United States Patent [19]

Bauer

[11] **3,895,474**

[45] ***July 22, 1975**

[54] **PROCESS FOR PREPARING PRE-MOISTENED ANTIMICROBIAL TOWELS**

[75] Inventor: **Stuart M. Bauer**, Succasunna, N.J.

[73] Assignee: **Pfizer Inc.**, New York, N.Y.

[*] Notice: The portion of the term of this patent subsequent to Jan. 22, 1991, has been disclaimed.

[22] Filed: **Nov. 16, 1973**

[21] Appl. No.: **416,484**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 305,859, Nov. 13, 1972.

[52] **U.S. Cl.** ..... **53/21 FC**; 53/21 FW; 53/36

[51] **Int. Cl.**[2] **B65B 63/04**

[58] **Field of Search** ..... 53/21 FC, 21 FW, 36

[56] **References Cited**

UNITED STATES PATENTS

3,481,099	12/1969	Clancy	53/21 FC
3,786,615	1/1974	Bauer	53/21 FC

Primary Examiner—Travis S. McGehee

Attorney, Agent, or Firm—Francis X. Murphy; Charles J. Knuth; Allen J. Spiegel

[57] **ABSTRACT**

A process for the preparation of pre-moistened antimicrobial towels is disclosed.

6 Claims, 2 Drawing Figures

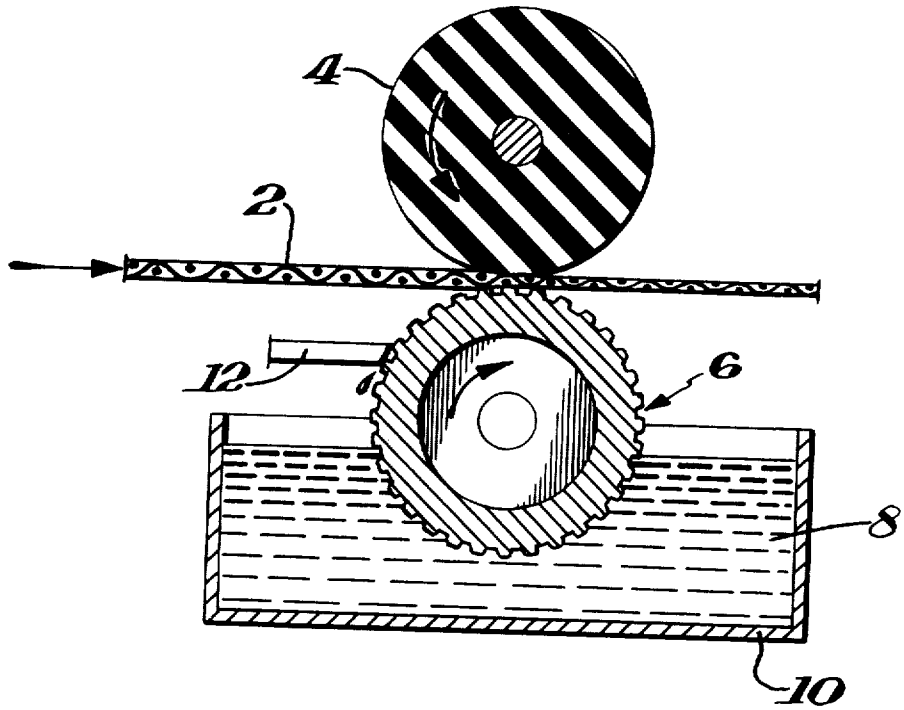


Fig. 1.

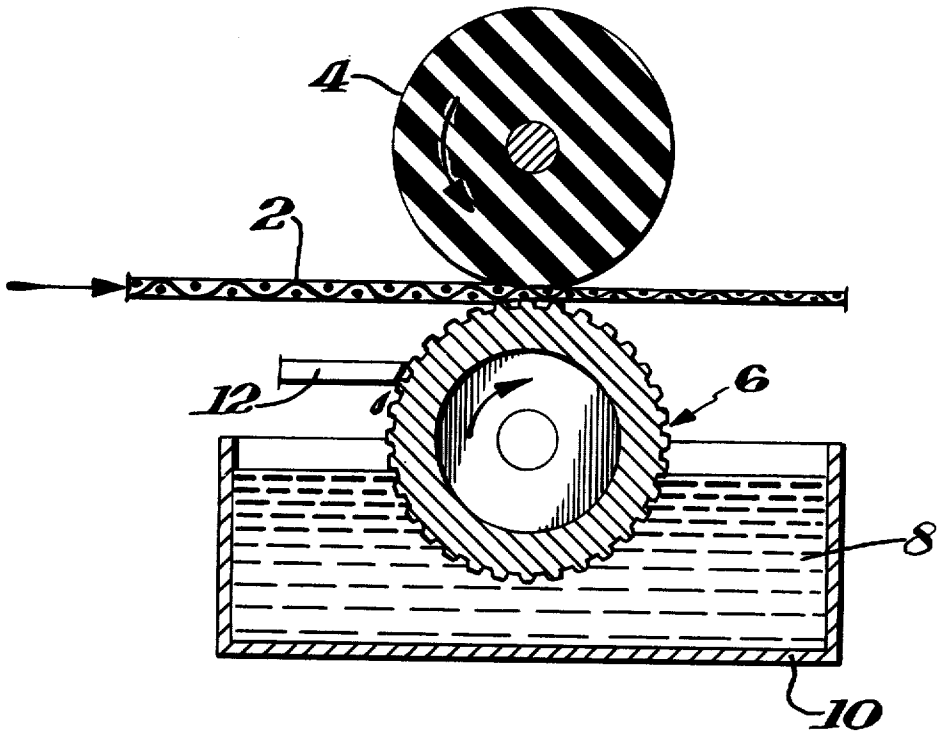
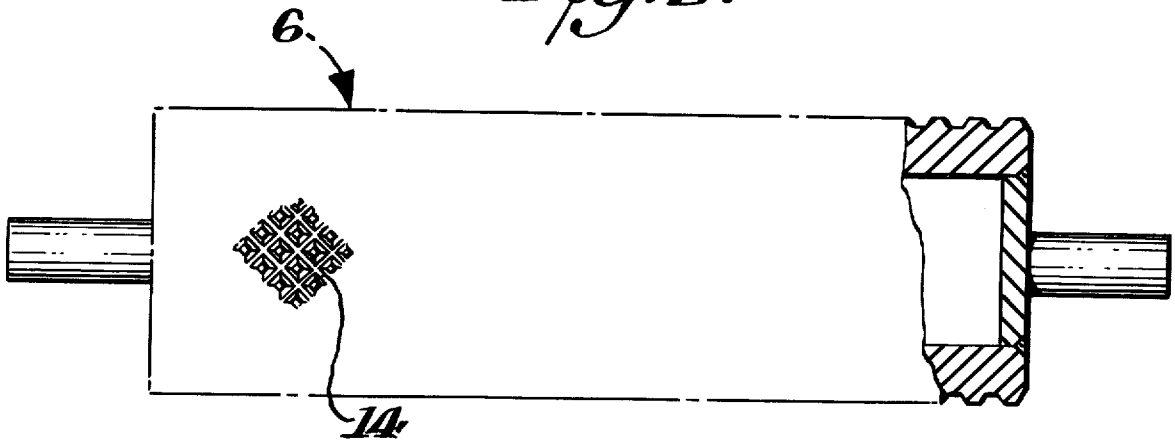


Fig. 2.



PROCESS FOR PREPARING PRE-MOISTENED ANTIMICROBIAL TOWELS

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of my co-pending application Ser. No. 305,859, Pat No. 3,786,615, filed Nov. 13, 1972.

BACKGROUND OF THE INVENTION

This invention relates to a novel process for preparing pre-moistened antimicrobial towels useful for sanitary purposes, e.g., in hemorrhoidal conditions, feminine hygiene, first aid, diaper change cleanups and similar uses.

Previously, packages of pre-moistened towels were prepared by placing a stack of towels into a container, saturating the towels with a solution containing an antimicrobial agent, placing a cover on the container and heat sealing a top on the container to completely seal the package. However, this method is subject to chromatographic effects whereby the antimicrobial agent may tend to concentrate in portions of the stack without being uniformly dispersed through the stack and the individual towels.

SUMMARY OF THE INVENTION

It has now been found that pre-moistened antimicrobial towels can be made by a process which comprises the steps of coating paper or fabric sheet in strip form with a solution of antimicrobial agent in a volatile vehicle; permitting at least a portion of said vehicle to evaporate; longitudinally folding said coated sheet; transversely perforating said coated sheet into separable towel segments; transversely folding said perforated sheet; arranging said folded and perforated sheet in stack form in a moisture-impervious container; moistening said stack with aqueous liquid; and enclosing said moistened stack with a moisture-impervious cover seal on said container.

Such a process produces a moistened towel in which the antimicrobial agent is uniformly dispersed on each towel, thereby protecting the product from spoilage and providing a uniform concentration of antimicrobial agent for the intended use.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be better understood by reference to the appended drawings, wherein FIG. 1 is a schematic view in section of an apparatus for carrying out the coating step of the invention, and FIG. 2 is a side elevation in partial section of a portion of the apparatus of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

As shown in FIG. 1, a strip of paper or fabric 2 is drawn past pressure roll 4 in rolling contact with cylinder 6. Cylinder 6 is preferably a precision engraved applicator suitable for gravure printing. Roll 4 and cylinder 6 are rotated in the directions indicated by the arrows by a drive source not shown. Cylinder 6 is partially immersed in antimicrobial solution 8 contained in reservoir 10, and excess solution is removed by doctor blade 12. The etched or incised surface of cylinder 6 is thereby moistened or saturated with the antimicrobial solution, and brought into contact with the material to be coated as it travels through the nip created by roll 4 and cylinder 6. The speed at which the material passes through the rollers is not critical and may be set at any predetermined speed desired.

Roll 4 suitably has a resilient surface, e.g., of rubber, whereby strip 2 of paper or other sheet material is pressed into intimate contact with the antimicrobial solution carried by the surface of cylinder 6.

Cylinder 6 is suitably a conventional gravure roll, e.g., having a diameter of about 9 inches and a width of about 54 inches. As best seen in FIG. 2, the surface of cylinder 6 is etched or engraved with a uniform pattern 14 (shown greatly magnified), e.g., a series of cells or wells, each in the form of an inverted truncated right rectangular pyramid to hold the antimicrobial solution. This pattern, and in particular the size and spacing of the individual cells, determines the quantity of solution transferred to strip 2 in the coating application. Preferred patterns are those having about 200–220 cells per lineal inch, each cell having a depth of up to about 0.0012 inch, which, in conjunction with a 25% by weight solution of antimicrobial agent, will transfer on the order of 0.1 mg. of said agent per square inch of surface to be coated. Concentrations of 4 to 50% by weight will successfully deposit up to 0.2 mg. of agent per square inch.

The towels are for example made from paper or non-woven hemp material having a substantial wet strength such as Dexter paper, Grade X 2067or N 2660, available from The Dexter Corp. of Windsor Locks, Connecticut. Woven or non-woven cloth made of rayon, nylon or cotton, alone or in combination, may also be used.

Preferred antimicrobial compounds are the quaternary ammonium compounds, e.g., benzalkonium chloride, an alkyl-substituted dimethylbenzyl-ammonium chloride wherein the alkyl substituents each contain 8 to 18 carbon atoms. Other well-known antimicrobial agents, such as cetyl pyridinium chloride, chlorhexidine, or propyl or methyl paraben, can be substituted wholly or partially for the benzalkonium chloride. The optimum amount of antimicrobial agent will vary with the particular agent being used and the end use of the product. However, in the case of quaternary ammonium compounds, a concentration of 0.1–0.2 mg. per square inch of the towelling is generally used. Optional ingredients, such as local anesthetics, vasoconstrictors, astringents, etc., may also be applied at this step, if desired. The volatile vehicle is usually water, a water-ethanol or a water-isopropanol mixture, which air dries by spontaneous evaporation. It is not necessarily essential to effect complete evaporation of the vehicle to the "bone-dry" state. The degree of evaporation required will be dictated by the ability to further process the towelling material without tearing in the subsequent folding and perforating operations.

After drying, the treated towelling material is longitudinally folded, transversely perforated, and transversely folded, e.g., by means of a conventional zig-zag folding machine capable of producing a transverse shear-cut perforation leaving bonds between the individual sheets, longitudinally folding into a "wing-fold", and transversely folding into a zig-zag fold. In a preferred embodiment, the perforating is effected at the site of every other transverse fold.

The expression "perforating" as employed herein and in the appended claims is to be understood to include the introduction into the strip material of a line of transverse slits defined by residual fiber bonds, or al

ternatively the introduction of a transverse row of holes.

The zig-zag folding affords the opportunity of packaging the towels in stack form. The stacks are placed in moisture-impervious containers, such as shallow polystyrene trays, and moistened with an aqueous liquid, which may for example be water, water-ethanol or water-isopropanol, optionally containing auxiliary agents, odorants or the like, if desired. The containers are than fitted with a moisture-impervious cover seal, e.g., a replaceable lid suitably trapped within a foil-backed paper cover sealed to an outwardly extending lip on the tray.

What is claimed is:

1. A process for preparing pre-moistened antimicrobial towels which comprises the steps of coating paper or fabric sheet in strip form with a solution of antimicrobial agent in a volatile vehicle; permitting at least a portion of said vehicle to evaporate; longitudinally folding said coated sheet; transversely perforating said coated sheet into separable towel segments; transversely folding said perforated sheet; arranging said folded and perforated sheet in stack form in a moisture-impervious container; moistening said stack with aqueous liquid; and enclosing said moistened stack with a moisture-impervious cover seal on said container.

2. The process of claim 1 wherein said coating is effected by gravure printing.

3. The process of claim 1 wherein said antimicrobial agent is a quaternary ammonium compound.

4. The process of claim 3 wherein said quaternary ammonium compound is benzalkonium chloride.

5. The process of claim 1 wherein said sheet is paper.

6. The process of claim 1 wherein said sheet is nonwoven hemp.

* * * * *