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(54) Title: SLEEVE-STYLE CARRIER WITH STOWABLE HANDLE AND BLANK THEREFOR

(57) Abstract: A carton for packaging a plurality of articles includes a tubular structure defining a rear end and a front end. A rear end wall is disposed at the rear end of the tubular structure. A partitioning wall extends longitudinally through an interior of the tubular structure between the rear and front ends. The partitioning wall includes a handle disposed at an upper end of the partitioning wall. The partitioning wall is configured to move between a first configuration in which the handle is at least substantially stowed within the interior of the tubular structure and a second configuration in which the handle is at least substantially extended out of said interior.

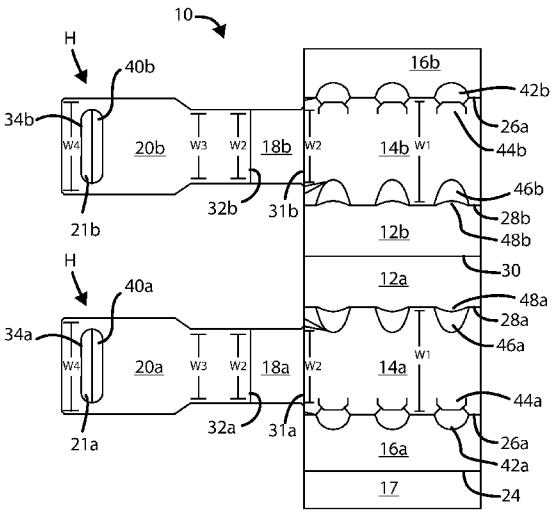

Fig. 1

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SLEEVE-STYLE CARRIER WITH STOWABLE HANDLE AND BLANK THEREFOR

TECHNICAL FIELD

The present invention relates to a carton, to a blank for forming the carton, and to a package comprising the carton and a number of articles contained therein, and more particularly to a carton defining a sleeve and including a stowable handle disposed at a front end of the sleeve.

BACKGROUND

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, it is generally desirable to form such cartons or carriers from as little material as possible and cause as little wastage in the materials from which they are formed as possible. Another consideration is the strength of the packaging and its suitability for holding and transporting large weights of articles.

It can be desirable to provide a multi-pack carton that can be conveniently carried by a user, e.g. via one or more handles. It can also be desirable to provide a carton that includes a partitioning structure for separating an interior of the carton into two or more separate cells. It can also be desirable to provide a carton that can be conveniently stacked with other cartons for storage, shipping, or display. It can also be desirable to provide a blank for a carton that can be conveniently shipped in a partially-assembled state for final assembly by a customer prior to loading.

SUMMARY

According to a first aspect of the invention, there is provided a carton for packaging a plurality of articles. The carton includes a tubular structure including a top wall, a bottom wall disposed opposite the top wall, and opposing first and second side walls each coupled to both the top and bottom walls. The tubular structure defines a rear end and a front end. The carton also includes a rear end wall disposed at the rear end of the tubular structure and a partitioning wall extending longitudinally through an interior of the tubular structure between the rear and front ends. A lower end of the partitioning wall is coupled to the rear end wall. The partitioning wall includes a handle disposed at an upper end of the partitioning wall. The partitioning wall is configured to move between a first configuration in which the handle is at least substantially stowed within the interior of the tubular structure and a second configuration in which the handle is at least substantially extended out of the interior.

Optionally, the rear end wall includes a first rear end wall panel and a second rear end wall panel. The first rear end wall panel is coupled to the first side wall. The second rear end wall panel is coupled to the second side wall.

Optionally, the partitioning wall includes first and second partitioning panels. The first partitioning panel is coupled at its lower end to the first rear end wall panel. The second partitioning panel is coupled at its lower end to the second rear end wall panel. The first and second partitioning panels are coupled to one another in face-contacting relationship.

Optionally, the first and second rear end wall panels are configured to be substantially coplanar with one another when the carton is in the first configuration.

Optionally, the first and second rear end wall panels are configured to be bent out of plane by rearmost ones of the plurality of articles when the carton is in the second configuration.

Optionally, the partitioning wall divides the interior of the tubular structure into two substantially equal volumes, each configured to receive a row of articles.

Optionally, an upper portion of each of the first and second side walls at least partially defines a plurality of article head engaging apertures.

Optionally, a lower portion of each of the first and second side walls at least partially defines a plurality of article heel engaging apertures.

Optionally, the handle includes a handle aperture and a cushioning flap.

Optionally, the rear wall includes first and second rear corner panels and first and second rear end panels. The first rear corner panel is coupled to the first side wall and the second rear end wall is coupled to the second side wall. The first rear end panel is coupled to the first rear corner panel and the second rear end panel is coupled to the second rear corner panel. The first and second rear corner panels are configured to be folded out of plane with respect to the first and second rear end panels in the first configuration so as to provide slack that may be taken up when the carton is moved to the second configuration.

Optionally, the first and second rear corner panels are coupled to the respective first and second side walls via a first pair of fold lines. The first and second rear end panels are coupled to the respective first and second rear corner panels via a second pair of fold lines. A folding

resistance of the second pair of fold lines is less than a folding resistance of the first pair of fold lines.

According to a second aspect of the invention, there is provided a blank for forming a carton configured to package a plurality of articles. The blank includes a plurality of main panels hinged together in a linear series. The plurality of main panels are configured to form a tubular structure in a set-up carton. The plurality of main panels include first and second side panels, first and second top panels, and first and second bottom panels. The blank also includes first and second rear end panels hingedly connected to the respective upper edges of the first and second side panels. The first and second rear end panels are configured to form a rear end wall of the tubular structure. The blank further includes first and second partitioning panels hingedly connected to the respective upper edges of the first and second rear end panels. The first and second partitioning panels are configured to be coupled to one another in a face-contacting relationship to form a partitioning wall of the set-up carton. The partitioning wall is configured to extend longitudinally through an interior of the tubular structure from the rear end wall to a front end of the tubular structure. The partitioning wall includes a handle disposed at a front end of the partitioning wall. The partitioning wall is configured to move between a first configuration in which the handle is at least substantially disposed within the interior of the tubular structure and a second configuration in which the handle is at least substantially extended out of the interior of the tubular structure.

Optionally, the plurality of main panels further includes a glue flap panel disposed at one end of the linear series.

Optionally, the glue flap panel is hingedly connected to the first bottom panel. The first bottom panel is hingedly connected to the first side panel. The first side panel is hingedly connected to the first top panel. The first top panel is hingedly connected to the second top panel. The second top panel is hingedly connected to the second side panel. The second side panel is hingedly connected to the second bottom panel.

Optionally, each of the first and second side panels at least partially define a plurality of article head-engaging apertures.

Optionally, each of the first and second side panels at least partially define a plurality of article heel-engaging apertures.

Optionally, the first and second rear end panels define a plane when the set-up carton is in the first configuration. The first and second rear end panels are configured to be bent out of the plane by rearmost ones of the plurality of articles when the set-up carton is in the second configuration.

Optionally, the blank is substantially symmetric about a central fold line.

According to a third aspect of the invention, there is provided a package including a carton and a plurality of articles contained therein. The carton includes a sleeve enclosing the plurality of articles. The sleeve defines a rear end and a front end. The carton further includes a rear end wall coupled to the rear end of the sleeve and a partitioning wall extending longitudinally through an interior of the sleeve. A rear end of the partitioning wall is coupled to the rear end wall. The partitioning wall includes a handle disposed at a front end of the partitioning wall. The carton is configured to transition between a first configuration in which the handle is at least substantially stowed within the interior of the sleeve and a second configuration in which the handle is at least substantially extended out of the interior.

Optionally, the plurality of articles are generally cylindrical shaped.

Optionally, the plurality of articles include cans.

Optionally, the rear end wall is substantially planar in the first configuration. The rear end wall is bent out of plane by rearmost ones of the plurality of articles in the second configuration.

According to a fourth aspect of the invention, there is provided a blank for forming a carton configure to package a plurality of articles. The blank includes a plurality of main panels hinged together in a linear series. The plurality of main panels are configured to form a tubular structure in a set-up carton. The plurality of main panels include first and second side panels, first and second top panels, and first and second bottom panels. The blank further includes first and second rear corner panels hingedly connected to the respective upper edges of the first and second side panels along a first pair of fold lines, and first and second rear end panels hingedly connected to the respective upper edges of the first and second rear corner panels along a second pair of fold lines. The first and second rear corner panels and first and second rear end panels are configured to form a rear end wall of the tubular structure. The blank further includes first and second partitioning panels hingedly connected to the respective upper edges of the first and second rear end panels. The first and second partitioning panels are configured to be coupled to one another in a face-contacting relationship to form a

partitioning wall of the set-up carton. The partitioning wall is configured to extend longitudinally through an interior of the tubular structure from the rear end wall to a front end of the tubular structure. The partitioning wall includes a handle disposed at a front end of the partitioning wall. The partitioning wall is configured to move between a first configuration in which the handle is at least substantially disposed within the interior of the tubular structure and a second configuration in which the handle is at least substantially extended out of the interior of the tubular structure.

Optionally, a folding resistance of the second pair of fold lines is less than a folding resistance of the first pair of fold lines.

Optionally, the first and second rear corner panels are configured to be folded out of plane with respect to the first and second rear end panels in the first configuration so as to provide slack that may be taken up when the carton is moved to the second configuration.

Optionally, when the set-up carton is in the first configuration, inwardly-extending depressions are formed in the rear end wall including two depressions each centered about a respective one of the second pair of fold lines and a third, central depression where the first and second rear end panels meet.

Optionally, a grain direction of the blank is oriented such that each of said second pair of fold lines extends generally along said grain direction.

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

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

FIGURE 1 is a plan view of a blank for forming a carton according to a first embodiment of the invention;

FIGURE 2 is a perspective view of the front end of a carton formed from the blank of Figure 1 with the carton's handle in the stowed configuration;

FIGURE 3 is a perspective view of the rear end of the carton of Figure 2 with the carton's handle in the stowed configuration;

FIGURE 4 is a perspective view of the front end of the carton of Figure 2 with the carton's handle in the extended configuration;

FIGURE 5 is a perspective view of the rear end of the carton of Figure 2 with the carton's handle in the extended configuration;

FIGURES 6A-6D show various steps in the construction of the carton of Figure 2.

FIGURE 7 is a plan view of a blank for forming a carton according to a second embodiment of the invention;

FIGURE 8 is a perspective view of the front end of a carton formed from the blank of Figure 7 with the carton's handle in the stowed configuration;

FIGURE 9 is a perspective view of the rear end of the carton of Figure 7 with the carton's handle in the stowed configuration;

FIGURE 10 is a perspective view of the front end of the carton of Figure 7 with the carton's handle in the extended configuration;

FIGURE 11 is a perspective view of the rear end of the carton of Figure 7 with the carton's handle in the extended configuration;

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Detailed descriptions of specific embodiments of the package, blanks and cartons 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 packages, blanks and cartons 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.

In the embodiments detailed herein, the terms "carton" and "carrier" refer, for the non-limiting purpose of illustrating the various features of the invention, to a container for engaging, carrying, and/or dispensing articles, such as cans and bottles. However, it is contemplated that the teachings of the invention can be applied to various containers, 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.

Referring to Figure 1, there is shown a first blank 10 for forming a carton 200 (see FIGS 2-5). The blank 10 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 carton described in more detail below.

In the exemplary embodiment, the blank 10 is configured to form a carton 200 for packaging an exemplary arrangement of exemplary articles C. In this example, the arrangement is a 2 x 3 matrix or array, and the articles C are cans. The blank 10 can be alternatively configured to form a carton for packaging other articles and/or different arrangements of articles and articles of different sizes.

Referring to Figure 1, the blank 10 includes a plurality of main panels 17, 16a, 14a, 12a, 12b, 14b, 16b hinged together in a linear series. In a set-up condition, the main panels forms a tubular structure or sleeve of carton 200 that encloses a plurality of articles C. The blank 10 also includes rear end panels 18a, 18b that are configured to form a rear end wall of the tubular structure. The blank 10 also includes partitioning panels 20a, 20b that are configured to be joined in a face-contacting relationship and extend longitudinally through an interior of the tubular structure between two adjacent rows of articles. Upper ends of the partitioning panels include a handle H disposed at a front end of the carton 200 that can be stowed in the carton's interior or extended out of the carton's interior and grasped by a user to carry the carton 200.

Blank 10 includes a glue flap panel 17, top panels 16, 16b, side panels 14a, 14b, and top panels 12a, 12b. The glue flap panel 17, bottom panels 16a, 16b, side panels 14a, 14b, and top panels 12a, 12b are aligned in a longitudinal direction and hingedly connected one to the next along transverse fold lines as described below.

In the exemplary embodiment, the blank 10 is substantially symmetric (with the exception of glue flap panel 17) about an axis defined by fold line 30 running transversely across the blank between adjacent first and second bottom panels 12a, 12b. More specifically, each panel or element represented by a numeral followed by the suffix "a" is functionally symmetric about that central line with the corresponding panel or element represented by a like reference

numeral followed by the suffix “b”. For example, an “a” element is complementary to and may cooperate, in a functional way, with a corresponding “b” element. It should be noted that the scope of the invention is not limited to a blank that is physically symmetric. Rather, the “a” elements may differ in size, shape, or contour from the corresponding “b” elements and still cooperate in a functional way. Corresponding elements may different in size to accommodate graphics. It should also be noted that the panels of the blank may be arranged differently such that the blank is not symmetric about the axis.

Top panels 12a, 12b are hingedly connected to one another along central fold line 30. Each top panel 12a, 12b is hingedly connected to a respective side panel 14a, 14b along a fold line 28a, 28b. Each side panel 14a, 14b is hingedly connected to a respective bottom panel 16a, 16b along a fold line 26a, 26b. First bottom panel 16a is hingedly connected to glue flap panel 17 along a fold line 24.

The blank 10 comprises a plurality of article head engaging apertures 46a, 46b disposed at the respective upper (relative to the constructed carton) ends of the side panels 14a, 14b. In the illustrated embodiment, each side panel 14a, 14b comprises three article head engaging apertures 46a, 46b.

Each of the article head engaging apertures 46a, 46b is generally crescent shaped. The inner arc of the crescent shape is defined by an outer edge of a rounded tab 48a, 48b. Rounded tabs 48a, 48b interrupt, and project slightly from, respective fold lines 28a, 28b. Each of the tabs 48a, 48b is arranged to be integrally formed with respective first and second top panels 12a, 12b. Each of the tabs 48a, 48b is configured to engage an uppermost surface of a corresponding article C. Each of the article head engaging apertures 46a, 46b is configured to receive a portion of an upper end of a corresponding article C.

The blank 10 also comprises a plurality of article heel engaging apertures 42a, 42b disposed at the lower (relative to the constructed carton) ends of the side panels 14a, 14b and extending into respective bottom panels 16a, 16b. In the illustrated embodiment, the blank includes three first article heel engaging apertures 42a and three second article heel engaging apertures 42b.

The article heel engaging apertures 42a, 42b interrupt respective fold lines 26a, 26b. Each of the article heel engaging apertures 42a, 42b includes a first, generally semi-circular portion defined by respective bottom panel 16a, 16b, and a second, generally trapezoidal portion defined by a respective side panel 14a, 14b. An upper edge of the second portion is defined

by a lower edge of a tab 44a, 44b. Each of the tabs 44a, 44b has a generally rectangular shape with chamfered lower corners. Each of the tabs 44a, 44b is defined by the upper edge of tabs 44a, 44b and by side severance lines that extend from that upper edge. Each of the tabs 44a, 44b is configured to engage a sidewall of a corresponding article C. Each of the article heel engaging apertures 42a, 42b is configured to receive a portion of a lower end of a corresponding article C.

Rear end panels 18a, 18b are hingedly connected to an upper edge of respective side panels 14a, 14b along fold lines 31a, 31b. In the illustrated embodiment, each of side panels 14a, 14b has a first width W1. Rear end panels 18a, 18b have a second width W2 that is less than the first width W1. Partitioning panels 20a, 20b are hingedly connected to an upper edge of respective rear end panels 18a, 18b along fold lines 32a, 32b. In the illustrated embodiment, each of the partitioning panels 20a, 20b has an overall shape that is generally rectangular. However, each of the partitioning panels 20a, 20b includes a lower portion having a third width W3 that may be equal to second width W2, and an upper portion having a fourth width W4 that may be slightly greater than third width W3 but slightly less than or substantially equal to first width W1.

An upper end of each of the partitioning panels 20a, 20b includes a handle H comprising a handle aperture 40a, 40b and optionally, a cushioning handle flap 21a, 21b hingedly connected to the remainder of partitioning panel 20a, 20b along a fold line 34a, 34b. In the illustrated embodiment, handle aperture 40a, 40b is in the shape of an elongated rectangle with rounded ends. Handle flap 21a, 21b extend along the length of handle aperture 40a, 40b and substantially bisect it, occupying an upper half of the aperture 40a, 40b. Handle apertures 40a, 40b are sized, shaped and placed at an appropriate distance from an upper edge of partitioning panels 20a, 20b so as to allow a user's fingers to be received therethrough, thereby allowing a user to carry the carton 200 by grasping the handle H. Handle flaps 21a, 21b are configured to be folded along fold lines 34a, 34b and out of the plane of partitioning panels 20a, 20b when a user grasps the handles H.

Turning to the construction of the carton 200 as shown in Figure 2, the carton can be formed by a series of sequential folding operations. The folding process is not limited to that described below and may be altered according to particular manufacturing requirements.

Blank 10 is positioned with its interior surface facing up. The blank 10 is folded inwardly about central fold line 30, substantially folding the blank 10 in half and bringing the interior surfaces of corresponding panels (e.g., 14a and 14b, 16a and 16b, etc.) into face-contacting

relationship with one another as shown in Figure 6A. Glue or other adhesive treatment can be applied to the interior surface of exposed glue flap panel 17 or, alternatively, to the exterior surface of a corresponding portion of second bottom panel 16b. Glue flap panel 17 is folded inwardly about fold line 24. The interior surface of glue flap panel 17 is brought into face-contacting relationship with a corresponding portion of the exterior surface of second bottom panel 16b and secured thereto as shown in Figure 6B.

Glue or other adhesive treatment is applied to the exterior surfaces of partitioning panels 20a, 20b. The partitioning panels 20a, 20b are then folded inwardly about fold lines 32a, 32b while bending the partitioning panels 20a, 20b out of plane so as to bring the exterior surfaces of partitioning panels 20a, 20b into face-contacting relationship with one another. As shown in Figure 6C, the upper (handle) ends of the partitioning panels 20a, 20b are drawn through a rear opening O in the sleeve structure formed by the blank's main panels and into the interior of this sleeve structure. This results in the partially erected carton shown in Figure 6D. In this configuration, the partially erected carton can be substantially flattened as shown so that it can be transported or shipped in a compact format for loading elsewhere. Advantageously, the collapsed carton shown in Figure 6D allows for quick hand loading / packing without requiring further gluing by the customer.

The partially-erected carton shown in Figure 6D can be fully erected by simply opening up the tubular structure and/or drawing partitioning panels 20a, 20b further into the interior of the tubular structure. This causes the end panels 18a, 18b to be folded inwardly along respective fold lines 31, 31b until they are substantially perpendicular with side panels 14a, 14b. In the set-up carton 200, partitioning panels 20a, 20b are substantially parallel to and equidistant from first and second side panels 14a, 14b, thus bisecting an interior of the carton 200 and defining two equal interior volumes, each configured to receive a row of articles C. Articles C can be loaded into the open front end of the erected carton 200 by hand or machine.

Handles H form a single functional handle in the set-up carton 200. Advantageously, this handle can be substantially or completely stowed in the interior of the carton 200 when not in use. This arrangement minimizes the carton's footprint, facilitates stacking of multiple cartons for shipping, storage, or display purposes, and reduces the risk of handle damage. Figure 2 shows the front end of the carton 200 with the handle in the stowed configuration. In the stowed configuration, a frontmost edge of the mated partitioning panels 20a, 20b may be disposed entirely within the carton interior or, alternatively, may extend slightly beyond a plane defined by the frontmost edge of the carton's tubular structure. Figure 3 shows the rear end of the carton 200 when the handle is in the stowed configuration. In this configuration, rear

end panels 18a, 18b and side panels 14a, 14b may each remain in a substantially planar configuration with the rear end panels 18a, 18b being substantially perpendicular to the side panels 14a, 14b. Figure 4 shows the front end of the carton 200 when the handle is in the extended configuration. A user may move the handle from the stowed configuration to the extended configuration by reaching their fingers into the interior of the carton 200 and pulling out the handle. In the extended configuration, the handle may extend so that it is completely or substantially outside of the carton's interior. The frontward displacement of partitioning panels 20a, 20b in the carton's extended configuration causes a forward displacement of rear end panels 18a, 18b, thereby bringing rear end panels 18a, 18b into contact with rearmost articles C. This contact may cause the panels 18a, 18b to bend out of plane and become at least partially contoured around rearmost articles C, as best seen in Figure 5. Similarly, as also shown in Figure 5, rearmost portions of side panels 14a, 14b may become bent out of plane and at least partially contoured around the rearmost articles C when the carton 200 is in the extended configuration.

FIG. 7 is a plan view of a blank 210 used to form a carton 2200 (see FIGS. 8-11) according to a second embodiment of the invention. Blank 210 and the corresponding carton 2200 can be generally similar to the blank 10 and carton 200 discussed above, and like or similar reference numbers in the figures indicate like or similar elements. The primary differences between the first and second embodiments relates to the configuration of the two cartons' rear end walls and partitioning walls. In addition, blank 210 as illustrated is configured to form a carton 2200 for packaging a 2 x 2 array of cans C rather than a 2 x 3 array as in the first embodiment.

Blank 210 includes two rear corner panels 217a, 217b that, together with rear end panels 218a, 218b, are configured to form a rear end wall of the carton's tubular structure. Rear corner panels 217a, 217b are hingedly connected to an upper edge of respective side panels 214a, 214b along fold lines 231a, 231b. Rear end panels 218a, 218b are hingedly connected to an upper edge of respective rear corner panels 217a, 217b along fold lines 250a, 250b. Fold lines 250a, 250b are each interrupted by two tabs 252a, 252b which are configured to decrease the folding resistance of fold lines 250a, 250b. Thus, the folding resistance of fold lines 250a, 20b may be less than the folding resistance of fold lines 231a, 231b. In other embodiments, more or fewer tabs may be used. In addition, tabs 252a, 252b may be replaced by slits or cutouts. Tabs may be preferred however as they are friendly for die cutting the blank because they avoid the production of paperboard scraps. In addition, the use of tabs may improve the tendency of the rear end wall to stay in the folded configuration shown in FIG. 9. Partitioning panels 220a, 220b are hingedly connected to an upper edge of respective rear end panels 218a, 218b along fold lines 232a, 232b. In the illustrated second embodiment,

each of side panels 214a, 214b has a width W5. Rear corner panels 217a, 217b, rear end panels 218a, 218b, and partitioning panels 220a, 220b each have a width W6 that may be less than W5. Rear corner panels 117a, 117b each have a length L1 (representing the distance between fold lines 231a, 231b and 250a, 250b) that may be substantially less than a length L2 of rear end panels 118a, 118b (representing the distance between fold lines 250a, 250b and 232a, 232b).

The construction of carton 2200 can be substantially similar to that of carton 200 described above.

The second embodiment's configuration of the rear end wall (i.e., its formation from rear corner panels 217a, 217b and rear end panels 218a, 218b connected via fold lines 250a, 250b) advantageously facilitates the simultaneous achievement of two goals: allowing the handle to be completely or substantially stowed in the interior of carton 2200 when not in use while also allowing the handle to extend sufficiently far out of the carton's interior when in use so as to be easily grasped by a user. Figure 8 shows the front end of the carton 220 with the handle in the stowed configuration. In the stowed configuration, a frontmost edge of the mated partitioning panels 220a, 220b may be disposed entirely within the carton interior or, alternatively, may extend slightly beyond a plane defined by the frontmost edge of the carton's tubular structure. Figure 9 shows the rear end of the carton 2200 when the handle is in the stowed configuration. Unlike in the first embodiment, the rear end wall is not in a substantially planar configuration when the handle is stowed. Instead, rear corner panels 217a, 217b are angled back into the carton's interior and rear end panels 218a, 218b are bent out of plane and at least partially contoured around the rearmost articles C. Thus, three separate inwardly-extending depressions are formed in the rear end wall: two depressions centered about fold lines 250a, 250b and one central depression where end panels 218a, 218b meet. This configuration provides ample "slack" in the rear end wall that can be taken up when the handle is moved into the extended configuration, thereby allowing for the use of a handle that can be extended further out of the carton's interior when in use. A user may move the handle from the stowed configuration to the extended configuration by reaching their fingers into the interior of the carton 2200 and pulling out the handle. In the extended configuration, the handle may extend so that it is completely or substantially outside of the carton's interior. The frontward displacement of partitioning panels 220a, 220b in the carton's extended configuration causes a forward displacement of rear end panels 218a, 218b and rear corner panels 217a, 217b thereby bringing rear end panels 218a, 218b into contact with rearmost articles C. This contact may cause the panels 218a, 218b to bend out of plane, or further out of plane, and become at least partially contoured around rearmost articles C, as best seen in Figure 11. Similarly,

rear corner panels 271a, 217b and/or rearmost portions of side panels 214a, 214b may become bent out of plane and at least partially contoured around the rearmost articles C when the carton 2200 is in the extended configuration.

In a preferred embodiment, the grain direction of the paperboard blank 210 is oriented such that fold lines 250a, 250b extend generally along the grain direction.

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 may be adjusted to accommodate articles of differing size or shape.

It will be recognized that as used herein, directional references such as "top", "base", "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. Any reference to “hinged connection” should not be construed as necessarily referring to a single fold line only; indeed, it is envisaged that a hinged connection can be formed from one or more of the following: a short slit, a frangible line or a fold line, without departing from the scope of the invention. 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.

As used herein, the terms “hinged connection” and “fold line” each refers to all manner of lines that define hinge features of the blank or substrate of sheet material, facilitate folding portions of the blank or substrate of sheet material with respect to one another, or otherwise indicate optimal panel folding locations for the blank or substrate of sheet material. Any reference to “hinged connection” should not be construed as necessarily referring to a single fold line only; indeed, a hinged connection can be formed from one or more fold lines.

As used herein, the term “fold line” may refer to one of the following: a scored line, an embossed line, a debossed line, a line of perforations, a line of short slits, a line of half-cuts, a single half-cut, an interrupted cut line, aligned slits, a line of short scores and any combination of the aforesaid options, without departing from the scope of the invention.

As used herein, the terms “weakened line of severance”, “severance line” and “frangible line” each may refer to all manner of lines formed in the blank or substrate of sheet material that facilitate separating portions of the blank or substrate of sheet material from one another, or

otherwise that indicate optimal separation locations on the blank or substrate. As used herein, the terms “weakened line of severance”, “severance line” and “frangible line” each may refer to one of the following: a single cut line, a single partial-depth cut line (e.g., a single half-cut line), an interrupted cut line, a score line, an interrupted score line, a line of perforations, a line of short cuts, a line of short slits, a line of short partial-depth cuts (e.g., a line of short half cuts), and any combination of the aforementioned options.

It should be understood that hinged connections, fold lines, weakened lines of severance, frangible lines and severance lines can each includes elements that are formed in the blank or substrate of sheet material, 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 frangible line. The line of perforations can be designed to facilitate folding and resist breaking to provide a fold line, to facilitate folding and facilitate breaking with more effort to provide a frangible fold line, or to facilitate breaking with little effort to provide a frangible line.

CLAIMS

1. A carton for packaging a plurality of articles, the carton comprising:

a tubular structure comprising a top wall, a bottom wall disposed opposite said top wall, and opposing first and second side walls each coupled to both the top and bottom walls, the tubular structure defining a rear end and a front end;

a rear end wall disposed at said rear end of said tubular structure; and

a partitioning wall extending longitudinally through an interior of the tubular structure between said rear and front ends, a lower end of the partitioning wall being coupled to said rear end wall;

wherein the partitioning wall comprises a handle disposed at an upper end of the partitioning wall;

wherein the partitioning wall is configured to move between a first configuration in which the handle is at least substantially stowed within the interior of the tubular structure, and a second configuration in which the handle is at least substantially extended out of said interior.

2. The carton of Claim 1, wherein said rear end wall comprises a first rear end wall panel and a second rear end wall panel, said first rear end wall panel being coupled to said first side wall and said second rear end wall panel being coupled to said second side wall.

3. The carton of Claim 2, wherein said partitioning wall comprises first and second partitioning panels, said first partitioning panel being coupled at its lower end to said first rear end wall panel, said second partitioning panel being coupled at its lower end to said second rear end wall panel, said first and second partitioning panels being coupled to one another in face-contacting relationship.

4. The carton of Claim 3, wherein said first and second rear end wall panels are configured to be substantially coplanar with one another when said carton is in the first configuration.

5. The carton of Claim 4, wherein said first and second rear end wall panels are configured to be bent out of plane by rearmost ones of said plurality of articles when said carton is in the second configuration.

6. The carton of Claim 1, wherein said partitioning wall divides said interior into two substantially equal volumes, each configured to receive a row of articles.

7. The carton of Claim 1, wherein an upper portion of each of said first and second side walls at least partially defines a plurality of article head engaging apertures.

8. The carton of Claim 1, wherein a lower portion of each of said first and second side walls at least partially defines a plurality of article heel engaging apertures.

9. The carton of Claim 1, wherein said handle comprises a handle aperture and a cushioning flap.

10. The carton of Claim 1,wherein said rear wall comprises first and second rear corner panels and first and second rear end panels, said first rear corner panel being coupled to said first side wall, said second rear corner panel being coupled to said second side wall, said first rear end panel being coupled to said first rear corner panel, said second rear end panel being coupled to said second rear corner panel, wherein said first and second rear corner panels are configured to be folded out of plane with respect to said first and second rear end panels in the first configuration so as to provide slack that may be taken up when the carton is moved to the second configuration.

11. The carton of Claim 10, wherein said first and second rear corner panels are coupled respectively to the first and second side walls via a first pair of fold lines, wherein said first and second rear end panels are coupled respectively to the first and second rear corner panels via a second pair of fold lines, and wherein a folding resistance of said second pair of fold lines is less than a folding resistance of said first pair of fold lines.

12. A blank for forming a carton configured to package a plurality of articles, the blank comprising:

a plurality of main panels hinged together in a linear series, the plurality of main panels being configured to form a tubular structure in a set-up carton, the plurality of main panels comprising first and second side panels, first and second top panels, and first and second bottom panels;

the blank further comprising first and second rear end panels hingedly connected to respective upper edges of the first and second side panels, the first and second rear end panels being configured to form a rear end wall of the tubular structure; and

first and second partitioning panels hingedly connected to respective upper edges of the first and second rear end panels, the first and second partitioning panels being configured to be coupled to one another in a face-contacting relationship to form a partitioning wall of the set-up carton, the partitioning wall being configured to extend longitudinally through an interior of the tubular structure from the rear end wall to a front end of the tubular structure;

wherein the partitioning wall comprises a handle disposed at a front end of the partitioning wall;

wherein the partitioning wall is configured to move between a first configuration in which the handle is at least substantially disposed within the interior of the tubular structure and a second configuration in which the handle is at least substantially extended out of the interior of the tubular structure.

13. The blank of Claim 12, wherein said plurality of main panels further comprises a glue flap panel disposed at one end of said linear series.

14. The blank of Claim 13, wherein said glue flap panel is hingedly connected to said first bottom panel, said first bottom panel is hingedly connected to said first side panel, said first

side panel is hingedly connected to said first top panel, said first top panel is hingedly connected to said second top panel, said second top panel is hingedly connected to said second side panel, and said second side panel is hingedly connected to said second bottom panel.

15. The blank of Claim 12, wherein each of said first and second side panels at least partially define a plurality of article head-engaging apertures.

16. The blank of Claim 15, wherein each of said first and second side panels at least partially define a plurality of article heel-engaging apertures.

17. The blank of Claim 12, wherein said first and second rear end panels define a plane when the set-up carton is in said first configuration, said first and second rear end panels being configured to be bent out of said plane by rearmost ones of said plurality of articles when the set-up carton is in said second configuration.

18. The blank of Claim 12, wherein said blank is substantially symmetric about a central fold line.

19. A package comprising a carton and a plurality of articles contained therein:

wherein the carton comprises a sleeve enclosing said plurality of articles, said sleeve defining a rear end a front end, said carton further comprising a rear end wall coupled to said rear end of the sleeve and a partitioning wall extending longitudinally through an interior of said sleeve, a rear end of said partitioning wall being coupled to said rear end wall, said partitioning wall including a handle disposed at a front end of said partitioning wall;

wherein the carton is configured to transition between a first configuration in which the handle is at least substantially stowed within the interior of said sleeve and a second configuration in which the handle is at least substantially extended out of said interior.

20. The package of Claim 19, wherein said plurality of articles are generally cylindrical shaped.

21. The package of Claim 19, wherein said plurality of articles comprise cans.

22. The package of Claim 19, wherein said rear end wall is substantially planar in said first configuration and wherein said rear end wall is bent out of plane by rearmost ones of said plurality of articles in the second configuration.

23. A blank for forming a carton configured to package a plurality of articles, the blank comprising:

a plurality of main panels hinged together in a linear series, the plurality of main panels being configured to form a tubular structure in a set-up carton, the plurality of main panels comprising first and second side panels, first and second top panels, and first and second bottom panels;

the blank further comprising first and second rear corner panels hingedly connected to respective upper edges of the first and second side panels along a first pair of fold lines, first

and second rear end panels hingedly connected to an upper edge of respective first and second rear corner panels along a second pair of fold lines, the first and second rear corner panels and first and second rear end panels being configured to form a rear end wall of the tubular structure; and

first and second partitioning panels hingedly connected to respective upper edges of the first and second rear end panels, the first and second partitioning panels being configured to be coupled to one another in a face-contacting relationship to form a partitioning wall of the set-up carton, the partitioning wall being configured to extend longitudinally through an interior of the tubular structure from the rear end wall to a front end of the tubular structure;

wherein the partitioning wall comprises a handle disposed at a front end of the partitioning wall;

wherein the partitioning wall is configured to move between a first configuration in which the handle is at least substantially disposed within the interior of the tubular structure and a second configuration in which the handle is at least substantially extended out of the interior of the tubular structure.

24. The blank of Claim 23, wherein a folding resistance of the second pair of fold lines is less than a folding resistance of the first pair of fold lines.

25. The blank of Claim 23, wherein said first and second rear corner panels are configured to be folded out of plane with respect to said first and second rear end panels in the first configuration so as to provide slack that may be taken up when the carton is moved to the second configuration.

26. The blank of Claim 25, wherein, when the set-up carton is in the first configuration, three inwardly-extending depressions are formed in the rear end wall comprising two depressions each centered about a respective one of said second pair of fold lines and a third, central depression where said first and second rear end panels meet.

27. The blank of Claim 23, wherein a grain direction of the blank is oriented such that each of said second pair of fold lines extends generally along said grain direction.

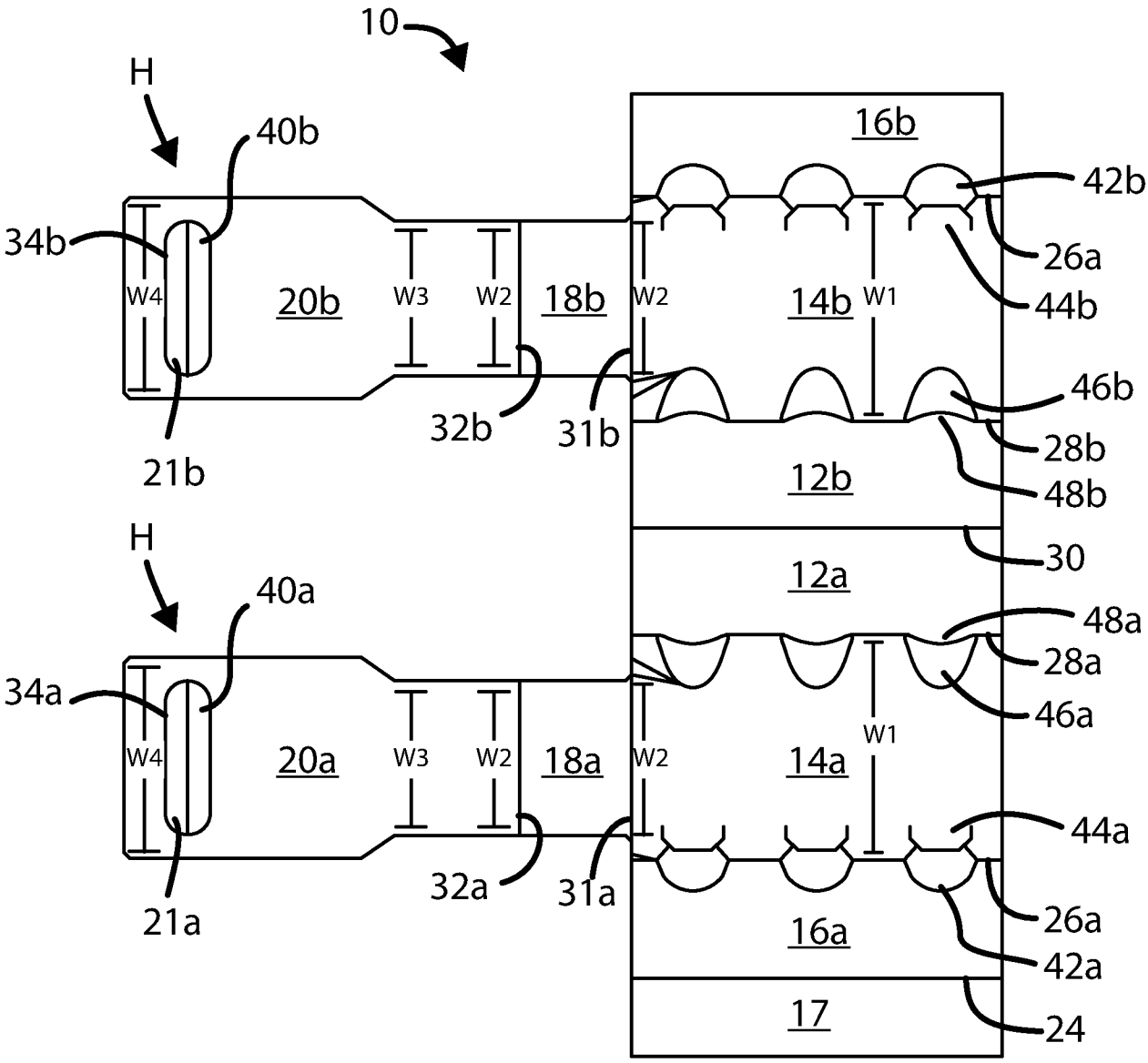
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Fig. 1

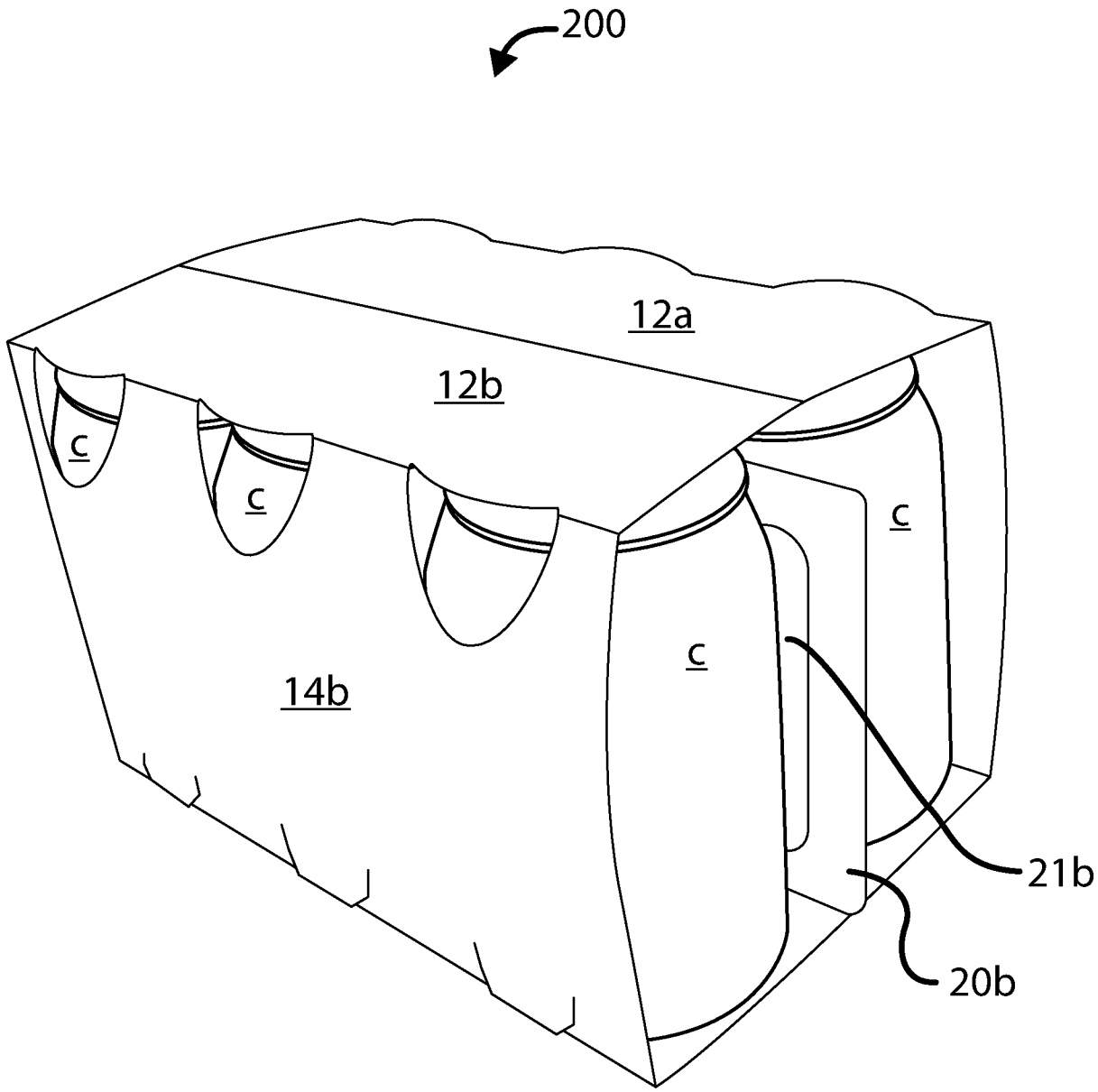

Fig. 2

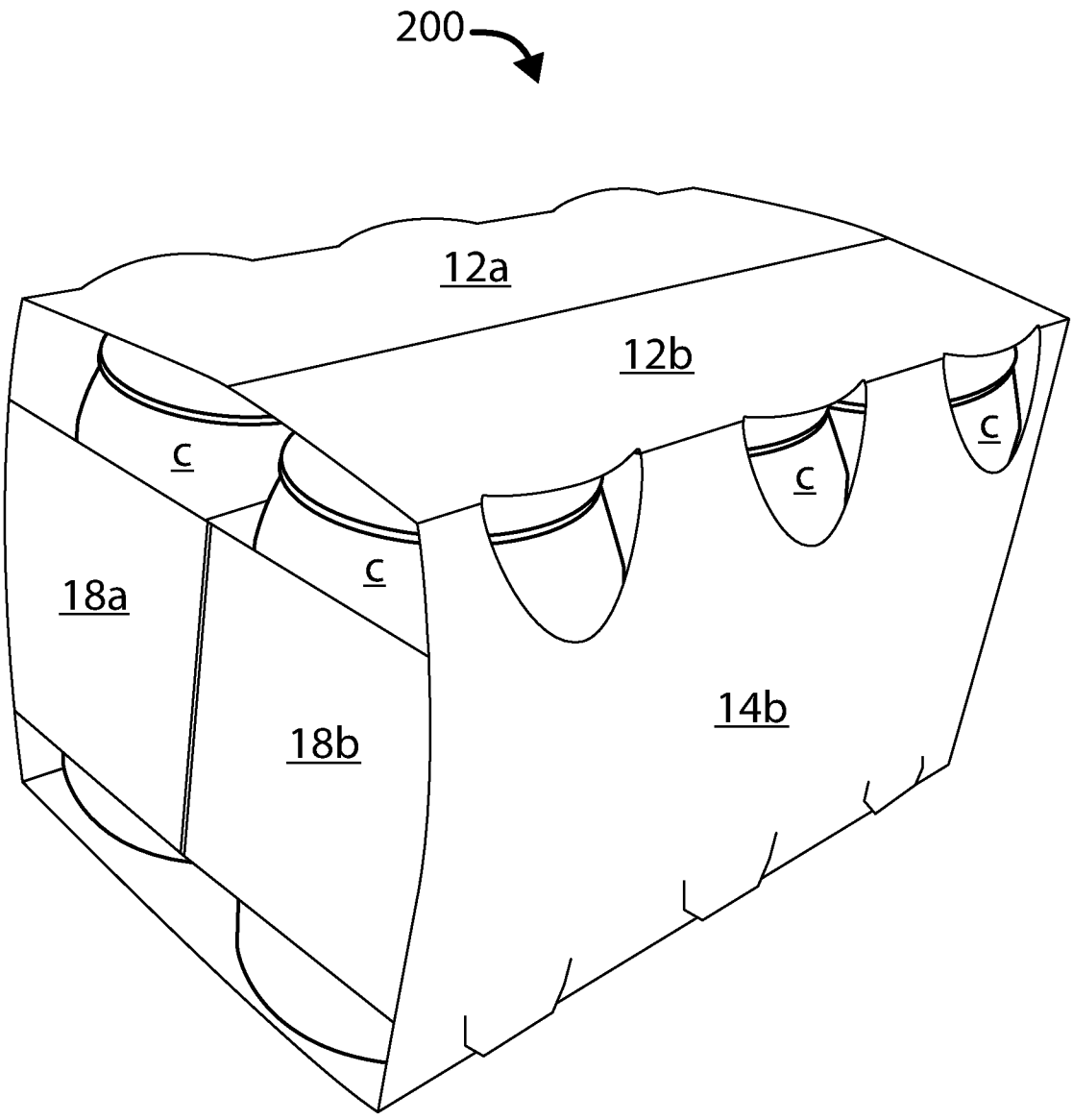

Fig. 3

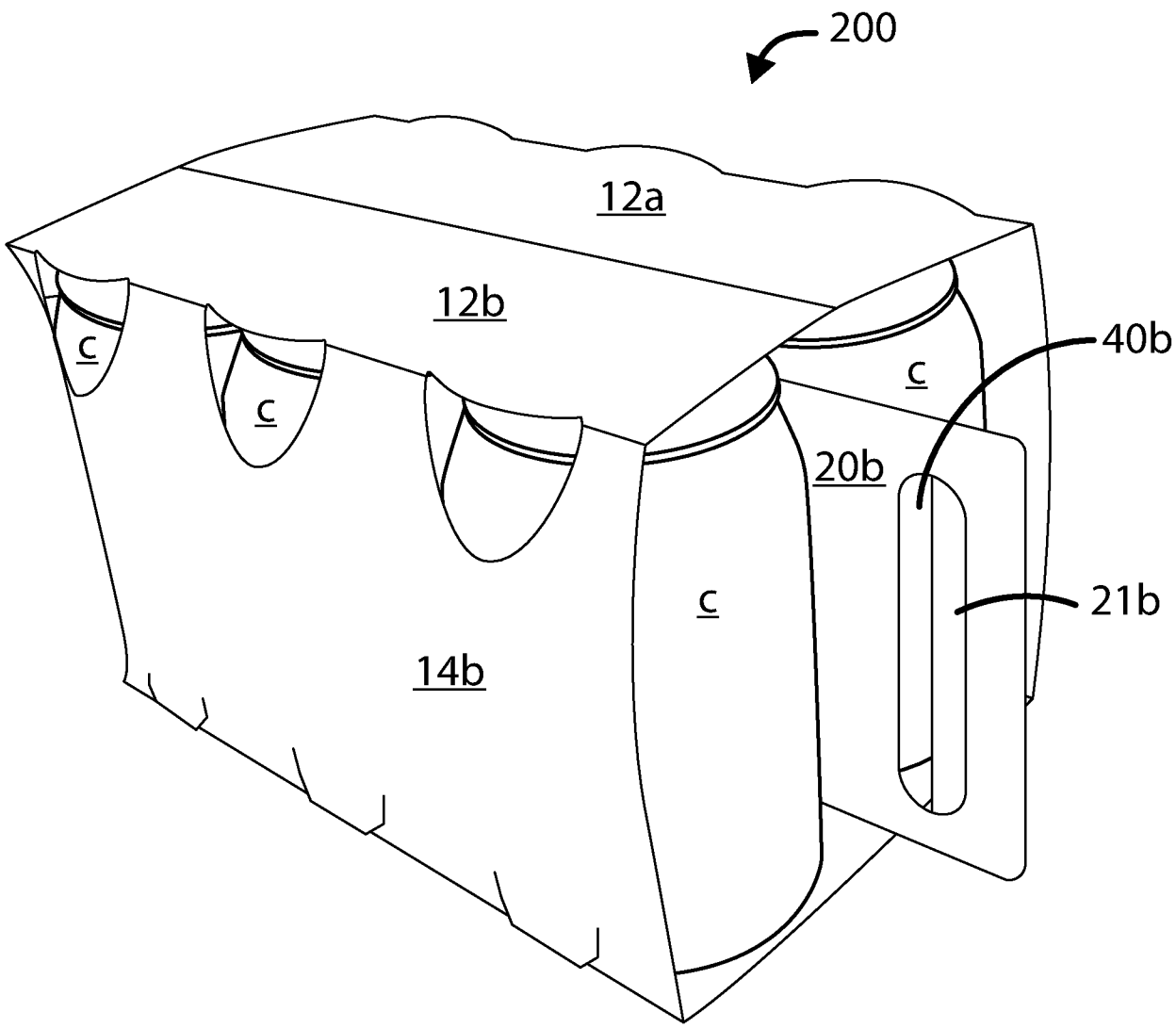

Fig. 4

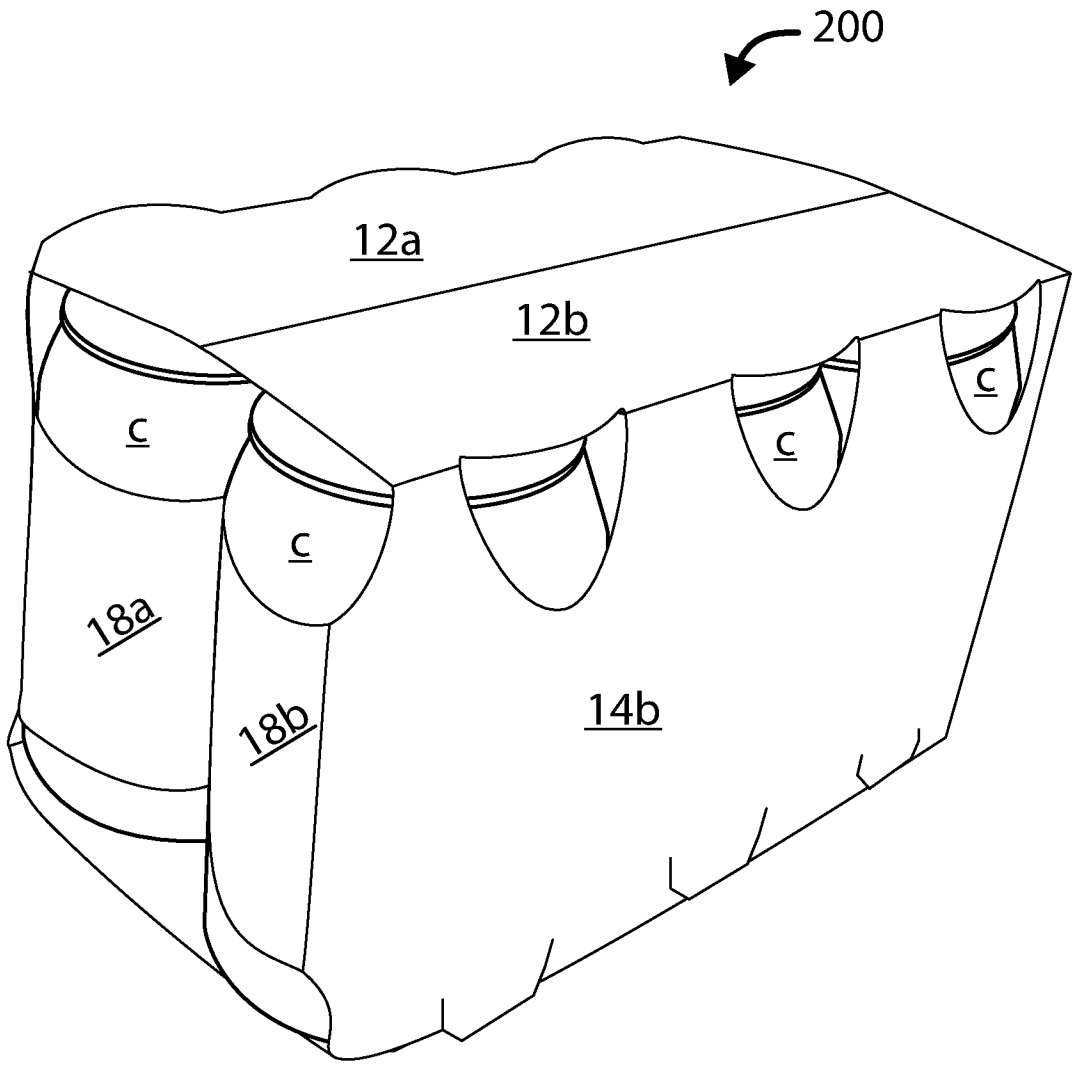

Fig. 5

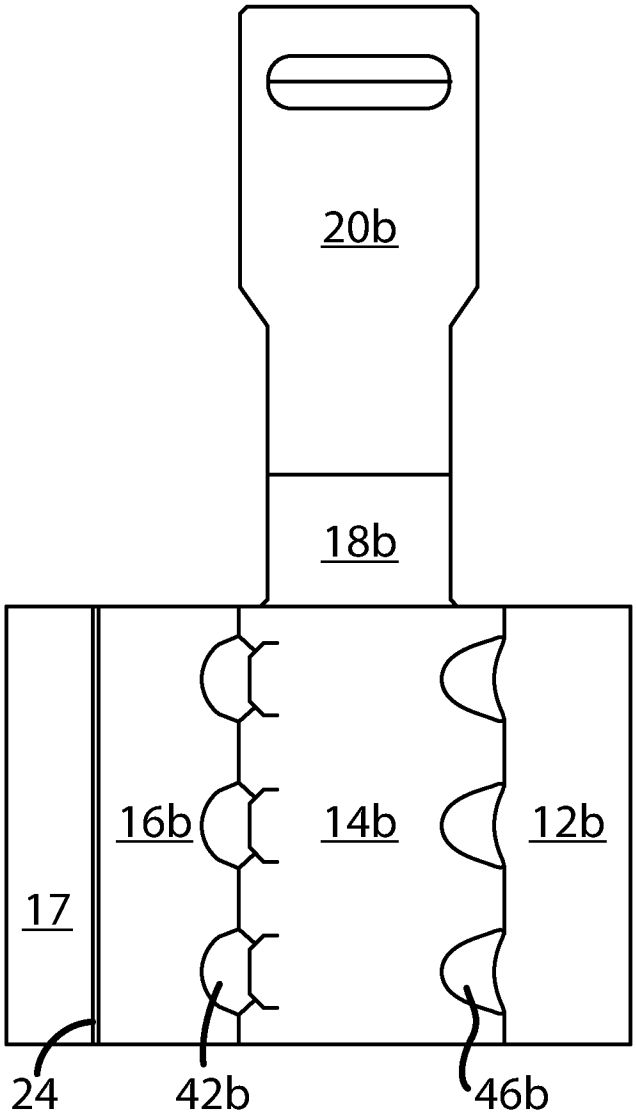

Fig. 6A

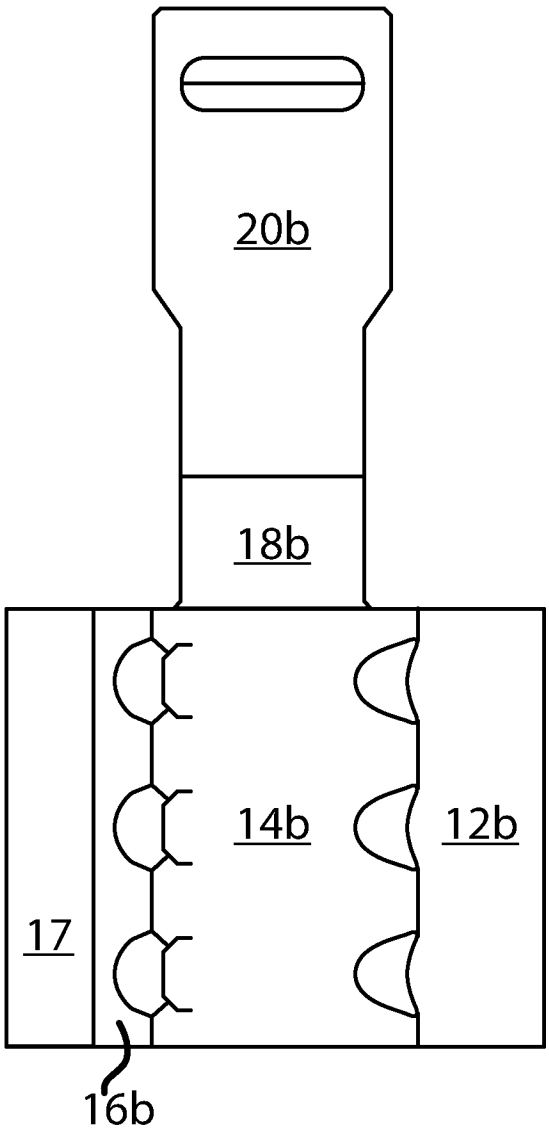

Fig. 6B

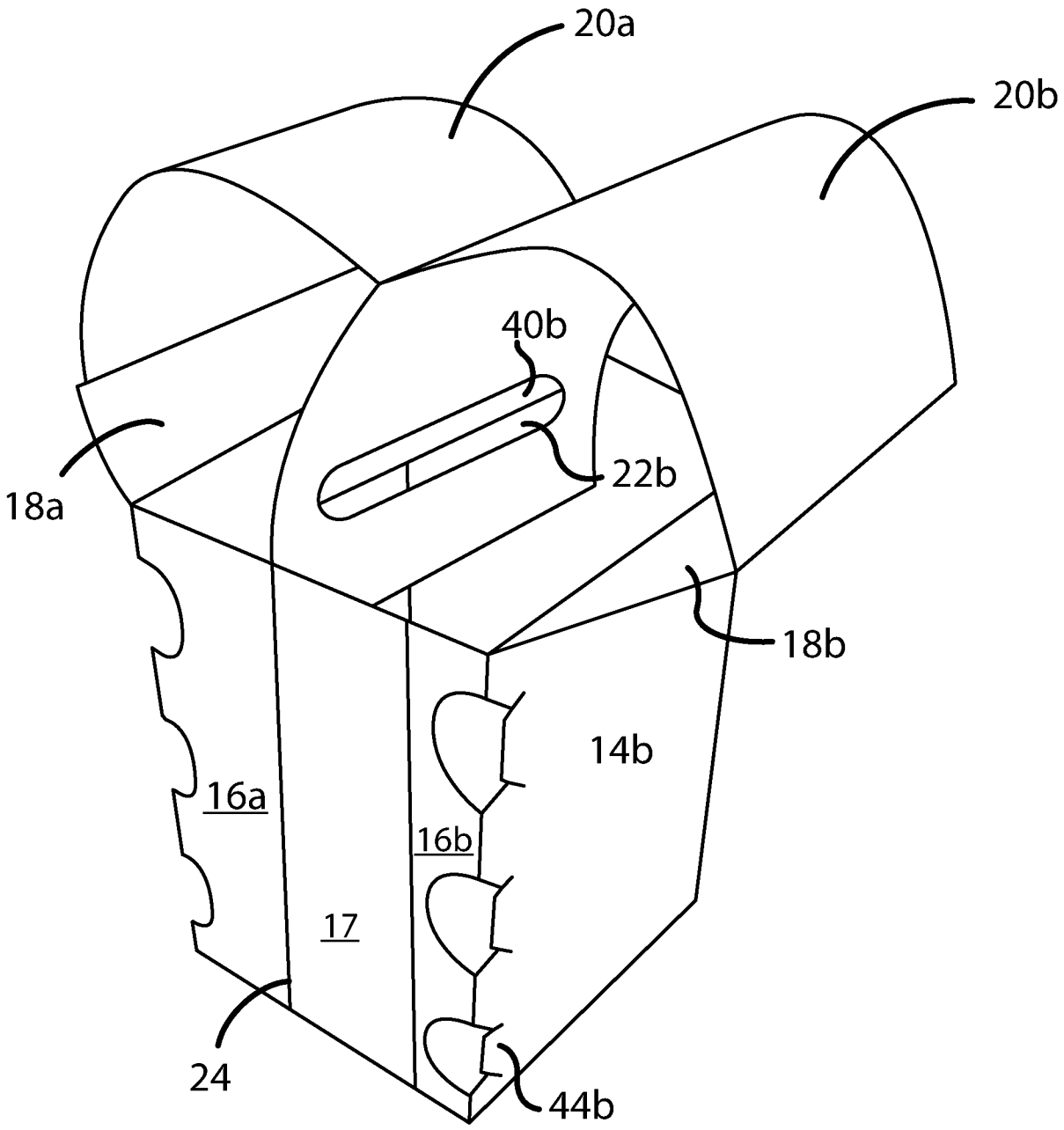

Fig. 6C

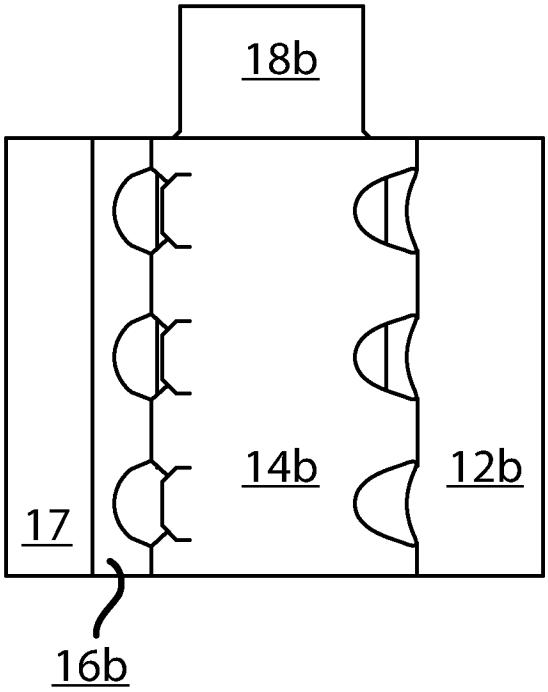

Fig. 6D

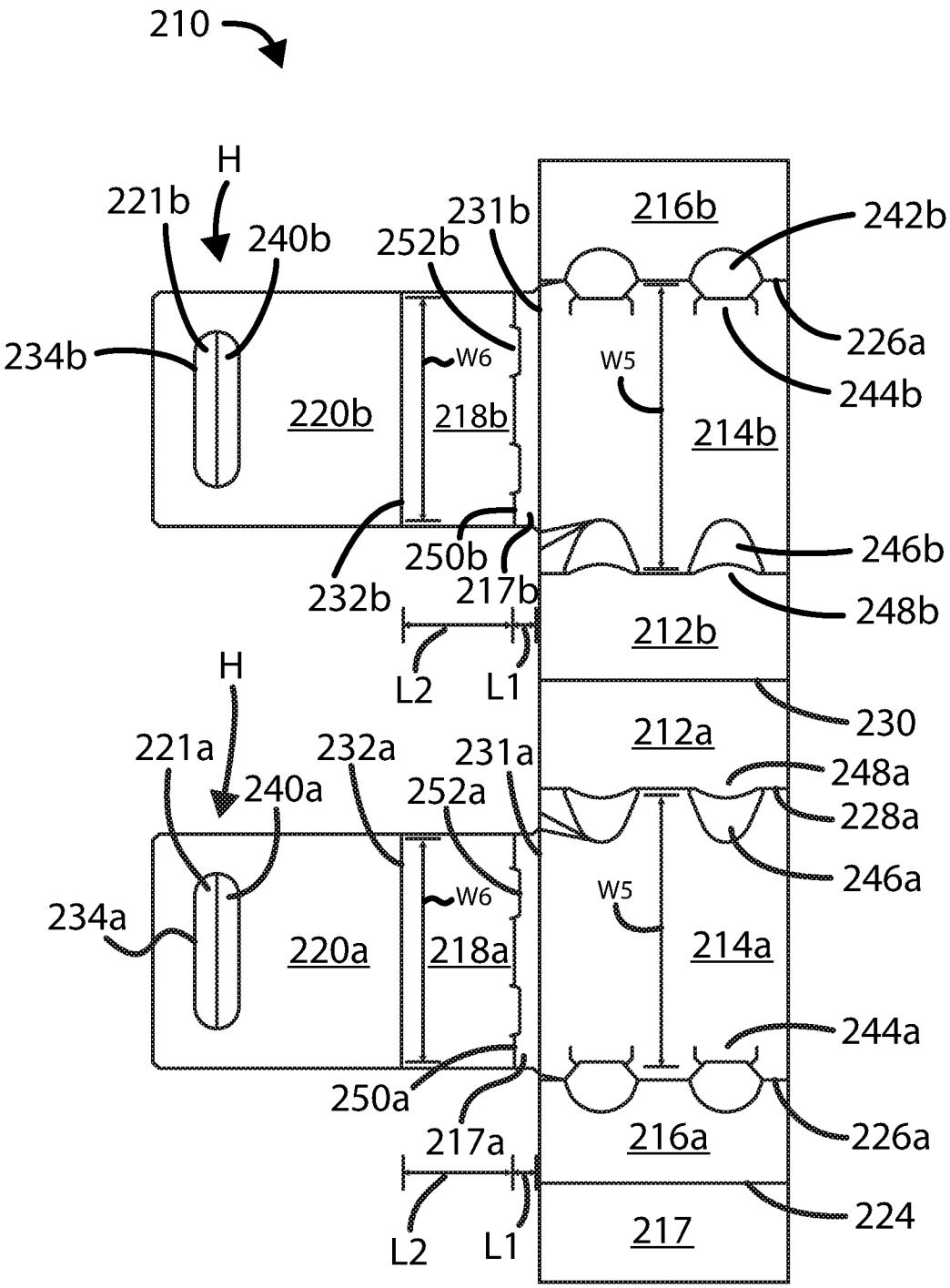
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Fig. 7

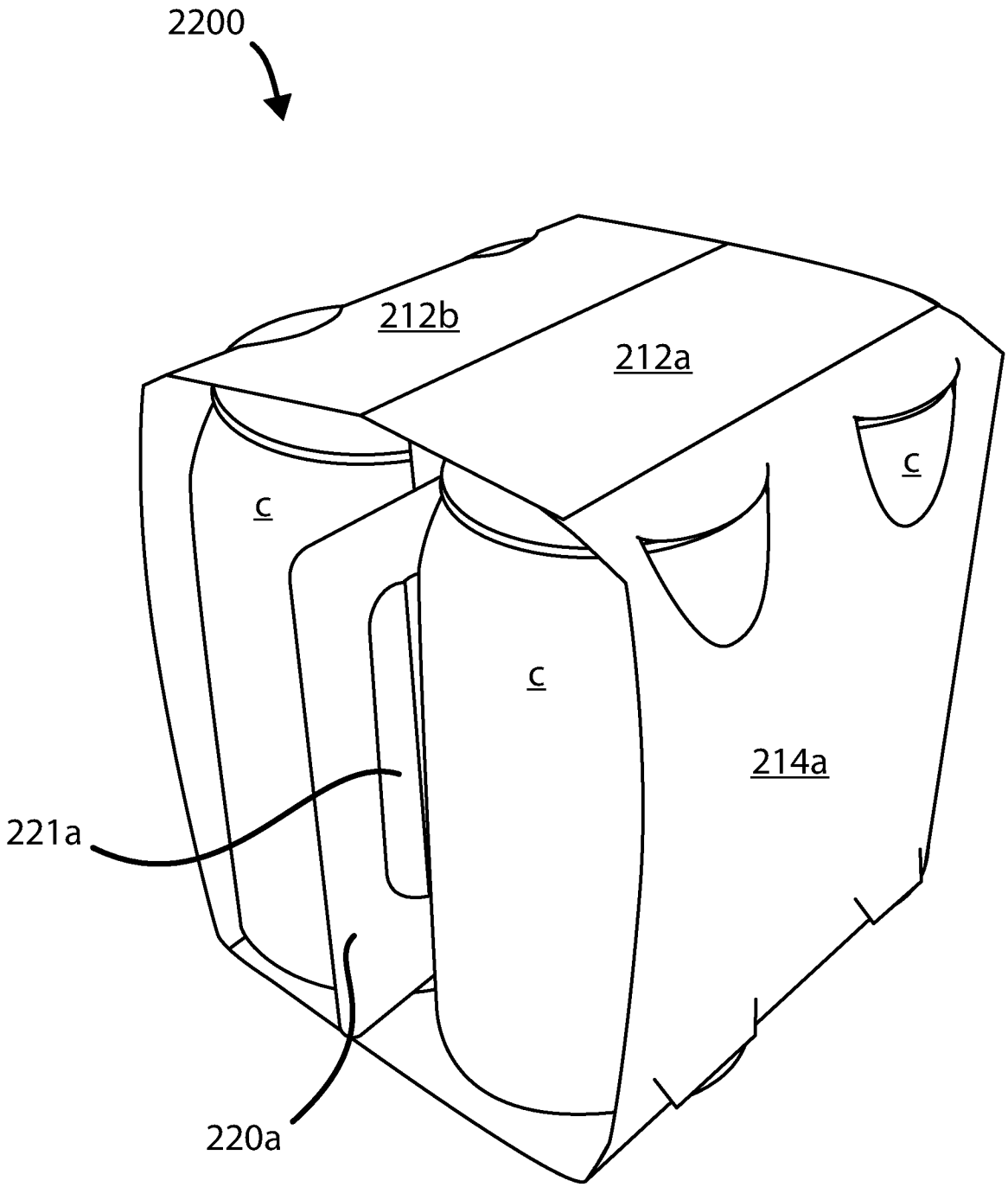

Fig. 8

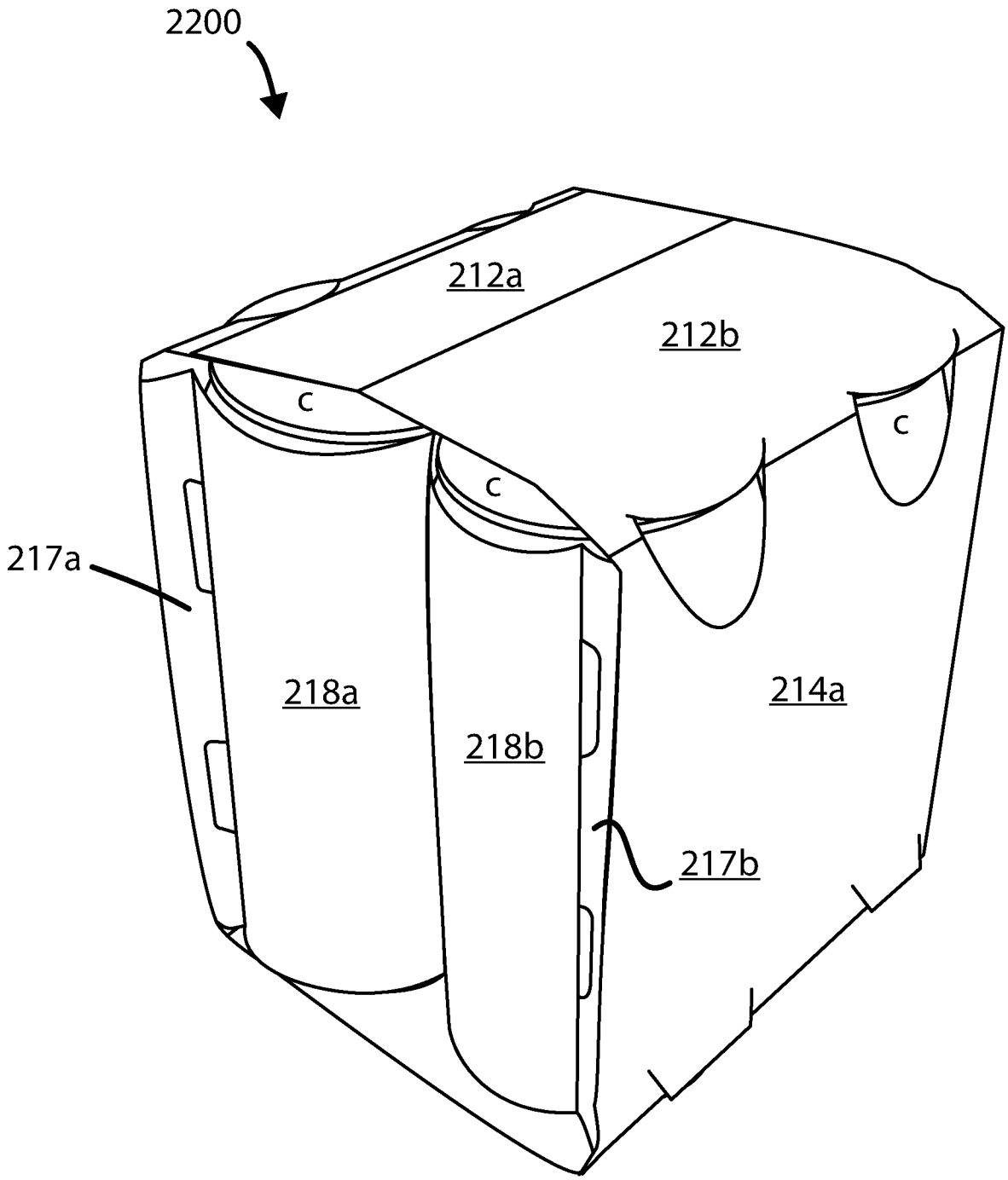

Fig. 9

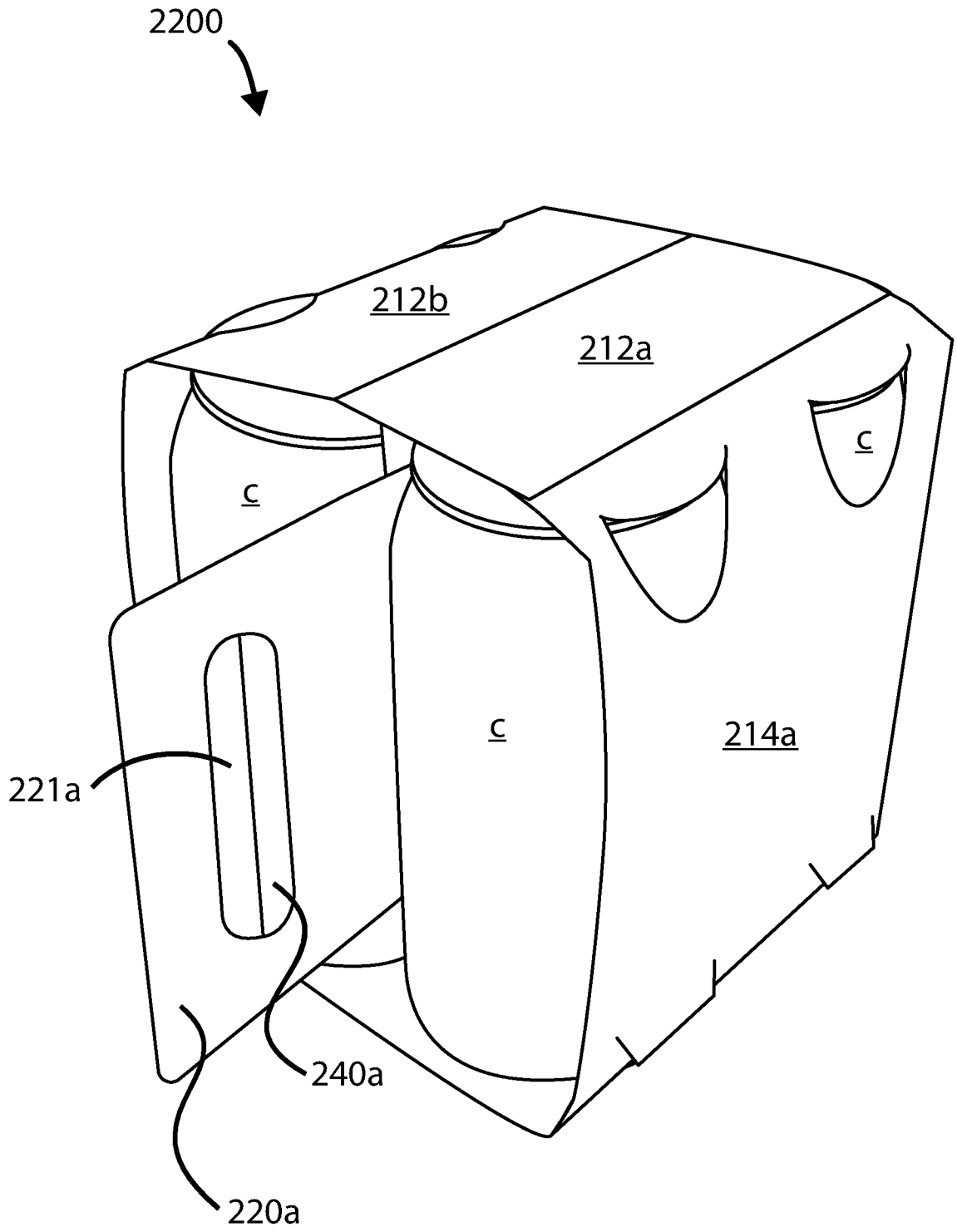

Fig. 10

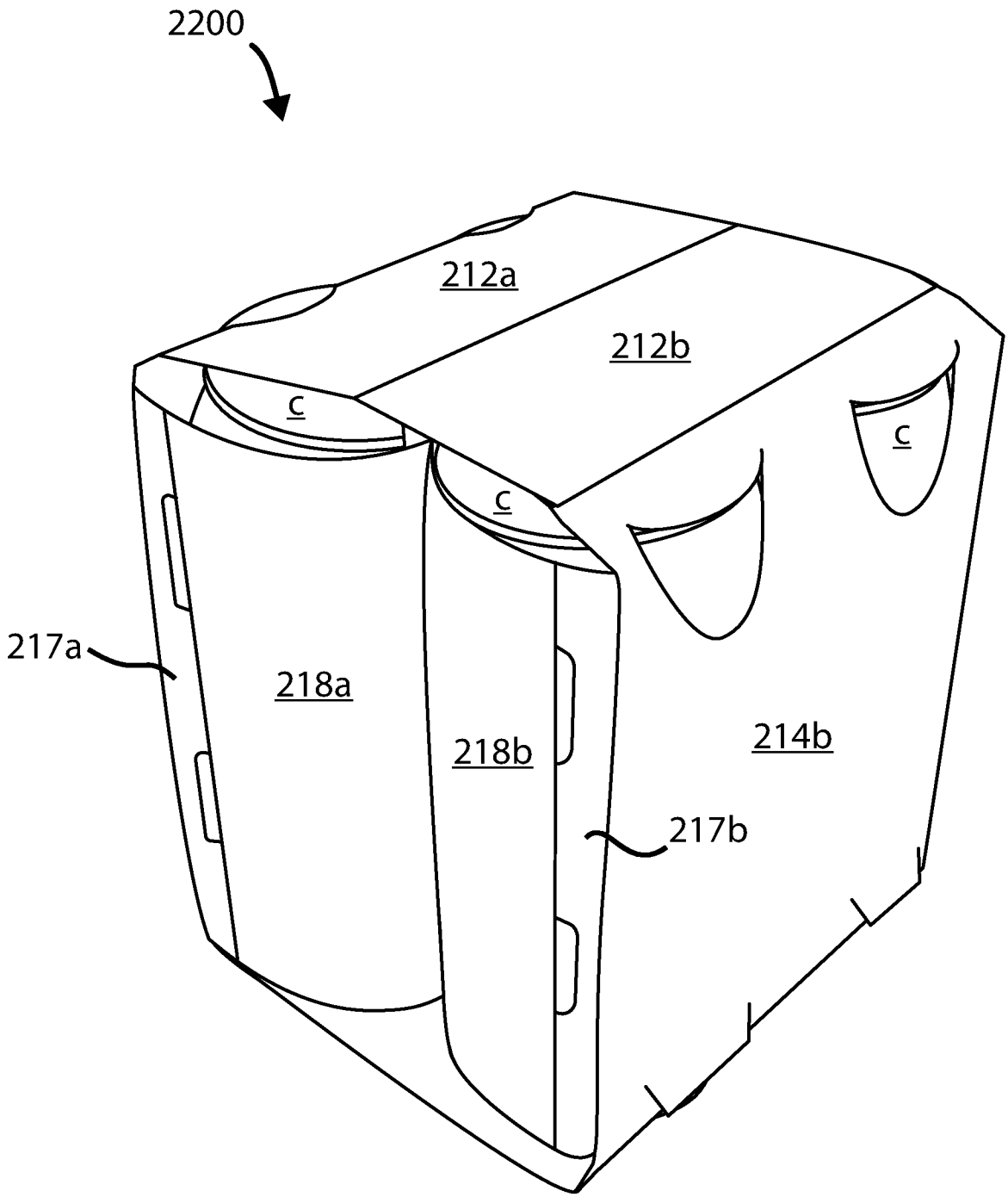

Fig. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/045916

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D71/26 B65D71/30
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2 034 679 A (KUNDTS THEODORE A) 17 March 1936 (1936-03-17) page 1, column 2, line 53 - page 2, column 2, line 20; figures 1-10	1-9, 12-22 10,11, 23-27
X	US 3 069 979 A (CHARLES DAVID H ET AL) 25 December 1962 (1962-12-25) column 2, lines 28-56; figures 1-3E	1-6, 12-14, 17-22
X	US 2 462 676 A (RILEY MELVIN A ET AL) 22 February 1949 (1949-02-22) column 2, line 3 - column 3, line 40; figures 1-9	1-4,6, 12,17-21
X	JP S52 12127 U (*) 27 January 1977 (1977-01-27) figures 1-6	1-4,6, 12,17-21

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 October 2017	08/11/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Grondin, David

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2017/045916

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2034679 A	17-03-1936	NONE	
US 3069979 A	25-12-1962	NONE	
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JP S5212127 U	27-01-1977	JP S5212127 U	27-01-1977
		JP S5532834 Y2	05-08-1980