FORM 1

624552

REGULATION 9

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A STANDARD PATENT

We, BROWN & WILLIAMSON TOBACCO CORPORATION of, 1500 Brown & Williamson Tower, Louisville Galleria, Louisville, Kentucky 40202, United States of America, hereby apply for the grant of a Standard Patent for an invention entitled:-

"WATER RESISTANT PAPERBOARD AND METHOD OF MAKING SAME"

which is described in the accompanying Complete Specification.

Details of basic application:-

Number: 485,024

Country: U.S.A.

Date: 26th February, 1990

Our address for service is: SHELSTON WATERS
55 Clarence Street
SYDNEY, N.S.W. 2000.

DATED this 19th day of FEBRUARY, 1991
BROWN & WILLIAMSON TOBACCO CORPORATION

By [signature]
Patent Attorneys of Australia
of SHELSTON WATERS

To: The Commissioner of Patents
WODEN A.C.T. 2606

File: D.B.B-361

Fee: $157.00

SO20070 20/02/91

(CONVENTION – Company) FORM 8 – REGULATION 12 (2)

COMMONWEALTH OF AUSTRALIA PATENTS ACT, 1952-1973

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

In support of the Convention Application No. ..... made by [(a)] BROWN & WILLIAMSON TOBACCO CORPORATION .....

.....

(hereinafter referred to as "Applicant") for a patent for an invention entitled:

[(b)] .....WATER RESISTANT PAPERBOARD AND METHOD OF MAKING SAME.....

.....

.....

I, [(c)] Peggy C. Duvall, Assistant Secretary .....

.....

of [(d)] 1500 Brown & Williamson Tower, Louisville Galleria, P.O. Box 35090, Louisville, Kentucky 40232, U.S.A.

do solemnly and sincerely declare as follows:

1. I am authorised by Applicant to make this declaration on its behalf.

2. The basic Application(s) as defined by section 141 of the Act was/were made in [(e)] U.S.A. on the 26th day of February 1990.

.....on the .....day of .....19...

by [(f)] Frank Kelley St. Charles

3. [(g)] Frank Kelley St. Charles

1914 Spotswood Lane, Fisherville, Kentucky 40023 U.S.A.

of .....

..... is/are

the actual Inventor(s) of the invention and the facts upon which Applicant is entitled to make the Application are as follows:

Applicant is the Assignee of the said Inventor(s).

4. The basic Application(s) referred to in paragraph 2 of this Declaration was/were the first Application(s) made in a Convention country in respect of the invention, the subject of the Application.

DECLARED at Louisville, Kentucky, U.S.A.

this 13th day of February 1991.

BROWN & WILLIAMSON TOBACCO CORP.

[(h)] .....

(Signature of Declarant)

Peggy C. Duvall
Assistant Secretary

To THE COMMISSIONER OF PATENTS.

(a) Here insert (in full) Name of Company.

(b) Here insert Title of Invention.

(c) and (d) Here insert Full Name and Address of Company Official authorised to make declaration.

(e) Here insert Basic Country or Countries followed by date or dates of Basic Application(s).

(f) Here insert Full Name(s) of Applicant(s) in Basic Country.

(g) Here insert (in full) Name and Address of actual Inventor or Inventors.

(h) Personal Signature of Declarant (c) (no seal, witness or legalisation).

SHELSTON WATERS
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WATER RESISTANT PAPERBOARD AND METHOD OF MAKING SAME

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(56) Prior Art Documents
AU 52548/90 C08F D21H
AU 609538 25026/88 D21H
AU 603258 22201/88 D21H

(57) Claim

1. A method of treating paperboard to retard the penetration of moisture therethrough comprising the steps of:

applying a thin coating of a surfactant to at least one surface of the paperboard that extends only partially through said paperboard; and,

immediately drying the coated surfactant coating on the paperboard.

2. A paperboard sheet comprising a thin coating of a surfactant on one surface thereof, said surfactant extending only partially through said paperboard.

3. A container fabricated of paperboard comprising a thin coating of a surfactant on one surface of the container, said surfactant extending only partially through said paperboard.

COMMONWEALTH OF AUSTRALIA 624552

FORM 10

PATENTS ACT 1952

COMPLETE SPECIFICATION

FOR OFFICE USE:

Class Int.Class

Application Number:
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority:

Related Art:

Name of Applicant: BROWN & WILLIAMSON TOBACCO CORPORATION

Address of Applicant: 1500 Brown & Williamson Tower, Louisville Galleria, Louisville, Kentucky 40202, United States of America

Actual Inventor: Frank Kelley St. Charles

Address for Service: SHELSTON WATERS, 55 Clarence Street, Sydney

Complete Specification for the Invention entitled:

"WATER RESISTANT PAPERBOARD AND METHOD OF MAKING SAME"

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is related to paper products such as paperboard and the like, and more particularly to paperboard having improved resistance to moisture penetration therethrough, and a method of making same.

2. Background of the Invention

The term "paperboard" will be used herein as meant in a generic sense for all forms of paper products such as cardboard, boxboard, etc.

A well recognized problem with paperboard is its propensity to absorb moisture. This is a particularly important drawback in the use of paperboard for article containers.

Various solutions have been proposed which renders the paperboard impervious to moisture. For example, U.S. Patent No. 3,107,837 teaches the wicking and bleeding problems of paperboard, and provides a solution which uses a coating of impervious material, such as polyvinyledine chloride, on the interior surface of a paperboard carton to form a moisture barrier. U.S. Patent No. 3,328,189 teaches preventing wicking of water through a paperboard container by applying a layer of perfluoroalkylmonocarboxylic acid on the inside of a carton

blank to form a moisture barrier. U.S. Patent No. 4,075,372 teaches applying a flexible precoat of a thermoplastic resin of polyvinyl acetate, ethylene vinyl acetate, ethylene vinyl chloride, and then applying a lacquer over the precoat to form a moisture barrier. U.S. Patent No. 4,198,267 teaches a process for manufacturing paper pulp by adding a composition to the pulp slurry which includes finely divided hydrophobic lubricating particles such as silica, or wax in a hydrocarbon oil carrier liquid, and a minor quantity of a surfactant to assist in spreading the carrier in the aqueous slurry to enhance the distribution and penetration of the lubricating particles in the slurry. U.S. Patent No. 4,207,142 teaches the use of various paper sizing agents which can be either mixed within the paper pulp from which paper is later made, or to the surface of the paper after it is made. And, U.S. Patent No. 4,597,831 teaches a method of sizing a paper sheet to render the paper sheet less absorbent to water by applying a foam of rosin the paper surface.

SUMMARY OF THE INVENTION

The present invention provides a method for treating paperboard with a surfactant to retard the penetration of moisture through the thickness of the paper board.

The present invention also provides a paperboard having a thin coating of a surfactant to retard the penetration of moisture through the thickness of the paperboard.

The present invention further provides a container fabricated of paperboard having the interior wall surfaces coated with a surfactant to retard the penetration of moisture through the thickness of the paperboard container walls.

In all cases the surfactant extends only partially through the paperboard.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention will be had upon reference to the following description in conjunction with the accompanying drawings wherein like numerals refer to like features and in which:

Figure 1 is a perspective view of a paperboard sheet of the present invention; and,

Figure 2 is a perspective view, partially in cross-section, of a paperboard container of the present invention.

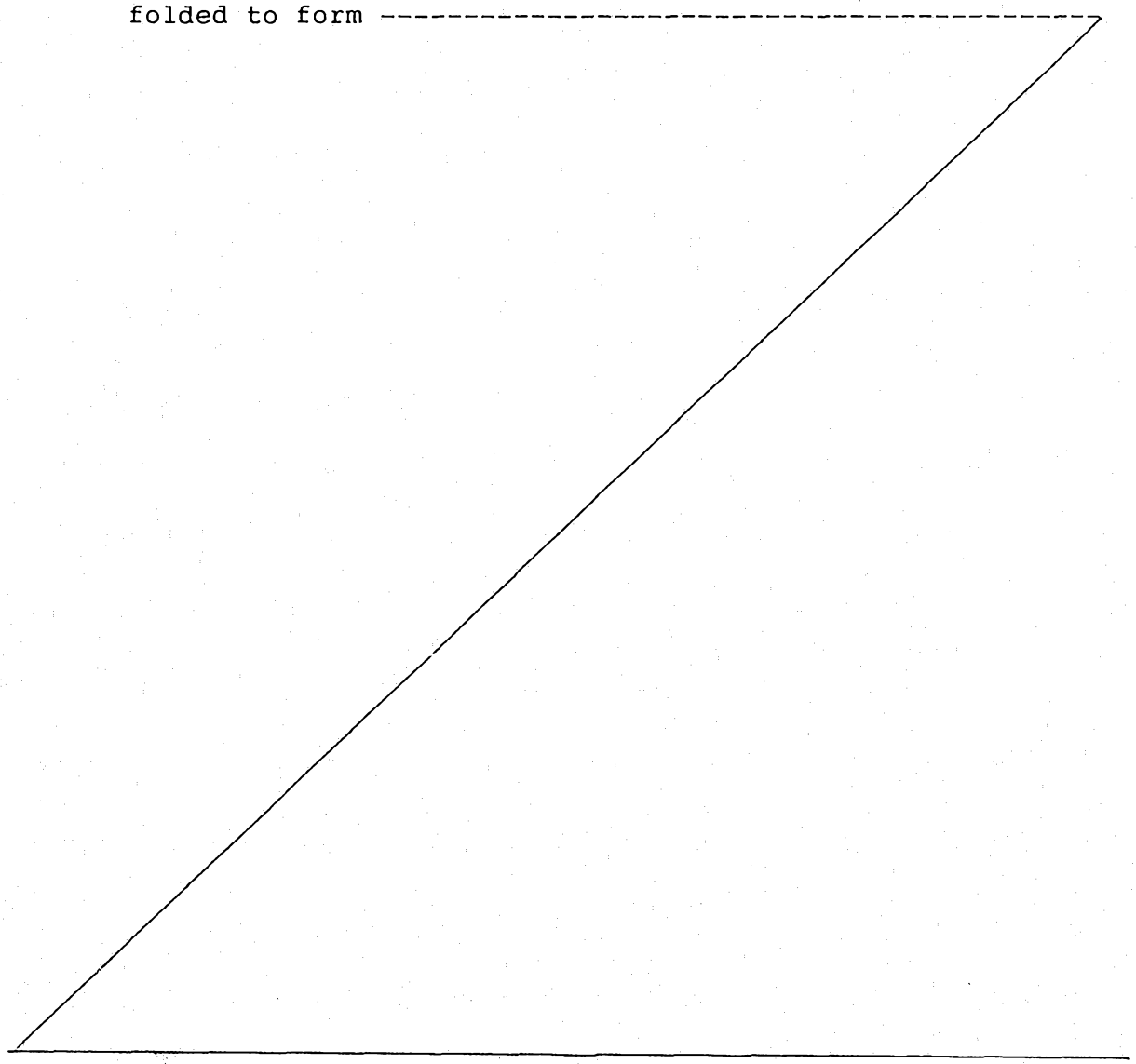
DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to Figure 1, there is shown a paperboard sheet 10 having a thin coating 12 of a surfactant on one

.../2

of its surfaces. Generally, cationic, anionic, and nonionic surfactants as well as amphoteric surfactants work well in the present invention.

With reference to Figure 2, there is shown a container 14 which is fabricated of a paperboard material such as the paperboard sheet 10 of Figure 1. The paperboard sheet is folded to form



the walls of the container 14 such that the surface of the sheet 10 having the coating 12 is the interior wall surface of the container 14.

The surfactant coating 14 is applied to the paperboard 10 by applying a thin layer of the surfactant to one surface of the paperboard, and then immediately drying the coated surfactant on the paperboard to keep the surfactant on the surface to which it is applied.

Various examples of the present invention were tested.

EXAMPLE 1

Three different sample dilute surfactant solutions were prepared by diluting a commercially available surfactant in water to form specific weight percent solutions. The following were the samples prepared:

(1) Sample 1: 1% Triton X -45-(Rohm & Haas) in water, which is a octoxynol a nonionic surfactant.

(2) Sample 2: 1% Sodium Carboxymethyl Cellulose in water.

(3) Sample 3: 1% Triton X -45 and 1% Sodium Carboxymethyl Cellulose CMC in water.

Each of the three samples of dilute surfactant solutions was printed of one surface of different paperboard sheet with a gravure cylinder having a 30 micron cell depth and dried.

Next, drops of 57% (weight-weight) potassium citrate in water were applied to the coated surface of the paperboard sheet, and also to an uncoated paperboard sheet as a control. The drop sizes were 5, 10, and 25 microliters. The paperboard sheets were then placed in a humidity cabinet at 69% relative humidity to prevent the drops from evaporating.

After about 24 hours, the paperboard sheets were removed from the humidity cabinet, and observations of the uncoated surface of the paperboard sheets were made to determine the effect of the surfactant.

The paperboard sheets coated with surfactant samples 1 and 3 did not show any distortion to the uncoated surface, and the coated surface was slightly swelled, but had a dry appearance. The paperboard sheet coated with sample 2 had a wet or greasy appearing spot on the uncoated surface. The uncoated control paperboard also had a wet or greasy appearing spot on the surface thereof opposite to the surface upon which the drops were deposited.

EXAMPLE 2

Surfactant sample 1 was printed on one surface of two different paperboard sheets with a gravure cylinder and dried.

Next, drops of 57% (weight-weight) potassium citrate in water were applied to the coated surface of one of the paperboard sheets and to one surface of an uncoated control paperboard sheet, and drops of a saturated potassium citrate were applied to the coated surface of the other one of the paperboard sheets, and to one surface of another uncoated control paperboard sheet. The drop volumes of the 57% potassium citrate and the saturated potassium citrate were 0.05 cc, 0.10 cc, 0.15 cc, and 0.30 cc.

The paperboard sheets having the drops of 57% potassium citrate was placed in a humidity cabinet at 69% relative humidity to prevent the drops of 57% potassium citrate from evaporating, and the paperboard sheets having the drops of saturated potassium citrate solution were placed in a humidity cabinet at 62.5% relative humidity to prevent the drops of saturated potassium citrate from evaporating.

After about 48 hours, the paperboard sheets were removed from the humidity cabinets, and observations of the uncoated surface of the paperboard sheets were made to determine the effect of the surfactant.

The uncoated paperboard control sheets both showed large coherent spots of potassium citrate solution on the opposite

side thereof to which the drops had been applied.

With the coated paperboard sheet upon which drops of saturated potassium citrate solution were applied, the potassium citrate drops of 0.05 cc, 0.10 cc, and 0.15 cc showed no evidence of having penetrated through the paperboard sheet to the uncoated surface. The potassium citrate drop of 0.30 cc showed some small distortion on the uncoated surface, but not the large coherent spots evident on the untreated paperboard control sheet.

With the coated paperboard sheet upon which drops of 57% potassium citrate were applied, the potassium citrate drops of 0.05 cc, and 0.10 cc showed no evidence of having penetrated through the paperboard sheet to the uncoated surface. The potassium citrate drops of 0.15 cc and 0.30 cc showed some small distortion on the uncoated surface, but not the large coherent spots evident on the untreated paperboard control sheet.

From the foregoing, it is clear that contrary to what would have been expected, the surfactant coating prevented or at least retarded the penetration of moisture through the thickness of the paperboard. It is contemplated that the surfactant causes the moisture or liquid to be preferentially wicked along the surface fibers of the paperboard material, thus, preventing or at least retarding penetration of the moisture through the paperboard sheet.

The foregoing detailed description is given primarily for clearness of understanding and no unnecessary limitations are to be understood therefrom for modifications will become obvious to those skilled in the art upon reading this disclosure and may be made without departing from the spirit of the invention and scope of the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A method of treating paperboard to retard the penetration of moisture therethrough comprising the steps of:

applying a thin coating of a surfactant to at least one surface of the paperboard that extends only partially through said paperboard; and,

immediately drying the coated surfactant coating on the paperboard.

2. A paperboard sheet comprising a thin coating of a surfactant on one surface thereof, said surfactant extending only partially through said paperboard.

3. A container fabricated of paperboard comprising a thin coating of a surfactant on one surface of the container, said surfactant extending only partially through said paperboard.

4. The container of claim 3, wherein the interior walls surfaces are coated with a surfactant.

5. A method of treating paperboard substantially as herein described with reference to the accompanying examples and drawings.

6. A paperboard sheet substantially as herein described with reference to the accompanying examples and drawings.

7. a container substantially as herein described with reference to the accompanying examples and drawings.

DATED this 21st day of FEBRUARY, 1992.

BROWN & WILLIAMSON TOBACCO CORPORATION

Attorney: LEON K. ALLEN
Fellow Institute of Patent Attorneys of Australia
of SHELSTON WATERS

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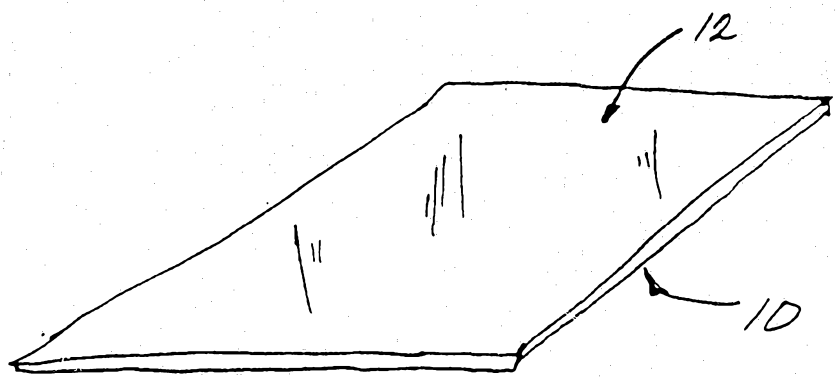

FIG.1

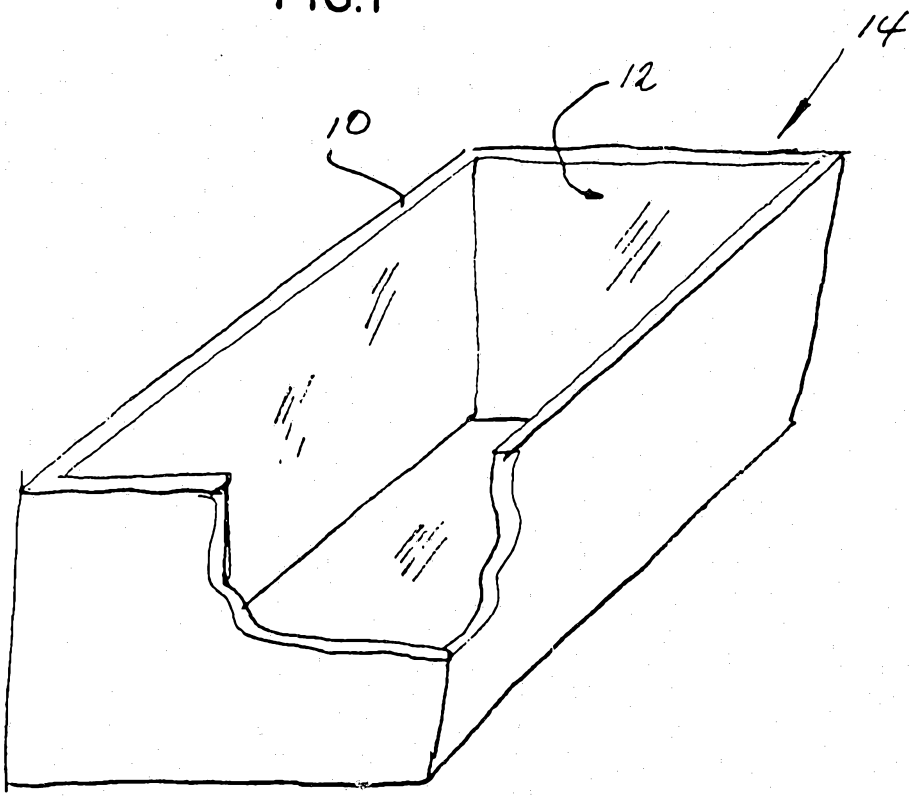

FIG.2