June 17, 1969 R. E. LUDDER 3,450,327

ROUND NESTABLE PAPER CONTAINER HAVING A HIGH GLOSS EXTERIOR FINISH AND AN INTERIOR AND BOTTOM WAX COATED SURFACE

Filed Oct. 25, 1967 Sheet 1 of 2

FIG. 1

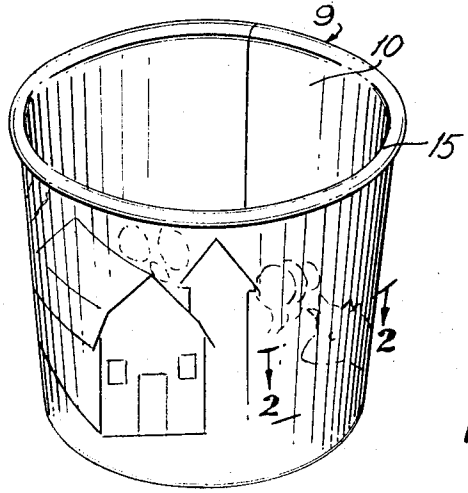


FIG. 2

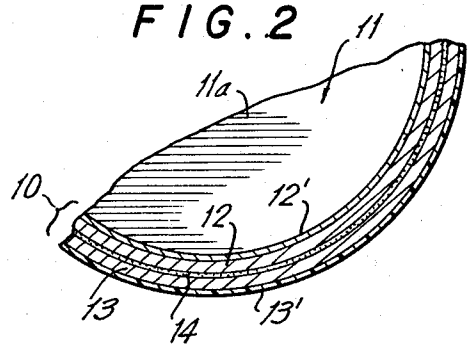


FIG. 3

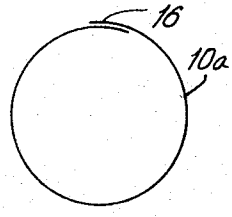


FIG. 4

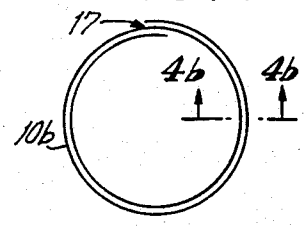


FIG. 5

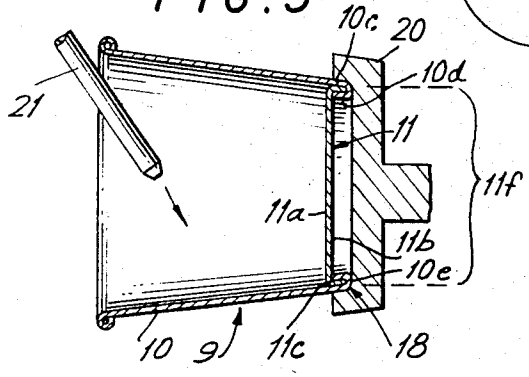


FIG. 8

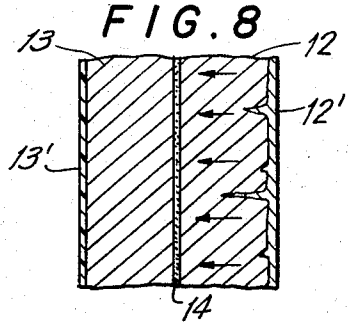


FIG. 6

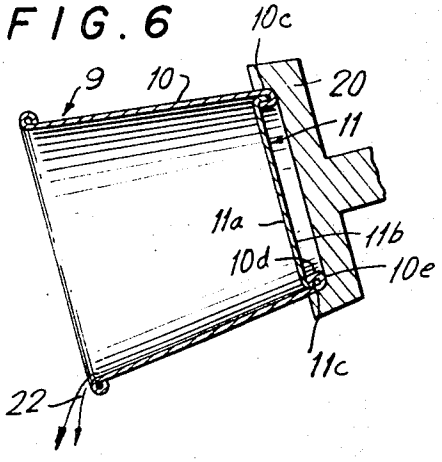
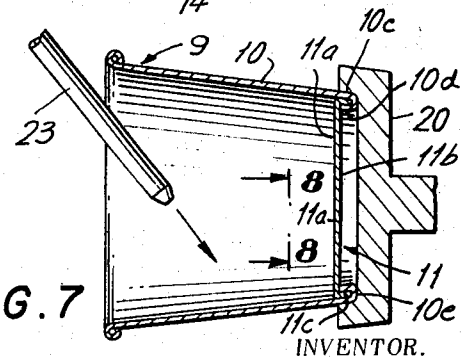


FIG. 7



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FIG. 4a

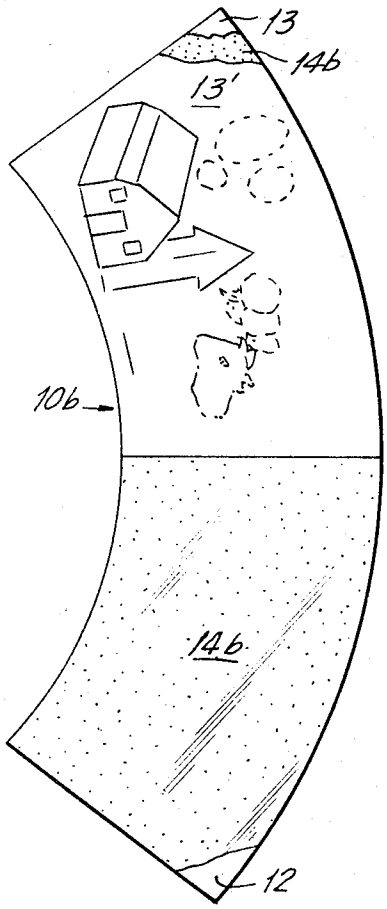


FIG. 4b

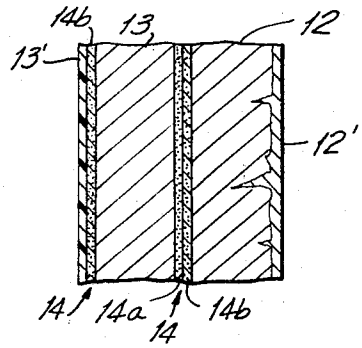


FIG. 9

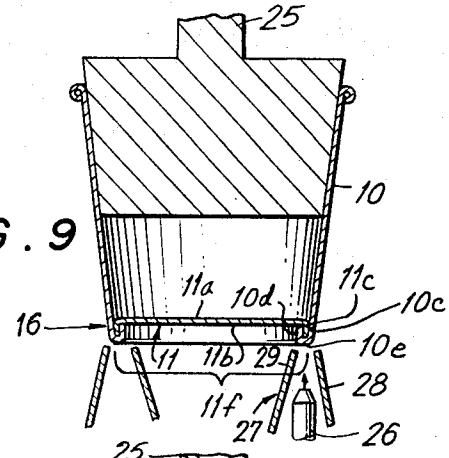


FIG. 10

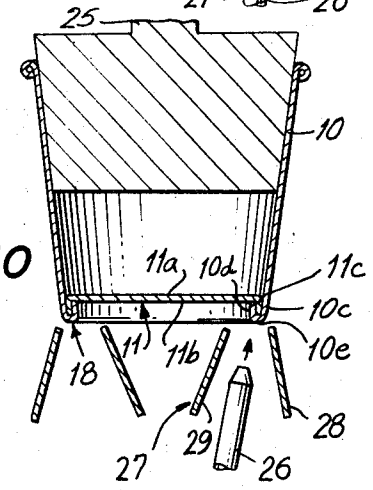
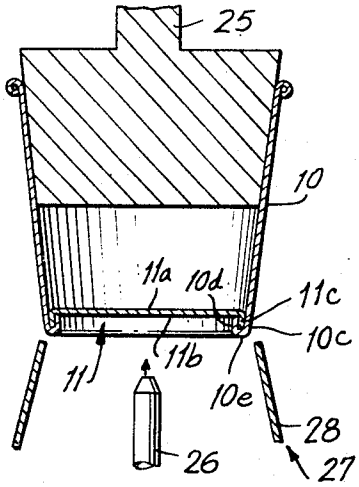


FIG. 11



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3,450,327

ROUND NESTABLE PAPER CONTAINER HAVING A HIGH GLOSS EXTERIOR FINISH AND AN INTERIOR AND BOTTOM WAX COATED SURFACE

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Continuation-in-part of application Ser. No. 605,338, Dec. 28, 1966. This application Oct. 25, 1967, Ser. No. 677,906
Int. Cl. B65d 5/40, 25/14, 5/56, 5/62, 3/00
U.S. Cl. 229—3.1 6 Claims

ABSTRACT OF THE DISCLOSURE

A paper container having its interior coated with wax, means for preventing said wax from penetrating to the exterior surface of the side wall of the container and the exterior side wall of said container having a glossy scuff-proof surface; means for preventing moisture penetration from penetrating towards the interior of the container through the bottom and lower end thereof; and method of producing same.

BACKGROUND OF THE INVENTION

Field of the invention and description of the prior art

This application is a continuation-in-part of my copending application Ser. No. 605,338 filed Dec. 28, 1966.

This invention relates to two-piece paperboard containers intended especially for the packaging of comestibles and more particularly for cottage cheese and other cultured dairy products, salads, butter, spreads and the like which require low gas and/or moisture barrier properties. It has been found that in the packaging of foods of this nature it is difficult to prevent the transmission of moisture vapor and the transmission of oxygen gas, the passage of both of which must be prevented in order to protect the flavor and freshness of the food. For example, it has been found that paperboard containers heavily coated with a suitable wax are much more impervious to the passage of moisture vapor and oxygen gas than are many plastic containers. In the production of such heavily waxed paperboard containers, it is difficult to produce a highly glazed or glossy outer surface on the side wall of the container, which is especially desirable where the side wall bears fanciful designs often comprising multi-colors.

In the conventional heavily waxed two-piece paperboard containers, a heavy coating of wax is applied to the exterior surface as well as to the interior surface and a highly glossy exterior surface of the side wall is unobtainable without ruining the wax properties. For example, while it is possible to obtain high gloss on overall waxed food containers simply by cold quenching them while the wax is still liquid, this sets up surface stresses which crack under refrigeration and the containers fail rapidly offering no resistance to the food.

SUMMARY OF THE INVENTION

According to the present invention, the side wall or body, comprises at least two plies which may be effected by a double wrap made of one sheet or a single wrap comprising a plurality of sheets. In either event, an intervening blocking layer of material separates the inner and outer ply. The blocking layer may be in the form

of an adhesive or glue which is impervious to the penetration of the hot wax applied to the interior of the container, or in the form of a blocking material which serves the same purpose, or a combination thereof. The purpose of such construction is to prevent the hot wax applied to the interior of the container from penetrating to the exterior surface of the container, which exterior surface is desired to be coated with a glossy finish, either by means of a high gloss wax or by means of a suitable coating of plastic material, in the manner well known in the art.

The blank from which the side wall is to be made may be printed with the desired design and colors, as is customary in present practice of paper printing and coating, and thus provide a clear, high gloss finish, preferably by means of a thermosetting resin.

After the side wall and bottom of the container are assembled in the manner well known in the art, the interior of the container is coated by a special formulation of paraffin wax, which wax is prevented from passing to the highly glossy outer surface of the side wall but is permitted to penetrate the entire bottom of the container.

To provide moisture resistance from exterior sources, such as when nestable containers are placed in stacked relation and the bottom of one container is seated within the lid of a lower container which often acts as a depository for moisture, the bottom surface of the container is coated by a special formulation of paraffin wax. Alternately, the wax coating may be applied substantially to the ledge of the container bottom surface.

These coatings give the container the dual advantages of (1) an inner barrier to the transmission of moisture vapor and oxygen gas, thus protecting the flavor and freshness of the food product; (2) a superior outside finish which not only contributes additional holding qualities to the package but complements and greatly enhances the printed decoration of the container; and (3) an exterior barrier to the transmission of moisture through the bottom surface of the container, thus protecting both the bottom member and seal between the bottom member and the side wall.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the drawings wherein like numerals refer to similar parts throughout the various views:

FIG. 1 is a perspective top view of the container;

FIG. 2 is a sectional view taken at 2—2 of FIG. 1;

FIG. 3 is a somewhat diagrammatic view showing a cross section of a side wall of the container made from a single sheet comprising two plies;

FIG. 4 is a similar view showing a cross section of a side wall of the container made from a double wrap of a one-ply sheet;

FIG. 4*a* is a plan view on a somewhat reduced scale of the precut blank from which the double-wrapped side wall of the cup of FIG. 4 is made showing a printed pattern and the blocking coating on said blank;

FIG. 4*b* is a greatly enlarged sectional view taken at 4*b*—4*b* of FIG. 4 showing the two-ply side wall fabricated from the blank illustrated in FIG. 4*a* and showing the relation of the interior wax coating on the inner ply, the barrier between the two plies, an outer barrier, and the exterior glazed finish on the outer ply of the side wall;

FIG. 5 is a longitudinal sectional view showing the first step of squirting or pouring wax into the interior of the container;

FIG. 6 is a similar view showing the draining of the excess wax out of the mouth of the container;

FIG. 7 is a view similar to FIG. 5 showing the second step of squirting or pouring wax into the container;

FIG. 8 is a greatly enlarged sectional view taken at 8—8 of FIG. 7 showing the two-ply side wall and the relation of the interior wax coating on the inner ply, the barrier between the two plies and the exterior glazed finish on the outer ply of the side wall; and

FIGS. 9, 10 and 11 inclusive, are longitudinal sectional views showing the coating of various portions of the container bottom.

Referring to the drawings, and more particularly to FIGS. 1 and 2, it will be seen that the container indicated in general as **9** comprises a tapered side wall designated in general as **10** and a bottom member designated in general as **11**. The side wall **10** comprises an inner ply **12** and an outer ply **13** and an intermediate barrier comprising a blocking layer **14**, which may be in the form of a blocking adhesive **14***a* (FIG. 4*b*), which is preferably polyvinyl alcohol or vinyl acetate, the preference being in the order named; or which may be in the form of a blocking coating **14***b* which (FIG. 4*b*) is preferably of a clay base, as for example, polyvinyl acetate and/or styrene butadiene latex combined with a clay material or titanium dioxide to obtain a white pigmentation to print upon. It is contemplated that other suitable adhesives may be employed, such as polyethylene or a starch adhesive, as well as a variety of suitable coatings, formulated to effect the desired barrier for preventing the passage of hot wax through the outer ply **13**.

As seen in FIG. 5, the container is formed in the manner well known in the art having a bottom member **11**, with an interior surface **11***a* and an exterior surface **11***b*, which is secured in position as by providing a downwardly peripherally extending flange **11***c* which is disposed between the outer wall portion **10***c* adjacent the lower end of the side wall **10** and the inwardly and upwardly turned end or skirt **10***d* of said end to form a pedestal **18**. The bottom flange **11***c* is peripherally sealed between the adjacent portions **10***c* and **10***d* of the side wall member **10** to provide a liquid-tight seal. At the lower end of the pedestal **18**, intermediate and integrally formed with said outer wall portion **10***c* and said upwardly turned skirt **10***d* is a bottom ledge **10***e* on which the container **9** is generally supported. The complete bottom surface **11***f*, as illustrated in FIG. 5, of the container **9**, includes the bottom ledge **10***e*, skirt **10***d* and the exterior surface **11***b*, which is the portion of the bottom member **11** circumscribed by peripheral skirt **11***c*. A suitable rolled rim or lip **15** is formed on the open end of the container as is customary and in a manner well known in the art.

In FIG. 3 there is shown the conventional formation of a side wall by a single wrap designated **10***a* which comprises at lease two plies of material adhered together by blocking adhesive with the ends of a single wrap multiply sheet secured together in a side seam **16**; while in FIG. 4 there is shown the conventional manner of forming a side wall by two or more wraps of a single ply sheet wherein the plies are laminated together by means of an intervening adhesive, which may be a blocking layer, and the ends of the single ply sheet are secured together as by side seam **17**, as is customary in the prior art. As above indicated, the outer surface of the side wall **10** commensurate with the outer surface of the container may be printed on the container blank before the side wall of the container is formed and, whether plain or with a design, its exterior surface may be provided with the desired high gloss. Preferably, the high gloss finish is provided by first printing and then coating with a thermosetting resin to provide a clear, high gloss protective finish, such as **13'**.

In FIG. 4*a*, there is shown a plan view of the present blank by which the side wall member **10***b* is formed in accordance with a preferred embodiment of the invention. The blank side wall is of a length to form the double-wrap container illustrated in FIG. 4 in which one-half of the blank, when formed, is the inner ply **12** and the other half the outer ply **13**. The paperboard stock carries a coating as, for example, a polyvinyl acetate along with a binder which is preferably of a clay base material, and which may form the blocking coating as hereinafter discussed.

Preferably, the high gloss finish is provided by first printing upon one-half of one side of the wall **10***b* and then coating with a thermosetting resin to provide a clear, high gloss protective finish as **13'**. When the wall **10***b* is of this double-wrap construction, the blocking adhesive **14***a* is applied opposite the printed side of the blank. When wrapped this surface **14***a* contacts **14***b*. The blocking coating **14***b* is contained on the inner ply **12** so that, in assembled relation for a double-wrap container, we have illustrated in FIG. 4*b* an exterior high gloss coating **13'**, blocking coating **14***b*, outer ply **13**, blocking layer **14**, formed of either or both the blocking coating **14***b* and blocking adhesive **14***a*, inner ply **12** with an interior wax coating **12'** hereinafter discussed in detail. Thus as illustrated in FIG. 4*b*, we have a container constructed in which the blocking layer **14** intermediate the inner ply **12** and outer ply **13** is comprised of both a blocking adhesive **14***a* and a blocking coating **14***b*. Depending upon the properties of the blocking adhesive **14***a* and the blocking coating **14***b*, either one or the combination of the two may constitute the blocking layer **14** and prevent the penetration of the wax **12'** from reaching the outer ply **13**. An additional feature is that a secondary blocking layer **14** may be provided between the ouer ply **13** and the high gloss protective finish **13'** in the form of blocking coating **14***b* to further assure the obtainment of a container free from unsightly wax marring on the exterior surface thereof and as a base for printing upon the container side wall **10**.

After the side wall and bottom have been assembled to complete the paperboard container **9** for either a single-wrap or double-warp container, the container is suitably held in a holder designated **20** and a series of containers so held is carried on a conveyor with the longitudinal axes disposed in the horizontal plane. The containers are rotated about their longitudinal axes while moved forward by he conveyor and wax is squirted or poured into the interior of the containers as by nozzles **21**. It will be noted that the container **9** shown in the drawings has a tapered side wall **10**, which as is customary in the art, makes an angle of 4°–7° to the central axis normally held in a horizontal plane. This slight angle is sufficient to cooperate with the rotation of the container to evenly spread the liquid wax applied through nozzle **21**. However, to remove the excess wax the container is tipped as shown in FIG. 6 to substantially increase the side wall tilt and drain out excess wax **22**. Of course, if it is desired to treat cylindrical containers, the holder **20** is held on the conveyor so that the container side wall is initially inclined at a suitable angle, say about 3°–8°, and thereafter tilted to a greater inclination to drain out excess wax **22**. The increased tilt angle as shown in FIG. 6 may be effected at one or more points in the path of travel of the container, as by means of cam segments (not shown) as is well known in the art.

The wax employed is preferably a compostion comprising 99.5% of fully refined paraffin wax having a melting point of 132°–134° F. and ½% of a polyethylene additive, such as one made by Eastman Chemical Company known in the trade as "C13." This formulation of wax is applied in two steps, the first at about 255° F. and after the excess has been drained from the container as shown in FFIG. 6, a second application is made with the above composition at about 180° F., such as by means of a nozzle **23**. After the second application the excess wax is drained from the container and the container is dried.

As will best be seen in FIG. 8, the wax not only coats the interior surface of inner ply **12** to provide the interior wax caoting **12'**, but partially penetrates the same to

inhibit flaking. While this wax coating thus applied is prevented from passing through the paper-adhesive laminate to the exterior surface of the side wall **10**, it does penetrate entirely through the bottom **11** of the container and a complete penetration through the bottom of the container is desirable so that the bottom is fully covered and the extra wax on the bottom adds strength to the corner and center portions of the container and also further assures a sealing fillet between the bottom member **11**, and side wall **10**.

For those containers stored or filled in a moisture laden or wet environment, it has been found desirable to provide a protective coating of wax on the complete bottom surface of the container, or parts thereof, in a manner to prevent the moisture from saturating the seal between the outer wall portion **10***c*, upwardly turned skirt **10***d* of the wall **10** and the downwardly extending flange **11***c* therebetween. In practice, the filled containers are often stored in refrigerators and the bottom ledge **10***e* of the pedestal rests within the lid of a lower stacked container. The lid often contains a degree of condensation, such as water, that upon storage for several days tends to saturate the ledge **10***e*, upwardly turned skirt **10***d* and downwardly extending flange **11***c* to effect a separation of the adhesive at the juncture therebetween which affects the structural rigidity of the container. When the skirt **10***d* becomes saturated. it starts to return to its original flat shape thereby applying a force on the overlapped seal which has a tendency to crack the seal.

Referring more particularly to FIGS. 9, 10 and 11, we have illustrated an exterior was coating on the bottom surface, which wax may be of the same type **12'** as used to interiorly coat the container, and which wax is applied either subsequent to the application of the interior wax as decribed above or thereafter.

In FIG. 9, the bottom surface **11***f* is wax coated while the container is mounted generally vertically on a holder designated **25** and, which may be rotated, while the wax is applied as by squirting to pouring it on to the ledge **10***e* thereof by nozzle **26**. Preferably when the entire bottom surface is to be coated the container and supply of melted wax are maintained in horizontally spaced relationship and moved along a defined path relative to each other to coat the surface thereof. Controlling means **27** is provided, which may be in the form of an outer guard means in the form of funnel **28** and an inner guard means in the form of funnel **29**, mounted for relative movement with respect to each other in any conventional manner not shown, to confine the area of application of the wax and then move the container and control means relative to each other for waxing of the next container. The spacing at the mouth of the funnels is substantially equal to the width of the ledge **10***e* to assure that the wax substantially coats the ledge only and not the exterior high glass finish.

FIG. 10 illustrates the invention wherein the bottom ledge **10***e* and skirt **10***d* are coated with the wax particularly the junction between the latter and bottom member **11***a*. The nozzle **26** is positioned within the confining means **27** formed by the outer funnel **27** and inner funnel **29** and the latter terminating in spaced relation to the upwardly turned skirt **10***d* which is wax coated with the ledge **10***e*.

FIG. 11 illustrates the invention wherein the entire bottom surface **11***f*, including the skirt **10***d*, bottom ledge **10***e* and the exterior surface **11***b*, enclosed by the skirt **10***d*, are coated as by positioning the nozzle **26** in spaced relation to the bottom **11** and providing control means **27** in the form of the funnel **28** having a diameter at its base substantially equal to the outer diameter of the container. Alternately, the bottom member **11** and skirt **10***d* may be wax coated by reducing the diameter of the control means **27**. The holder can be simultaneously rotated relative to the nozzle **26**, in any conventional manner to properly disperse the wax being applied or the holder and nozzle **26** may be maintained in fixed relationship to each other. In addition the wax is applied through the nozzle **26** in timed relation to the positioning of the container in overlapping relation thereto. The container may be intermittently stopped when the wax is applied thereto.

Thus in accordance with the present invention applicant has invented a packaging container of the nestable type which for the first time combines many ideal characteristics not heretofore available in a single container. The invention permits the obtainment of a high exterior glossy finish which has long been desired for beauty and texture to properly attract the eye of the consumer, and still have the qualities that permit the storage of the container for prolonged periods of time, due to its wax coated interior and bottom surface. The wax coated bottom permits the container to remain on a damp or moistened surface for a considerable period of time without affecting the structure of the container and more importantly the contents contained therein.

Having thus described my invention with particularity with reference to its preferred form, it will be obvious to those skilled in the art, after understanding my invention, that other changes and modifications may be made therein without departing from the spirit and scope of my invention, and I aim in the appended claims to cover such changes and modifications as are within the scope of the invention.

What is claimed is:

1. A paper container, comprising

(A) a tapered side wall member and a bottom member secured thereto in sealing engagement therewith at one end thereof to form a bottom on which the container is supported, said side wall extending upwardly and outwardly from said bottom member and terminating in an open top having a peripheral lip,

(B) said side wall member comprising an inner ply and an outer ply with an intervening blocking layer of material,

(C) an exterior high gloss finish on said outer ply with an intervening blocking layer of material,

(D) an interior wax coating on said inner ply, said blocking layers serving as barriers preventing said interior wax coating from penetrating to and marring said exterior high gloss finish, and

(E) an exterior wax coating on said bottom, said exterior wax coating serving as a barrier preventing moisture from penetrating and separating the seal between said side wall member and said bottom member whereby said container may be positioned on a wet surface for prolonged periods of time without affecting the structural rigidity thereof.

2. A paper container as set forth in claim **1** wherein said blocking layer between said inner and outer plies comprises a blocking coating on said inner ply, and a blocking adhesive between said blocking coating and said outer ply and securing said outer ply and said coated inner ply together.

3. A paper container as set forth in claim **2** wherein said blocking adhesive is a starch adhesive, and said blocking coating is a clay base coating.

4. A paper container as set forth in claim **1** wherein said blocking layer between said inner and outer plies is polyvinyl alcohol.

5. A paper container as set forth in claim **1** wherein said interior wax coating is a composition comprising approximately 99.5% of a fully refined paraffin wax having a melting point of about 132°–134° F. and 0.5% of a polyethylene additive.

6. A paper container as set forth in claim **1** wherein said bottom includes

(a) a bottom ledge integrally formed with said side wall member at the closed end of the container and on which the container is supported, and

(b) an upwardly extending skirt integrally formed with said bottom ledge,

(c) the exterior surface of said bottom member being circumscribed by said skirt,

and said exterior wax coating is disposed on and extends continuously over said ledge, skirt, and bottom member exterior surface.

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U.S. Cl. X.R.

117—95; 229—1.5