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MILK CONTAINER CONSTRUCTION

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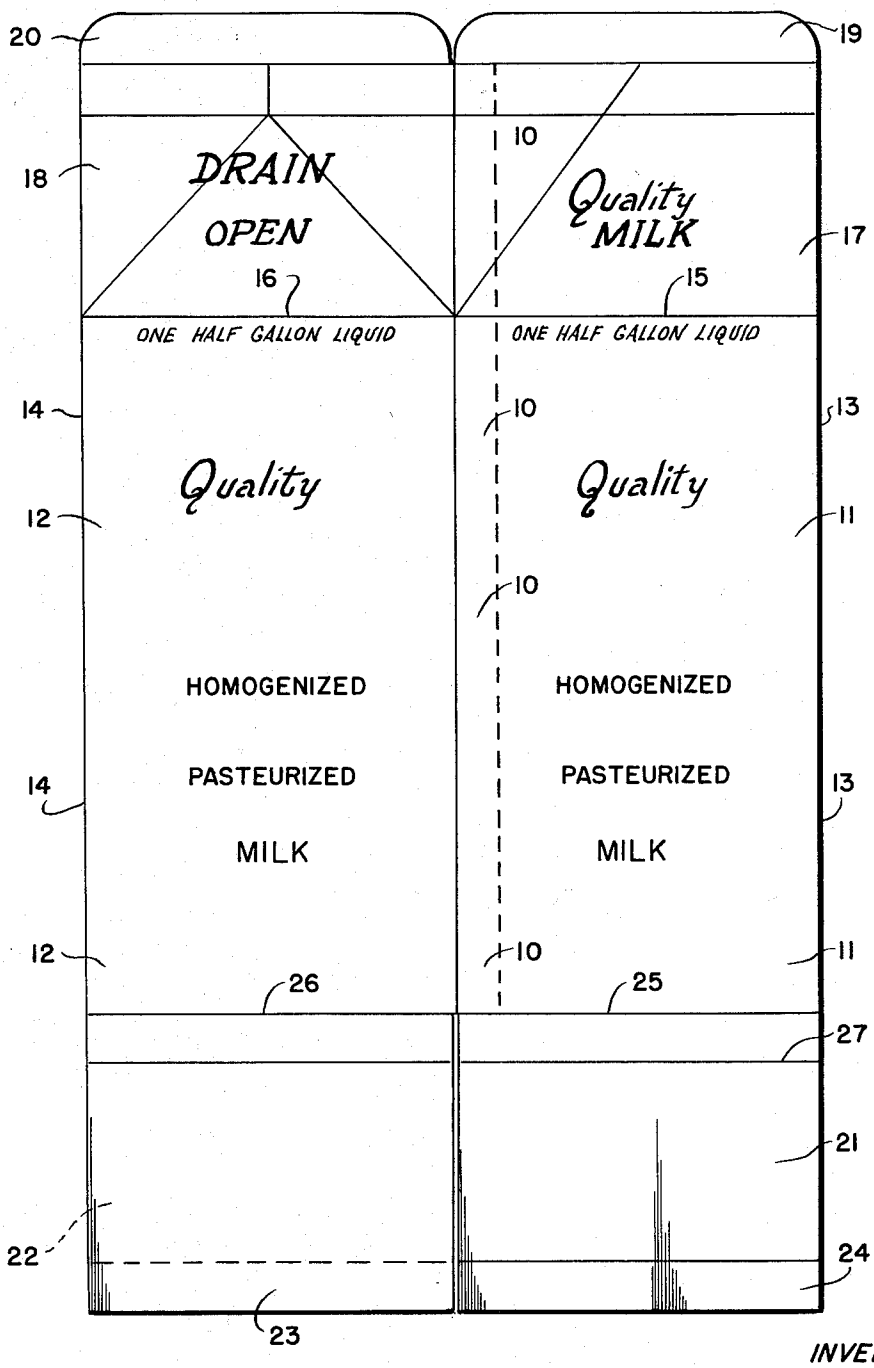


FIG. 1

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FIG. 2

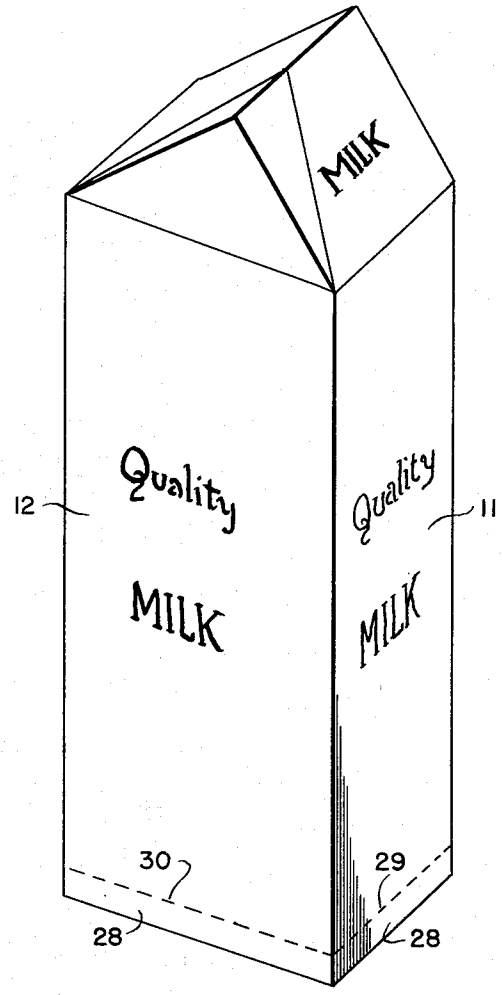
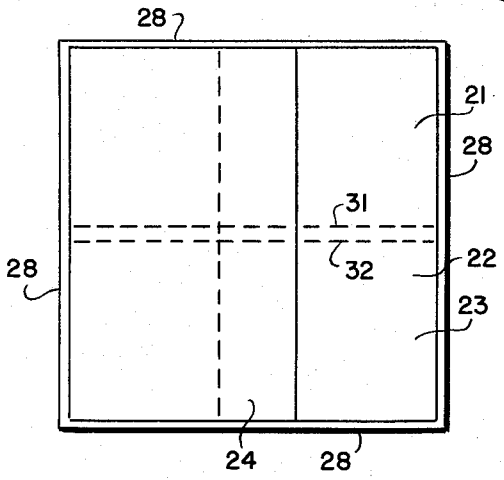


FIG. 3



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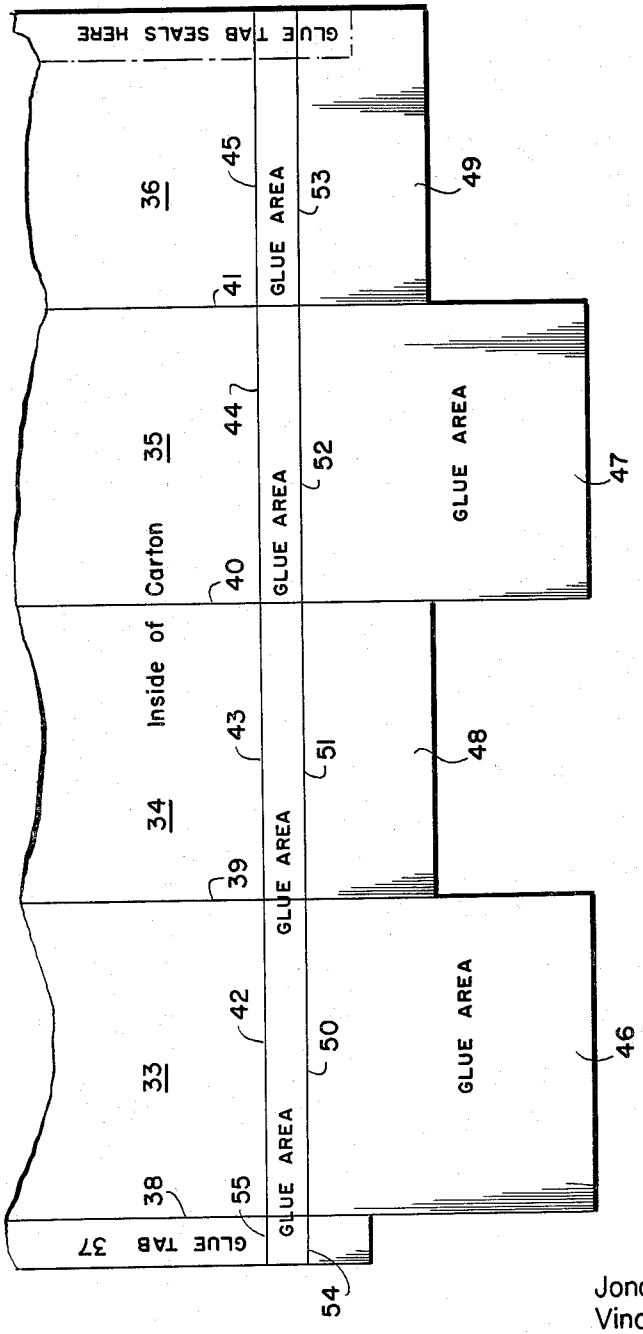


FIG. 4

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MILK CONTAINER CONSTRUCTION

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1 Claim. (Cl. 229—17)

This invention relates in general to containers and more specifically to disposable sheet containers of the general type used to package liquids of various types. The invention finds particular application in the disposable milk container field, although it can be applied to the packaging of other materials.

Containers of this general type are made from a flat blank of sheet stock which has been impressed with a suitable pattern of scored lines which mark out on the sheet the side panels and end flaps. Such containers are disclosed in considerable detail in U.S. Patents 2,025,477 and 2,750,095. The sheet is first formed into an elongated member, generally of rectangular cross-section, and then the bottom end flaps are folded to close the lower end of the container, the flaps being retained in fixed position by glue or other closure means. The exposed areas of the container are then coated with a sealing film by dipping the container in a liquid bath of wax, plastic or other suitable material adapted to form a leakproof barrier at ordinary temperatures. The container is subsequently filled and the top sealed in various ways well known in this art and not particularly pertinent to this invention.

An alternative method of preparing a milk carton is by using a pre-coated paper board before forming into a suitable carton. This method requires no additional sealing film other than the necessary glue used to hold the flaps in a fixed position. This pre-coating may be applied to the milk carton stock by any suitable coating technique.

The success of wax-coated paper cartons as a container for milk is clear by their almost universal use for that purpose. They have almost completely replaced the glass bottle, which formely enjoyed the bulk of this trade. However, the milk carton now used commercially has some annoying defects which require correction. Although extensive work has been done to discover a solution to these problems, no solution prior to this invention has been found. The bottom of the containers is a generally flat surface formed by the folded lower end flaps coated with wax. Impact on the bottom of the containers causes wax flaking or rupture of the bottom along the bottom edges and on the lower side-walls. This damage is generally caused by rough handling in the distribution of the containers wherein containers are severely jarred or even dropped a substantial distance.

When flakes of wax break loose at the bottom of the container as a result of jarring or shock, they float to the top of the milk, being lighter than the milk. They are poured with the milk and not observed, since the wax is substantially the same color as the milk. While the wax is not harmful or toxic, it is distasteful to encounter this foreign body in the milk. The dry areas caused in the carton stock due to this flaking may become saturated with liquid and conainer leakage is inevitable.

"Wax rub-off" is another problem encountered with the paper milk container. This involves the tendency of the wax to shear and rub off the carton in the contact area, particularly the flat bottom of the carton. Wax rub-off occurs in the contacted surfaces. This is due to an abrasive or dragging action of the carton, which causes the shearing of the wax coating.

It is the object of this invention to provide an improved container and method of assembling said container which will overcome the above-mentioned difficulties.

It is a further object of the invention to provide an improved container and method of preparing said container to prevent leakage of the container when filled with liquid.

It is a further object of this invention to provide an improved conainer and method of assembling said container so that wax flaking is avoided.

It is a further object of this invention to provide an improved container and method of assembling said container so that wax rub-off is avoided.

These and other objects of the invention and the accomplishment of these objectives is made clear in the following detailed description of the invention and in the attached drawings referred to in the detailed description.

FIGURE 1 is a sketch of a partially assembled blank illustrating the scored lines on the blank for assembly in accordance with this invention.

FIGURE 2 is a sketch of an assembled container illustrating the chime support formed in accordance with this invention.

FIGURE 3 is a view of the assembled container showing the bottom of the container formed in accordance with this invention.

FIGURE 4 is a partial view of a flat sheet scored for assembly in accordance with this invention.

The invention involves in one aspect the arrangement of inner and outer end flaps in the scored blank so that the bottom inner and outer end flaps are folded back on themselves 180 degrees to form a chime and then folded inwardly 90 degrees to cross each other to form a protected recessed bottom for the container. When the container formed as indicated is waxed, a sealed bottom is provided so that leakage is prevented and the bottom seal is protected by means of the chime from rough contact, blows, scraping or shearing action on the coated surfaces.

Coating wax can be removed from the bottom edge of this chime by passing the assembled carton over a heated plate. This action drives the wax into the board fibers leaving a dry waxed, non-marring surface. This means the carton can be placed on a counter surface, such as furniture, without any danger of marring the finish or leaving telltale impressions on the surface upon removal of the carton.

Referring now to FIGURE 1, a partially assembled blank is shown with the sides of the blank folded over and glued along flap **10**, **10**. This flap is illustrated by the dotted line on FIGURE 1, the flap being positioned under the side panel **11**. The blank may be packed flat in this form until ready for assembly with two side panels **11**, **12** located in side-by-side relationship on top and two side panels located directly beneath the upper side panels **11**, **12**. The scored lines **13**, **13** and **14**, **14** serve to separate the upper side panels from the lower side panels in the flattened position of the blank. The top of the container can be seen indicated at the top of FIGURE 1 above scored lines **15**, **16**. These top end flaps are similarly connected and retained in a flattened position until assembly. Top end flaps **17**, **18** are visible on FIGURE 1. Directly beneath top end flaps **17**, **18** are similar flaps on the covered half of the blank. The top tab **19** is attached to the upper top end flap **17**, but the top tab **20** is attached to the bottom top end flap which is covered by the upper top end flap **18**. The top end flaps indicated, when assembled, form a gabled top for the container as indicated on the assembled view depicted on FIGURE 2. The top of the container, however, is not pertinent to the invention and can vary quite radically from the top pictured on FIGURE 2. For

instance, the top of the container may be a flat top in the assembled carton.

The bottom end flaps are arranged with alternate inner and outer lower end flaps, the inner lower end flap **21** being visible on FIGURE 1 whereas the opposite lower end flap **22** is covered by the outer lower end flap **23**. The outer lower end flap **24** is covered by the inner lower end flap **21**, but the lower end portion of the outer lower end flap **24** is visible on FIGURE 1 because the outer flaps are somewhat longer than the inner flaps. The shortened termination of the inner lower end flap **22** beneath the outer lower end flap **23** is indicated by the dotted line.

When the flattened carton is set up for assembly, the side panels are brought together somewhat to form a tubular member of rectangular cross-section and the lower end flaps are then folded along the scored lines **25, 26**, the four lower end flaps being folded at the same level to provide the bottom of the carton. The opposite inner flaps are folded in, first 180 degrees, and then these flaps are folded back 90 degrees along the scored line **27** to fall into the same plane perpendicular to the erected side panels. These inner end flaps **21, 22** can pass over each other but it is found preferable to terminate these inner end flaps just short of contact with each other. The outer end flaps **23, 24** are then folded back on the scored line **26** at the same level as the inner end flaps 180 degrees and then inwardly on themselves 90 degrees to fall in the same plane, one flap being arranged to pass over the other flap to provide an enclosed protected bottom for the carton. These flaps are glued in this position, although other closure means may be utilized, if desired.

FIGURE 2 shows the assembled carton. The chime **28** at the base of the carton is illustrated by the dotted line **29**. The level of the bottom of the container is shown by the dotted lines **29, 30**. FIGURE 2 shows the top closed after filling. Before the top is closed, however, the assembled carton is dipped in a wax or wax-like material bath so that it becomes coated or impregnated with this material. The material sets as the temperature drops, forming a moisture-proof barrier. Paraffin wax is used extensively for this purpose although a variety of different materials may be used for this purpose. For instance, various synthetic waxes, while not so satisfactory as paraffin wax, can be used. Various olefin polymers or copolymers are available for this purpose, such as polyethylene or polypropylene.

FIGURE 3 shows the bottom view of the assembled carton of FIGURE 2. The lower end of the chime **28** is illustrated. The outer lower end flaps **23** and **24** are seen with flap **24** folded over the flap **23**. The inner lower end flaps **21, 22** are seen beneath the outer lower end flaps with their ends shown by dotted lines **31, 32** leaving a short space between the two flaps. This provides a channel which serves as a pocket to receive wax drainage. Such a channel must be provided to allow for wax drainage in the carton. Since a thick section of wax, however, can stand less flexure without breakage than a thin section, this thick channel of wax is more subject to breakage from flexure than the remainder of the waxed surface. However, this invention protects this channel from flexure since the bottom is recessed and protected from contact with flat surfaces by the protective chime. The container is filled with liquid, such as milk, after the wax has hardened or set and then the top is sealed.

FIGURE 4 shows a slightly modified arrangement of the lower end flaps of a carton blank which is in accordance with this invention. The upper part of the container is not pertinent to the invention and hence is not shown on FIGURE 4. The four inside panels **33, 34, 35** and **36** are shown in side-by-side arrangement. A glue tab **37** is shown at one end of the blank attached to the vertical panel **33**. The scored lines **38, 39, 40** and **41** separate the vertical panels. The scored lines **42, 43, 44** and **45** determine the bottom of the container, the lower end flaps **46, 47, 48** and **49** being folded on these scored lines to form the chime at the base of the container. The scored lines **50, 51, 52** and **53** are used to fold the lower end flaps back on themselves so as to form the bottom of the container. The glue area between the scored lines **55, 42, 43, 44, 45** and scored lines **50, 51, 52, 53** and **54** (see FIGURE 4) is coated with glue so as to set up the chime at the lower end of the container. The glue tab **37** is coated on its underside with glue and the carton folded over to form a tubular member of rectangular cross-section, the glue tab **37** being pressed into position as indicated on panel **36** to form the enclosed tubular member. With the chime glue area properly coated and the lower end flaps so folded back as to bring this glue area in contact with the inner side of the vertical panels, the double thickness chime at the lower end of the container is formed. The inner end flaps **48, 49** are then folded back 90 degrees upon themselves to fall into the same plane, but because of their restricted length, these flaps leave a narrow panel between their outer ends to serve as a drainage basin for wax on the interior of the carton. The lower end of the glue tab **37** folds in and is glued on top of the inner lower end flap **49** in the assembled position. The outer lower end flaps **46, 47**, folded back on themselves 90 degrees, form a lower protective cover for the inner flaps, the outer lower end flaps in this embodiment of the invention being shaped so as to completely cover the lower end of the carton. The upper surface of the lower end flap **47** is glued so that this flap in its folded position connects to and covers the inner lower end flaps. The lower end flap **46** is also glued and makes contact with the lower end flap **47**, completely covering flap **47** when properly assembled. The assembled carton is then completely submerged in melted wax or wax-like material such as melted paraffin wax and the carton is then allowed to drain of excess wax. The wax hardens, providing a protective coating for the container and the container is then filled with liquid such as milk. The wax-coated container, because of the assembly details disclosed in this invention, is essentially stronger than prior cartons, being capable of resisting to a high degree damage from rough handling, particularly in the region of the recessed lower end. The chime formed at the lower end of the container adds substantially to the structural strength of the vessel so that there is less damage to the wax coating from flexing than was previously encountered with containers of the prior design.

Because the chime used in this invention adds materially to the structural strength of the container, thereby rendering the container less liable to flexure, coating materials not previously considered usable for coating milk containers can now be utilized. For instance, in plastic coated cartons there is little impregnation of plastic materials into the paper fibers so that the applied plastic does not contribute to the strength of the overall carton structure. Plastic materials are usually applied in a very thin film on the carton stock and any flexure of this coating causes the carton to be strained. For this reason, filled plastic milk containers are soft to the touch and lack inherent strength, which contributes to carton bulging. However, by providing a container in accordance with the teaching of this invention, these protective chimes so strengthen the container that substantially no flexure at the lower end of the container occurs, and plastic materials such as polyethylene can be used for coating the container. Furthermore, with the bottom of the container suitably recessed and protected by the chime, less damage to the wax coating at the lower end of the container from fracture and shock occurs. The strength of the wax coating is therefore materially less important and low tensile strength materials such as

polyethylene can be used to seal the containers assembled in accordance with the teaching of this invention.

Example 1

A suitable container for a half-gallon supply of milk was made from a paper carton blank similar to those depicted in the drawings and with the bottom arranged as depicted on FIGURE 4. The side panels were 3¾" wide and measured 8⅛" from the top scored lines above which the container top is formed down to the scored lines at the bottom which mark the beginning of the lower end flaps and define the bottom of the vessel. A second set of scored lines ⅜" therebelow on the lower end flaps set of the thickness of the chime (⅜") so that when the end flaps were folded back on themselves 180 degrees and inwardly 90 degrees, the usable length of the container from top scored lines to recessed bottom of container measured 7¾". The inner lower end flaps measured 2$\frac{3}{16}$" in length so that when folded properly they formed a channel between their outer end ⅛" wide to serve as a drainage channel for wax at the bottom of the container. The outer lower end flaps were 4⅛" long so that when folded properly they formed square covers at the bottom of the vessel 3¾ x 3¾", completely covering the bottom of the vessel. This provided a tight seal when the flaps were glued together providing an exceedingly rigid container even though made only of carton stock and adapted to retain ½ gallon of milk. The container, when coated with paraffin wax, was leakproof and the bottom was completely protected from damage by the ⅜" chime at the lower end of the container.

The example given hereinabove as well as the detailed description of the invention are provided only to aid in understanding the invention and are not intended to limit the scope of the invention. The only limitations intended are contained in the attached claim.

We claim:

A milk container carton formed from a single sheet of material formed with parallel sets of folding creases extending perpendicularly to each other in intersecting relationship defining a central rectangular portion folded along certain of said parallel creases providing four side walls of said carton, the improvement comprising: a chime formed at the bottom of said container from lower end flaps folded inwardly on a first scored line 180 degrees and folded outwardly on a second scored line 90 degrees, the surface between said first and second scored lines being glued to provide rigidity to the chime, a container bottom formed by the lower inner flaps located in opposition to each other in coplanar relationship and underlapped by lower outer flaps similarly located in opposition to each other in coplanar relationship and glued to said lower inner flaps, a wax drainage trough formed by restricting the length of said lower inner flaps to provide the width of said trough between the opposing edges of said lower inner flaps and by making the lower outer flaps long enough to overlap and provide a floor for said wax drainage trough, a wax coating located on the interior and exterior of said container, the exterior wax coating at the lower end of said chime being driven into the board fibres by heat to provide a dry waxed, non-marring surface, whereby a rigid and strong container is formed which is highly resistant to wax rub-off, flaking and leaking.

References Cited in the file of this patent

UNITED STATES PATENTS

1,414,236	Walmsley	Apr. 2, 1922
2,063,645	Ware	Dec. 8, 1936
2,444,895	Ringler	July 6, 1948
2,570,982	Read	Oct. 9, 1951
2,750,095	Alden	June 12, 1956
2,826,349	Hovland	Mar. 11, 1958