ABSTRACT
A tray-like storage and display package is formed from a stretchy, normally flaccid and preferably transparent material, such as polyethylene film, which is wrapped into a sleeve extending about the sides of an array of cartons and underlies at least a portion of the bottom of the array. The packaged arrays produced thereby are stable and may be stacked one above the other to form a stable display stack which is resistant to flowering. Handles are provided on the individual tray-like package, preferably formed by the film itself as a result of the folding and heat seal patterns used in assembling the package. The film normally has little or no tension about the array of cartons thereby allowing free removal of cartons when the package is resting or supported on a flat surface, as for example, when forming the top package in a stack of such packages. The position of the handles is such that the application of lifting force to them also imparts circumferential tension tightening the material and thereby stretching it to distribute the forces developed therein to circumferentially compress the cartons against each other and develop frictional forces therebetween sufficient to unite the array and all of the cartons into an integral unit to allow handling while yet enabling one by one removal of the cartons from the array as desired when the package is resting or supported on a flat surface.

12 Claims, 5 Drawing Figures
BACKGROUND OF THE INVENTION

This invention relates to a package for a plurality of articles and more particularly to such a package adapted to form mass displays.

One of the major thrusts of the packaging industry has been to provide packages suitable for accommodating and displaying a plurality of articles or individual items such as cartons of product. Prior art devices of this nature have been based on the premise that the display package must be suitable for handling the contained articles throughout the chain of distribution; i.e., they must be strong and rigid.

In accordance with this premise U.S. Pat. No. 3,519,125 issued July 7, 1970 to N. MacNeale and commonly owned by the assignee of this invention provides a tightly overlapped package typically utilizing opaque materials such as kraft paper including tear strips to allow the top of the package to be separated and removed while the bottom serves as a low-walled display tray.

Various packages suitable for shipping as integral packages and for establishing a display have also been formed from tensioned clear films of shrinkwrapped polymers. By way of example only, U.S. Pat. Re No. 27,212 issued Nov. 9, 1971 to M. L. Brown discloses a package typical of these comprising a low-walled relatively rigid tray and tight overlap of heat-shrunk PVC film. The prior art has also provided tension overlapped packages including apertures through the overlap to allow pimemarking on the top or bottom of the contained product, tear strips to facilitate opening of the tensioned package and rigid trays within the package which allow the contained product to be handled after the overlap is opened.

The provision of a tensioned wrapper completely covering the package contents, as illustrated by these prior art devices, has two major drawbacks. First, because these packages are to be used in the chain of distribution, without additional protection, they necessarily use more and stronger material than would be required of a package suitable for use within a retail store but lacking the structural integrity to make it satisfactory for use with most distribution systems. Second, the tight application of the wrapping material about the cartons within the package makes removal of said cartons, and especially the first one, difficult. The provision of tear strips and the like only partially obviates this problem.

An alternative to the approach taken by the above packages is to provide a package which is suitable for handling within, for instance, a retail store and which is suitable for forming mass displays but which lacks the structural integrity to allow it to be used, without other protection, throughout the chain of distribution. Preferably, such a package would not materially constrain removal of the enclosed cartons and would be constructed of the minimum amounts of material consistent with its limited purposes. Such a package could be used, for instance, for containing and handling a portion of the contents of a larger shipping container. A large shipping container particularly well suited for use in shipping a number of packages of the present invention is shown in U.S. Pat. application Ser. No. 233,170 filed Mar. 9, 1972 and commonly owned by the assignee of this invention and now abandoned, and U.S. Pat. application Ser. No. 327,553 filed Jan. 29, 1973 as a continuation-in-part thereof, copending herewith.

When a large number of containers are stacked in multiple layers one above the other for mass display purposes, the resulting stack may be instable and therefore it is necessary or desirable to provide means for increasing the stability of the display of the upper layers from "flowering" outwardly. It has been heretofore recognized that "flowering" can be reduced or eliminated by inserting a tie sheet between the layers of such a mass display to frictionally bind the individual containers of a layer together through the downward force placed on the tie sheet by the layer or layers of containers thereabove.

In the present specification as well as in the subjoined claims, the word "carton" is used to refer to a product enclosure for a unit of product as would normally be sold at retail, the word "package" is used to refer to any means for handling a plurality of cartons together; and the word "containers" is used for a shipping case for a plurality of packages. The word "flowering" refers to the tendency of a stack of cartons to be unstable and, where a plurality of stacks of cartons are placed next to each other in parallel generally vertical columns, the tendency of the upper layers thereof to expand outwardly.

In co-pending U.S. application Ser. No. 238,898, filed Mar. 28, 1972, now U.S. Pat. No. 3,826,363 and owned by the assignee of the present invention, there is disclosed a package for containing a multiplicity of items arranged in a rectangular array including a flexible sleeve extending vertically upward along the outward sides of said array, said sleeve being substantially contiguous to the outward sides of said array and having substantially no tension, whereby at rest items may be easily removed from said package. A bottom portion underlies at least the corners of the bottom and is connected to said sleeve. A pair of handles for lifting the package and the contained items is provided, located one on each of an opposing pair of the sides of said sleeve. Upon lifting the handles, the flexible sleeve resists circumferential tension so as to tighten about the contained items compressing them together and providing substantially increased structural integrity. The entire disclosure of the aforesaid application Ser. No. 238,898 is hereby incorporated herein by reference as fully and completely as if physically copied herein and the present invention is an improvement over the invention disclosed in the aforesaid application Ser. No. 238,898, U.S. Pat. No. 3,826,363.

OBJECTS AND SUMMARY OF THE INVENTION

Accordingly it is an object of this invention to provide a package which is suitable for handling its contents within a retail store and for forming stable mass displays and which resists flowering.

It is another object of this invention to provide such a package which utilizes minimal amounts of material and which is easily formed.

It is a further object of this invention to provide a package from which the contents can easily be removed.

It is a still further object of this invention to provide an improvement to the package disclosed in U.S. application Ser. No. 238,898, U.S. Patent No. 3,826,363.

These and other objects are provided by a tray-like storage and display package which is formed from a
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stretchy, normally flaccid and preferably transparent material, such as polyethylene film, which is wrapped into a sleeve extending about the sides of an array of cartons and underlies at least a portion of the bottom of the array. The packaged arrays produced thereby are stable and may be stacked one above the other to form a stable display stack which is resistant to flowering. Handle means are provided on the individual tray like package, preferably formed by the film itself as a result of the folding and heat seal patterns used in assembling the package. The film (when the package is resting on a flat surface) normally has little or no tension about the array of cartons thereby allowing free removal of cartons when the package is resting or supported on a flat surface, as for example when forming the top package in a stack of such packages. The position of the handle means is such that the application of lifting force to them also imparts circumferential tension tightening the material and thereby stretching it to distribute the forces developed therein to circumferentially compress the cartons against each other and develop frictional forces therebetween sufficient to unite the array and all of the cartons into an integral unit to allow handling while yet enabling one by one removal of the cartons from the array as desired when the package is resting or supported on a flat surface.

BRIEF DESCRIPTION OF THE DRAWINGS

Although the specification concludes with claims particularly pointing out and distinctly claiming the subject matter regarded as forming the present invention, it is believed the invention will be better understood from the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view showing a package illustrating an embodiment of the present invention.

FIGS. 2 and 3 are perspective views showing the assembly of the embodiment of FIG. 1.

FIG. 4 is a perspective view illustrating the use of the embodiment of the invention shown in FIG. 1 and the tensioning of the package during lifting thereof as a unit in accordance herewith, and

FIG. 5 is a perspective view illustrating the use of the embodiment of the invention shown in FIG. 1 after lifting as shown in FIG. 4 and during withdrawal of a carton freely upwardly outwardly, as for individual sale thereof.

DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

Turning now to the drawings, FIG. 1 illustrates an embodiment of the invention. A number of cartons 10 are arranged in an array forming a rectangular parallelepiped having a height H, a width W and a depth D. Underlying the array of cartons 10 may be, but need not necessarily be, placed a support sheet 11 of corrugated board or the like. Encircling the cartons 10 is a sheet of stretchy and flaccid, as well as preferably transparent material 12. The material 12 can be cross-linked polyethylene shrink film about 3 mils thick, or any of the myriad of other materials known in the packaging art to be stretchy, flaccid and of sufficient strength and therefore not enumerated herein, and is sized such that one edge 16 may wrap around the width and depth of the array of containers 10 and allow the edges 13 and 14 to overlap so that a seam can be formed in the region 15 by heat sealing, adhesives, solvents or any other means known in the art to be satisfactory for forming a seam in the material 12 to define a sleeve extending about the side of the array. If desired, the sleeve can be formed without a seam, as by comprising a section of blown tubing, or the like.

The material 12 preferably has a dimension along the edges 13 and 14 to allow it to extend a distance A, preferably at least equal to one-half the height H of the array, vertically upward along the containers 10 and to extend under the support sheet 11 by a distance B of which is typically from about 1/2 to ½ the depth D of the array.

The support sheet 11, if used, is preferably the same size as or slightly smaller than bottom of the array of cartons so as not to interfere with circumferential tightening of the sleeve around the array during lifting, as will be described more fully hereinafter and will typically be made of materials similar to the corrugated paperboard which would be used in forming a conventional case for the cartons being handled but it need not necessarily be rigid and may therefore merely be a sheet of plastic film or paper such as heretofore used to form "tie sheets" within a mass display. Its function is to prevent cartons 10 from slipping through the otherwise open portion of the package underlying the cartons 10. It is obvious that this function can be provided in many other ways. For instance, the support sheet can be approximately the same size as the otherwise open area of the bottom of the package and be adhesively secured to the material 12. Alternatively, strips of plastic, tape, corrugated board or the like can be appropriately placed and secured to provide underlying support for at least a portion of each carton 10.

As discussed hereinafter, it is also possible to provide an embodiment of this invention wherein at least some or all of the carton 10 have no underlying support for any sheet like the support sheet 11 and such support sheet may be completely eliminated and is therefore not shown in FIGS. 4 and 5.

FIGS. 2 and 3 illustrate the manner in which the support sheet 11 (if used) and the material 12 may be assembled about the array of cartons 10. Referring particularly to FIG. 2, the cartons 10 may be disposed in the desired array and rest on their tops; i.e., inverted from the position shown in FIG. 1. The support sheet 11 (if used) is then put in place. The material 12 is then wrapped about the sides of the array extending vertically along said sides a distance A and the edges 13 and 14 are overlapped and a seam formed by any of the means previously described in the region 15 between said edges. Preferably little or no circumferential tension is applied to the material 12 in the course of forming the seam, and the circumference of the sleeve can be, for instance, ½ inch greater than the circumference of the array when using 3 mil polyethylene. A portion of the sleeve material extends beyond the support sheet 11 by a distance B.

As shown in FIG. 3, the portions of the material 12 extending beyond the edges of the array from the pair of opposing sides forming the width W dimension are folded downwardly into contact with bottoms of the carton 10 or the support sheet 11 (if used). This folding causes the remaining portions of the material 12, which initially extend beyond the edges of the array to fold down against the plane of the bottom of the array or of the support sheet 11 (if used) and extend beyond the array of cartons 10 in a wing-like manner as shown.
The assembly is completed by folding the wing-like portions downwardly and attaching or bonding them together and to the portion of the material 12 disposed on the faces forming the depth dimension D of the array preferably by heat sealing in the triangular regions designated 19 in FIG. 1, although it is to be understood that the bonding or sealing may alternatively be formed by adhesives, solvents, or by any other means known in the art to be satisfactory for seaming or bonding the material 12, and any such process is intended hereafter to be included in the general term “heat sealing.”

As shown in FIG. 1, the last mentioned folding and sealing operation forms, on each of a pair of opposing faces of the array, a rectangular region 18 having a height equal to dimension B, which comprises two (2) layers of material 12, and two triangular regions 19 each comprising three (3) thicknesses of material 12.

In accordance with the present invention, only a limited portion, designated 19a, of the triangular regions 19 are heat sealed although such limited portion 19a, and the heat sealing thereof, preferably extends to all three overlapping layers defined within the region 19. In this connection, a consideration of the drawing, and particularly FIGS. 1–3, will make it clear that the triangular region defined by 19 extends not only to the overlapping portions of the material 12 initially extending beyond the array a distance B which, after formation of the first set of folds, from the configuration of FIG. 2 to the configuration of FIG. 3, form two layers of the region 19 but, in addition, the extent of the material 12 defined by the distance A underlying such folded two layers.

Preferably, in accordance with the present invention, the heat sealed portion 19a is generally curvilinear, being of generally egg or teardrop shaped configuration with the larger or broader end generally upwardly (as defined by the orientation illustrated as FIG. 1) and the narrow or more pointed end generally oppositely thereof. Alternatively, the region 19a may be considered to be of generally rounded generally triangular shape. Further, the heat sealed portions 19a are situated so that the larger or upper end portions also generally converge or extend generally towards each other and the narrow or lower end portions of the heat sealed portions 19a generally diverge and extend towards opposite bottom corners of the package. It is to be emphasized that while the heat sealed portions 19a are preferentially widened at the upper ends thereof and narrowed at the lower ends thereof, and while this configuration appears to give a better stress distribution than a longitudinally symmetric heat sealed portion 19a, a longitudinally symmetric shape for the heat portions 19a may provide a usable structure. Further, the heat sealed portions 19a may be entirely curvilinear, i.e., have no straight line edge portions, or may have edge portions, particularly side edge portions which are straight. For example, the heat sealed portions 19a may have side edge portions defined by straight line rays radiating generally from the adjacent bottom corner of the array. It has been found preferable that, although straight line edges may be advantageous, stress-raising corners, discontinuities or sharply defined edges should be avoided.

Moreover, it has been further found that it is advantageous and preferable that no edge of the heat sealed portion 19a be contiguous with an edge of the region 19 in as much as weakening or stress concentration appears to result if an edge of the heat-sealed portion 19a is contiguous with an edge of the region 19 which may lead to tearing of the single layer of material 12 adjacent such contiguous edge. Accordingly, it is preferable that the heat sealed portion 19a be entirely within and completely surrounded by the region 19.

As stated previously, the material 12 is preferably formed about the array of cartons 10 with little or no tension. Because of this, when the completed package of FIG. 1 is resting on the portion of the material 12 underlying the array and the support sheet 11 (if used) each of the cartons 10 is unconstrained and can be easily removed upwardly and outwardly of the package. However, when a mass display is formed by a stack of such packages, the mass display is stable and the packages prevent flowering thereof without necessitating any supplemental tie sheets, or the like.

FIG. 4 illustrates the manner in which the package of the present invention is handled. A lifting force is applied to the lower edge of the rectangular region 18 on each side of the array which thereby serves as a lifting means and defines a handle. Because there is little or no circumferential tension in the material 12, a hand may be easily slipped between the cartons 10 and the material 12 to apply the lifting force. Application of the lifting force causes upward displacement and pulling of the material 12 particularly in the region of the rectangular region 18 and in the underlying two layers of material within the region 19, beneath the heat sealed portions 19a and, to some extent, of all the material 12, including that within the heat-sealed portions 19a and even thereabove. This displacement and pulling gathers or bunches some of the material 12 together and imparts circumferential tension to the material 12 and, due to the stretchy and pliable nature of the material 12, a distributed strain is developed, first at the bottom corners and thence gradually distributed upwardly as indicated by the pull lines depicted in FIG. 4. The circumferential tension developed compresses the cartons, 10 together, enabling frictional forces between the faces thereof to substantially lock the cartons 10 into a sufficiently rigid block to allow handling them much as they could be handled if enclosed within a rigid package such as a corrugated box. The shape of the heat sealed portion 19a restricts upward displacement, pulling and bunching of the inner two layers thereafter while permitting occurrence of such upward displacement, pulling and bunching generally below such heat sealed portion to define the handle height and direct the distribution of the developed tensile forces to enhance the desired development of compressive forces on the items of the array.

As mentioned previously, the use of support sheet 11 is optional. The support sheet 11 can be eliminated if the portions of the material 12 underlying the cartons 10 have a dimension B large enough that at least part of each carton 10 is supported by the material 12. Even this requirement can be eliminated if the circumferential tension developed in lifting the package locks the cartons 10 together with enough force to prevent slippage of a carton 10 not supported from below before substantial upward displacement of the outside edges of the array occur. The “locking force” required to achieve this is reduced as the coefficient of friction between the faces of the cartons 10 is increased. Some cartons will possess a sufficient coefficient of friction as
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manufactured to eliminate both of the above requirements and others will require additional treatment, by, for instance, the use of a sticky coating such as that commonly applied to large paper bags of product to allow them to be stacked on a pallet (commonly referred to as palletizing adhesive), to be suitable for use with a package of this invention in which some of the containers have no underlying support sheet 11 nor flexible film 12. The minimum requirement, of course, is that a portion of the material 12 (or some member attached to the material 12) underly the array at the corners.

As stated previously, the material 12 is preferably initially formed about the array of cartons 10 with little or no tension. In addition, and as also previously stated, the material 12 is preferably stretchy and pliable, as well as desirably being substantially flaccid so that, upon release of the lifting forces to the handle found by the bunching up of the regions 18, and upon the package being again rested on an underlying support surface, substantial relaxation of the bunched up regions 18 occurs and the package generally acquires the appearance shown in FIG. 5. Complete relaxation does not necessarily occur and residual bunching up of the regions 18 may remain, as well as residual distortions and pull lines in the regions 19 and throughout the material 12, as well as some residual stretching of the material 12 and lengthening of the sleeve portion and of the upper edge 16 thereof. Because of this, when the completed package of FIG. 1 is resting on the portion of the material 12 underlying the array and the support sheet 11 (if used) each of the cartons 10 is again unconstrained and can be at least as easily, if not more easily, removed upwardly and outwardly of the package and as is clearly illustrated and shown in FIG. 5.

As heretofore pointed out, the package material 12 is preferably transparent so that a stack or group of stacks thereof can be used as a mass display without requiring individual stacking of cartons at the point of display.

Many modifications of the invention can be made and it is not intended to limit the invention to the particular structures described, all reasonable equivalents thereof being intended to fall within the scope of this invention.

What is claimed is:

1. A package for a multiplicity of items such as cartons or the like to enable such items to be packaged for shipping, storage and display thereof as a unit while being yet easily removable therefrom for subsequent handling as individual items wherein each of such items has at least a base portion of generally upstanding paralleloped configuration and such multiplicity of items is arranged with the base portions in a closely packed rectangular array, said package comprising a generally uniform width sleeve of stretchy and pliable material having an array encircling portion extending peripherally continuously around and vertically upwardly from outward lowermost edges of the sides of said array, substantially contiguous to the outward sides of said array and being of sufficient peripheral extent as to be at least as large as said array and therefore substantially unstressed by the enclosed array when the bottom thereof is supported on a surface so that such items may be easily lifted upwardly therefrom and removed from said package for handling as individual items when the same is at rest, and an extending portion extending beyond said lowermost edges folded inwardly past an opposed side pair of such edges toward such other to define a bottom portion extending generally perpendicularly inwardly of said array encircling portion to contiguously underly at least each of the corners of the bottom of said array and, a pair of end flaps extending outwardly of side bottom portion generally in opposite directions parallel said side pair of lowermost edges, each of said end flaps comprising a generally medial generally rectangular region defined by a single thickness of material flanked on both sides by a pair of contiguous generally triangular regions defined if material folded to a double thickness, each of said end flaps being folded along an end lowermost edge of the array against the array encircling portion and overlying an end of said array and being bonded thereto in only a portion of each of said triangular regions less than the total area thereof and unbonded in the remainder of said triangular region to define means for enabling lifting of the package and the enclosed array as a unit by defining a pair of handles connected with said array encircling portion, one on each of opposing pair of ends thereof generally centered between and upwardly of a pair of said bottom corners and spaced upwardly thereof upon the application of lifting force to said handle a distance such that tensile stresses are induced in the sleeve between said handles and the adjacent ones of said bottom corners and distributed upwardly thereof to provide resultant components directed inwardly of the array to cause at least the bottom portion of the sleeve to tighten about at least that part of the array defined by the base portion of the enclosed items and compress them together with a force sufficient to maintain said array substantially coherent through frictional forces developed thereby between adjacent ones of said items and to thereby provide substantially increased structural integrity to said package during such lifting.

2. Package defined in claim 1 wherein said handles comprise upwardly bunched up portions of said central portions of said end flaps and the underlying portions of said array encircling portions.

3. Package defined in claim 2 wherein said material comprises a heat sealable plastic film and wherein said bonding comprises heat sealed portions extending through each of the layers of said triangular regions and into the underlying triangular region of said array encircling portion.

4. Package defined in claim 3 wherein each of said heat sealed portions are spaced upwardly from said lowermost edges to enable said lifting of said bunched up portions of said central and underlying portions to bunch up portions of the innermost layer of each of said triangular regions disposed between said bunched up portions of said rectangular regions and the adjacent bottom corners of the array and the underlying portions of said array encircling portions to enhance development of circumferential tensile forces in said array encircling portion upwardly of said bottom corners and along the sides of said array.

5. Package defined in claim 4 wherein said heat sealed portions are of generally curvilinear configuration.

6. Package defined in claim 5 wherein said heat sealed portions are of generally elongated configuration, spaced inwardly of the hypotenuse of said triangular
regions and angularly oriented towards upwards convergence and downwards divergence.

7. Package defined in claim 6 wherein an edge of each of said heat sealed portions adjacent each such hypotenuse is generally linear and parallel thereto.

8. Package defined in claim 6 wherein each of said heat sealed portions is of generally egg or teardrop shaped configuration.

9. Package defined in claim 6 wherein each of heat sealed portions is of generally rounded generally triangular configuration.

10. Package defined in claim 9 wherein said generally triangular configuration is defined between a pair of rays radiating from an adjacent corner of the package.

11. Package defined in claim 5 wherein the major axis of each of said heat portions is directed generally towards an adjacent bottom corner of said array.

12. Package defined in claim 11 wherein said heat sealed regions are each bounded generally by a pair of diverging rays radiating generally from an adjacent bottom corner of said array.

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