully hydrolized polyvinyl alcohol.

4. A container according to claim **1** wherein the halo-metallic Werner type complex is a chrome complex.

5. A container according to claim **1** wherein the halo-metallic Werner type complex is a chrome complex of a fatty acid.

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