A composite package (100) comprising a handle structure insert (10), a group of articles (A) disposed in part on the handle structure insert (10) and a polymeric film (80) tightly wrapped about a substantial portion of the group of articles (A) and the handle structure insert (10), wherein the handle structure comprises one or more piercing projections (44a-d) configured to pierce the polymeric film (80).
COMPOSITE PACKAGE, TRAY AND BLANK THEREFOR

FIELD OF THE INVENTION

[0001] The present invention relates to packaging, more specifically, but not exclusively to a composite packaging comprising a tray and a wrapping material, wherein the tray provides a handle for carrying the package.

BACKGROUND OF THE INVENTION

[0002] In the field of packaging it is often required to provide consumers with a package comprising multiple primary product containers, such multi-packs are desirable for shipping and distribution and for display of promotional information. For cost and environmental considerations, such cartons or carriers need to be formed from as little material as possible and cause as little wastage in the materials from which they are formed. It is also possible to reinforce the strength of the packaging and its suitability for holding and transporting large weights of articles.

[0003] It is known to use a shrink-wrap material to hold together a group of articles. In such packs, a group of articles, such as plastics drinks bottles are arranged in an order group, wrapped with a film and heat applied to shrink the film such that it wraps tightly about the group. Such packages are widely known and the shrink-wrap material is low-cost. Such packages can be difficult to, grasp, hold and therefore carry. Often the access point for a user to grasp the packaged group of articles is along an edge of the shrink wrap material. This is not always easy or comfortable for the user and additionally, under a heavy weight of packaged goods, the shrink-wrap material can stretch and tear, sometimes causing complete failure of the package. Because no other mechanism is provided for holding the articles in a group, if the shrink wrap fails then all of the articles may fall out of the failed packaged.

[0004] In U.S. Pat. No. 7,793,779 to Spivey a composite package is disclosed which comprises a carton and shrink-wrap film. The carton comprises handle panels at each of its ends which are adapted for grasping and carrying the carton. The articles and the carton are secured together by means of neck-through apertures provided in the carton and by means of an overwrap of polymer film (e.g. shrink wrap) with the handle protruding outward from the respective sides of the carton. In such an arrangement, care must be taken when the shrink wrap is applied to ensure that the handle panels are protruding outward during the application and shrinking of the polymer film. Whereas the neck-through apertures may mitigate against relative movement of the carton and the article group and/or the shrink wrap, care is required during the construction of the package to ensure that the carton is properly aligned on top of and laid correctly onto the articles. Further disadvantageously, with very heavy weights of articles, the handle may fail. Furthermore, the presence of the carton may limit the extent to which the shrink-wrap can be tightly wrapped about the articles. It may also be uncomfortable for a user to carry a large multi-pack by holding a handle in each hand.

[0005] The present invention seeks to provide an improvement in the field of composite packaging, which provides an alternative handle solution for a package where the articles are held together predominantly by a polymeric film, such as shrink wrap.

SUMMARY OF INVENTION

[0006] According to an aspect of the present invention there is provided a composite package comprising a handle structure insert, a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure comprises one or more piercing projections configured to pierce the polymeric film.

[0007] According to another aspect of the present invention there is provided a composite package comprising a handle structure insert, a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure comprises a reinforced handle panel formed contiguously with and extending into a bottom panel of the handle structure insert.

[0008] According to yet another aspect of the present invention there is provided a composite package comprising a handle structure insert, a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure comprises a bottom panel comprising shaped edges, wherein the shaped edges are at least partially similarly shaped to the shape of an adjacent part of the group of articles to facilitate tight wrapping of the polymeric film about the group of articles and the handle structure insert.

[0009] According to a further aspect of the invention there is provided a composite package comprising a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure insert comprises one or more piercing projections configured to pierce the polymeric film.

[0010] According to another further aspect of the invention there is provided a handle structure insert for a composite package comprising a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure insert comprises a reinforced handle panel formed contiguously with and extending into a bottom panel of the handle structure insert.

[0011] According to yet another further aspect of the invention there is provided a handle structure insert for a composite package comprising a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure insert comprises a bottom panel comprising shaped edges, wherein the shaped edges are at least partially similarly shaped to the shape of an adjacent part of the group of articles to facilitate tight wrapping of the polymeric film about the group of articles and the handle structure insert.

[0012] Preferably, the handle structure insert comprises a bottom panel and said one or more piercing projections are formed at the end of a corner section of the bottom panel.

[0013] Preferably, the piercing projection has a point and a barb and the polymeric film catches on the barb.

[0014] Preferably, the corner section comprises a longitudinally extending weakened line formed from the group con-
sisting of: a cut line, a perforated line, a score line, a crease line, an embossment, a debossment, a line comprising a series of half-depth cut and fold lines.

[0015] Preferably, the reinforced handle has a width along a lateral axis that is less than the maximum width along a lateral axis of the bottom panel.

[0016] Preferably, the reinforced handle panel comprises a primary handle panel and a pair of reinforcing handle panels hingedly attached and affixed thereto, the reinforcing handle panels comprising leg portions formed from material taken from the bottom panel and wherein the reinforced handle panel contiguously extends into a section of the bottom panel that is the same width as the width of the reinforced handle panel, which section is partially reinforced by a leg portion of the reinforcing handle panel.

[0017] Preferably, said section of the bottom panel has a longitudinal length that is between about 20% and about 30% of the maximum longitudinal length of the bottom panel. Preferably, said section is defined in part by a pair of longitudinal weakened lines which each terminate in an arcuate or curved or semi-circular cut line. Preferably, said weakened line comprises a fold line and a cut line.

[0018] Preferably, the shaped edges comprise undulated curved portions which follow the contour of two adjacent articles disposed in the composite package.

[0019] Within the scope of this application it is envisaged that the various aspects, embodiments, examples, features and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings may be taken independently or in any combination thereof. For example, features described in connection with one embodiment are applicable to all embodiments unless there is incompatibility of features.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Exemplary embodiments of the invention will now be described with reference to the accompanying drawings, in which:

[0021] FIG. 1, is a plan view of a blank for forming a handle structure insert according to a first embodiment of the invention for use in forming a composite package;

[0022] FIG. 2, is a perspective view from above of a composite package comprising a handle structure insert formed from the blank of FIG. 1, a group of articles and a polymeric film wrapped about the handle structure insert and the group of articles;

[0023] FIG. 3, is an enlarged perspective view of a corner portion of the composite package of FIG. 2;

[0024] FIG. 4, is a partial perspective view from below of the composite package of FIGS. 2 and 3; and

[0025] FIG. 5, is a perspective view from of the composite package being carried by a carrying handle of the handle structure insert.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS OF THE PRESENT INVENTION

[0026] Detailed descriptions of specific embodiments of the composite packages, blanks and handle structure inserts are disclosed herein. It will be understood that the disclosed embodiments are merely examples of the way in which certain aspects of the invention can be implemented and do not represent an exhaustive list of all of the ways the invention may be embodied. As used herein, the word “exemplary” is used expansively to refer to embodiments that serve as illustrations, specimens, models, or patterns. Indeed, it will be understood that the composite packages, blanks and handle structure inserts described herein may be embodied in various and alternative forms. The figures are not necessarily to scale and some features may be exaggerated or minimised to show details of particular components. Well-known components, materials or methods are not necessarily described in great detail in order to avoid obscuring the present disclosure. Any specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the invention.

[0027] The invention generally relates to a composite package comprising a handle structure insert, a group of articles disposed in part on the handle structure insert (which may also be referred to as a tray) and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert. The handle structure insert comprises a number of features below advantageously may be employed individually or in any combination. The illustrated handle structure insert comprises all of the following features, but it will be recognised that one or more of them may be adopted in isolation of the other features in other envisaged embodiments:

[0028] (i) one or more piercing projections configured to pierce the polymeric film for mitigating against undesirable tearing of the polymeric film;

[0029] (ii) a reinforced handle panel formed contiguously with and extending into a bottom panel of the handle structure insert; and

[0030] (iii) a bottom panel comprising shaped edges, wherein the shaped edges are at least partially similarly shaped to the shape of an adjacent part of the group of articles to facilitate tight wrapping of the polymeric film about the group of articles and the handle structure insert.

[0031] In the embodiments detailed herein, the terms handle structure insert and tray refer, for the non-limiting purpose of illustrating the various features of a structural part of the composite package of the invention, for supporting and/or assisting carrying of the articles, such as bottles. However, it is contemplated that the teachings of the invention can be applied to various articles, which may or may not be tapered and/or cylindrical. Other exemplary articles include bottles (for example metallic, glass or plastics bottles), cans (for example aluminium cans), tins, pouches, packets and the like.

[0032] A blank 10 for forming a handle structure insert is formed from a sheet of suitable substrate. It is to be understood that, as used herein, the term “suitable substrate” includes all manner of foldable sheet material such as paperboard, corrugated board, cardboard, plastic, combinations thereof, and the like. It should be recognized that one or other numbers of blanks may be employed, for example, to provide the carrier structure described in more detail below.

[0033] In the exemplary embodiment, the blank 10 is configured to form a handle structure insert carton or carrier suitable for packaging an exemplary arrangement of exemplary articles ‘A’, which typically may be a large multipack of substantial weight. For example, the arrangement of articles in the illustrated embodiment is a 4x6 matrix arrangement of plastic (for example PET) bottles sized to each hold 500 ml of
beverage (for example mineral water). The blank 10 may be suitable for and/or can be alternatively configured to form a handle structure insert for a composite package comprising different sizes and/or different types and/or different numbers and/or different configurations of articles.

[0034] The blank 10 is substantially symmetrical along its longitudinal and lateral axes. As such where only one end or corner of the blank 10 is described it will be understood that the opposite end or other corners are substantially the same in the illustrated embodiment. The blank 10 comprises a bottom panel 18. Formed contiguously with the bottom panel 18 and at each end thereof a primary handle panel 26b, 26a is provided. A longitudinal axis of the blank 10 runs between the primary handle panels 26b, 26a. At least portions of the edges 46b, 46a of the bottom panel 18 may lie 22a, 22d to be substantially similar to or match the contour of the article group forming part of a composite package 100 (see FIG. 4) with the handle structure insert formed from the blank 10. A lateral axis of the blank 10 runs between the side edges 40a, 40b of the blank 10.

[0035] It is preferable that each end of the handle structure insert that is formed from the blank 10 comprises a handle so that in use a customer or user of the composite package 100 can readily grasp and carry the composite package 100 without first having to find the “correct” end of the package 100. However, it will be understood that in other embodiments of the invention, only one handle is provided at one end of the composite package 100. Preferably, where two handles are provided a user may opt to carry the composite package 100 using both handles. However, many of the beneficial aspects of the invention are provided to support holding and carrying of the composite package 100 using only one handle (as shown in FIG. 5). In such a carrying position, the handle structure insert is required to support a significant weight. Aspects of the invention address the various considerations when dealing with such a weight, which considerations may include: the user’s comfort; the handle taring through the polymeric film; the handle taring off the handle structure insert; and keeping the handle insert structure and article group together as a unit using the tightness of the wrapping of the polymeric film.

[0036] As will now be described the handle structure insert of the present invention comprises a number of features which individually contribute to the strength and durability of the handle and the composite package 100, which may be applied together individually or in any suitable combination in other envisaged embodiments.

[0037] Referring again to FIG. 1, each primary handle panel 26b, 26a, is contiguous with the bottom panel 18 and may be delineated therefrom only by means of an optional lateral fold line 28a. The edges of the primary handle panels 26b, 26a may be joined adjacent fold lines 22a, 22b, 22c, 22d to extend contiguously into the bottom panel 18 as weakened lines 31a/33a/35a; 31b/33b/35b; 31c/33c/35c; 31d/33d/35d. Each weakened line 31a/33a/35a; 31b/33b/35b; 31c/33c/35c; 31d/33d/35d may comprise: a fold line 31a, 31b, 31c, 31d (that may be formed from an alternating series of half-depth cuts and crease lines); a cut line 33a, 33b, 33c, 33d; and a terminating cut 35a, 35b, 35c, 35d that is substantially semi-circular and returns back in the opposite direction to the cut line 33a, 33b, 33c, 33d in order to prevent or at least mitigate against the unintentional propagation of the cut line 33a, 33b, 33c, 33d further into the bottom panel 18. Preferably, each weakened line 31a/33a/35a; 31b/33b/35b; 31c/33c/35c; 31d/33d/35d defines an edge of a leg. 12a, 12b, 12c, 12d of a reinforcing handle panel 24b, 24a, 20b, 20a.

[0038] A reinforcing handle panel 24b, 24a, 20b, 20a may be hinged preferably directly to the primary handle panel 26b, 26a along fold lines 22a, 22b, 22c, 22d. Each reinforcing handle panel 24b, 20b, 24a, 20a preferably extends into and is contiguous with the bottom panel 18 by virtue of the leg panel 12a, 12b, 12c, 12d. The leg panel is defined by a lateral fold line 30a, 30b, 30c, 30d, the weakened line 31a/33a/35a; 31b/33b/35b; 31c/33c/35c; 31d/33d/35d, a lateral cut line 46a, 46b, 46c, 46d and a longitudinal cut line 48a, 48b, 48c, 48d. Each reinforcing panel 24b, 24a, 20b, 20a and leg 24b/12a; 20b/12b; 24a/12c; 20a/12d are together foldable as a unit onto the inside face of the primary handle panel 26b, 26a and bottom panel 18. As such each reinforcing panel 24b, 24a, 20b, 20a provides a layer or partial layer of reinforcing material that spans the primary handle panel 26b, 26a and the bottom panel 18.

[0039] A section of the bottom panel 18 is contiguous with the primary handle panel 26b. The section may be defined as the material of the bottom panel 18 substantially between the weakened lines 31a/33a/35a and 31b/33b/35b. The section of the bottom panel 18 has a lateral width between those weakened lines 31a/33a/35a and 31b/33b/35b that is substantially the same width as the lateral width of the primary handle panel 26b (between fold lines 22a and 22b). Preferably, said section of the bottom panel 18 has a longitudinal length (which may be defined as the distance between fold line 28a and the termination 35a/35b) that is between about 20% and about 30% of the maximum longitudinal length of the bottom panel 18 (between fold lines 28a and 28b).

[0040] The blank 10 additionally comprises one or more piercing projections 44a, 44b, 44c, 44d. Preferably, the one or more piercing projections 44a, 44b, 44c, 44d is/are configured and arranged such that during manufacture of the composite package, when the polymeric film 80 is slurry about the group of articles ‘A’ and the handle structure insert, at least one of the one or more piercing projections 44a, 44b, 44c, 44d/cuts through and pierces the polymeric film 80 in a predetermined manner and at a controlled pre-determined location on the composite package 100. Preferably, the one or more piercing projections 44a, 44b, 44c, 44d is/are configured to pierce the polymeric film 80 when the composite package 100 is first lifted by one of the primary handles (see FIG. 5). The weight or substantially downward force applied to the handle structure insert by the group of articles may cause the one or more piercing projections 44a, 44b, 44c, 44d to cut through the polymeric film 80. Preferably, each piercing projection 44a, 44b, 44c, 44d has an arrow head or point and a barb or shoulder and the polymeric film catches on the barb (see FIG. 3). The catching of a pierced edge of the polymeric film 80 on the barb may assist in preventing a tear from propagating through the polymeric film 80.

[0041] The primary handle panel 26b, 26a and the corresponding reinforcing handle panels 24b, 20b, 24a, 20a comprise handle elements. Many handle structures are known which may be suitably employed in the present invention. The handle illustrated is therefore optional and it will be understood that in a basic form, the handle elements may comprise simple apertures into which a user can insert part of their hand. Nevertheless, the handle structure illustrated in FIGS. 1 to 5 is beneficial because the handle elements co-operate to form a cushioned, three-dimensional handle structure that may be more robust and/or more comfortable than other.
handles especially where the multi-pack is of significant weight. The handle structure will be described with reference only to one end of the blank 10, it being understood that the handle at the other end of the blank 10 is identical. In other envisaged embodiments however, the handle structures are not identical.

[0042] The primary handle panel 26b includes a first, outer, handle flap 68b. The first handle flap 68b is movable out of the plane of the primary handle panel 26b to form a handle aperture, through which a user may insert part of their hand (H) for grasping the composite package 100 (see FIG. 5).

[0043] The first outer handle flap 68b, comprises an arrangement of fold, weakened and cut lines. The first outer handle flap 68b, is hingedly connected to the primary handle panel 26b proximate an upper portion of the handle aperture by virtue of a first hinge connection formed as an arcuate fold line 66b. A further optional fold line 61b is disposed proximate to and opposite to the first fold line 60b. Between the weakened lines 60b, 61b a first, at least substantially or approximately elliptically-shaped panel is provided. The panel may also be described as being a leaf-shaped panel. Preferably, the arcuate fold lines 60b, 61b converge such that the at least substantially or approximately elliptically-shaped panel has pointed ends. In other envisaged embodiments, the converging arcuate fold lines 60b, 61b may converge at a point or may not quite meet one another and may converge at a rounded portion or straightened edge portion.

[0044] The first handle flap 68b is defined in part by the first substantially-elliptically shaped panel and in part by a line of separation 81b. The line of separation 81b may be a cut-line interrupted by one or more connecting nick portions 73b. Preferably, the line of separation 81b extends from inwardly curved terminations disposed below and proximate to ends of the first substantially-elliptically shaped panel and curves upwardly and arcuately and then across part of the primary handle panel 26b.

[0045] An optional weakened arrangement is provided, in part to assist in initiating the separation of the first handle flap 68b from the primary handle panel 26b, and in part to assist with the inward folding of the first handle flap 68b when the handle is deployed. The optional weakened arrangement comprises a linear fold line 76b disposed above and substantially parallel to a linear section of the line of separation 81b.

[0046] The first handle flap 68b is foldable about the first arcuate fold line 60b inwardly of the primary handle panel 26b. The first substantially elliptically-shaped panel provides a cushioned edge of a three-dimensional load-bearing structure. The three-dimensional load-bearing structure is further formed and supported by inner elements namely second and third handle flaps 46b, 52b.

[0047] Each inner handle flap 46b, 52b is hinged to a reinforcing handle panel 20b, 24b, by second fold line 48b and third fold lines 54b respectively. Preferably, the second and third fold lines 48b, 54b are arcuate and yet further fold lines 47b, 57b disposed proximate to and opposite to the second and third fold lines 48b, 54b are provided. At least substantially elliptically-shaped panels are formed between the second arcuate fold line 48b and the further fold line 47b and between the third arcuate fold line 54b and the further fold line 57b. Otherwise the second and third handle flaps 46b, 52b are free of connection from the adjacent reinforcing handle panels 20b, 24b (separated by a cut line 51b, 53b) or are at least separable therefrom (by separation of a perforation or connecting nick) so that the second and third handle flaps 46b, 52b can be folded out of the plane of the adjacent reinforcing handle panel 20b, 24b and inwardly of the handle structure insert, in co-operation with the folding of the partially overlapping first handle flap 68b.

[0048] The second and third handle flaps 46b, 52b may be sized and shaped so that their substantially elliptically-shaped panels are disposed at an acute angle relative to the first substantially elliptically-shaped panel. The second and third handle flaps 46b, 52b may be sized and shaped so that a portion of them is disposed in underlying relationship with the first handle flap 68b when the blank 10 is manipulated into a handle structure insert.

[0049] Turning to the construction of the handle structure insert (illustrated in FIGS. 2, 3, 4 and 5), it is envisaged that the handle structure insert can be formed by a series of sequential folding operations in a straight line machine so that the carton is not required to be rotated or inverted to complete its construction. The folding process is not limited to that described below and may be altered according to particular manufacturing requirements.

[0050] Each handle reinforcing panel 24b, 20b, 24a, 20a, and its associated is folded 12a, 12b, 12c, 12d folded about fold lines 22a, 31a, 22b, 31b, 22c, 31c, 22d, 31d until it is disposed at least substantially in overlapping face contacting relationship with the bottom panel 18. In this way the primary handle panel reinforcement additionally reinforces a section of the bottom panel 18 and spans the hinge connection 28b between the primary handle panel 26b and the bottom panel 18. Optionally affixing means, such as adhesive, hot melt glue or staples may be used to affix the handle reinforcing panels 24b, 20b, 24a, 20a and/or their associated legs 12a, 12b, 12c, 12d to the inside face of the bottom panel 18. The primary handle panels 26b, 26a and the reinforcing handle panels 24b, 20b, 24a, 20a may be folded relative to the bottom panel 18 about fold lines 28a, 30a, 30b, 28b, 30b, 30d respectively. Before or after folding the handle panels, a group of articles ‘A’ may be placed and arranged onto the bottom panel 18. It may make the loading of the articles ‘A’ onto the bottom panel 18 easier if the handle panels 26b, 26a are not first folded. In such a construction sequence, after loading the articles ‘A’ onto the bottom panel 18, the handle panels 26b, 26a are then folded upwardly relative to the bottom panel 18 to create ends of a tray about the grouped arrangement of articles ‘A’. The reinforced handle 26b/24b/20b formed from the primary handle panel 26b and one or more reinforcing handle panels 24b/20b preferably have a width along a lateral axis that is less than the maximum width along a lateral axis of the bottom panel 18.

[0051] Polymeric film 80 (for example a shrink-wrap material) is then wrapped about the article group and the handle structure insert. Optionally, the polymeric film 80 may be substantially rectangular and may be cut from a roll of wrapping material. The polymeric film 80 may be applied by placing it substantially centrally on top of the article group and folding it around the lateral axis of the handle structure insert. Each free end of the polymeric film wrap 80 may be disposed beneath the bottom panel 18 and preferably one end of the film is positioned to overlap the other free end of the film 80. Further preferably, the polymeric film 80 may be longer than the end-to-end length of the group of articles (i.e. the distance between each folded handle panel). The polymeric film 80 may be tightened about the grouped articles ‘A’ and the handle structure insert preferably by the application of heat such that the polymeric wrap 80 shrinks and tightens
about the articles ‘A’ and handle structure insert. The polymeric film 80 is preferably oversized beyond the end-to-end length of the handle structure insert to a limited extent such that the polymeric wrap 80 at each end of the composite package 100 is tightened about the tops, shoulders and bases of the end most articles, but does not completely cover the handle structure (see FIG. 2 wherein the tightened polymeric film 80 is illustrated by shading). As such a roughly oval-shaped area at each end of the composite package 100 may be free of shrink wrap 80. This area may be defined by an edge 82 of the shrink wrap-material 80 (see FIG. 4). In this way the reinforced handle 26a/24a/20a can be accessed for carrying the composite package 100. It may be necessary to work the more (preferably 26a/24a/20a) one of the shrink wrap 80 from the handle panels 26b, 24b, 20b through the area denoted by edge 82.

[0052] In use, the handle can be pulled out of the “oval area” 82 (see FIG. 5) and used as shown by a user inserting their hand “H” at least partially into the handle aperture which is formed when the first outer handle flaps 66a is folded. When the first handle flap 66a is folded inwardly, the second and third handle flaps 52b, 46b are also caused to fold inwardly. The arcuate fold lines 60b, 54b, 48b limit the extent to which the handle flaps 66b, 52b, 46b can be inwardly folded and together co-operate to form a 3-dimensional cushioned handle configured to bear the load imported by the group of articles. The reinforced handle is contiguous with a large area or section of the bottom panel 10 which may contribute to the strength of the handle structure (see FIG. 4).

[0053] Preferably, as the composite package is constructed and completed, the piercing projections 44a, 44b, 44c, 44d may pierce the shrink-wrap film 80. Preferably, the blank 10 is shaped such that a pointed, barbed or serrated type projection 44a, 44b, 44c, 44d is provided. In this way (and as can be seen in FIG. 3), the polymeric film 80 as well as being pierced may become hooked onto the barbed piercing projection 44a, 44b, 44c, 44d. One or more deliberately created and location-controlled piercings may help to mitigate against undesirable tearing of the polymeric shrink wrap 80 when the composite package 100 is lifted and carried, particularly when carried by one handle as illustrated in FIG. 5. The load exerted on the shrink wrap 80 may otherwise be localised at certain “pressure points” due to the shape of the articles and/or the shape of the handle insert structure and/or the significant weight of the article group. Furthermore, the engagement of a “tooth” 44a, 44b, 44c, 44d into the polymeric material 80 may prevent or mitigate against relative movement between the handle structure insert, the articles ‘A’ and the polymeric wrap 80.

[0054] By providing a handle structure insert with one or more preferably rounded corners sections 14a, 14b, 14c, 14d, the polymeric film 80 can be guided around and formed tightly against the rounded corners (see sections 21a, 21b, 21c, 21d in FIG. 1 and FIG. 3). Then, by providing piercing projections 44a, 44b, 44c, 44d at the termination of the corner section 14a, 14b, 14c, 14d, deliberate and controlled piercing of the wrap 80 is achieved which may mitigate against or prevent the polymeric wrap 80 from rupturing on the handle insert structure (which could otherwise cause a tear to propagate and destroy the integrity of the wrapping film 80). The shaped piercing 44a, 44b, 44c, 44d and the optional shoulder or barb thereof may assist in catching the polymeric film 80 and reducing the risk of a tear propagating.

[0055] Preferably, each corner section 14a, 14b, 14c, 14d may be provided with a longitudinal weakened line formed as a cut line 42a, 42b, 42c, 42d, which assists in the controlled folding or forming of the handle structure insert about the article group. In this way when the polymeric film 80 is tightened about the handle structure insert and the article group, the bottom panel 18 of the handle structure insert has a certain amount of “give” in it that can promote a tight fit of the shrink wrap 80. As can be seen in FIG. 4, each corner section 14a, 14b, 14c, 14d may fold to at least partially follow the contour of the articles ‘A’. As referred to above, the optional shaping of the side edges 40a, 40b also assists in the tight wrapping of the shrink wrap 80 which in turn creates a secure enclosure for the articles ‘A’. In other embodiments, it is envisaged that the longitudinal weakened line 42a, 42b, 42c, 42d may be any one or more or a combination of: a perforated line, a score line, a crease line, an embossment, a debossment, a line comprising a series of half-depth cut and fold lines.

[0056] It can be appreciated that various changes may be made within the scope of the present invention, for example, the size and shape of the panels and apertures may be adjusted to accommodate articles of differing size or shape. In other embodiments of the invention it is envisaged that the corner sections may be differently shaped and/or the piercing projections may be differently shaped.

[0057] It will be recognised that as used herein, directional references such as “top”, “bottom”, “front”, “back”, “end”, “side”, “inner”, “outer”, “upper” and “lower” do not limit the respective panels to such orientation, but merely serve to distinguish these panels from one another.

[0058] As used herein, the terms “hinged connection” and “fold line” refers to all manner of lines that define hinge features of the blank, facilitate folding portions of the blank with respect to one another, or otherwise indicate optimal panel folding locations for the blank. A fold line is typically a scored line, an embossed line, or a debossed line. Any reference to hinged connection or fold line should not be construed as necessarily referring to a single fold line only; indeed it is envisaged that hinged connection can be formed from any one or more of the following, a short slit, a frangible line or a fold line without departing from the scope of the invention.

[0059] As used herein, the term “severance line” refers to all manner of lines that facilitate separating portions of the substrate from one another or that indicate optimal separation locations. Severance lines may be frangible or otherwise weakened lines, tear lines, cut lines, or slits.

[0060] It should be understood that hinged connection, severance lines and fold lines can each include elements that are formed in the substrate of the blank including perforations, a line of perforations, a line of short slits, a line of half-cuts, a single half-cut, a cut line, an interrupted cut line, slits, scores, any combination thereof, and the like. The elements can be dimensioned and arranged to provide the desired functionality. For example, a line of perforations can be dimensioned or designed with degrees of weakness to define a fold line and/or a severance line. The line of perforations can be designed to facilitate folding and resist breaking, to facilitate folding and facilitate breaking with more effort, or to facilitate breaking with little effort.

1. A composite package comprising a handle structure insert, a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle
structure insert, wherein the handle structure comprises one or more piercing projections configured to pierce the polymeric film.

2. A composite package according to claim 1, further comprising a handle structure insert, a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure comprises a reinforced handle panel formed continuously with and extending into a bottom panel of the handle structure insert.

3. A composite package according to claim 1, further comprising a handle structure insert, a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure comprises a bottom panel comprising shaped edges, wherein the shaped edges are at least partially similarly shaped to the shape of an adjacent part of the group of articles to facilitate tight wrapping of the polymeric film about the group of articles and the handle structure insert.

4. A composite package according to claim 1 wherein the handle structure insert comprises a bottom panel and said one or more piercing projections is formed at the end of a corner section of the bottom panel.

5. A composite package according to claim 1 wherein the piercing projection has a point and a barb and the polymeric film catches on the barb.

6. A composite package according to claim 2 wherein the corner section comprises a longitudinally extending weakened line formed from the group consisting of: a cut line, a perforated line, a score line, a crease line, an embossment, a debossment, a line comprising a series of half-depth cut and fold lines.

7. A composite package according to claim 2 wherein the reinforced handle has a width along a lateral axis that is less than the maximum width along a lateral axis of the bottom panel.

8. A composite package according to claim 7 wherein the reinforced handle panel comprises a primary handle panel and a pair of reinforcing handle panels hingedly attached and affixed thereto, the reinforcing handle panels comprising leg portions formed from material taken from the bottom panel and wherein the reinforced handle panel continuously extends into a section of the bottom panel that is the same width as the width of the reinforced handle panel, which section is partially reinforced by a leg portion of the reinforcing handle panel.

9. (canceled)

10. A composite package according to claim 8 wherein said section is defined in part by a pair of longitudinal weakened lines which each terminate in an arcuate or curved or semi-circular cut line.

11. (canceled)

12. A composite package according to claim 3 wherein the shaped edges comprise undulated curved portions which follow the contour of two adjacent articles disposed in the composite package.

13. A handle structure insert for a composite package comprising a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure insert comprises one or more piercing projections configured to pierce the polymeric film.

14. A handle structure insert according to claim 13, further comprising a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure insert comprises a reinforced handle panel formed continuously with and extending into a bottom panel of the handle structure insert.

15. A handle structure insert according to claim 13, further comprising a group of articles disposed in part on the handle structure insert and a polymeric film tightly wrapped about a substantial portion of the group of articles and the handle structure insert, wherein the handle structure insert comprises a bottom panel comprising shaped edges, wherein the shaped edges are at least partially similarly shaped to the shape of an adjacent part of the group of articles to facilitate tight wrapping of the polymeric film about the group of articles and the handle structure insert.

16. A handle structure insert according to claim 13, further comprising a bottom panel and wherein said one or more piercing projections is formed at the end of a corner section of the bottom panel.

17. A handle structure insert according to claim 16 wherein the piercing projection has a point and a barb and the polymeric film catches on the barb.

18. A handle structure insert according to claim 13 wherein the corner section comprises a longitudinally extending weakened line formed from the group consisting of: a cut line, a perforated line, a score line, a crease line, an embossment, a debossment, a line comprising a series of half-depth cut and fold lines.

19. A handle structure insert according to claim 14 wherein the reinforced handle has a width along a lateral axis that is less than the maximum width along a lateral axis of the bottom panel.

20. A handle structure insert according to claim 19 wherein the reinforced handle panel comprises a primary handle panel and a pair of reinforcing handle panels hingedly attached and affixed thereto, the reinforcing handle panels comprising leg portions formed from material taken from the bottom panel and wherein the reinforced handle panel continuously extends into a section of the bottom panel that is the same width as the width of the reinforced handle panel, which section is partially reinforced by a leg portion of the reinforcing handle panel.

21. (canceled)

22. A handle structure insert according to claim 20 wherein said section is defined in part by a pair of longitudinal weakened lines which each terminate in an arcuate or curved or semi-circular cut line.

23. (canceled)

24. A handle structure insert according to claim 15 wherein the shaped edges comprise undulated curved portions.

25. (canceled)

26. (canceled)