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METHOD FOR FORMING A NON-WICKING CARTON

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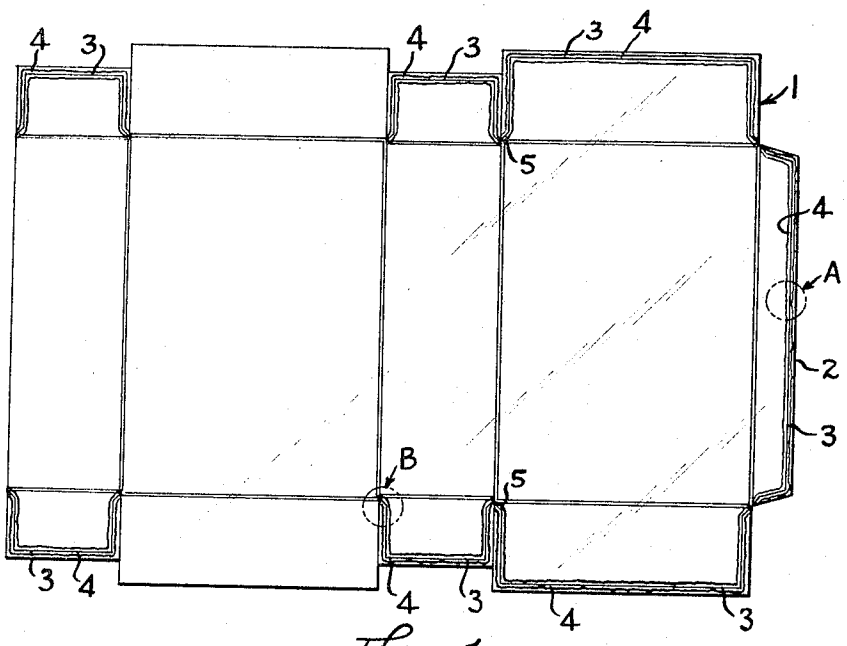


Fig. 1

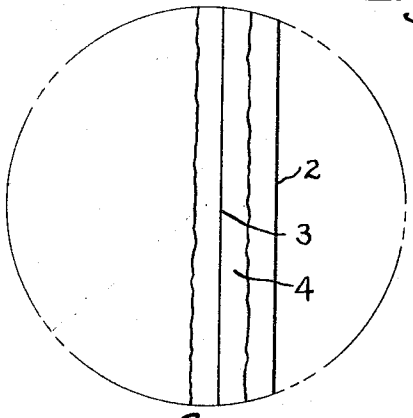


Fig. 2

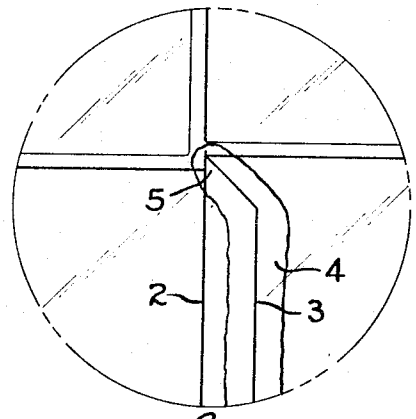


Fig. 3

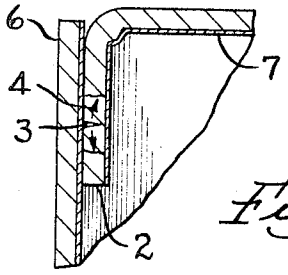


Fig. 4

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METHOD FOR FORMING A NON-WICKING CARTON

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Original application Nov. 7, 1963, Ser. No. 322,173. Divided and this application Aug. 9, 1965, Ser. No. 482,985

5 Claims. (Cl. 117—4)

This invention relates to a method for producing an edge construction for a paperboard or similar container, which protects the visible portions of the container against staining by water or grease containing substances contained therein. This application is a division of application Ser. No. 322,173, filed Nov. 7, 1963, now abandoned.

Considerable difficulties have been experienced in previous attempts to make containers of paperboard or other fibrous material that are required to be in direct contact with aqueous or greasy products, because of the deleterious effects produced by wick absorption of the contents of the container by raw-cut edges that are disposed within the interior of the container structure. Such wicking of the container contents imparts a discolored or greasy appearance to the surface of the container and causes a weakening of the strength thereof. Previous attempts to remedy this problem have been directed to the covering of the raw edges by a layer of thermoplastic film as illustrated, for example in U.S. Patents 3,066,844, and 3,078,768. Such procedures are difficult and uneconomical where the edges to be protected have an irregular configuration as is common in food packaging carton constructions.

It is an object of the present invention to provide a novel and economical means for preventing the wicking of container contents into the side walls which means need not be in direct contact with the contents of the container.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

FIGURE 1 is a plan view of a carton blank embodying the invention,

FIGURE 2 is a magnified view of the portion of the carton of FIGURE 1 enclosed by circle A,

FIGURE 3 is a magnified view of the portion of the carton of FIGURE 1 enclosed by circle B,

FIGURE 4 is a fragmental sectional view of a completed container embodying my invention.

The drawings show a preferred form of my invention. Carton blank 1, formed of paperboard or the like has a coating of a thermoplastic or other water and grease resistant material on at least the side of the blank which is to form the inside of the carton. When carton blank 1 is cut from a coated sheet of paperboard, raw edges 2 are produced at which the paperboard fibers are exposed. It would be extremely laborious and expensive to coat all of these edges, particularly where irregular configurations are involved. I have found, however, that wicking of the contents of the container may be controlled simply and economically by placing a barrier to such wicking within the paperboard adjacent to such raw-cut edges.

I prefer to form this barrier by cutting partially through the paperboard from the outer side at 3, such cuts being a short distance from the raw-cut edges and positioned so as to prevent the contents of the container to discolor any of the visible portions. To these cuts I apply a solution of a material which diffuses into the paperboard by wicking and which will dry to form a water and grease resistant barrier within the paperboard. I prefer that this cut extends to a depth one-half or more of the thickness of the paperboard in order that the barrier forming material will easily penetrate the entire thickness of the same along the cut line. Instead of a single slit 3, I may form a plurality of parallel slits, if found desirable. Another alternative mode of applying the barrier to the paperboard is by roughening or buffing the outer surface of the paperboard adjacent to the raw-cut edge 2. Thus it will be apparent that any means of rupturing the outer surface of the paperboard adjacent to the cut edge so as to permit the barrier forming solution to be absorbed into the paperboard is contemplated to be within the scope of my invention. In order to prevent wicking of the contents around the ends of the barriers, I prefer that such ends extend completely to the raw edge to be protected, as shown at 5. If the treated edge 5 firmly abuts an adjacent plastic coated wall of the carton when set up, said treated edge is effectively removed from direct contact with the interior of the carton, and yet undesirable wicking around the barrier will be prevented.

The quantity of barrier-forming solution applied is controlled such that the barrier will be a predetermined width. If the container is to contain food and the barrier-forming materials have not been proved completely safe for direct contact with food, it is necessary that the barrier does not extend up to the raw cut edge 2, but rather, there should be an untreated portion between the edge and the barrier as shown in FIGURE 4. Thus, wicking will occur only up to the barrier and will not be visible since it is hidden from view by the other flap 6, as shown in FIGURE 4. In the event that the contents of the container are not a food product or the barrier forming material is such that contact with foods is permissible, it will be understood that the barrier 4 may well extend up to the raw-cut edge 2.

Coating 7, as shown in FIGURE 4, may be, for example, thin layer of polymeric material. In the event the container is used to contain food, it will, of course, be necessary that this layer also be suitable for contact with foods.

My preferred composition for a material to form the oleophobic, hydrophobic barrier is a chromium coordination complex of a perfluoroalkylmonocarboxylic acid having 4 to 12 carbon atoms. Such compositions are fully described in U.S. Patent 2,662,835 and 2,693,458. I find that effective penetration of the fiberboard is obtainable by the use of a solution which contains a 0.1 to 2% of this resin. Water containing isopropyl alcohol forms a particularly suitable vehicle for the effective penetration of the solution into the board, as the alcohol reduces the surface tension of the solution and thus facilitates rapid wicking of the same into the fiberboard. Sixty to seventy pounds of this solution are required to effectively treat 3,000 square feet of treated paperboard area. These resins tend to form a greenish coloration on ordinary paperboards. I have found, however, that by using a clayless board, such a green coloration can be avoided. Another class of materials which I have found to be effective are

the fatty acid amides such as palmitic and stearic acid amides in solutions containing approximately 10% solids. In the event that the contents of the container comprise, for example, only aqueous material, without greasy components, it would obviously be sufficient to form the barrier from a hydrophobic material which is not oleophobic, for example, a silicone resin or Quilon, a chromium/stearic acid complex. Conversely, in the packaging of greasy materials which do not contain any water, it would be feasible to use an oleophobic material which is not hydrophobic, such as polyvinyl alcohol.

I prefer to apply the barrier-forming material by the use of an applicator such as a felt pad device which is to apply the barrier-forming material along any desired pattern of lines. Thus it is possible to give the barrier an irregular configuration suited to any carton design. Any suitable applicator which will deliver a substantial but carefully metered amount of liquid to the paperboard surface in a short time would be satisfactory in the practice of my method.

In use the applicator is wetted with the barrier forming material in any convenient manner and brought into contact with the lines of rupture 3 which have previously been made on the carton blank, and which have the same configuration as the applicator. This configuration is chosen as shown in FIGURE 1, so that only those raw cut edges which will be exposed to the contents of the container will be provided with a barrier to wicking. The applicator is held in direct contact with the carton blank for at least a time sufficient to allow the barrier forming material to be infused throughout the thickness or cross section of the board along the lines where the surface is ruptured. Holding the applicator in such contact for more than this minimum length of time will produce a wider barrier and thus a greater amount of resultant protection against wicking. The infusion of the barrier-forming material may be stopped before the same has reached the raw cut edge, thus leaving a strip of untreated paperboard in direct contact with the interior of the container.

The following tests were conducted to illustrate the effectiveness of my invention:

EXAMPLE I

A cut was made approximately ½" from one edge on the uncoated side of a piece of 0.015 inch paperboard coated on one side with 8 lb./ream of polyethylene. This cut was treated with a 10% solution in isopropanol of a palmitic acid amide, Kemstrene Amide UR 1279–135–9, for a time sufficient to form a barrier about ¼" wide. After drying, the treated side of this paperboard was glued to the polyethylene coated side of a larger piece of the same paperboard. An untreated piece of paperboard was glued to this larger piece in the same manner for purposes of comparison. Ground dog food containing 10% red dyed lard oil was then placed in contact with the raw cut edge of the treated and untreated paperboard specimens. These

test specimens were then stored at 100° F. and the following degree of staining by the dyed lard oil were observed:

TABLE I

Day	Treated Sample	Untreated Sample
1	Up to barrier	⅛" into board.
2	do	¼" to 1" into board.
3	do	1" into board.
6	do	Do.

While I have described preferred forms of my invention in detail herein, it is to be understood that many variations are possible without departing from the spirit of my invention. Therefore, no limitations are intended except those specifically set forth in the appended claims.

I claim:

1. A method for making a cut edge of fiberboard, at least one surface of which is coated with a film of water and grease resistant material, resistant to wick absorption of grease and water, which comprises rupturing a portion of the surface of said fiberboard opposite said coated surface along a line spaced a short distance from said edge, applying an oleophobic, hydrophobic substance to said ruptured portion of said outer surface, allowing said substance to be infused throughout the thickness of said fiberboard at and around said ruptured portion to form a barrier to wick absorption of grease and water, said barrier being constituted as a narrow band of impregnated fiberboard having a thickness substantially equal to that of the fiberboard.

2. The method of claim 1 wherein said rupturing is effected by cutting partially through said fiberboard along said line.

3. The method of claim 2 wherein said oleophobic, hydrophobic substance is applied in solution, the volatile component of which comprises an alcohol.

4. The method of claim 3 wherein said oleophobic hydrophobic substance comprises a chromium coordination complex of a perfluoroalkylmonocarboxylic acid having 4 to 12 carbon atoms.

5. The method of claim 4 wherein the amount of said substance applied is limited so that the outer limits of said narrow band, in the direction of said edges, reached by the infusion of said solution lie intermediate said edges and said lines of rupture.

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