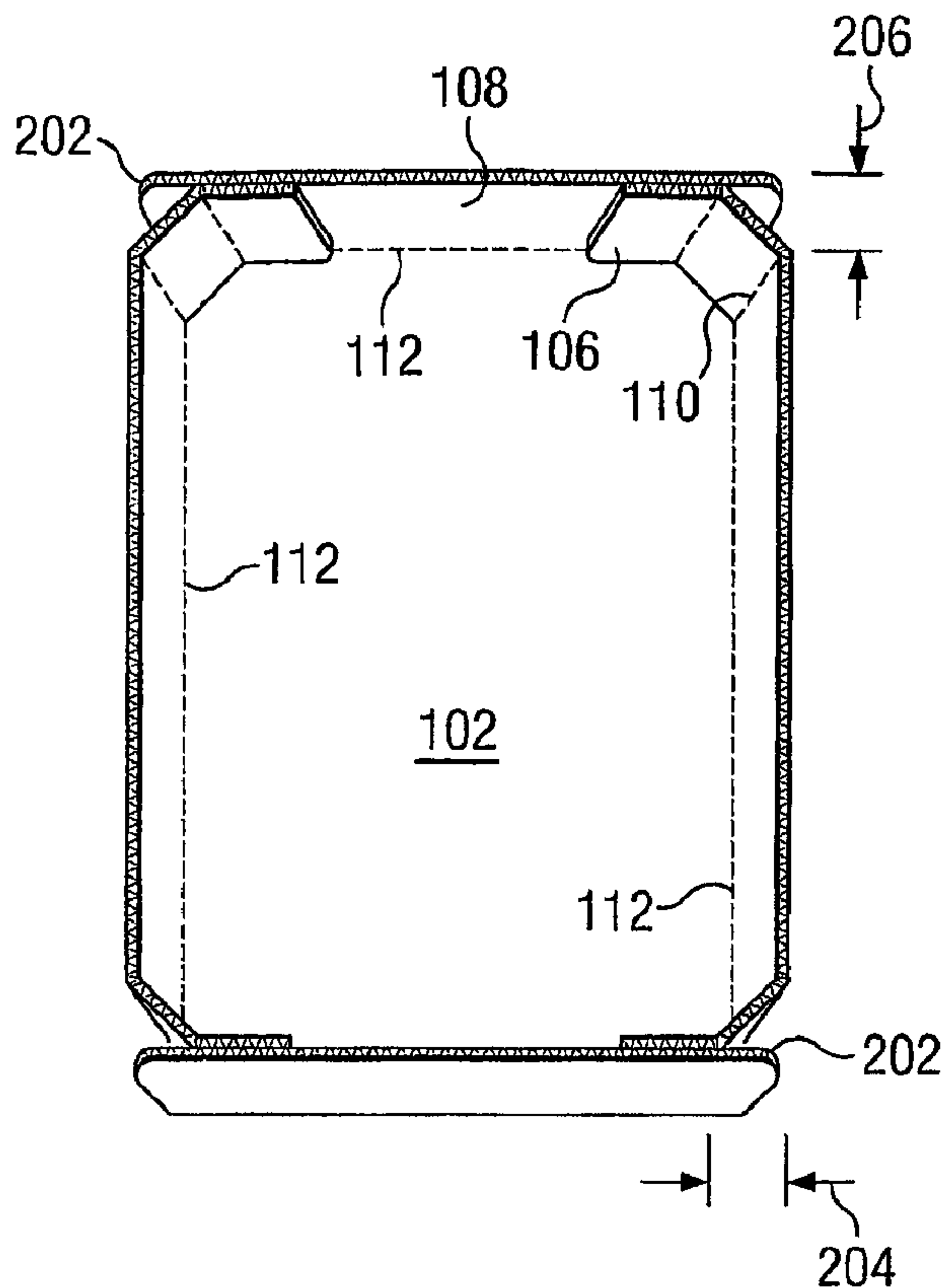




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 (54) Title: IMPROVED SHIPPING AND DISPLAY CARTON



(57) Abrégé/Abstract:

A product tray having shrink-wrapped plastic stacked, shipped and sold on pallets due to an improved design made from a single blank of cardboard or other package material. Such improved product tray resists horizontal shifting and prevents vertical stack

(57) **Abrégé(suite)/Abstract(continued):**

failures when exposed to horizontal forces during shipping. Each improved product tray supports a comparable compressive load while being composed of less material or less expensive material as compared with prior art designs. Such improved product trays may be stacked, shipped, and sold on pallets without first packaging them into boxes, and without the substantial additional labor normally required for trays made according to the prior art, at warehouse club stores and other outlets.

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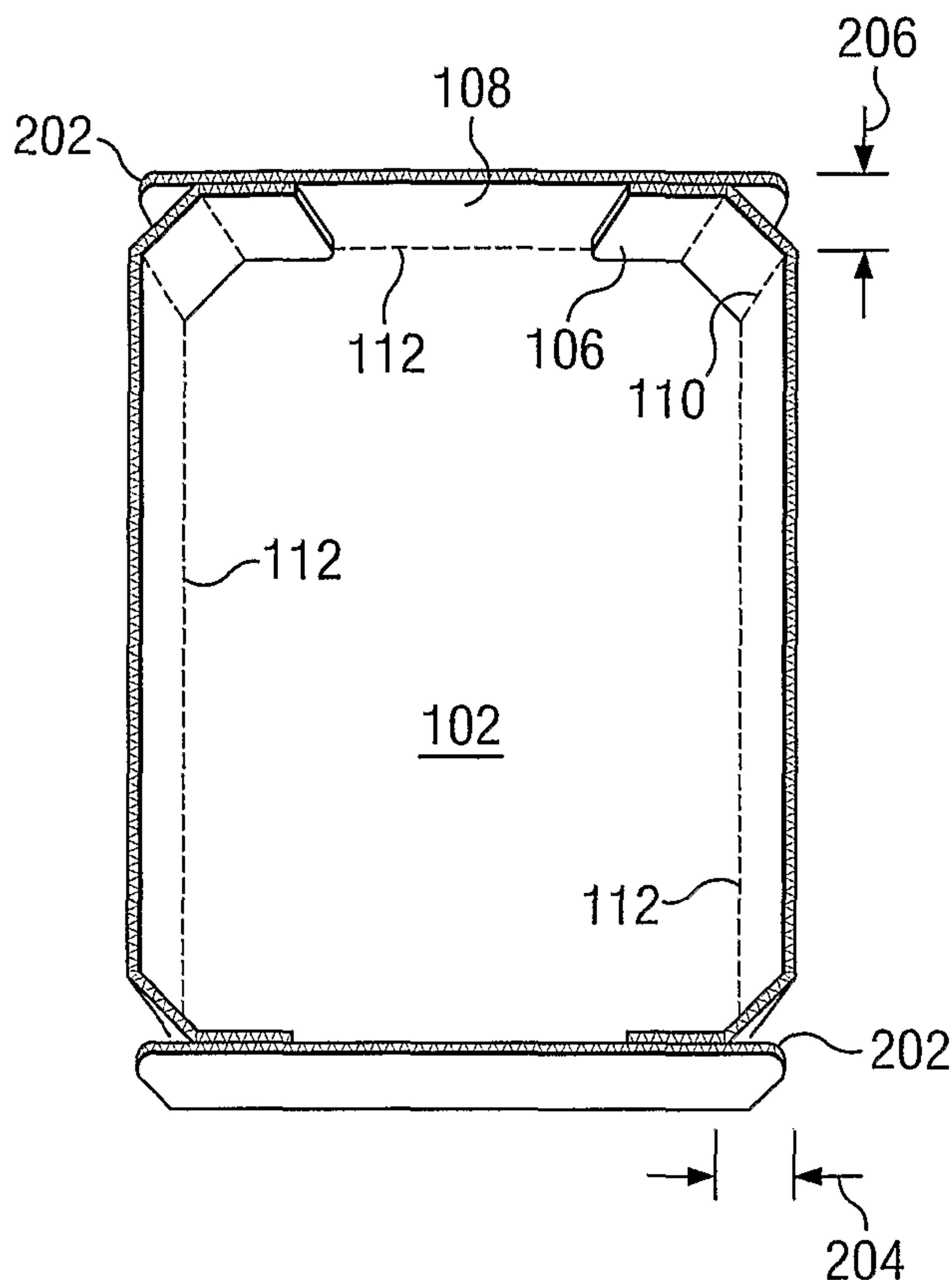
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
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## (54) Title: IMPROVED SHIPPING AND DISPLAY CARTON



(57) Abstract: A product tray having shrink-wrapped plastic stacked, shipped and sold on pallets due to an improved design made from a single blank of cardboard or other package material. Such improved product tray resists horizontal shifting and prevents vertical stack failures when exposed to horizontal forces during shipping. Each improved product tray supports a comparable compressive load while being composed of less material or less expensive material as compared with prior art designs. Such improved product trays may be stacked, shipped, and sold on pallets without first packaging them into boxes, and without the substantial additional labor normally required for trays made according to the prior art, at warehouse club stores and other outlets.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## IMPROVED SHIPPING AND DISPLAY CARTON

### BACKGROUND OF THE INVENTION

#### Technical Field

The present invention relates generally to a stackable tray package. More specifically, the invention relates to a tray for retail sale which may be filled, wrapped and stacked without  
5 the need for inserts or dividers to provide additional necessary support for a compression load. The invention also relates to a method of making the same.

#### Description of Related Art

Millions of dollars are spent each year in packaging products for transportation from manufacturers to retail outlets. Rather than require these products to be packaged and  
10 ultimately removed from boxes and pallets, and individually placed on shelves in a store front, it has long been desirable to ship products in large quantities in relatively large containers such as pallets and sell them directly from such containers to consumers. Retail outlets, including member-only warehouse stores, provide the buying public, including private individuals and businesses, price savings by selling goods directly from pallets.  
15 These types of retail outlets reduce their costs by eliminating substantial amounts of labor and shipping materials. Warehouse stores often prefer to deal with suppliers who ship their goods on pallets. Goods are often sold in relatively bigger packages providing increased cost savings.

Some goods, such as individual bags of snack products, are bundled together in a  
20 product tray and enclosed with transparent shrink-wrapped plastic such that the individual goods may be viewed from the tray's top. These trays do not easily survive undamaged while being shipped alone on pallets to retail establishments. Consequently, manufacturers

are required to use substantial extra labor and shipping materials to get these trays to market. Specifically, these trays require significant manual labor as trays are boxed at a manufacturing facility before being stacked onto pallets, secured with stretch wrap, and shipped. Once at a retail establishment, additional manual labor is required to remove  
5 individual trays from boxes before displaying and selling them.

With reference to **Figure 1**, a typical prior art product tray as viewed from above is comprised of a single blank folded into a tray having a bottom panel **102**, short sides **108**, and long sides **116**. The long sides have flaps **106** which are bent at a single crease **110**, form ninety degree corners, and are secured to the short sides **108** of the tray. The flaps **106** may  
10 be secured to the short sides **108** by glue, staples or other means.

During shipment on pallets, these trays experience horizontal forces which cause one tray to move relative to another. If a single tray moves sufficiently relative to the others in a stacked column, its rigid sides no longer remain aligned with those of the other trays. The shrink-wrapped plastic alone must then support any downward forces. The weight of one or  
15 more trays is frequently sufficient to cause a puncture in the shrink-wrapped plastic stretched over the top of a misaligned tray, especially where the cargo of a product tray cannot bear a compressive load.

**Figure 5** illustrates a typical stack failure with two trays **502**, **504** formed using a prior art design. With reference to **Figure 5**, such shrink-wrapped plastic ruptures when  
20 downward forces exerted by a lower corner **506** of a misaligned top product tray **504** overcomes the resistive shrink-wrapped plastic of a bottom product tray **502**. The ruptured shrink-wrapped plastic makes a supporting bottom product tray **502** unsuitable for sale. As one bottom product tray **502** fails, other stacked trays within a column above the bottom product tray **502** are likely to shift and cause the shrink-wrapped plastic on other trays to  
25 rupture. For example, a misaligned upper corner **508** no longer can provide vertical support for trays above it because the walls must be carefully aligned according to trays made with

prior art designs. Horizontal shifts result in compression failure when one tray 504 moves just a mere fraction of an inch or centimeter (the thickness of tray walls) relative to a lower product tray 502. Such tray failures are especially frequent for products such as bags of snack products which cannot provide any support for a compression load.

5 A variety of shipping and display cartons and trays have been invented to try to eliminate the need for manual labor associated with stacking and shipping these trays for eventual sale from pallets. For example, plants, gift baskets, lamps, bags of chips, buckets of cut flowers, and stuffed animals are not easily amenable to sale from pallets. Since these items do not easily support a compressive load, they generally are not amenable to stacking.

10 Several patents disclose improved cartons, crates and trays which provide improved means for bundling, shipping, and selling such products from pallets or other types of displays.

For example, U.S. Patent 2,152,079 issued to Mott on March 28, 1939 discloses a combination shipping and display carton. After shipping, a perforated section of the package may be removed for display and sale of individual packaged units within the carton. Even

15 though this invention provides a means to stack bundles of individual units, this invention requires substantial manual labor to modify each package to allow for sale of individual units contained within each package.

U.S. Patent 3,315,875 issued to Praetorius on April 25, 1967 discloses a similar concept in that a side panel may be removed exposing individual units for sale. Likewise,

20 U.S. Patent 4,000,811 issued to Hardison et al., and 5,826,728 to Sheffer disclose a convertible carton which provides protection for its contents during shipping, and which subsequently may be transformed into an aesthetically pleasing display carton. These inventions may solve alignment and shipping problems, but also require substantial manual labor prior to final display and sale of goods even though such packages may be stacked and

25 shipped on pallets. Further, these solutions require additional packaging. These types of packages are also not designed for individual sale but merely display other products for

individual sale.

U.S. Patent 5,052,615 issued to Ott et al. on October 1, 1991 discloses a stackable carton or tray for a single layer of tomatoes. This invention requires separate reinforcing members inserted into tray corners so as to bear the load of other trays. Also, these trays are  
5 not formed from a single folded cardboard blank.

U.S. Patent 6,712,214 issued to Wintermute et al. on March 30, 2004 discloses a stackable display tray which is similarly formed from a blank and multiple inserts. Portions of the blank are folded up to create sides and reinforced corners for a multi-sided tray or shell. Angular panels are positioned inside the tray to provide increased stability and support.  
10 The invention requires separately inserted side panels.

U.S. Patent 6,270,007 and U.S. Patent 6,488,200 issued to Jensen, Jr., and International Patent Application PCT/US01/26610 disclose an improved crate for stacking and shipping plants. They disclose a crate system of cardboard or similar material consisting of a bottom cap, crate walls, and a top cap. The bottom and top caps are the same size and  
15 shape, and are interchangeable. Goods inside the crate are protected from compressive loads, and the crates can be stacked several crates deep on a pallet. This invention requires several pieces of cardboard or other packaging material to form a crate. Further, this invention does not necessarily bundle several smaller pieces of merchandise together for sale as a unit or package. Such crate is not meant to be sold as part of the product packaging. It would be  
20 more ideal to have a shipping container with just a bottom and support walls thus eliminating the need for a top piece or lid for each container.

U.S. Patent Application 10/792,976 filed on March 4, 2004 discloses a food transport tray which may be folded from a single blank and which has side locator flanges and receiving platforms over the sides and corner regions of the container. Such container has  
25 increased strength and improved features for improved stackability. However, this invention requires that the sides and corresponding corners are folded at substantially right angles to



form a tray. Further, such tray is not designed for use with a shrink-wrapped plastic covering.

Published International Patent Application PCT/US02/19025 discloses a stackable display container which may be formed from a single blank, shipped flat and assembled  
5 without adhesive. Such container has stacking shoulders and reinforced corners. This invention requires that the corners are folded at substantially right angles to form a container. Also, the container requires manual assembly, usually at the point of sale. Such containers are for displaying other containers and products for individual sale, and are not shrink-wrapped in plastic for sale as one unit.

10 None of these inventions solves the problems associated with frequent punctures of shrink-wrapped plastic over a tray. Consequently, a need exists for a carton or tray that is easily stackable, that remains stacked in columns during shipping, yet resists or prevents punctures to unsupported shrink-wrapped plastic covering each tray. A need exists for a tray which more successfully resists misalignment when exposed to horizontal forces during  
15 shipment. A need exists for a tray which may be stacked in columns and shipped on pallets, which allows the contents of the carton or tray to be seen, and which requires little or no additional manual labor to be sold from pallets. A need exists for a tray which does not need to be first packaged in boxes before being loaded onto pallets, and subsequently unloaded from these boxes before being ready for retail sale. The present invention fills these and  
20 other needs as detailed more fully below.

## SUMMARY OF THE INVENTION

Product trays shrink-wrapped with plastic may be stacked, shipped and sold on pallets due to an improved design made from a single blank of cardboard, corrugate, or other package material. Such improved product trays resist horizontal shifting and prevent vertical stack failures when exposed to horizontal forces during shipping. Each improved product tray supports a comparable compressive load while being composed of less material and/or less expensive material as compared with prior art designs. Such improved product trays may be stacked, shipped, and sold on pallets at retail warehouse stores, club stores, and other outlets without substantial additional packaging and without the additional labor normally required for packing and unpacking such trays.

The invention accordingly comprises the features described more fully below, and the scope of the invention will be indicated in the claims. Further objects of the present invention will become apparent in the following detailed description.

## BRIEF DESCRIPTION OF THE DRAWINGS

The novel features characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will be best understood by reference to the following detailed description of illustrative embodiments when read in conjunction with the accompanying drawings, wherein:

**Figure 1** shows an overhead view of a prior art design for a retail product tray wherein each side flap is bent at a ninety degree angle and forms a sharp corner;

**Figure 2** shows an overhead view of one embodiment of the present invention of a product tray wherein each side flap is scored and bent at two locations near each corner of a traditional prior art design thus forming an octagonal tray;

**Figure 3** shows an overhead view of a flat tray blank having scores, along which are folded sides, and flaps for forming a tray according to one embodiment of the present invention;

**Figure 4** shows a perspective view of two trays stacked squarely one above another, each tray formed according to one embodiment of the present invention;

**Figure 4A** shows a close up view of one corner of a tray according to the present invention; and,

**Figure 5** shows a perspective view of a column failure wherein an upper product tray made according to a prior art design ruptures the shrink-wrapped plastic of a lower product tray, and wherein other trays in the column above such failure become susceptible to similar misalignment and failure, and thus may similarly become unsuitable for retail sale.

**Reference Numerals**

- 102 Bottom panel
- 104 offset gap
- 106 side flap
- 5 108 short side
- 110 flap bend or crease
- 112 side crease
- 116 long side
- 202 overhang of short side
- 10 204 short side horizontal support distance
- 206 long side horizontal support distance
- 402 stacked, bottom container
- 404 stacked, top container
- 502 lower prior art tray
- 15 504 upper prior art tray
- 506 lower corner of misaligned upper tray
- 508 upper corner of misaligned upper tray

## DETAILED DESCRIPTION

While the invention is described below with respect to a preferred embodiment, other embodiments are possible. The concepts disclosed herein apply equally to other stackable product trays, including any container with substantially vertical sides and an open top. The invention is described below with reference to the accompanying figures.

**Figure 2** shows an overhead view of a product tray according to a preferred embodiment of the invention. This product tray has substantially the same volume as a traditional prior art tray such as a prior art tray shown in **Figure 1**. With reference to **Figure 2**, the long sides **116** or sidewalls, and short sides **108** or endwalls, are both folded at ninety degrees to form a generally rectangular tray. The long sides **116** and short sides **108** are folded along side crease lines **112** made by a forming machine. In one embodiment, side crease lines **112** are fully or partially perforated, but may be just creased. Folding the sides **108**, **116** at an angle less than or greater than ninety degrees, forming a trapezoidal tray as seen from a frontal view, provides improved stackability but reduces the compressive strength of the tray and wastes interior tray space. Having such a trapezoidal shape as seen from a frontal view would provide more protection to a shrink-wrapped plastic covering, but would not provide equivalent compressive resistance to a vertical compressive load.

The product tray in **Figure 2** is formed from a single cardboard blank of roughly the same size used in prior art designs. Thus, less re-tooling of the tray-forming machinery is required to produce an improved product tray. The flaps **106** of the long sides **116** or sidewalls have flap creases **110**, which may or may not be perforated, and, in a preferred embodiment, form a corner in two bends of approximately forty-five degrees each. Other bends or creases **110** of different angles may be formed. For example, a first bend of thirty degrees followed by a bend of sixty degrees is possible.

The angles of the two or more bends determine the size of a short side horizontal support distance **204** and a long side horizontal support distance **206**. In the case of two

creases **110**, each bent at forty-five degrees, the short side and long side support distances **204, 206** are equal. In other cases, the short side and long side support distances **204, 206** may be unequal. These support distances **204, 206** may be chosen to conform to the requirements of a given situation. The two or more flap creases **110** may give the tray more  
5 of an octagonal or multi-sided shape as opposed to a generally rectangular shape of prior art designs. With two or more bends, the length of each long side flap **106** may be longer than the height of the mating short side **108** or endwalls for convenience in attaching each flap **106** to a short side **108**.

With reference to **Figure 2**, the long side flaps **106** may be attached to the short sides  
10 **108** or endwalls with adhesive. Adhesive is preferentially applied by part of a machine which forms tray blanks into trays. In other instances, adhesive may be manually applied. The side flaps **106** may be attached by other means such as staples.

The location of each flap bend **110** is chosen so as to minimally reduce the useable volume of the tray while still providing substantial protection from stack failure. Various  
15 locations of the side creases or bends **110** may be selected based on a number of factors including, but not limited to, the material composition of the tray blank, the weight and size of the tray cargo, and the ability of the tray cargo to support a compression load. Other numbers of flap creases **110** greater than two may be used in each flap. Alternatively, flaps **106** may be bent into a circular shape, a regular shape, or irregular shape, without forming a  
20 crease and may still provide the benefits of the present invention.

A gripping edge **202** is formed on each end of each short side **108** from the presence of multiple creases **110**. A hole or punch out may be additionally formed on or near this area for additional gripping by a finger or hand. The gripping edge **202** makes a convenient  
gripping place on the tray for consumers. In one instance, after purchasing a tray, a consumer  
25 punches through the shrink-wrapped plastic stretched over the area between a flap **106** and the gripping edge **202** for easier gripping and carrying of the tray.

**Figure 3** shows an overhead view of a flat tray blank according to the present invention. The most common material used for shipping/display cartons is corrugated cardboard. This material is strong, lightweight, relatively inexpensive, and recyclable. Improved product trays may be made of corrugated cardboard or any other material. In one  
5 test, trays made according to the invention, and made from a cost neutral corrugated paperboard material, increased the compression strength of each tray by 74% as compared to prior art designs. In the same test, distribution-related damage to trays was reduced by a factor of 6. Trays of this design may be stacked on pallets, secured with shrink wrap, and shipped from factory to retail outlet without the need for dividers or additional support  
10 material. Further, trays of this design do not need to be placed inside boxes before stacking them onto pallets. Trays of this design do not require the manual labor associated with unpacking the trays from boxes before displaying them on a pallet or store shelf. Without the need for such protective boxes, these trays also do not require the labor of loading and unloading the boxes, thus trays of this design provide substantial savings on labor and  
15 material costs.

With reference to **Figure 3**, each long side **116** or sidewall has two flaps **106**. Each flap has two or more flap creases **110**. The location and spacing of creases **110** should be chosen so as to provide for a sufficient length of flap **106** to attach to a short side **108** or endwall to form an enclosed tray while providing the benefits described herein. In one  
20 embodiment of the improved tray, the flaps **106** are longer than the height of the short side **118** or endwall. However, any length of flap **106** is possible. The flaps **106** are preferably cut with an offset gap **104** so as to ensure proper folding of each tray blank in a tray folding machine. One alternative to an offset gap **104** is a single cut to simultaneously form an endwall **108** and a flap **106**. The bottom of each offset gap **104** is rounded so as to  
25 discourage tearing of a tray along a side crease **112**. The corners of the short sides **108** and flaps **106** also may be rounded for increased operability during folding and formation of each

tray. The rounding also may be more aesthetically pleasing, helps avoid misalignment of stacked trays, and reduces the amount of damage to shrink-wrapped plastic over each tray. The tray blanks may be formed in the same machinery as prior art designs with appropriate modification to form the additional flap creases **110** and other differing features.

5           **Figure 4** shows a perspective view of two trays, made according to the current invention, stacked squarely one above another. Several trays stacked one above another are referred to as a column of trays. With reference to **Figure 4**, during shipment on a pallet (not shown) a top tray **404** may experience horizontal forces and may shift horizontally relative to a bottom tray **402**. Horizontal movement may be in either a transverse or longitudinal  
10 direction. When a top tray **404** shifts, its sides **108**, **116** may not align vertically with those of a bottom tray **402**. If a top tray **404** shifts far enough, the vertical forces exerted downward on a bottom tray **402** can only be resisted by the shrink-wrapped plastic (not shown) stretched across the top of a bottom tray **402**.

          With the design of the present invention, a top tray **404** would have to shift either a  
15 short side horizontal support distance **204** or a long side horizontal support distance **206**. In one embodiment, a long side **116** is approximately 19 inches (48 cm) in length, a short side **108** is approximately 15 inches (38 cm) in length, and both a short side horizontal support distance **204** and a long side horizontal support distance **206** are approximately 1.5 inches (3.8 cm) in length. For this embodiment, these distances were determined to be satisfactory  
20 to resist typical horizontal shifting forces associated with transportation of snack products such as, but not limited to, bags of potato chips. Other sizes and proportions may be used according to the present invention for other products and for prevailing conditions. Such sizes and proportions may be designed to accommodate the weight of the tray cargo and the compression load on each tray. Optimal sizes of a short side horizontal support distance **204**  
25 and a long side horizontal support distance **206** may be determined by experimentation given the prevailing circumstances and requirements for any given product tray.



**Figure 4A** shows a close-up overhead view of one corner of a tray formed according to the present invention. With reference to **Figure 4A**, the wavy lines in the tray material are the inner layer of paper material typical of corrugated paperboard. Trays made of other materials may not appear identical to the embodiment shown in **Figure 4A**. In **Figure 4A**, a  
5 flap **106** is creased in two locations with bends of approximately forty-five degrees each. The extra bend at each corner provides extra stability when trays are stacked one on top of another. By having at least one extra additional bend at each corner, there is substantially more strength in the tray to support a compression load.

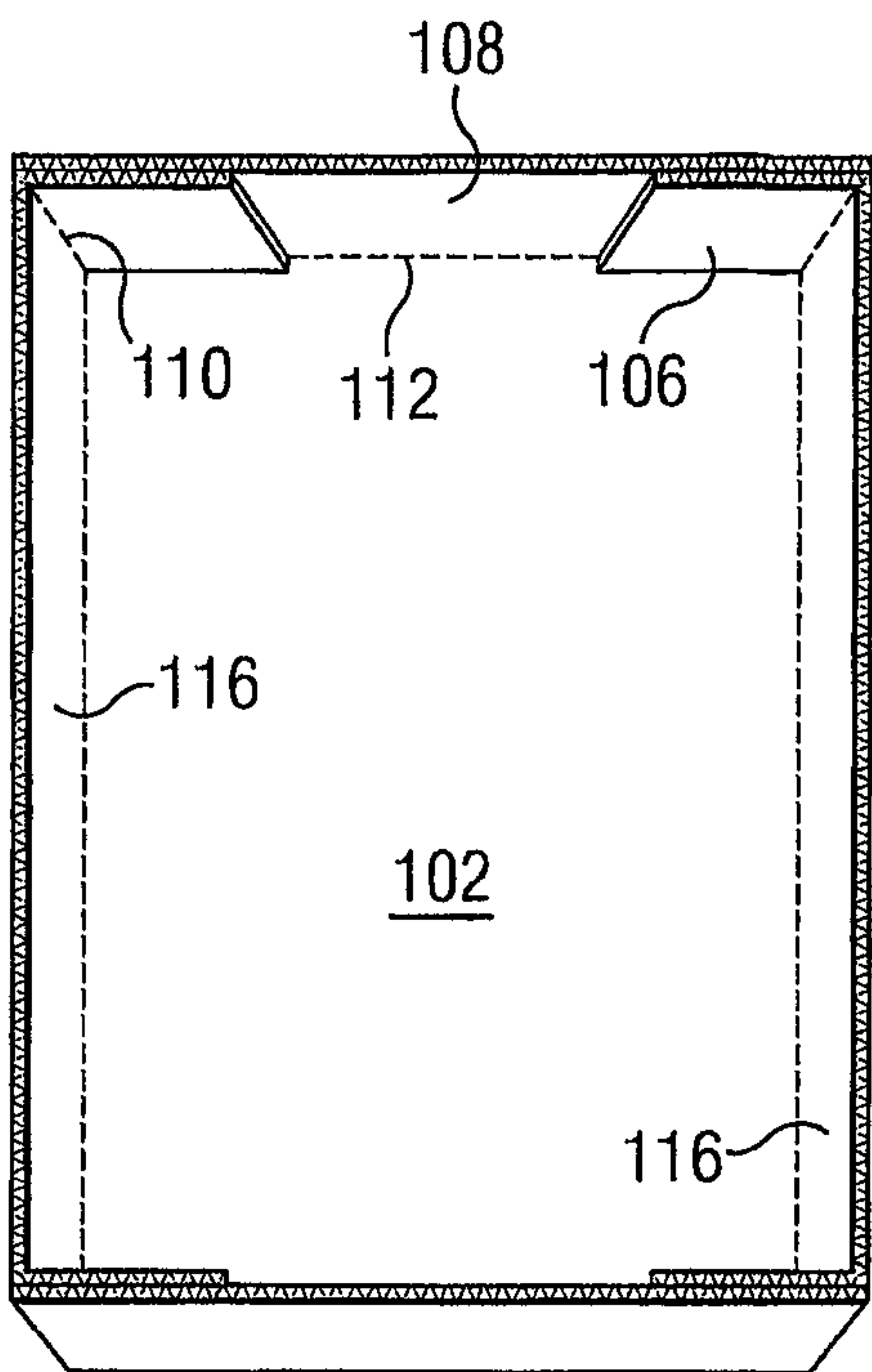
Specific embodiments of the invention have been disclosed. However, one of ordinary  
10 skill in the art will recognize that one can modify the dimensions and particulars of the carton, as well as the specific design of the crease lines, without straying from the inventive concept.

I claim:

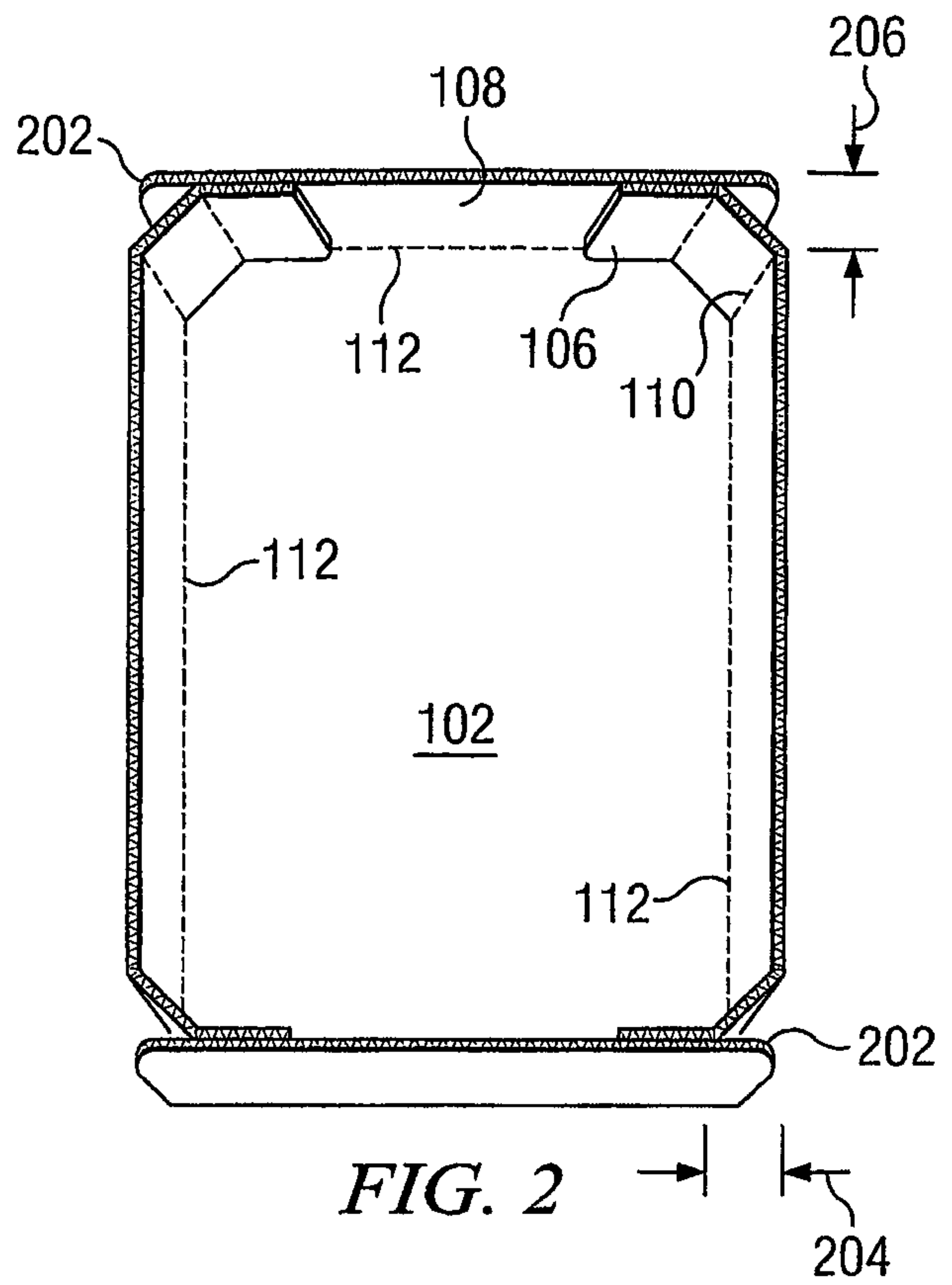
1. A tray formed from a single blank, said tray comprising:
  - a floor approximately rectangular in shape comprising a length and a width;
  - two endwalls disposed on opposite sides of said floor, wherein each endwall comprises a width defined by the distance between two ends of said endwall, and a height, and wherein said width of each said endwall is approximately equal to said width of said floor;
  - two sidewalls disposed on opposite sides of said floor;
  - two flaps disposed on opposite sides of each said sidewall and affixed to each said endwall, with each flap defining a sidewall horizontal support distance and an endwall horizontal support distance, wherein each said flap comprises a first section, a second section, and a height, wherein said height of each said flap is approximately equal to said height of each said endwall and wherein said second section is affixed to said endwall without said second sections contacting one another;
  - one gripping edge at each said end of each said endwall, wherein each said gripping edge comprises a width approximately equal to said endwall horizontal support distance and a height substantially equal to said height of said endwall across a substantial portion of said width; and
  - a gap between each said gripping edge and each said sidewall defined by said gripping edge, said first section of said flap, and said height of said endwall.
  
2. The tray of claim 1 wherein each said flap further comprises:
  - a first flap crease and a second flap crease, wherein said second section of each said flap is defined by said second flap crease, and wherein said first section of each said flap comprises an area between said first flap crease and said second flap crease.
  
3. The tray of claim 2 wherein each said flap is folded inwardly at each said flap crease.

4. The tray of claim 2 wherein each said flap is folded inwardly at an angle of approximately  $45^\circ$  at each said flap crease.
  
- 5 5. The tray of claim 3 further comprising for each flap:  
  
a first angle defined by said sidewall and said first section of said flap; and  
  
a second angle defined by said first section and said second section of said flap.
  
6. The tray of claim 5 wherein the sum of said first angle and said second angle is  
10 approximately equal to  $90^\circ$ .
  
7. The tray of claim 1 further comprising:  
  
each said sidewall having a length of approximately 19 inches;  
  
each said endwall having a length of approximately 15 inches; and  
  
15 wherein each said sidewall horizontal support distance is approximately 1.5 inches and  
wherein each said endwall horizontal support distance is approximately 1.5 inches.

1/4



*FIG. 1*  
*(PRIOR ART)*



*FIG. 2*

2/4

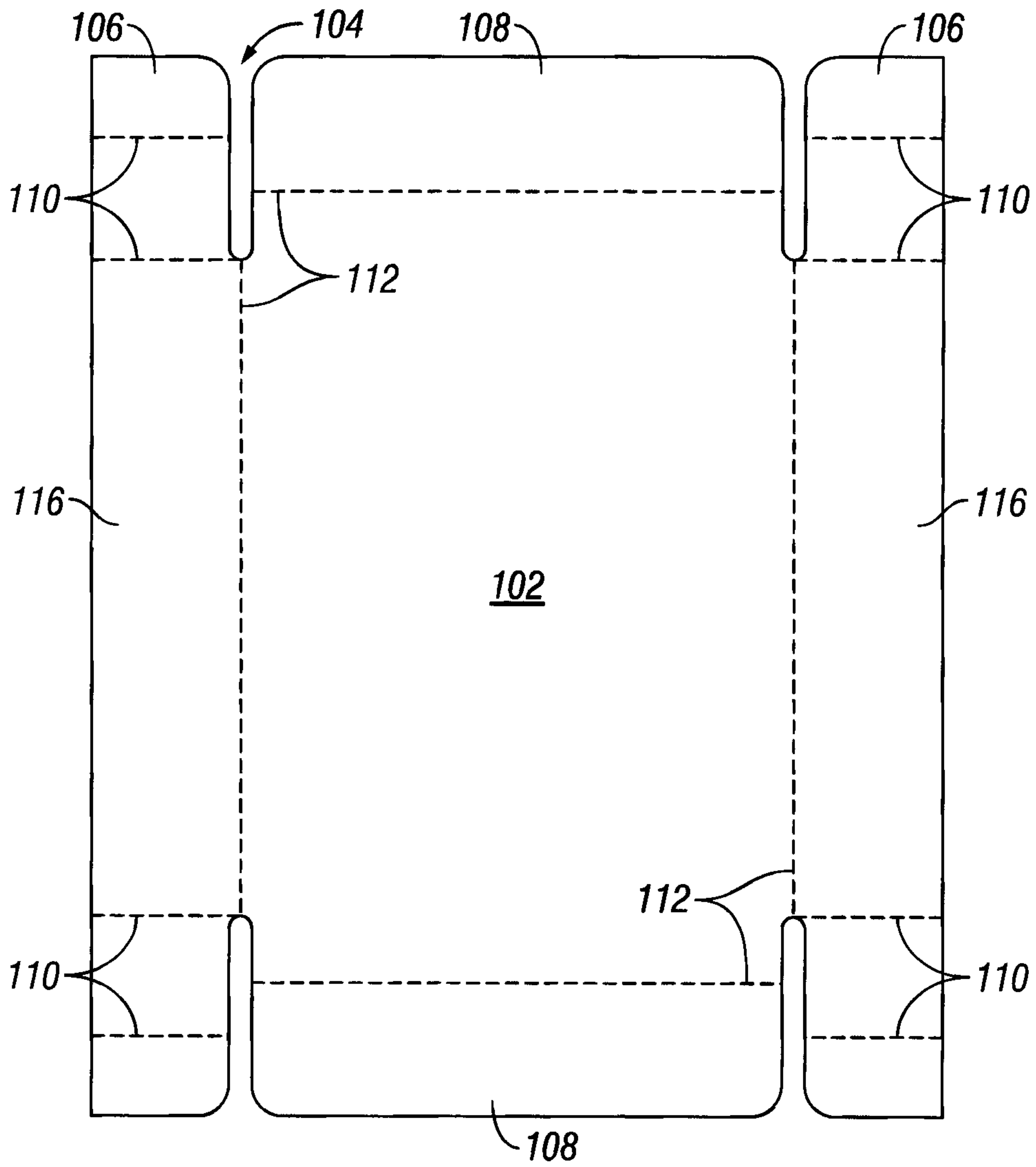


FIG. 3

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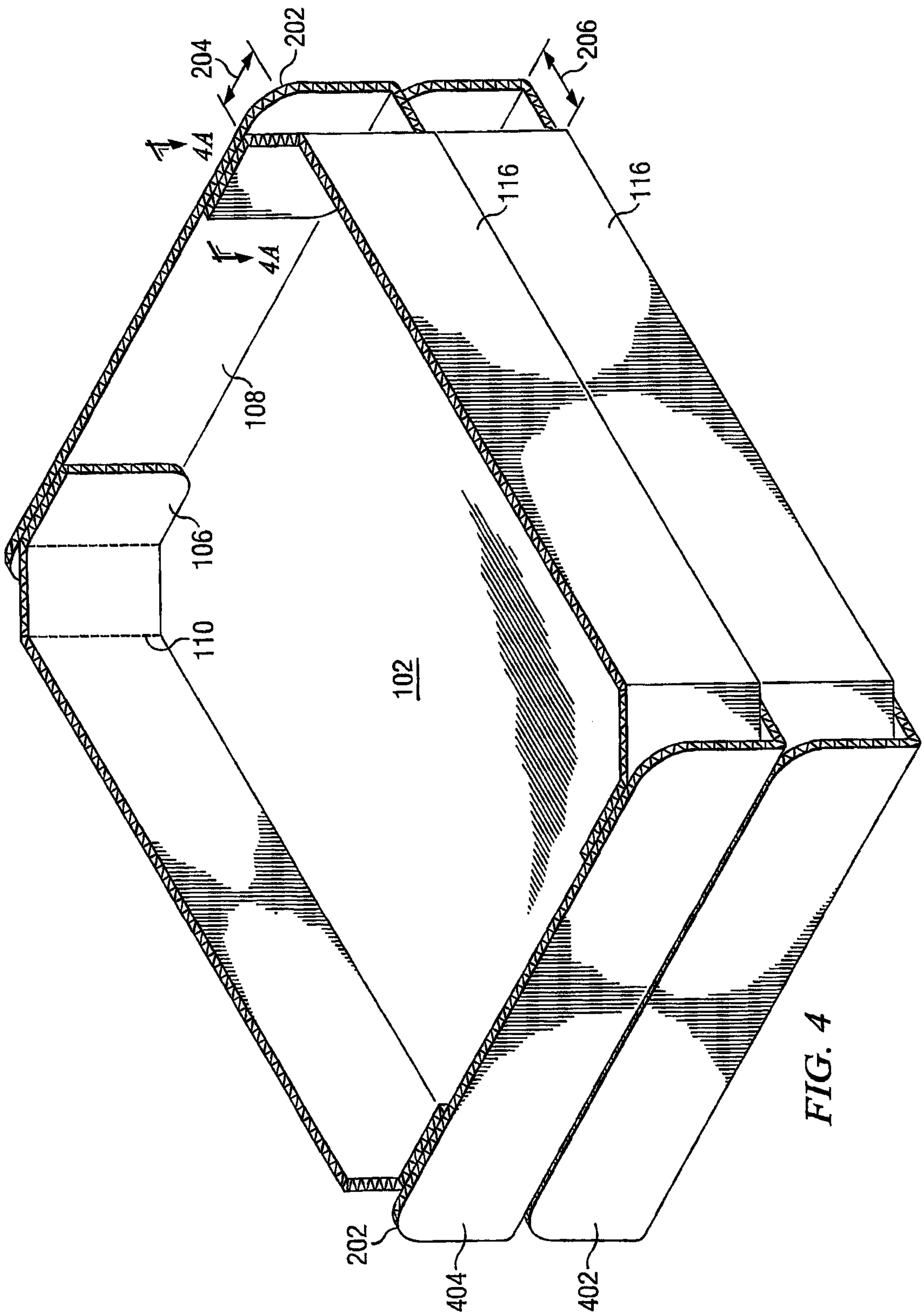


FIG. 4

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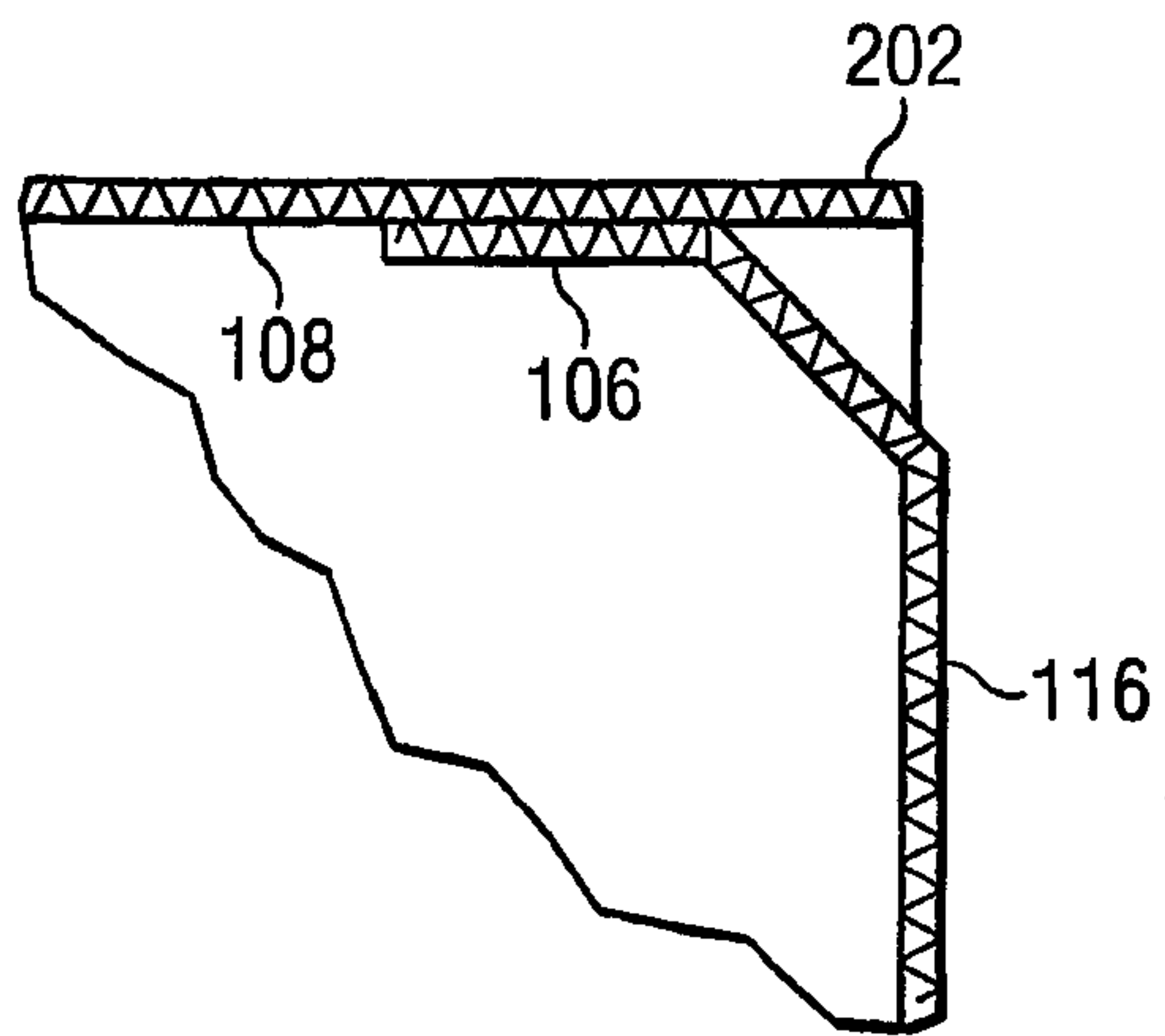


FIG. 4A

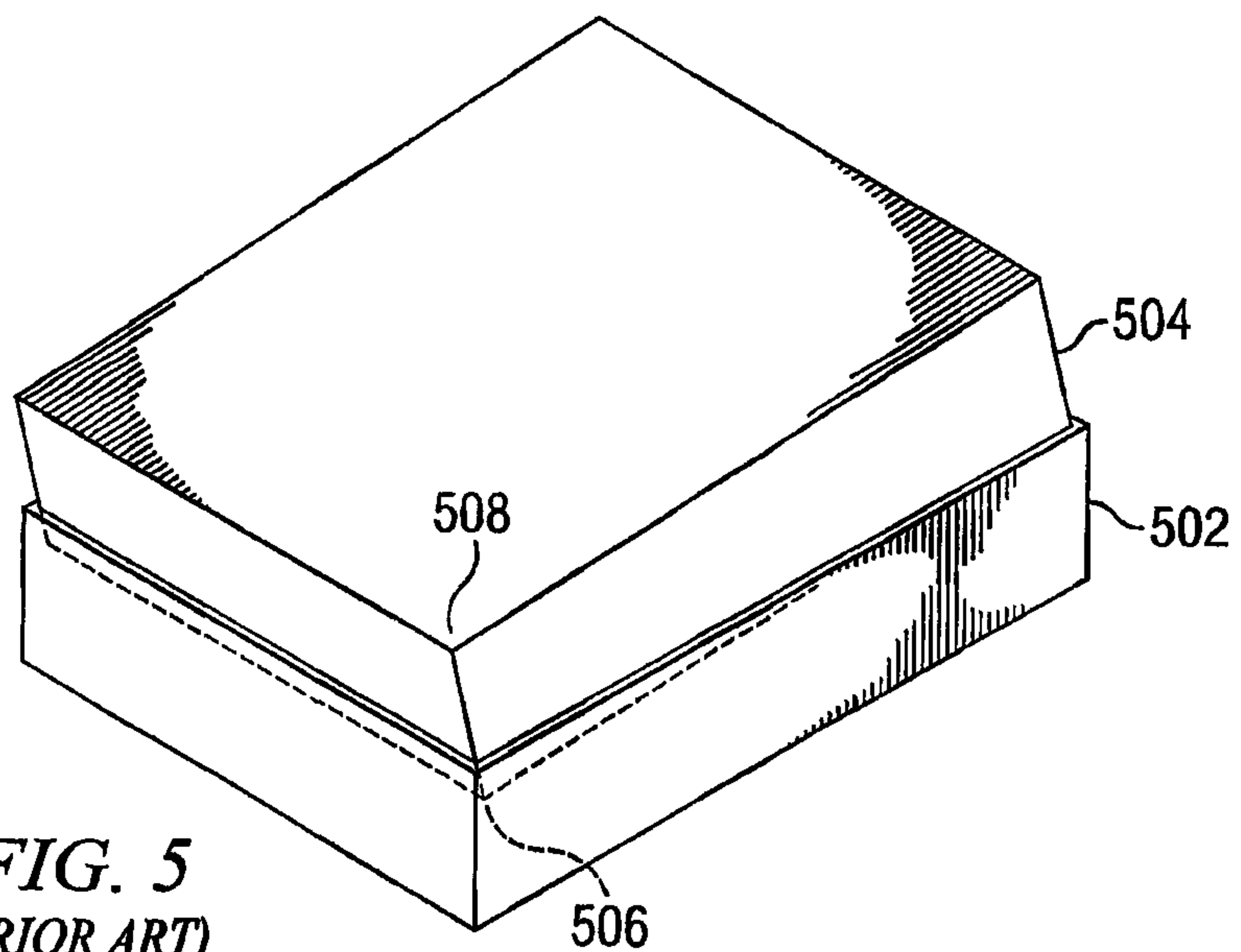


FIG. 5  
(PRIOR ART)

