IN THE UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF GEORGIA
ATLANTA DIVISION

PACTIV LLC, Plaintiff, v. **HIGHLAND PACKAGING SOLUTIONS, INC.**, Defendant.	Civil Action No. 1:15-cv-01316-MHC

FIRST AMENDED COMPLAINT

Plaintiff Pactiv LLC ("Pactiv"), for its complaint against Defendant Highland Packaging Solutions, Inc. ("Highland Packaging"), states and alleges as follows:

PARTIES

1. Pactiv LLC is a Delaware limited liability company with its principal place of business at 1900 W. Field Court, Lake Forest, IL 60045. Pactiv has four Georgia locations: one in Conyers, two in Covington, and one in Macon.

2. Highland Packaging Solutions, Inc. is a Florida corporation that is located at 1420 Gordon Food Service Drive, Plant City, FL 33563 and that conducts business in this judicial district.

JURISDICTION

3. This is an action for patent infringement under the patent laws of the United States, Title 35, United States Code, Section 271 *et seq*. and arising from Highland Packaging's acts of infringement of U.S. Patent Nos. 7,766,169; 7,775,364; D694,126; 8,640,872; and D732,401 (collectively, the "patents-in-suit"), through its importation, manufacture, use, offer for sale, and sale of packaging products, namely, particular sheet-formed and/or molded containers, such as this Highland Packaging egg carton:

4. This Court has subject matter jurisdiction over the claims and causes of action asserted in this Complaint because the claims arise under the patent laws of the United States.

5. Highland Packaging is subject to personal jurisdiction in the Northern District of Georgia consistent with the principles of due process, because Highland Packaging offers its products for sale in this District, has transacted business in this District, has committed acts of patent infringement in this District, and/or has placed infringing products into the stream of commerce through established distribution channels with the expectation that such products will be purchased by residents of this District, for example, distribution of its infringing packaging products to Publix Super Markets, Inc. stores in this District.

6. Venue is proper in this District under 28 U.S.C. § 1391(b) and § 1400(b).

FACTUAL BACKGROUND

7. On August 3, 2010, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 7,766,169 ("the '169 patent"), titled "Stackable egg-box, stack of egg-boxes and method for destacking said egg-box." A copy of the '169 patent is attached as Exhibit A.

8. On August 17, 2010, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 7,775,364 ("the '364 patent"), titled "Grasping closure system for container for frangible items." A copy of the '364 patent is attached as Exhibit B.

9. On November 26, 2013, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. D694,126 ("the '126 patent"), titled "Sheet-formed container for frangible items." A copy of the '126 patent is attached as Exhibit C.

10. On February 4, 2014, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 8,640,872 ("the '872 patent"), titled "Egg container with stack-spacing system." A copy of the '872 patent is attached as Exhibit D.

11. On June 23, 2015, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. D732,401 ("the '401 patent"), titled "Sheet-formed container for frangible items." A copy of the '401 patent is attached as Exhibit E.

12. Pactiv is the owner by assignment of all right, title, and interest in the patents-in-suit.

13. Pactiv is the world's largest manufacturer and distributor of food packaging and foodservice products, supplying packers, processors, supermarkets, restaurants, institutions, and foodservice outlets across North America. In

particular, Pactiv produces custom-labeled, stackable polyethylene terephthalate ("PET") egg cartons for customers throughout the United States.

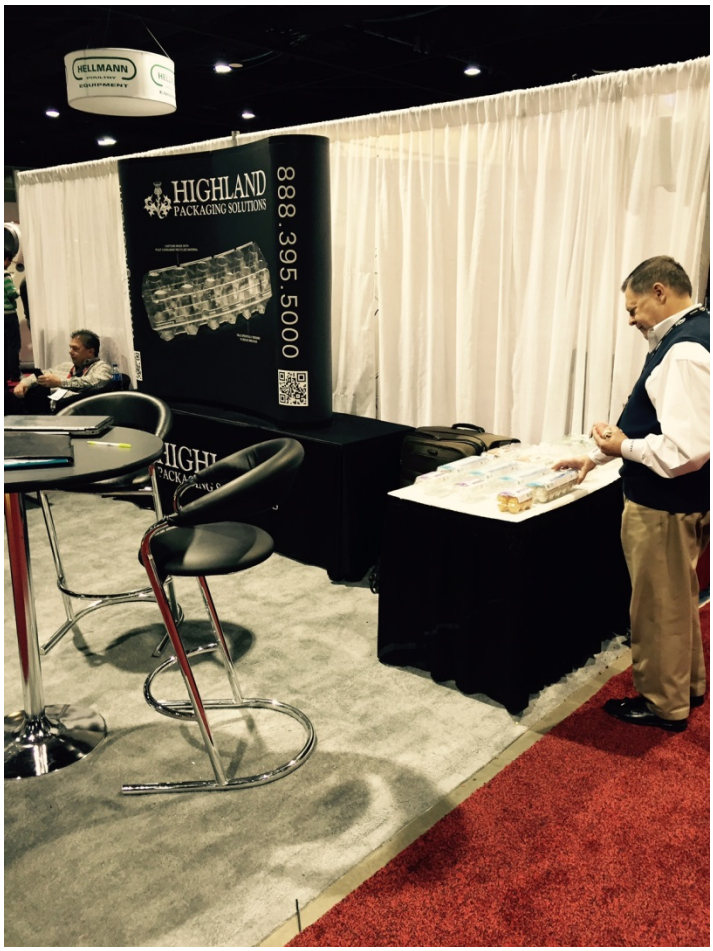
14. According to the U.S. Census Bureau, Georgia is the number one producer of poultry and poultry products. It is estimated that the poultry industry's annual contribution to the State is $38 billion and directly or indirectly employs 138,000 Georgians. On an average day, Georgia produces approximately thirty million pounds of chicken and thirteen million eggs. Poultry products earn more than any other Georgia crop. The statewide economic impact of the industry is an estimated $13.5 billion annually. *See, e.g.*, http://www.gapf.org/IndustryFacts/default.cfm.

15. A number of major poultry processors are based in Georgia, including Gold Kist, Fieldale Farms, Claxton, Mar-Jac, and Cagle's. Additionally, a number of other major poultry companies operate in Georgia, including Tyson, Con-Agra, and Continental Grain. *See* http://www.georgiaencyclopedia.org/articles/business-economy/poultry.

16. According to its website, Highland Packaging manufactures and designs large volume products using PET material, including packaging for food. *See* http://www.highcor.com/About/WhatWeDo.

17. Atlanta, Georgia hosted the International Production & Processing Expo ("IPPE") from January 27 through January 29, 2015. According to its website, the IPPE is the world's largest annual poultry, meat, and feed industry event of its kind. This year, it is estimated that approximately 30,000 attendees from more than 100 countries attended IPPE in Atlanta. *See* http://ippexpo.com/.

18. Highland Packaging was listed as an Exhibitor at the IPPE in Atlanta (Booth C9333), and, as shown in the photo below, did attend IPPE.



19. Highland Packaging marketed, used, and, upon information and belief, offered to sell its food packaging products at the IPPE in Atlanta, including the packaging products that are covered by the claims of the patents-in-suit.

20. On February 3, 2015, Pactiv wrote to Highland Packaging, identified the ’169, ’364, ’126, and ’872 patents, and expressed concern over Highland Packaging’s infringing egg cartons. Pactiv further provided Highland Packaging with a copy of a prior complaint filed on February 2, 2015 in the U.S. District Court for the Northern District of Georgia, Civil Action No. 1:15-cv-00334-MHC. Since at least as early as that date, Highland Packaging has had knowledge of the ’169, ’364, ’126, and ’872 patents and Pactiv’s infringement claims.

21. Highland Packaging’s infringement of the claims of the patents-in-suit has injured Pactiv and will cause irreparable injury in the future unless Highland Packaging is enjoined from further infringing the claims of the patents-in-suit.

FIRST CLAIM FOR RELIEF
PATENT INFRINGEMENT OF THE ’169 PATENT

22. Pactiv incorporates the foregoing paragraphs by reference as though fully set forth herein.

23. Highland Packaging has infringed and continues to directly infringe at least claim 1 of the ’169 patent by importing, making, offering to sell, selling,

supplying, causing to be supplied, using, and/or causing to be used, in or into the United States, packaging products as claimed in the ’169 patent. The accused packaging products that embody the inventions claimed in the ’169 patent include at least Highland Packaging’s stackable trays obtained by molding of a sheet of plastic material containing the limitations of at least claim 1 of the ‘169 patent, such as this Highland Packaging egg carton:

24. The infringement by Highland Packaging has injured and continues to injure Pactiv and will cause irreparable harm unless Highland Packaging is enjoined from infringing the claims of the ’169 patent.

25. Highland Packaging’s infringement of the claims of the ’169 patent has been and continues to be willful under 35 U.S.C. § 284 because Highland Packaging has acted with knowledge of the ’169 patent and knowledge that its actions constitute infringement of the ’169 Patent, or at least has acted with

knowledge of an objectively high likelihood that its actions constitute infringement of the ’169 patent.

26. Pactiv has complied with the statutory requirement of giving notice of the ’169 patent to Highland Packaging at least by filing a prior complaint in the U.S. District Court for the Northern District of Georgia on February 2, 2015—Civil Action No. 1:15-cv-00334-MHC —alleging that Highland Packaging infringed claims of the ’169 patent and providing Highland Packaging with a copy of that complaint on February 3, 2015.

SECOND CLAIM FOR RELIEF
PATENT INFRINGEMENT OF THE ’364 PATENT

27. Pactiv incorporates the foregoing paragraphs by reference as though fully set forth herein.

28. Highland Packaging has infringed and continues to directly infringe at least claim 1 of the ’364 patent by importing, making, offering to sell, selling, supplying, causing to be supplied, using, and/or causing to be used, in or into the United States, packaging products as claimed in the ’364 patent. The accused packaging products that embody the inventions claimed in the ’364 patent include at least Highland Packaging’s stackable trays obtained by molding of a sheet of plastic material containing the limitations of at least claim 1 of the ’364 patent, such as this Highland Packaging egg carton:

29. The infringement by Highland Packaging has injured and continues to injure Pactiv and will cause irreparable harm unless Highland Packaging is enjoined from infringing the claims of the ’364 patent.

30. Highland Packaging’s infringement of the claims of the ’364 patent has been and continues to be willful under 35 U.S.C. § 284 because Highland Packaging has acted with knowledge of the ’364 patent and knowledge that its actions constitute infringement of the ’364 Patent, or at least has acted with knowledge of an objectively high likelihood that its actions constitute infringement of the ’364 patent.

31. Pactiv has complied with the statutory requirement of giving notice of the ’364 patent to Highland Packaging at least by filing a prior complaint in the U.S. District Court for the Northern District of Georgia on February 2, 2015—Civil Action No. 1:15-cv-00334-MHC —alleging that Highland Packaging

infringed claims of the ’364 patent and providing Highland Packaging with a copy of that complaint on February 3, 2015.

THIRD CLAIM FOR RELIEF
PATENT INFRINGEMENT OF THE ’126 PATENT

32. Pactiv incorporates the foregoing paragraphs by reference as though fully set forth herein.

33. The ’126 Patent claims an ornamental design for a sheet-formed container for frangible items. Figure 1 of the ’126 Patent is shown below:

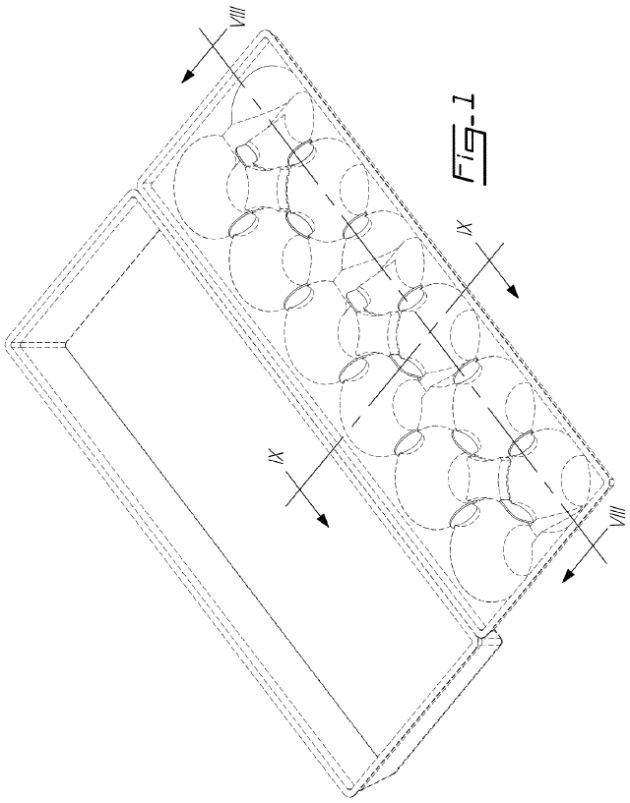


Fig. 1

34. Highland Packaging has infringed and continues to directly infringe the ’126 patent by importing, making, offering to sell, selling, supplying, causing

to be supplied, using, and/or causing to be used, in or into the United States, packaging products as claimed in the '126 patent. The accused packaging products that embody the design claimed in the '126 patent include at least Highland Packaging's containers for receiving frangible items, such as its egg cartons. An example of Highland Packaging's infringing packaging products is shown below:

35. The infringement by Highland Packaging has injured and continues to injure Pactiv and will cause irreparable harm unless Highland Packaging is enjoined from infringing the claim of the '126 patent.

36. Highland Packaging's infringement of the claims of the '126 patent has been and continues to be willful under 35 U.S.C. § 284 because Highland Packaging has acted with knowledge of the '126 patent and knowledge that its actions constitute infringement of the '126 Patent, or at least has acted with

knowledge of an objectively high likelihood that its actions constitute infringement of the ’126 patent.

37. Pactiv has complied with the statutory requirement of giving notice of the ’126 patent to Highland Packaging at least by filing a prior complaint in the U.S. District Court for the Northern District of Georgia on February 2, 2015—Civil Action No. 1:15-cv-00334-MHC —alleging that Highland Packaging infringed claims of the ’126 patent and providing Highland Packaging with a copy of that complaint on February 3, 2015.

FOURTH CLAIM FOR RELIEF
PATENT INFRINGEMENT OF THE ’872 PATENT

38. Pactiv incorporates the foregoing paragraphs by reference as though fully set forth herein.

39. Highland Packaging has infringed and continues to directly infringe at least claim 1 of the ’872 patent by importing, making, offering to sell, selling, supplying, causing to be supplied, using, and/or causing to be used, in or into the United States, packaging products as claimed in the ’872 patent. The accused packaging products that embody the inventions claimed in the ’872 patent include at least Highland Packaging’s containers for receiving frangible items comprising a

sheet of formed polymer containing the limitations of at least claim 1 of the ‘872 patent, such as this Highland Packaging egg carton:

40. The infringement by Highland Packaging has injured and continues to injure Pactiv and will cause irreparable harm unless Highland Packaging is enjoined from infringing the claims of the ’872 patent.

41. Highland Packaging’s infringement of the claims of the ’872 patent has been and continues to be willful under 35 U.S.C. § 284 because Highland Packaging has acted with knowledge of the ’872 patent and knowledge that its actions constitute infringement of the ’872 Patent, or at least has acted with knowledge of an objectively high likelihood that its actions constitute infringement of the ’872 patent.

42. Pactiv has complied with the statutory requirement of giving notice of the ’872 patent to Highland Packaging at least by filing a prior complaint in the

U.S. District Court for the Northern District of Georgia on February 2, 2015—Civil Action No. 1:15-cv-00334-MHC —alleging that Highland Packaging infringed claims of the ’872 patent and providing Highland Packaging with a copy of that complaint on February 3, 2015.

FIFTH CLAIM FOR RELIEF
PATENT INFRINGEMENT OF THE ’401 PATENT

43. Pactiv incorporates the foregoing paragraphs by reference as though fully set forth herein.

44. The ’401 Patent claims an ornamental design for a sheet-formed container for frangible items. Figure 1 of the ’401 Patent is shown below:

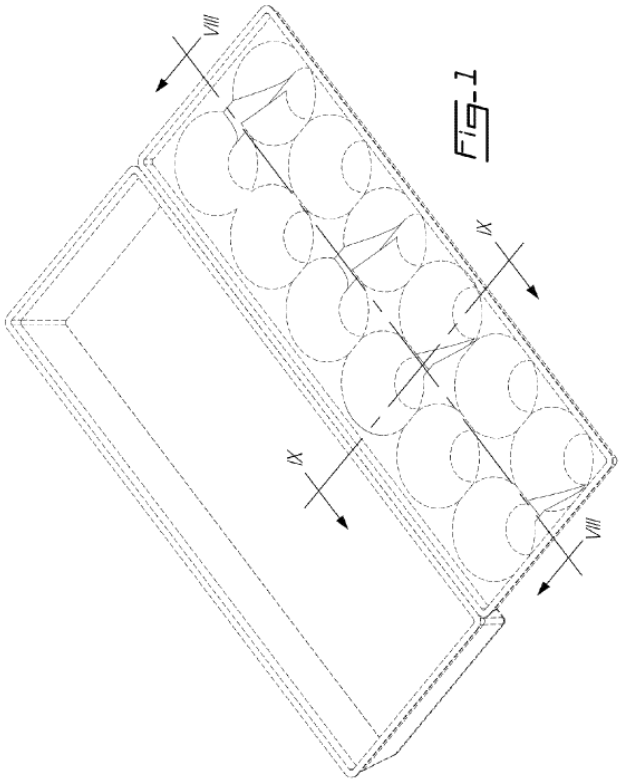


Fig. 1

45. Highland Packaging has infringed and continues to directly infringe the ’401 patent by importing, making, offering to sell, selling, supplying, causing to be supplied, using, and/or causing to be used, in or into the United States, packaging products as claimed in the ’401 patent. The accused packaging products that embody the design claimed in the ’401 patent include at least Highland Packaging’s containers for receiving frangible items, such as its egg cartons. An example of Highland Packaging’s infringing packaging products is shown below:

46. The infringement by Highland Packaging has injured and continues to injure Pactiv and will cause irreparable harm unless Highland Packaging is enjoined from infringing the claim of the ’401 patent.

47. Pactiv has complied with the statutory requirement of giving notice of the ’401 Patent to Highland Packaging at least by filing this amended complaint and providing Highland Packaging with a copy of the same.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff Pactiv prays that this Court:

a. Enter a judgment that Highland Packaging has directly infringed at least one of the claims of each of the patents-in-suit;

b. Enter a judgment that Highland Packaging has willfully infringed claims of each of the patents-in-suit;

c. Grant a preliminary injunction enjoining Highland Packaging and its agents, servants, officers, directors, employees, and persons or entities acting in concert with Highland Packaging from directly infringing the claims of the patents-in-suit;

d. Grant a permanent injunction enjoining Highland Packaging and its agents, servants, officers, directors, employees, and persons or entities acting in concert with Highland Packaging from directly infringing the claims of the patents-in-suit;

e. Award Pactiv damages in an amount sufficient to compensate Pactiv for Highland Packaging's infringement of the '169 patent, the '364 patent, and the '872 patent, but not less than a reasonable royalty;

f. Award Pactiv damages in an amount sufficient to compensate Pactiv for Highland Packaging's infringement of the '126 patent and the '401 patent,

including disgorgement of all profits related to the infringement of the ’126 patent and the ’401 patent;

g. Award Pactiv treble damages in view of Highland Packaging’s willful infringement pursuant to 35 U.S.C. § 284;

h. Award Pactiv interest and costs pursuant to 35 U.S.C. § 284;

i. Declare this case exceptional under 35 U.S.C. § 285 and award Pactiv its reasonable attorneys’ fees, expenses, and costs incurred in this action; and

j. Grant such other and further relief that the Court finds just and equitable.

DEMAND FOR JURY TRIAL

Plaintiff Pactiv demands a jury trial on all issues so triable.

Dated: July 16, 2015

Respectfully submitted,

/s/ Jason P. Grier

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Attorneys for Plaintiff Pactiv LLC

EXHIBIT A

US007766169B2

(12) **United States Patent**
St-Onge

(10) **Patent No.: US 7,766,169 B2**
(45) **Date of Patent: Aug. 3, 2010**

(54) **STACKABLE EGG-BOX, STACK OF EGG-BOXES AND METHOD FOR DESTACKING SAID EGG-BOX**

(75) Inventor: **Yves St-Onge**, Blainville (CA)

(73) Assignee: **Interplast Packaging Inc.**, Terrebonne (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 582 days.

(21) Appl. No.: **10/934,400**

(22) Filed: **Sep. 7, 2004**

(65) **Prior Publication Data**

US 2005/0189256 A1 Sep. 1, 2005

Related U.S. Application Data

(60) Provisional application No. 60/500,359, filed on Sep. 5, 2003.

(51) **Int. Cl.**
B65D 85/32 (2006.01)

(52) **U.S. Cl.** **206/521.1**; 206/521.8; 206/519

(58) **Field of Classification Search** 206/521.1, 206/521.7, 505, 515, 519, 521.8, 520
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

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2007/0151892	A1 *	7/2007	St-Onge	206/521.1

FOREIGN PATENT DOCUMENTS

CA	2028229	4/1992

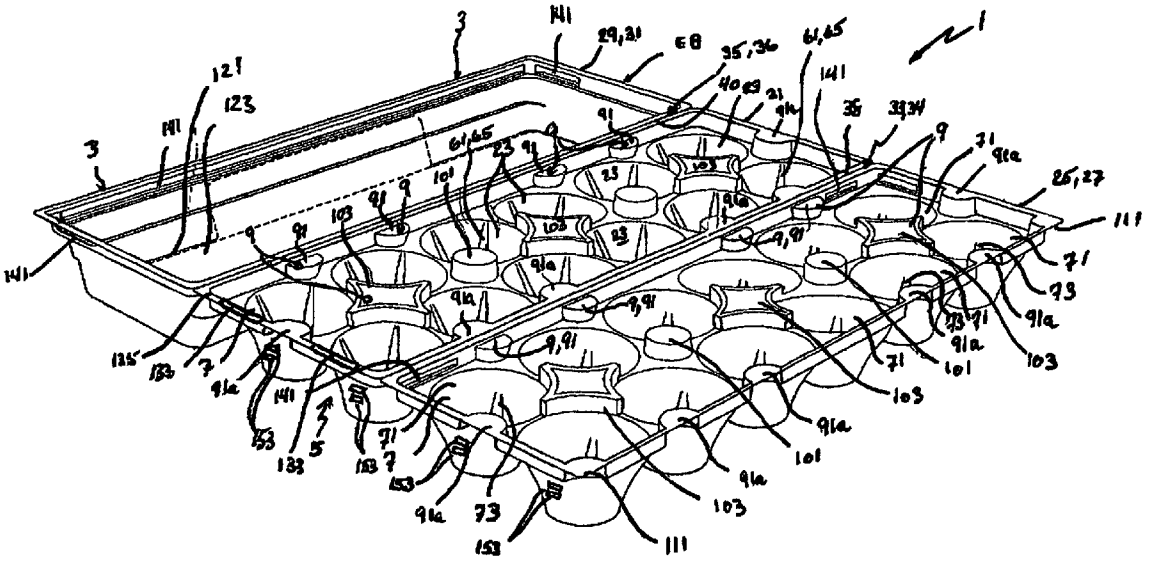
* cited by examiner

Primary Examiner—J. Gregory Pickett
(74) *Attorney, Agent, or Firm*—Ogilvy Renault LLP

(57) **ABSTRACT**

A stackable tray obtained by vacuum molding of a sheet of plastic material, said tray comprising, in open position: a) a top and a bottom; b) at least one receiving cavity opened upwardly; c) spacing means to keep, in a stack of trays, the top portion and the bottom portion of neighboring trays at distance from each other to thereby prevent interlocking. A stack of said trays and a method using said trays.

14 Claims, 7 Drawing Sheets



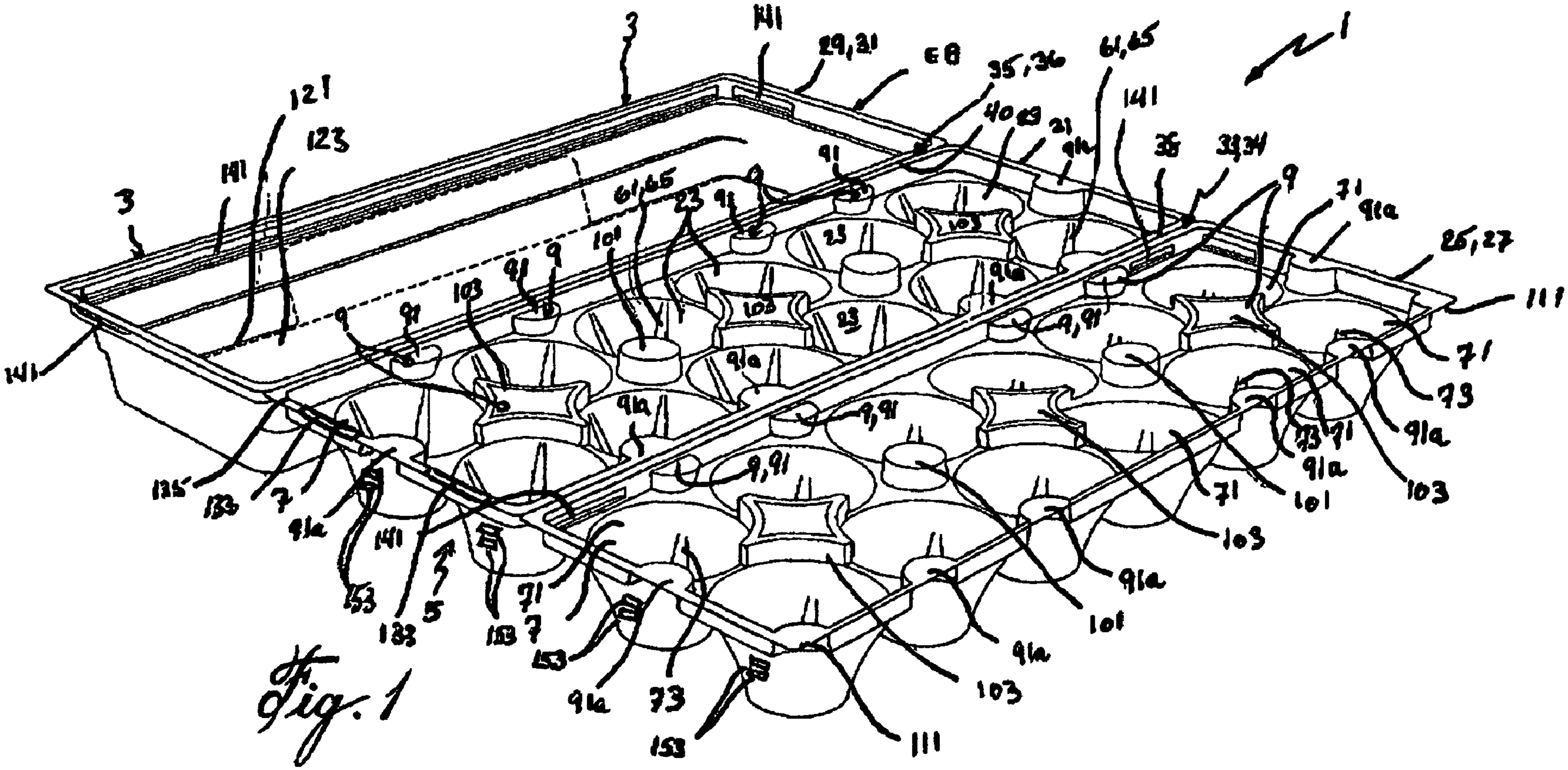


Fig. 1

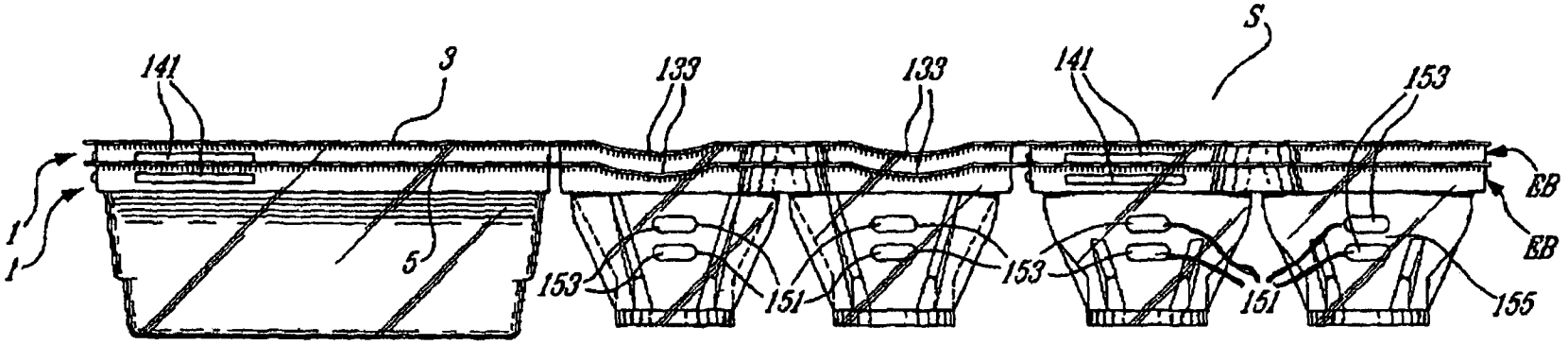

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Fig. 2

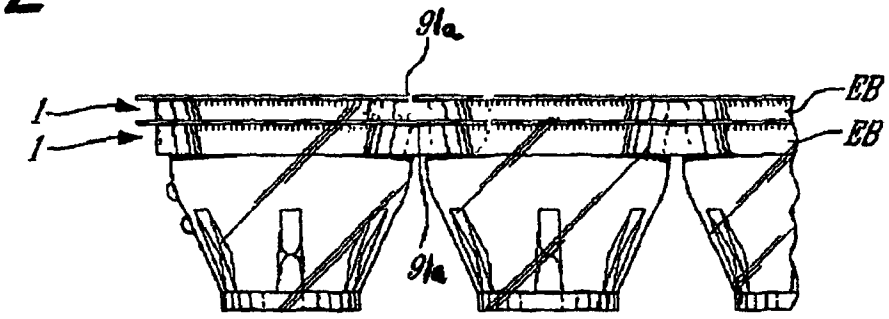
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Fig. 3

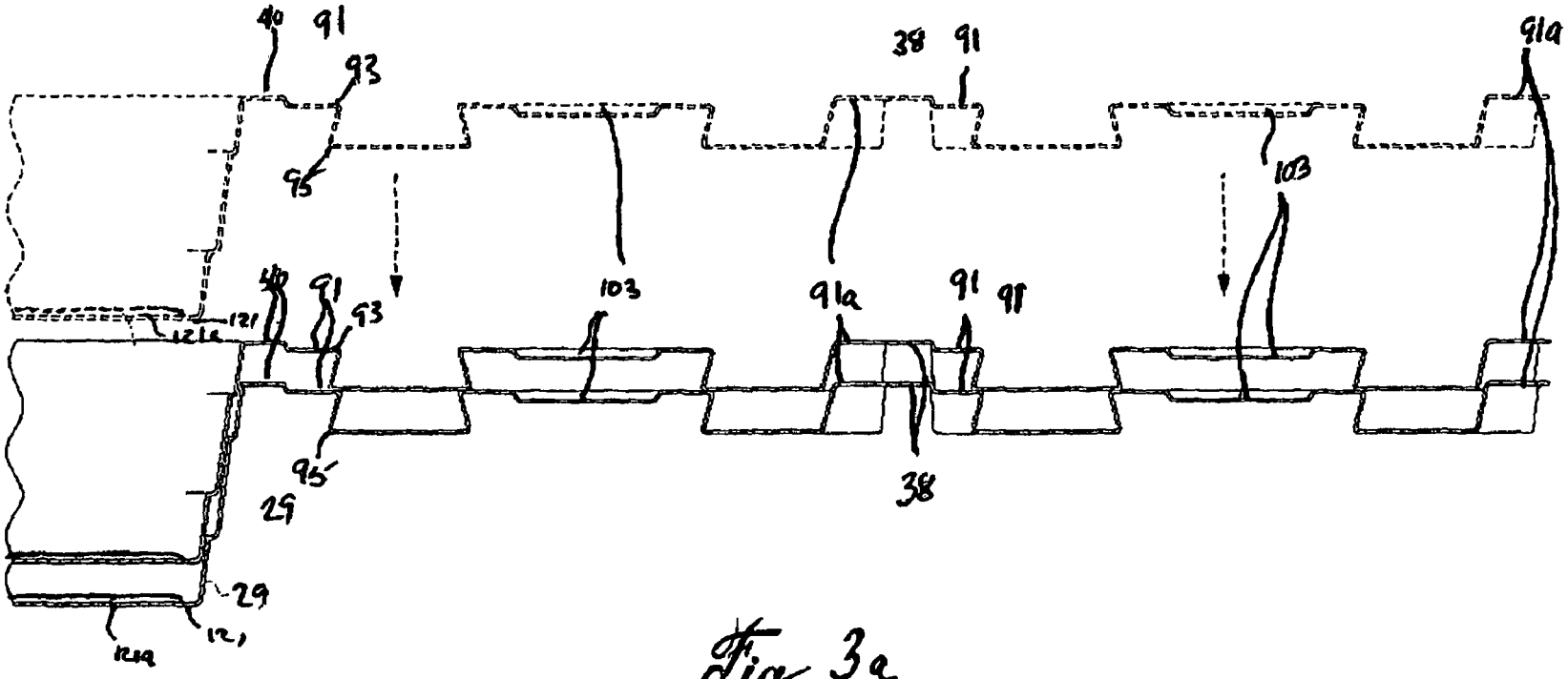


Fig. 3a

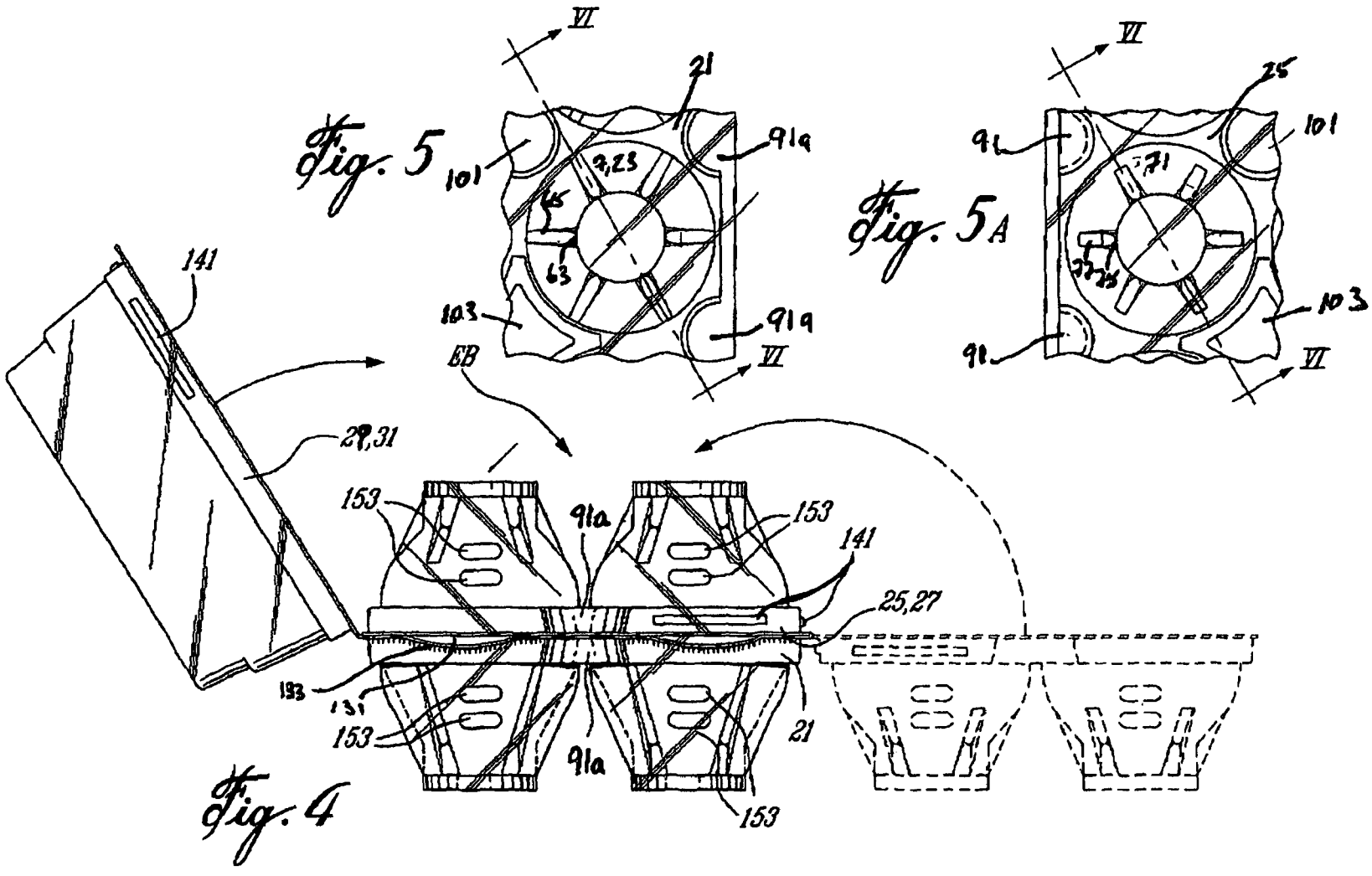
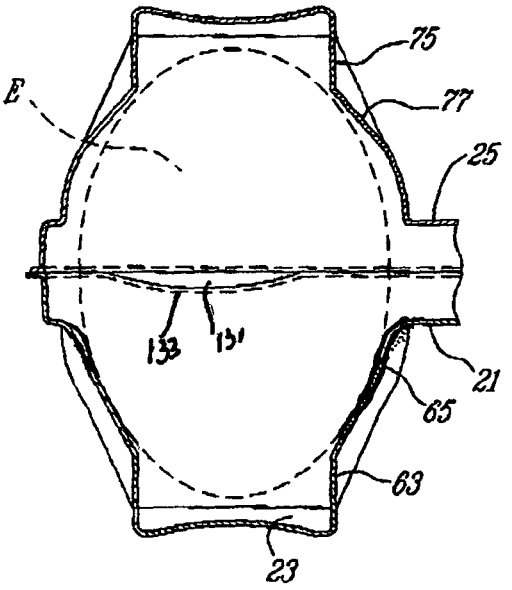


Fig. 5

Fig. 5A

Fig. 4

Fig. 6



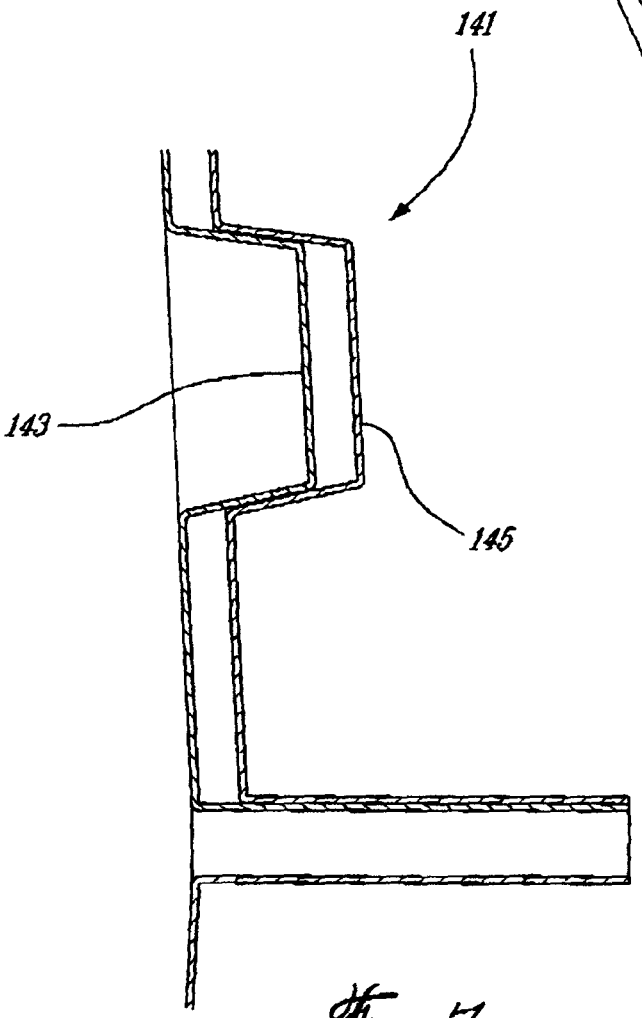


Fig. 7

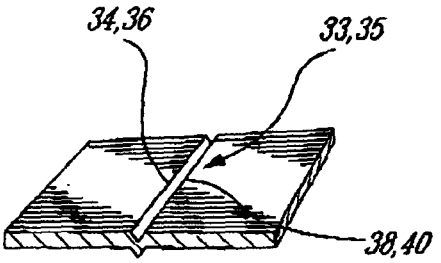


Fig. 8

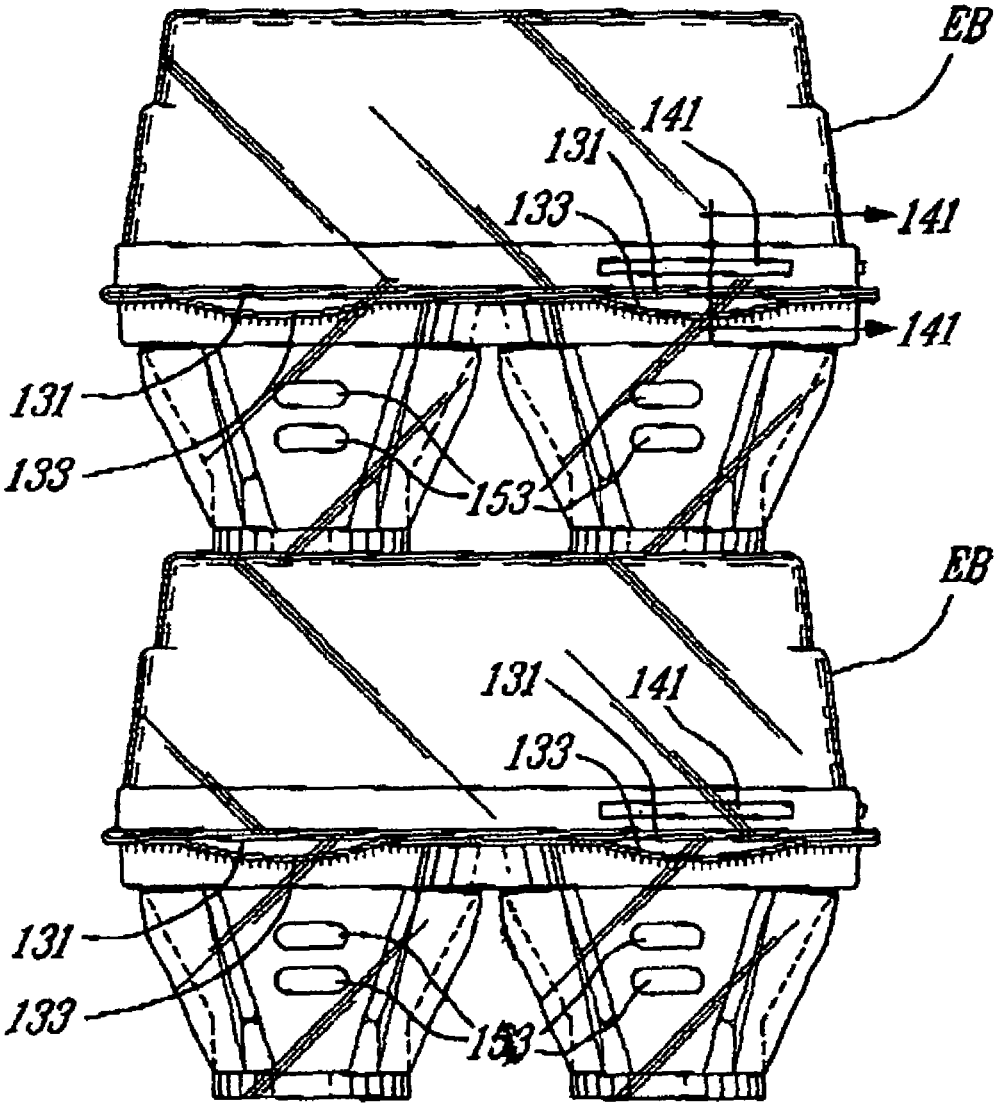


Fig. 9

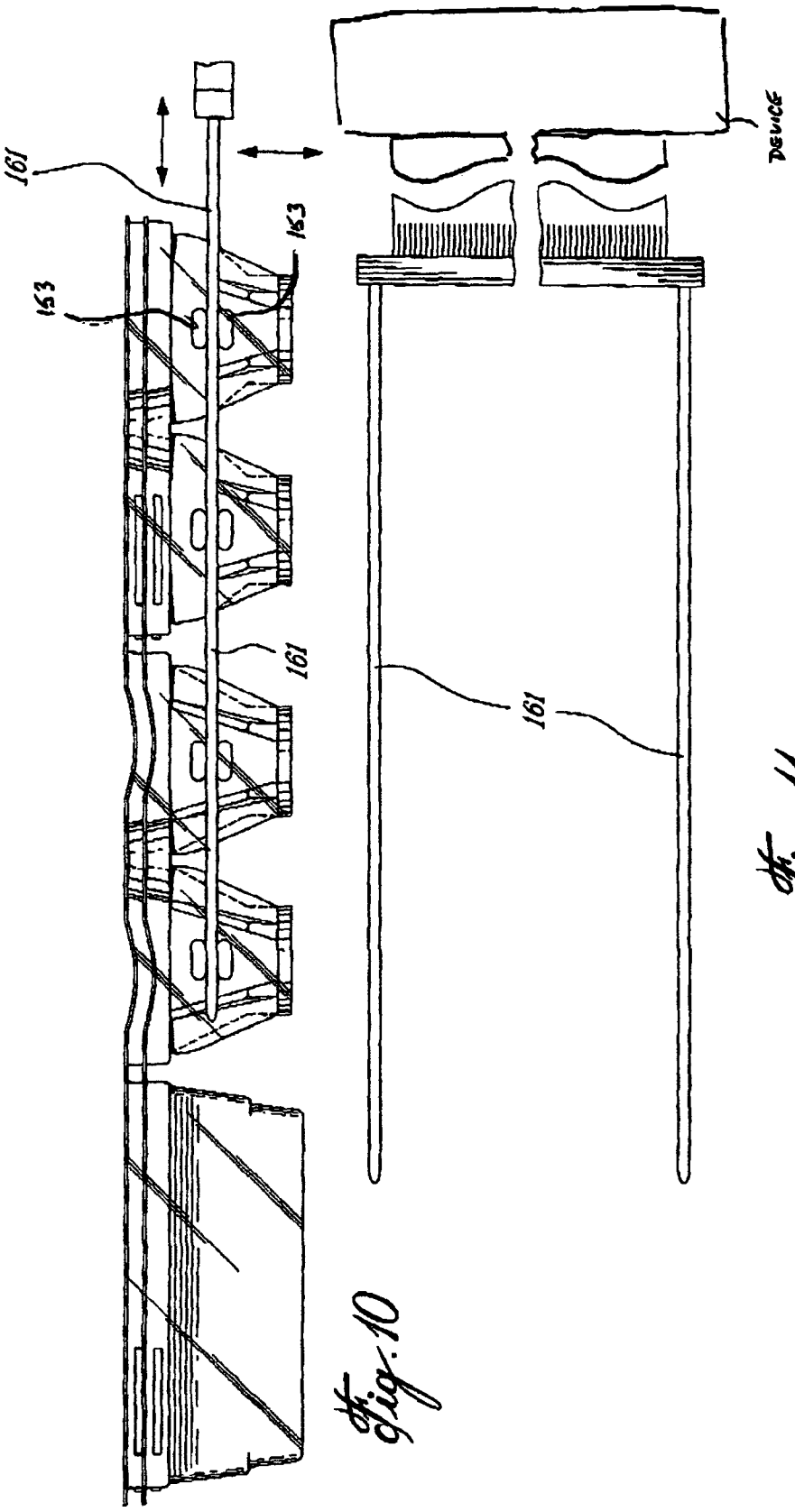


Fig. 10

Fig. 11

STACKABLE EGG-BOX, STACK OF EGG-BOXES AND METHOD FOR DESTACKING SAID EGG-BOX

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of provisional application No. 60/500,359 filed on Sep. 5, 2003.

FIELD OF THE INVENTION

The invention relates to an improvement in trays obtained by thermoforming (e.g. vacuum moulding) of a sheet of plastic material and intended to be stacked (i.e. nested) one into the other before use. More particularly, each of said trays defines an egg-box into an opened position. The invention also relates to a stack of said trays and to a method for destacking (i.e. denesting) said trays.

BACKGROUND OF THE INVENTION

It is known in the art to obtain trays according to thermoforming techniques, especially vacuum moulding, and to stack them one into the other. It is also known to stack trays defining an egg-box into an opened position (see Applicant's Canadian Patent No. 2,028,229). However, when trays are stacked one into the other, friction and/or air lock may be created between neighboring trays. Such interlocking of trays involves that when a tray is picked up (or denested) from the stack, one or several neighboring trays may be simultaneously picked up. This drawback becomes very important when said stack of trays is intended to fed an automated packaging and/or labelling apparatus, especially an apparatus intended to fill egg-box trays with eggs. Indeed, when the apparatus become jammed, it has to be stopped and an operator must manually remove the jammed trays from the apparatus. There is a substantial lost of productivity and of course substantial risks of damaging the apparatus.

Therefore, there is a strong need for trays that can be stacked one into the other without creation of air lock or friction between neighboring trays, to allow an easy removal of each tray from the stack of trays.

There is also a strong need for a method allowing an easy removal of each tray from a stack of trays.

There is further a strong need for a device allowing to easily pick-up each tray from a stack of trays.

SUMMARY OF THE INVENTION

The Applicant has now discovered an innovative manner to prevent interlocking of neighboring trays in a stack of trays to thereby overcome the drawback existing with prior art trays.

The Applicant has further discovered an innovative method and device for an easy denesting of each tray of a stack of trays.

More particularly, the invention relates to a stackable tray obtained by thermoforming, especially vacuum molding, of a sheet of plastic material. Said tray comprises, in open position:

a) a top and a bottom;

b) at least one receiving cavity opened upwardly;

c) spacing means to keep, in a stack of trays, the top portion and the bottom portion of neighboring trays at distance from each other to thereby prevent interlocking therebetween. Advantageously, the air between trays is in fluid communication with the air surrounding a stack of trays to avoid pneumatic interlocking of trays.

Advantages of said trays are the following:

resistant, good protection of the integrity of egg-shells during packaging, storing and transport;

light in weight and inexpensive to manufacture;

may define a plate or bowl for receiving meals to be eaten by a traveler in a public transport (e.g. jet planes, buses, trains, etc.);

discourages the opening of the box by a customer in a grocery store;

when in close position, has a tight interlocking system preventing accidental opening of said box;

may have two closed boxes joined together by a portion of plastic sheet provided with a tearing line allowing to remove one box from the other, without affecting the integrity of said boxes.

Advantageously, according to a preferred embodiment, the invention also relates to a tray defining an egg-box obtained from a rectangular sheet of plastic and provided with a plurality of egg receiving cavities. Of course, other kind of boxes may be considered within the field of the invention. For example, said boxes may be a lunch box, a box for various articles (food items or not), etc.

Advantageously, the sheet of plastic material may consist of any appropriate thermoplastic material, especially polyethylene terephthalate sheet. Of course any equivalent thermoplastic sheet that can be thermoformed, especially by vacuum molding, may be used. The thickness of said sheet may vary between wide limits so far it is still possible to embody said tray by thermoforming techniques such as vacuum molding. Preferably, said thickness may be of 14 mil. Preferably, a clear and transparent thermoplastic sheet may be used.

Said trays may be obtained by any usual thermoforming techniques such as vacuum molding (i.e. by forming a sheet of thermoplastic material under the action of heat (e.g. by thermal convection) and a mechanical stress, this one being preferably obtained by air vacuum created at the base of the mould thanks to air vacuum nozzles.) Such techniques are well known to skilled workman and do not necessitate any substantial description in the present disclosure.

A man skilled in the art was not encouraged to embody a molded article by thermoforming, especially vacuum moulding, while said article has negative angles because the risk of having this article locked on the mould. However, surprisingly, the article can be easily removed from the mould to thereby allow the manufacture of trays provided with stoppers allowing to space apart neighboring trays in a stack of trays (in open position).

Advantageously, according to another preferred embodiment, the egg-box may comprise a first portion provided with the egg receiving cavities, a second portion defining an inner cover, and a third portion defining an outer cover; a fourth portion defining a hinge between the first portion and the second portion, and a fifth portion defining a hinge between the first portion and the third portion.

Advantageously, the tray may comprise characteristics analogous to the tray disclosed in Applicant's Canadian Patent no. 2,028,229. Preferably, in this patent the egg-box in an opened position defines a tray comprising:

(a) a first portion defining a first open container having at least one compartment intended to receive egg shells, and having a peripheric bearing surface,

(b) a second portion defining a second open container having a number of compartments identical to the number of com-

partments of the first container and of construction sensibly similar to the one of the first open container,

(c) a third portion defining a third open container having at least one compartment and of size slightly greater than the one of the first and second container, and having a peripheric bearing surface;

(d) a fourth portion defining first binding means allowing to bind said first and second containers,

(e) a fifth portion defining second binding means allowing to bind said first and third containers, said second binding means being on a side of the first container that is opposite the one provided with the first binding means;

(f) first interlocking means to removably retain together said first and third containers into a closed position of the egg-box, once the egg-box folded into a closed position;

(g) second interlock means to removably retain together said first and third containers into a closed position of the egg-box and cooperating with the second container, once the egg-box folded into a closed position

Advantageously, according to another preferred embodiment, each egg receiving cavity of the first portion may be further provided with a set of at least three (more preferably six) inwardly projecting ribs for supporting an egg. Preferably, said ribs may have a lower portion substantially straight in the bottom of the cavity and an upper portion curved to substantially fit with a corresponding contour of an egg. This particular structure is useful to prevent damage to an egg contained in said cavity.

Advantageously, according to another preferred embodiment, the second portion may be further provided with egg receiving cavities for the upper portion of eggs. Preferably, each of said receiving cavity of the second portion may be further provided with a set of at least three (more preferably six) inwardly projection ribs allowing to minimize movement of an egg housed in said cavities of the first and second portions. Advantageously, said ribs may have a portion substantially straight near the bottom of the cavity and a portion substantially curved to substantially fit with a corresponding contour of an egg. This particular structure, when used in combination with the one described in the preceding paragraph is much more efficient to prevent damage to an egg contained in said cavity.

Said ribs may be preferably equidistant. However, they could be distributed in different ways. The size of cavities is such to receive an egg shell of predetermined size (e.g. small, medium, large, extra-large, etc.). The egg shell is introduced in the cavity and is supported by said ribs, rather than by the side wall or by the bottom, The egg shell is advantageously at distance from the bottom of said cavity.

The fact that egg shell is retained by ribs is particularly advantageous in order to preserve the integrity of the egg shell. Indeed, any impact of the container with an outside object will prevent a direct impact on the egg shell, this later being at distance from the bottom of the container and from the side wall by ribs. Said ribs are not directly in contact with the outside of the container.

Advantageously, according to another preferred embodiment, spacing means may comprise at least one first stopper provided between cavities and/or cavities and periphery of each first and second portions, and at least one second stopper which may be provided between cavities and/or cavities and periphery of each first and second portions. Said stopper having at least one negative angle allows in a stack of said trays, to have its upper portion supporting the lower portion of corresponding stopper of a neighboring tray.

Advantageously, according to another embodiment of the invention, the first portion may comprises:

- at least one group of first stoppers, preferably two first stoppers and more preferably four first stoppers; and
- at least one group of second stoppers, preferably two second stoppers and more preferably six second stoppers;

at least one of said stoppers having at least one negative angle. Preferably, some stoppers of a group of stoppers may have negative angles and some stoppers of the same group of stoppers may have positive angles. More preferably, some of the first stoppers have negative angles and some of the second stoppers have negative angles. Preferably, said first stoppers are positioned adjacent the periphery of the first portion. Preferably, said second stoppers are positioned between cavities of the first portion.

Advantageously, according to another embodiment of the invention, the second portion may comprise:

- at least one group of first stoppers, preferably tow first stoppers and more preferably four first stoppers;
- at least one group of second stoppers, preferably two second stoppers and more preferably six second stoppers; and
- optionally at least one group of third stoppers, preferably two third stoppers;

at least one of said stoppers having at least one negative angle. Preferably, some stoppers of a group of stoppers may have negative angles and some stoppers of the same group of stoppers may have positive angles. More preferably, some of the first stoppers have negative angles and some of the second stoppers have negative angles. Preferably, said first stoppers are positioned adjacent the periphery of the second portion. Preferably, said second stoppers are positioned between cavities of the second portion Third stopper preferably have positive angles and are preferably positioned at the corner of the periphery of the second portion.

Advantageously, according to another preferred embodiment, the first stoppers may be half-moon shaped and/or star shaped; the second stoppers may be circular shaped, half moon shaped and/or star shaped; and the third stoppers may be quarter-moon shaped.

Advantageously, according to another preferred embodiment, the third portion may be further provided with at least one substantially flat surface for receiving thereon a printed label, a printed stamp or both. For example, said flat surface may support an advertising label, and information stamp (printed directly on the surface), or both. Optionally, said label may be affixed on said surface (preferably inside the third portion) by any appropriate means such as for example gluing.

Advantageously, according to another preferred embodiment, the first portion and/or the second portion and the third portion, preferably the first portion, may be provided with at least one venting opening (preferably four venting openings). These venting openings allow a good ventilation of the inside of the box to thus prevent the gathering of humidity therein and allow a better preservation of its content (e.g. eggs). They may further contribute to prevent air locking of neighboring trays (in a stack of trays) by making easier the fluid communication of air entrapped between trays with the surrounding atmosphere (outside the stack).

Advantageously, according to another preferred embodiment, the inner cover and outer covers may be further provided with an interlocking means, preferably comprising at least one two parts fasteners (more preferably, four two parts fasteners).

Advantageously, according to another preferred embodiment, said tray may be further provided with means for facilitating denesting by an automated packaging and/or labeling

apparatus. Preferably, said means may comprises projecting members provided on the outside of cavities near ends of the tray. More particularly, projecting members are provided by set of two on the outside of each cavities near ends of the tray to thus define a receiving track for a denesting tool.

The invention also relates to a stack of trays as defined hereinbefore.

The invention further relates to a method for denesting trays from a stack of empty trays to feed an automated packaging and/or labeling apparatus. Said method preferably comprises a step in which trays are successively picked up from a stack of trays as defined hereinbefore. Advantageously, a tool (e.g. a fork like tool) which is part of a packaging and/or labeling apparatus, engages a track defined by the projecting members and denests a tray from the bottom of the stack to feed said apparatus.

The invention further relates to an improved device for denesting trays from a stack of empty trays, and preferably carrying out the aforesaid method. This device is more preferably characterized in that it comprises a fork like tool for engagement with a corresponding receiving tracks of a tray to be individually picked-up from the bottom of a stack of trays, to be laid on a conveying means (e.g. a conveyor) and then disengaged from said receiving tracks and repositioned for engagement of the receiving tracks of a subsequent tray of the stack of trays.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be better understood with reference to the following drawings in which particularly preferred embodiments are described, said drawings respectively representing:

FIG. **1** is a perspective view of a preferred embodiment of a tray according to the invention;

FIG. **2** is a side elevational view of two trays of FIG. **1** stack one into the other;

FIG. **3** is a partial view of FIG. **2** showing how works stoppers having negative angle;

FIG. **3***a* is a partial cross-sectional view according to line IIIa-IIIa in FIG. **1** showing how stoppers work;

FIG. **4** is end elevational view of a tray of FIG. **1** with its second portion tilted over the first portion;

FIGS. **5** and **5***a* are a top plan view of a receiving cavity provided with ribs according to the invention;

FIG. **6** is a cross sectional view according to line VI-VI in FIGS. **5** and **5***a* showing distinct portion of the ribs with respect to the contour of the egg (in dotted line);

FIG. **7** is a cross sectional view according to line VII-VII in FIG. **9** showing a preferred embodiment of a two part fastener when said tray has its second and third portion tilted successively over the first portion;

FIG. **8** is a partial view of the tray of FIG. **1** showing a preferred embodiment of a hinge according to the invention.

FIG. **9** is a end elevational view of two trays according to the invention, with their third and second portions successively tilted over the first portion, stacked one above the other;

FIG. **10** is a schematic view of a tool of a packaging/labeling machine for picking up trays from a stack of trays according to the invention and put it on a conveying means (e.g. a conveyor); and

FIG. **11** is a schematic view of a tool allowing to pick up the tray from the stack.

BRIEF DESCRIPTION OF PARTICULARLY PREFERRED EMBODIMENTS AS REPRESENTED IN THE DRAWINGS

With reference to the enclosed drawings, there is represented especially in FIG. **1**, a particularly preferred embodiment of the invention, that is a stackable tray **1** obtained by vacuum molding of a sheet of thermoplastic sheet, especially a transparent polyethylene terephthalate sheet having a 14 mil thickness. This tray **1** comprises, in open position:

- a top portion **3** and a bottom portion **5**;
- receiving cavities **7** opened upwardly;
- spacing means **9** to keep, in a stack S of trays, the top portion **3** and the bottom portion **5** of neighboring trays **1** at distance from each other to thereby prevent frictional or pneumatic interlocking therebetween.

Advantageously, the tray represented in FIG. **1** relates to a tray defining an egg-box EB provided with a plurality of egg receiving cavities **7**. Of course, other kind of boxes may be considered within the field of the invention. For example, said boxes may be a lunch box, a box for various articles (food items or not), etc.

More particularly, as illustrated in the drawings, the egg-box EB may comprise a first portion **21** provided with the egg receiving cavities **23**, a second portion **25** defining an inner cover **27**, and a third portion **29** defining an outer cover **31**; a fourth portion **33** defining a hinge **34** between the first portion **21** and the second portion **25**, and a fifth portion **35** defining a hinge **36** between the first portion **21** and the third portion **29**.

As illustrated in FIG. **8** the hinges **34**, **36** may merely consist of a fold or a weakening line made in the thermoplastic material. Alternatively, the hinge could be any well known variation of plastic hinges. It is preferred to have hinges **34** and **36** defined as a mere fold in the plastic material. Such hinges are easy to manufacture and inexpensive. They can be made by any appropriate technique well known in the art. For example, the plastic sheet may be partially cut or weakened to define folding lines **38** and **40**.

As illustrated in FIGS. **5** and **6**, each egg receiving cavity **23** may be further provided with a set of six inwardly projecting ribs **61** for supporting an egg E, preferably said ribs **61** having a lower portion **63** substantially straight in the bottom of the cavity **23** and an upper portion **65** curved to substantially fit with a corresponding contour of an egg E.

As illustrated in FIGS. **5***a* and **6**, the second portion **25** may be further provided with egg receiving cavities **71** for the upper portion of eggs E. Preferably, each of said receiving cavities **71** may be further provided with a set of six inwardly projection ribs **73** allowing to minimize movement of an egg E to be housed in corresponding cavities **23** and **71**. Advantageously, said ribs **73** may have a portion **75** substantially straight and a portion **77** substantially curved to substantially fit with a corresponding contour of an egg E.

As illustrated in FIGS. **1**, **2**, **3**, **3***a*, **5** and **5***a*, spacing means **9** may comprise first stoppers **91** and second stoppers **103** having negative angles. In a stack S of open trays **1**, upper portion **93** of stoppers **91** supports the lower portion **95** of corresponding first stoppers **91** of a neighboring tray **1**, and stoppers **103** which have negative angles work similarly to stoppers **91**, so as in a stack S of open trays **1**, its upper portion supports the lower portion of corresponding stoppers **103** of a neighboring tray **1**.

Optionally, as illustrated in FIGS. **1**, **2**, **3**, **3***a*, **5** and **5***a*, first portion **21** and second portion **25** may further comprise first stoppers **91***a* having normal and/or positive angle(s), preferably positives angle(s).

Also, as illustrated in FIGS. **1**, **2**, **3**, **3***a*, **5** and **5***a*, the first and second portions **21** and **25** may further comprise second stoppers **101** having normal and/or positive angle(s), preferably positive angle(s).

When the box is closed, these stoppers **91**, **91***a*, **101** and **103** may be brought one against the other or closed to each other to consolidate the structural rigidity of the resulting box.

As illustrated in FIG. **1**, the second portion **25** may be further provided with third stoppers **111** provided at the outer corners, said third stoppers **111** having positive angles. These stoppers **111** also contribute to consolidate the structural rigidity of the resulting box.

As illustrated in FIG. **1**, stoppers **91** and **91***a* may have a substantially half-moon shaped; stoppers **101** and **103** may have a substantially circular shaped, half moon shaped and/or substantially star shaped; and stoppers **111** may be substantially quarter-moon shaped. Of course, said stoppers may have other geometric configurations. The above identified geometric choice are only illustrative and not limitative.

As illustrated in FIGS. **1**, **2** and **9**, the third portion **29** may be further provided with at least one substantially flat surface **121** for receiving thereon a printed label, a printed stamp or both. For example, said flat surface **121** may support an advertising label **123**. Alternatively, information may be printed directly on the surface (example: CUP code and/or peremption date), or both. Optionally, said label **123** may be glued on said surface. Optionally, the surface **121** may define a recess **121***a* (as illustrated in FIG. **3***a*).

As illustrated in FIGS. **1**, **2**, **3**, **4** and **9**, the first portion **21** may be further provided with venting means **131**. Preferably, said means merely consist in a deformation **133** in a rim **135** of the box EB at the end of the first portion **21** of the tray **1**. Alternatively, according to another preferred embodiment, the inner and outer cover may also be each provided with venting openings.

As illustrated in FIGS. **1**, **2**, **4**, **7** and **9**, the inner cover and outer cover may be further provided with four sets of two parts fastener **141**. Each fastener **141** has portions **143**, **145** molded in the plastic that engages one into the other upon closure of the outer cover over the inner cover. Portions **143** and **145** have a rectangularly shaped profile. As seen in FIG. **7**, the portions **143** and **145** define a tapered end. To open the box, reverse step are merely carried out. Boxes EB when in closed position, may be stacked as illustrated in FIG. **9**. Preferably, the bottom of the box is received in the recess **121***a*.

As illustrated in FIG. **2**, said tray **1** may be further provided with means **151** for facilitating the denesting by an automated packaging and/or labeling apparatus. Preferably, said means may comprises projecting members **153** provided on the outside of cavities **23** near ends of the tray **1**. More particularly, projecting members **153** are provided by set of two on the outside of each cavities **23** near ends of the tray **1** to thus define a receiving track **155** for a denesting tool **161** (see FIGS. **10** and **11**).

The invention also relates to a stack S of trays **1** as defined hereinbefore.

The invention further relates to a method for denesting trays **1** from a stack S of empty trays **1** to feed an automated packaging and/or labeling apparatus, said method comprising a step in which trays are successively picked up from a stack S of trays **1** as defined hereinbefore. Advantageously, a tool **161** (e.g. a fork like tool) which is part of a packaging and/or labeling apparatus, engages the tracks **155** (on both sides of the tray **1**) defined by the projecting members **153** and denests a tray **1** from the bottom of the stack S to feed said apparatus. Preferably, the tool **161** engages the tracks **155**, moves the tray **1** at the bottom of the stack downwardly on an appropriate conveyer means C, and then withdraw from the tracks **155**. As illustrated, there are advantageously 16 projecting members **153**, eight on each side of the tray **1**. The invention also relates to a device comprising a tool **161** for carrying out the aforesaid method.

The present invention is not limited to the preferred embodiments recited hereinbefore and also relate to any variation and equivalent that may appear to be obvious to a skilled workman.

What is claimed is:

1. A stackable tray obtained by vacuum molding of a sheet of plastic material, said tray comprising, in open position:

a) a top and a bottom;

b) a first portion with at least two rows of receiving cavities opened upwardly;

c) at least a second portion hinged to the first portion;

d) spacing means to keep, in a stack of trays, the top portion and the bottom portion of neighboring trays at distance from each other to thereby prevent interlocking, the spacing means comprising:

at least one group of first stoppers each having a first horizontal support portion and a first slanted portion in an obtuse angle relation with the first horizontal support portion from top to bottom, and being positioned between one of the rows and the periphery of the tray; and

at least one group of second stoppers each having a second horizontal support portion and a second slanted portion in an acute angle relation with the second horizontal support portion, and being positioned:

(1) between said rows of cavities interiorly of the periphery of the tray; and/or

(2) between one of said rows and the hinge between the first portion and the second portion;

whereby when the trays are stacked, the group of first stoppers of an upper tray are adjacent to but separated from the group of first stoppers of a lower tray, and the group of second stoppers of the upper tray are seated on the group of second stoppers of the lower tray, thereby preventing interlocking between trays about the periphery of the trays and interiorly of the periphery of the trays.

2. A stackable tray according to claim **1**, wherein said tray defines an egg-box obtained from a rectangular sheet of plastic and wherein said receiving cavities are egg receiving cavities.

3. A stackable tray according to claim **2**, wherein the egg-box comprises a first portion provided with the egg receiving cavities, a second portion defining an inner cover, and a third portion defining an outer cover; a fourth portion defining a hinge between the first portion and the second portion, and a fifth portion defining a hinge between the first portion and the third portion.

4. A stackable tray according to claim **3**, wherein each egg receiving cavity is further provided with a set of at least three inwardly projecting ribs for supporting an egg, said ribs having a lower portion substantially straight in the bottom of the cavity and an upper portion curved to substantially fit with a corresponding contour of an egg.

5. A stackable tray according to claim **3**, wherein each egg receiving cavity is further provided with a set of six inwardly projecting ribs for supporting an egg, said ribs having a lower

portion substantially straight in the bottom of the cavity and an upper portion curved to substantially fit with a corresponding contour of an egg.

6. A stackable tray according to claim **3**, wherein the second portion is further provided with egg receiving cavities for the upper portion of eggs receiving cavity is further provided with a set of six inwardly projecting ribs for supporting an egg, said ribs having a lower portion substantially straight in the bottom of the cavity and an upper portion curved to substantially fit with a corresponding contour of an egg.

7. A stackable tray according to claim **3**, wherein the third portion is provided with at least one substantially flat surface for receiving thereon a printed label, a printed stamp or both.

8. A stackable tray according to claim **3**, wherein the inner and outer cover are each provided with venting openings.

9. A stackable tray according to claim **3**, wherein the inner cover and outer cover are provided with interlocking means.

10. A stackable tray according to claim **9**, wherein the interlocking means comprise a pair of two parts fastener.

11. A stackable tray according to claim **3**, wherein means are provided to facilitate movement of the tray on an automated packaging/labeling apparatus.

12. A stackable tray according to claim **11**, wherein said means to facilitate movement of the tray through an automated packaging/labeling apparatus comprise pair of small protuberances provided on the outer face of cavities near end of trays.

13. A stackable tray according to claim **1**, further comprising a third portion hinged to the second portion, with the first portion forming an inner cover, the second portion forming a base, and the third portion forming an outer cover, with rows of the receiving cavities being in the first portion and the second portion.

14. A stackable tray according to claim **13**, comprising another group of the second stoppers between one of the rows of receiving cavities of the second portion and the hinge between the second portion and the third portion.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,766,169 B2
APPLICATION NO. : 10/934400
DATED : August 3, 2010
INVENTOR(S) : Yves St-Onge

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

At column 8, line 23:
"and the bottom portion of neighboring trays at distance" should read
-- and the bottom portion of neighboring trays at a distance --

At column 9, line 6:
"the upper portion of eggs receiving cavity is further provided" should read
-- the upper portion of eggs, each receiving cavity is further provided --

At column 10, line 6:
"mated packaging/labeling apparatus comprise pair of small" should read
-- mated packaging/labeling apparatus comprise a pair of small --

At column 10, line 7:
"protuberances provided on the outer face of cavities near end" should read
-- protuberances provided on the outer face of cavities near an end --

At column 10, line 8:
"of trays." should read
-- of the trays. --

Signed and Sealed this
Twenty-first Day of April, 2015

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office

EXHIBIT B

US007775364B1

(12) **United States Patent**
Archambault et al.

(10) **Patent No.: US 7,775,364 B1**
(45) **Date of Patent: Aug. 17, 2010**

(54) **GRASPING CLOSURE SYSTEM FOR CONTAINER FOR FRANGIBLE ITEMS**

(75) Inventors: **Germain Archambault**, Saint-Hubert (CA); **François Blanchette**, Mirabel (CA)

(73) Assignee: **Interplast Packaging Inc.**, Terrebonne (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/628,242**

(22) Filed: **Dec. 1, 2009**

(51) **Int. Cl.**
B65D 85/32 (2006.01)

(52) **U.S. Cl.** **206/521.1**

(58) **Field of Classification Search** 206/521, 206/521.1, 521.15, 521.2, 521.3, 521.4, 521.5, 206/521.6, 521.7, 521.8; 220/508
See application file for complete search history.

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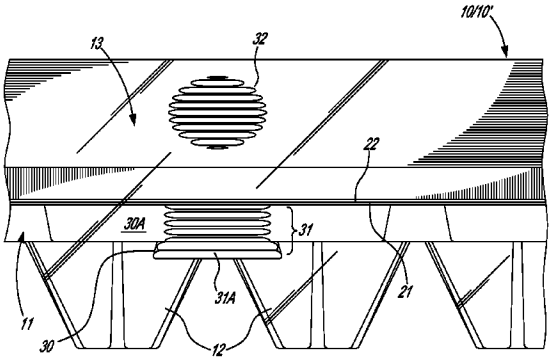
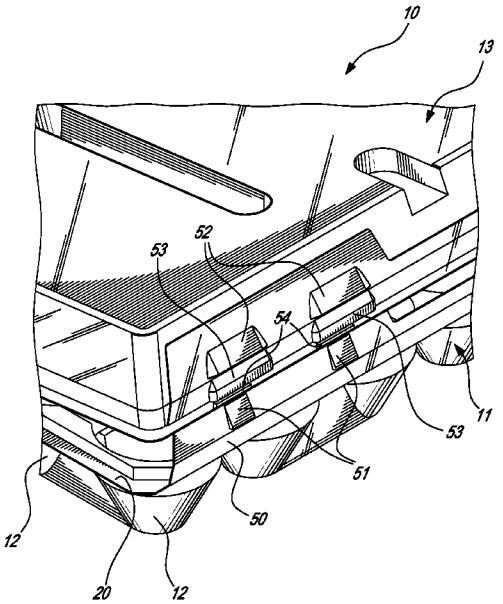
(74) *Attorney, Agent, or Firm*—Ogilvy Renault LLP

(57) **ABSTRACT**

A container comprises a sheet of polymer formed into a base portion. The base portion has cavities for receiving and supporting frangible items. A cover portion has cavities for covering the frangible items. The cover portion has a flat peripheral wall defining concavities. A first hinge rotates the cover portion onto the base portion to hold the items captive. An elongated tab has male connectors oriented with a ramp portion. A female connector projects from the peripheral wall of the cover portion and is in vertical alignment with the male connectors. A second hinge rotates the tab toward the interior of the base portion. Connectors block the cover portion to the base portion when closed together. A grasping wall spans between and projects from the receiving cavities and from the container, defining a grasping surface. A clearance is positioned between the female connector and the base portion when the container is closed.

16 Claims, 5 Drawing Sheets





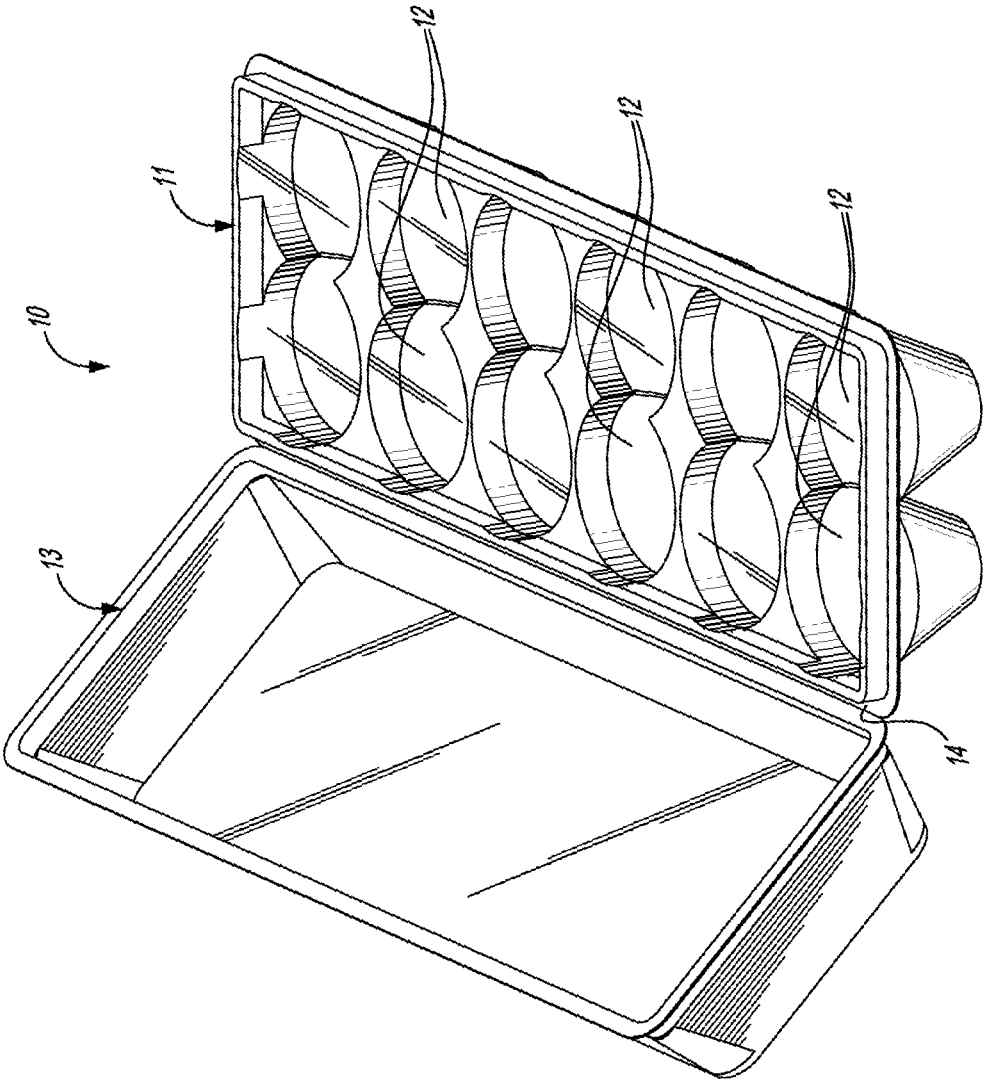
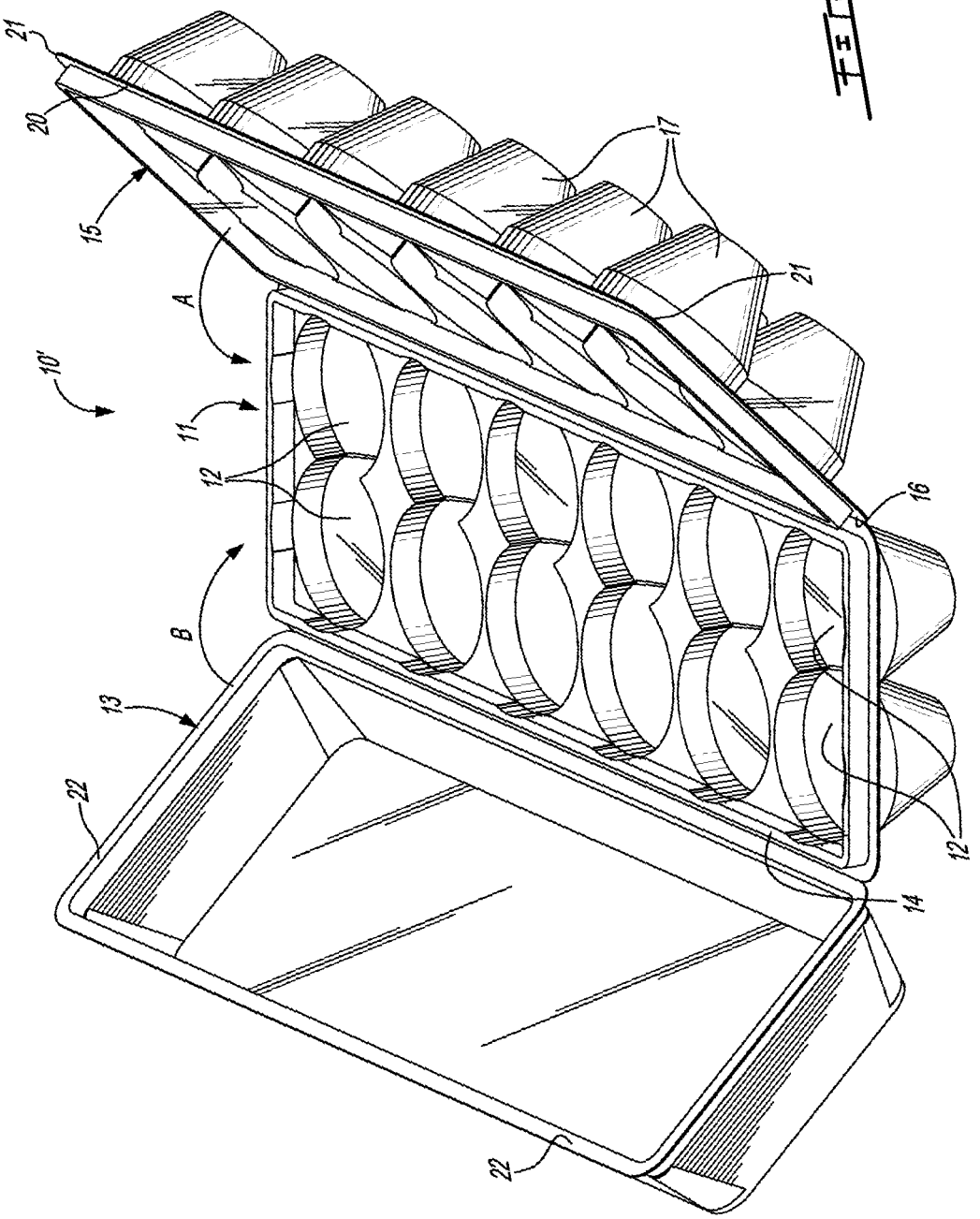


FIG. 1

FIG. 2



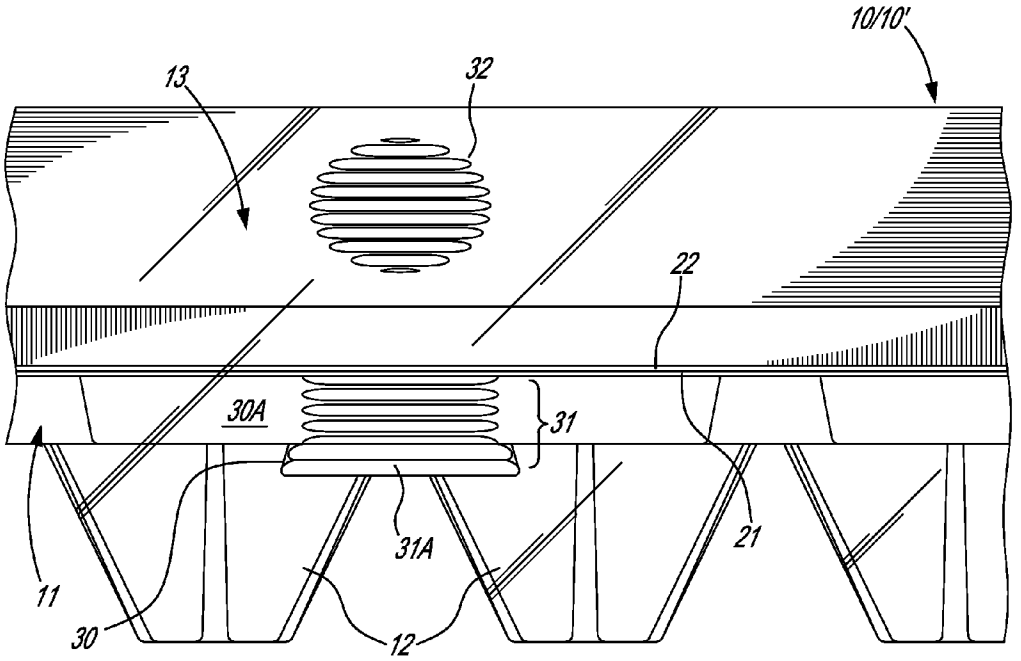


FIG. 3

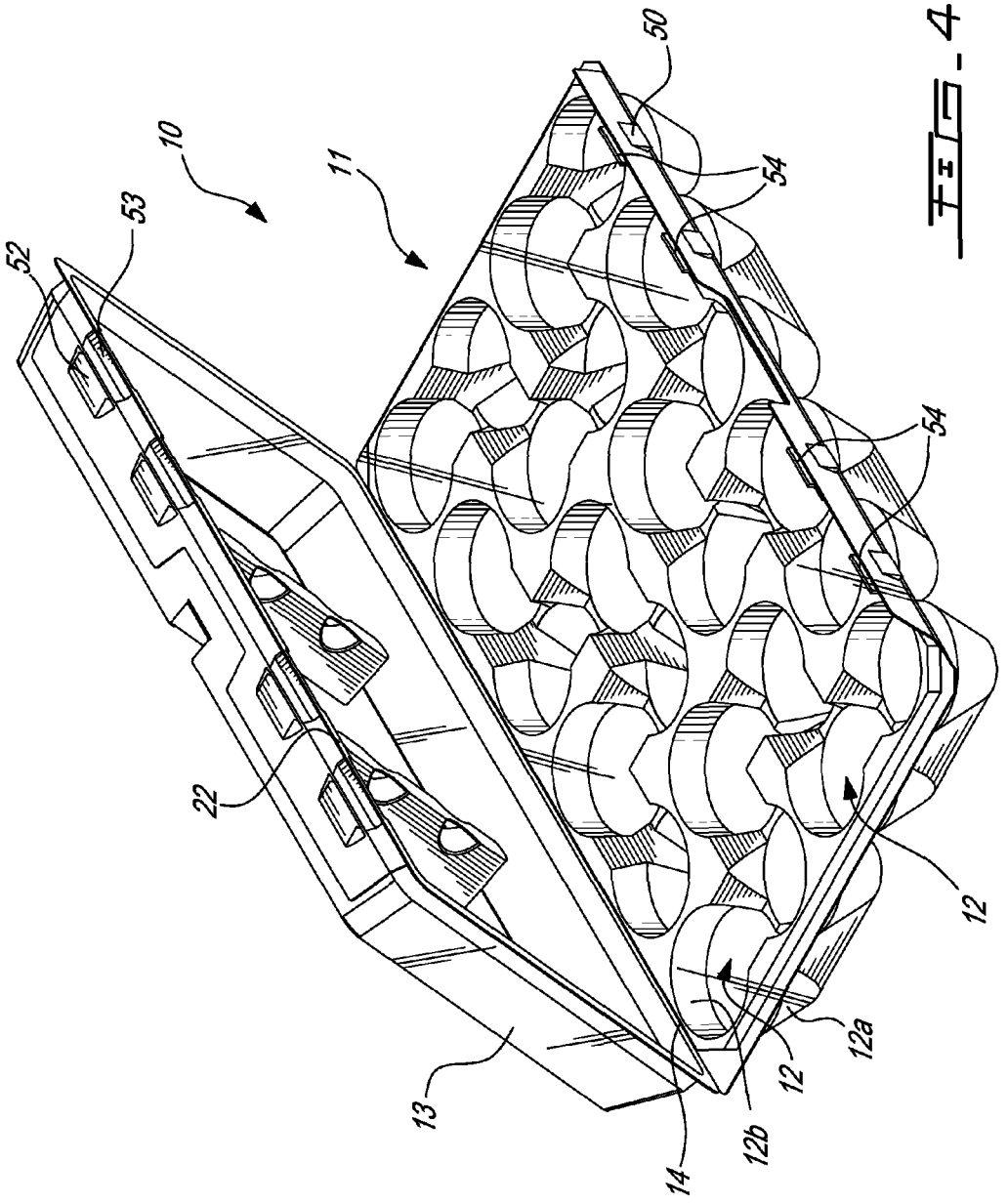


FIG. 4

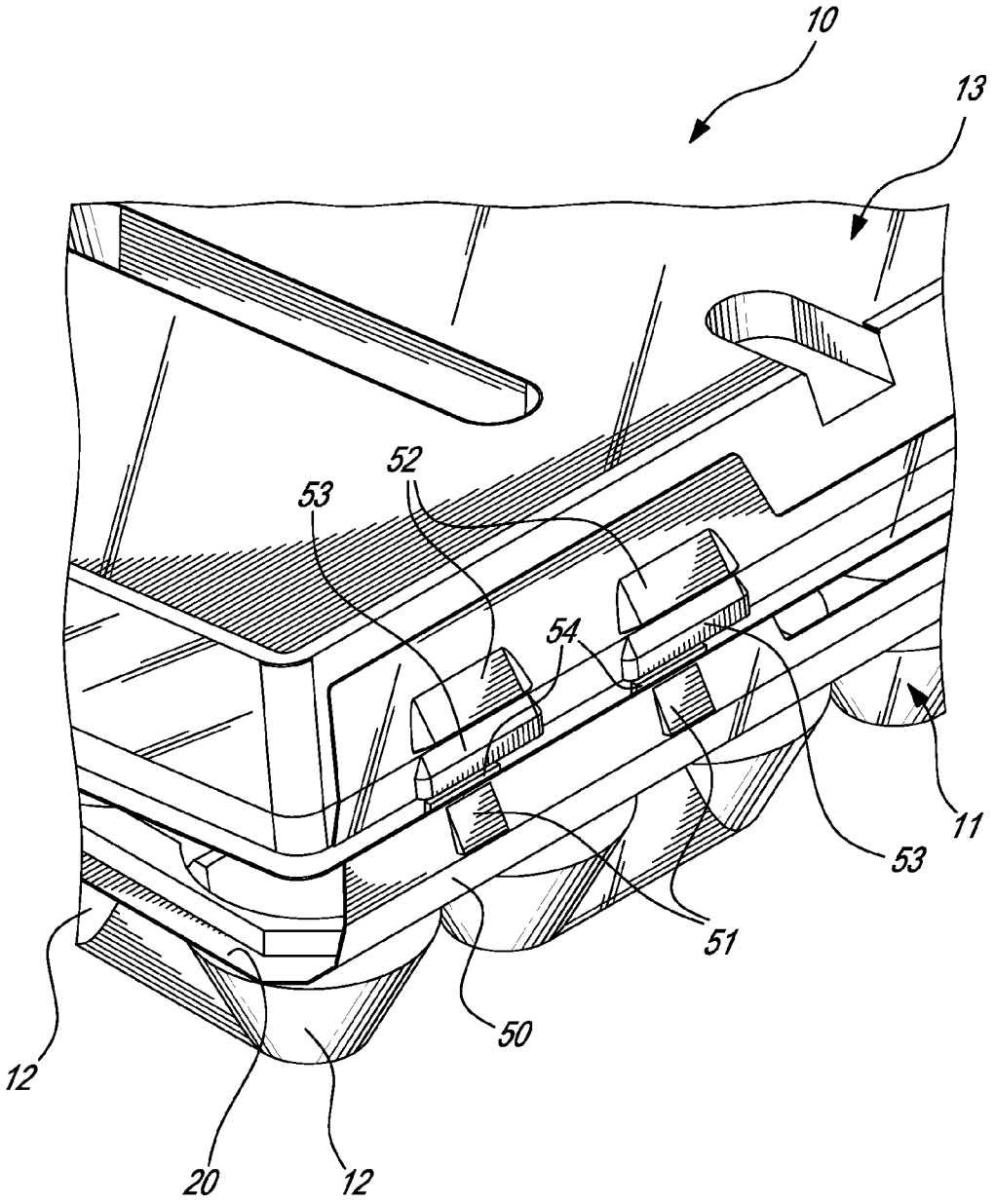


FIG. 5

GRASPING CLOSURE SYSTEM FOR CONTAINER FOR FRANGIBLE ITEMS

FIELD OF THE APPLICATION

The present application relates to containers for receiving frangible objects such as eggs, and to structural components of such containers.

BACKGROUND OF THE ART

Egg containers of all kinds have been developed for the transportation and sale of eggs. As eggs are relatively fragile, the egg containers must protect the eggs from the various manipulations involved from the packaging of the eggs to the consumer's refrigerator.

One significant improvement in egg containers is the use of thermoformed plastics as material for the egg containers. Thermoformed plastics are typically transparent, which allows the eggs to be visible, and are relatively inexpensive to produce. As they can inspect the eggs by seeing through the material of the egg container, the consumers do not need to open the egg container, as is the case with cardboard egg containers, for instance. In the case of cardboard boxes, it may occur that the boxes are not closed properly after inspection. This may cause the breakage of eggs if the improperly closed egg container is subsequently manipulated by another consumer.

SUMMARY OF THE APPLICATION

It is therefore an aim of the present disclosure to provide a novel egg container.

Therefore, in accordance with the present application, there is provided a container for receiving frangible items comprising a sheet of polymer formed into: a base portion having a plurality of item receiving cavities for supporting frangible items; at least one cover portion having at least one item covering concavity for covering the frangible items, the cover portion having a generally flat peripheral wall defining the at least one item covering concavity; a first hinge between a first longitudinal edge of the base portion and the cover portion for rotating the cover portion onto the base portion to hold the frangible items captive in the item receiving cavities; connectors to block the cover portion to the base portion when closed together; at least one grasping wall spanning between the two item receiving cavities on an opening side of the container, the two item receiving cavities being along a second longitudinal edge of the base portion, the grasping wall projecting away from the two egg receiving cavities and outward from the container to define a grasping surface; and friction surface means on the grasping surface.

Further in accordance with the present application, there is provided a container for receiving frangible items comprising a sheet of polymer molded into: a base portion having a plurality of item receiving cavities for supporting frangible items; a cover portion having at least one item covering concavity for covering the frangible items, the cover portion having a generally flat peripheral wall defining the at least one item covering concavity; a first hinge between a first longitudinal edge of the base portion and the cover portion for rotating the cover portion onto the base portion in closing the container to hold the frangible items captive in the item receiving cavities; an elongated tab having wedge-shaped male connectors oriented with a ramp portion facing upward; a second hinge between a second longitudinal edge of the base portion and the elongated tab for rotating the elongated tab toward an interior of the base portion; at least one female connector projecting outwardly from the generally flat peripheral wall of the cover portion, the at least one female connector being in vertical alignment with the wedge-shaped male connectors of the tab for mating engagement therewith when the container is closed; and at least one outwardly projecting clearance positioned between the at least one wedge-shaped female connector and the second longitudinal edge of the base portion when the container is closed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic perspective view of a two-fold egg container;

FIG. **2** is a schematic perspective view of a three-fold egg container;

FIG. **3** is an enlarged elevation view of a grasping system for the egg containers of FIGS. **1** and **2**;

FIG. **4** is a perspective view of a closure system of the egg container of FIGS. **1** and **2**; and

FIG. **5** is an enlarged perspective view of a closure system of the egg container of FIG. **4**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings and more particularly to FIG. **1**, an egg container is generally shown at **10**. The egg containers described hereinafter are preferably made of transparent or translucent plastics, for instance using a thermoforming process or other molding process. Other materials and/or processes may be used as well. The containers described hereinafter may be used to contain eggs or any other frangible items (e.g., tomatoes).

The egg container **10** of FIG. **1** is a two-fold egg container, as it has two portions hinged to one another. The egg container **10** has a base portion **11** having a plurality of egg-receiving cavities **12** (e.g., six, twelve, eighteen, twenty-four, or any other suitable number), with each cavity **12** supporting an egg. A top cover portion **13** is hinged to the base portion **11** by hinge **14**. The top cover portion **13** may or may not have egg cavities to cover a top portion of the eggs supported by the egg-receiving cavities **12**. Alternatively, the top cover portion **13** may present a flat top surface as in FIG. **1**, with or without strengthening components (e.g., arches, posts). Although not shown, mating connectors or any other suitable type of connectors are provided on the periphery of the base portion **11** and top cover portion **13** for interlocking them when the egg container **10** is closed.

Referring to FIG. **2**, a three-fold egg container is generally illustrated at **10'**. The egg container **10'** is similar to the egg container **10** of FIG. **1**, but has a middle cover portion **15**. The middle cover portion **15** is hinged to the base portion **11** by hinge **16**. The hinges **14** and **16** are preferably on opposite edges of the base portion **11**. The middle cover portion **15** typically has egg cavities **17** to cover a top portion of the eggs supported by the egg-receiving cavities **12**. Although not shown, mating connectors or any other suitable type of connectors are provided on the periphery of the top cover portion **13** and the middle cover portion **15** for interlocking them when the egg container **10'** is closed.

In order to close the egg container **10'**, the middle cover portion **15** is firstly hinged into contact with the base container **12**, as illustrated by arrow A. The top cover portion **13** is then hinged onto the middle cover portion **15**, as illustrated by arrow B. When the egg container **10**/**10'** is closed, peripheral flanges **21** and **22** lay flat one on the other.

Referring to FIG. **3**, the egg container **10**/**10'** is shown having a grasping system for facilitating the opening of the egg container **10**/**10'** (i.e., two-fold or tri-fold egg container). The grasping system is positioned on an opening side of the egg container **10**/**10'** and comprises a wall **30** that projects forwardly in the base portion **11**, and toward an exterior of the base portion **11**. The wall **30** spans between top parts of two of the egg receiving cavities **12**, preferably between the egg receiving cavities **12** that are on opposite sides of a central axis of the egg container **10**/**10'**. The wall **30** projects forwardly from the egg receiving cavities **12**. It is observed in FIG. **5** that there is a single wall **30** in the egg container **10**/**10'**, but there may be more on the opening side of the egg container **10**/**10'**. However, there are preferably pairs of egg receiving cavities **12** with no wall **30** between them. Accordingly, the absence of other such walls visually emphasizes the presence of this component of the grasping system on the base portion **11**. The wall **30** merges into a vertical portion **30**A of the peripheral wall of the base portion **11**.

Protrusions such as ribs **31** are provided on the wall and project forwardly therefrom. The ribs **31** form a friction surface that will be contacted by a finger/fingers of a user when opening the egg container. The ribs **31** are illustrated as being partly on the wall **30**, and partly on the vertical portion **30**A of the peripheral wall of the base portion **11**. The ribs **31** are generally horizontal, and are therefore transverse to an opening direction of the egg container **10**/**10'**. An oversized rib **31**A may be provided at a bottom of the wall **30**, for reinforcing the wall **30**. Other geometries may be used for the friction surface as an alternative to ribs. For instance, a plurality of pimples may be provided. Alternatively, gripping patches may be glued to the wall **30**. Any suitable friction surface means may be used.

Still referring to FIG. **5**, another set of protrusions are provided on the top cover portion **13**, and is illustrated as ribs **32**. The ribs **32** are parallel to the ribs **31**, and generally define a circular shape to match that of a finger tip. The ribs **32** may define other shapes as well. Other geometries may be used for the protrusions as an alternative to ribs. For instance, a plurality of pimples may be provided.

The presence of protrusions on both the base portion **11** and the top cover portion **13** guide a user in opening the egg container **10**/**10'** with the grasping system. As the grasping system may be centrally located on the egg container **10**/**10'**, the opening pressure is generally evenly distributed on the top cover portion **13**, thereby facilitating the separation of the top cover portion **13** from the base portion **11**.

As the vertical portion **30**A is longer than the wall **30**, it has a tendency to deform prior to the wall **30**, when pressure is applied to the ribs **31**. Accordingly, the egg receiving cavities **12** are protected from deformation by the presence of some of the ribs **31** in the vertical portion **30**A.

Referring concurrently to FIGS. **4** and **5**, a closure system is illustrated for the egg container **10**. The closure system is used with two-fold egg containers. The closure system comprises a tab **50** that projects forwardly from the peripheral flange **20** of the base portion **11**. The tab **50** is hinged to the peripheral flange **20**, whereby it is shown oriented upwardly in FIGS. **4** and **5**. Wedge connectors **51** are formed in the tab **50**. FIGS. **4** and **5** show four such wedge connectors **51**, but there may be more or fewer of the wedge connectors **51** on the tab **50**.

Corresponding female connectors **52** are formed in the top cover portion **13**. Each female connector **52** is aligned vertically with a respective wedge connector **51**, for mating engagement therewith. The wedge connector **51** is matingly inserted into the female connector **52**, and a downwardly-oriented flat surface of the wedge connector **51** abuts against a corresponding abutment surface of the female connector **52**, thereby securing the top cover portion **13** to the base portion of the egg container **10**. In order to open the egg container **10**, the wedge connectors **51** are moved out of engagement with the female connectors **52**, for instance by pulling the top cover portion **13** away from the base portion **11**. The wedge connectors **51** have a wedge shape to facilitate the engagement of the wedge connectors **51** in the female connectors **52** when closing the egg container **10**, by presenting a ramp portion against which the top cover portion **13** slides during closing of the egg container **10**.

It is observed that the female connectors **52** may be wider than the wedge connectors **51**, as shown in FIGS. **7** and **8**. This excess width of the female connectors **52** is to ensure that the wedge connectors **51** fit into the female connectors **52** despite any misalignment of the top cover portion **13** with respect to the base portion **11**.

Clearances **53** are defined in the top cover portion **13**, and are each paired up with one of the female connectors **52**. The clearances **53** are positioned below the female connectors **52** when the egg container **10** is closed. The clearances **53** of a bottom container **10** accommodate the female connectors **52** of a top container **10** when the containers **10** are stacked one on another. This ensures that stacks of open containers **10** are vertically straight.

The clearances **53** form a passage that facilitates the demolding of the egg container. More specifically, the presence of the female connectors **52** requires the presence of corresponding protrusions on the mold used to form the egg container **10**. As the female connectors **52** project outwardly from the inner cavity of the top cover portion **13**, there have been some difficulties in removing the egg container **10** from its mold without deforming the egg container. Therefore, the use of the clearances **53** is particularly practical when the egg container **10** is stacked open. In an embodiment, a portion of the clearances **53** adjacent to the female connectors is ramp-shaped to facilitate engagement of the connectors **52** and **53**. It is pointed out that there may be a single elongated one of the female connectors **52** and a single elongated one of the clearances **53** for a plurality of wedge connectors **51**. In another embodiment, as illustrated in FIG. **4**, the egg container **10** has the peripheral flange **22** and the clearances **53** open into the peripheral flange **22**.

In an embodiment, posts **54** may be provided to project upwardly from the base portion **11**, and are placed behind the wedge connectors **51**. The posts **54** are positioned so as to be in close proximity to a rear side of the wedge connectors **51** when the egg container **10** is closed. Accordingly, in case of excess pressure on the top cover portion **13**, the wedge connectors **51** will not disengage from the female connectors **52**, as the posts **54** will prevent the tab from rotating inwardly. Posts or other like abutment members may be used to limit the inward rotation of the tab **50**.

The egg containers **10** and **10'** may have one or more of the elements described above. Although the egg containers **10** and **10'** are preferably made of a transparent thermoplastic that is molded (e.g., vacuum molded), it is considered to provide some of the above-referred embodiments in other materials.

The egg containers of the present disclosure may contain any suitable number of egg receiving cavities. One suitable material for the egg containers of the present application is polyethylene terephthalate (PET). PET has many advantages, as this material can be transparent or opaque and can be produced at high volume and at low cost. Wall thicknesses of PET cases in a contemplated embodiment are of 0.0175 inch

in thickness, but other thicknesses as low as 0.012 to as high as 0.022 inch are also contemplated. It is pointed out that the thickness may be outside of these ranges, especially after the container **10** is formed. However, any suitable thickness can be used, depending on the fragility of the objects packaged in the container **10**.

The invention claimed is:

1. A container for receiving frangible items comprising:

a sheet of polymer formed into:

a base portion having a plurality of item receiving cavities for supporting frangible items;

at least one cover portion having at least one item covering concavity for covering the frangible items, the cover portion having a generally flat peripheral wall defining the at least one item covering concavity;

a first hinge between a first longitudinal edge of the base portion and the cover portion for rotating the cover portion onto the base portion to hold the frangible items captive in the item receiving cavities;

connectors to block the cover portion to the base portion when closed together;

at least one grasping wall spanning between the two item receiving cavities on an opening side of the container, the two item receiving cavities being along a second longitudinal edge of the base portion, the grasping wall projecting away from the two egg receiving cavities and outward from the container to define a grasping surface; and

friction surface means on the grasping surface.

2. The container according to claim **1**, further comprising a vertical peripheral wall above the egg receiving cavities in the base portion, the grasping wall merging with the vertical peripheral wall to form concurrently the grasping surface, with the friction surface means being on the grasping wall and on the vertical peripheral wall.

3. The container according to claim **1**, comprising solely a single one of the grasping wall between egg receiving cavities.

4. The container according to claim **1**, wherein the friction surface means are ribs molded with the base portion.

5. The container according to claim **1**, further comprising friction surface means on the generally flat peripheral wall of the cover portion, the friction surface means being in vertical alignment with the friction surface means of the base portion.

6. The container according to claim **1**, wherein the grasping wall spans between the item receiving cavities on opposite sides of a longitudinal center of the container.

7. The container according to claim **1**, further comprising:

two of the cover portion, with an intermediate one of the cover portions item covering cavities for covering the frangible items on the item receiving cavities;

a second hinge between the second longitudinal edge of the base portion, and the intermediate cover portion for rotating the intermediate cover portion onto the base portion, with a top one of the cover portions being hinged about the first longitudinal edge to hold the base portion, the intermediate cover portion and the top cover portion closed together.

8. The container according to claim **1**, further comprising a rib at a bottom of the grasping wall to reinforce the grasping wall, the rib extending between the two item receiving cavities.

9. The container according to claim **1**, wherein the frangible items are eggs, and each of the egg receiving cavities receives one egg.

10. A container for receiving frangible items comprising:

a sheet of polymer molded into:

a base portion having a plurality of item receiving cavities for supporting frangible items;

a cover portion having at least one item covering concavity for covering the frangible items, the cover portion having a generally flat peripheral wall defining the at least one item covering concavity;

a first hinge between a first longitudinal edge of the base portion and the cover portion for rotating the cover portion onto the base portion in closing the container to hold the frangible items captive in the item receiving cavities;

an elongated tab having wedge-shaped male connectors oriented with a ramp portion facing upward;

a second hinge between a second longitudinal edge of the base portion and the elongated tab for rotating the elongated tab toward an interior of the base portion;

at least one female connector projecting outwardly from the generally flat peripheral wall of the cover portion, the at least one female connector being in vertical alignment with the wedge-shaped male connectors of the tab for mating engagement therewith when the container is closed; and

at least one outwardly projecting clearance positioned between the at least one female connector and the second longitudinal edge of the base portion when the container is closed.

11. The container according to claim **10**, comprising one of the female connector and one of the outwardly projecting clearance for each one of the wedge-shaped male connector.

12. The container according to claim **10**, wherein the at least one of outwardly projecting clearance has a ramp portion adjacent to the at least one female connector, the ramp portion being oriented upward.

13. The container according to claim **10**, comprising one of the female connector for each one of the wedge-shaped male connector, the female connector being substantially wider than the wedge-shaped male connector.

14. The container according to claim **10**, further comprising a peripheral flange defining a periphery of the cover portion, the clearances opening into the peripheral flange.

15. The container according to claim **10**, further comprising at least one abutment member projecting upwardly from the base portion and positioned adjacent to the tab to limit an inward movement of the tab when the container is closed.

16. The container according to claim **10**, wherein the frangible items are eggs, and each of the egg receiving cavities receives one egg.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,775,364 B1
APPLICATION NO. : 12/628242
DATED : August 17, 2010
INVENTOR(S) : Germain Archambault and François Blanchette

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

At column 5, line 20:
"connectors to block the cover portion to the base portion" should read
-- connectors to lock the cover portion to the base portion --

At column 5, line 26:
"wall projecting away from the two egg receiving cavi-" should read
-- wall projecting away from the two item receiving cavi- --

At column 5, line 49:
"two of the cover portion, with an intermediate one of the" should read
-- two of the cover portions, with an intermediate one of the --

At column 5, line 50:
"cover portions item covering cavities for covering the" should read
-- cover portions having item covering cavities for covering the --

At column 6, line 6:
"gible items are eggs, and each of the egg receiving cavities" should read
-- gible items are eggs, and each of the item receiving cavities --

At column 6, line 40:
"least one of outwardly projecting clearance has a ramp por-" should read
-- least one outwardly projecting clearance has a ramp por- --

Signed and Sealed this
Twenty-first Day of April, 2015

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office

EXHIBIT C

US00D694126S

(12) United States Design Patent

Blanchette et al.

(10) Patent No.: US D694,126 S
(45) Date of Patent: ** Nov. 26, 2013

(54) **SHEET-FORMED CONTAINER FOR FRANGIBLE ITEMS**

(71) Applicant: **Interplast Inc.**, Terrebonne (CA)

(72) Inventors: **François Blanchette**, Mirabel (CA); **François St-Louis**, Sainte-Julie (CA); **Germain Archambault**, Saint-Hubert (CA)

(73) Assignee: **Interplast Inc.**, Terrebonne (CA)

(**) Term: **14 Years**

(21) Appl. No.: **29/435,345**

(22) Filed: **Oct. 23, 2012**

(51) **LOC (9) Cl.** **09-03**

(52) **U.S. Cl.**
USPC **D9/757**; D9/762

(58) **Field of Classification Search**
USPC D9/762, 757, 737, 761, 420, 425, 426, D9/456; D7/611; 220/508; 206/521, 521.1, 206/521.3, 521.4, 521.6, 521.8, 521.9, 564; 229/406
See application file for complete search history.

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(Continued)

Primary Examiner — Mark Goodwin
(74) *Attorney, Agent, or Firm* — Baker Botts L.L.P.

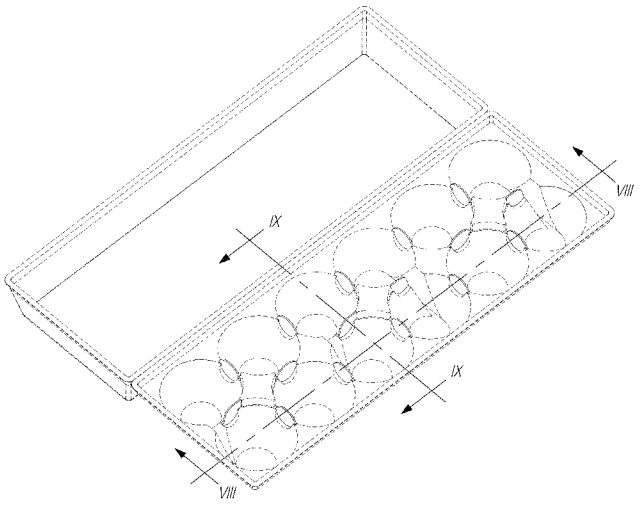
(57) **CLAIM**

The ornamental design for a sheet-formed container for frangible items, as shown and described.

DESCRIPTION

FIG. **1** is an isometric view of a sheet-formed container for frangible items in accordance with the present design;
FIG. **2** is a top plan view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **3** is a bottom plan view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **4** is a front view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **5** is a rear view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **6** is a right-side view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **7** is a left-side view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **8** is a cross-section view taken along cross-section lines VIII-VIII of the sheet-formed container for frangible items of FIG. **1**; and,
FIG. **9** is a cross-section view taken along cross-section lines IX-IX of the sheet-formed container for frangible items of FIG. **1**.
The broken line showing of a container is included for the purpose of illustrating environmental structure only and forms no part of the claimed design.

1 Claim, 5 Drawing Sheets



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D632,975	S *	2/2011	Dijkstra et al.	D9/757
D632,976	S *	2/2011	Dijkstra et al.	D9/757
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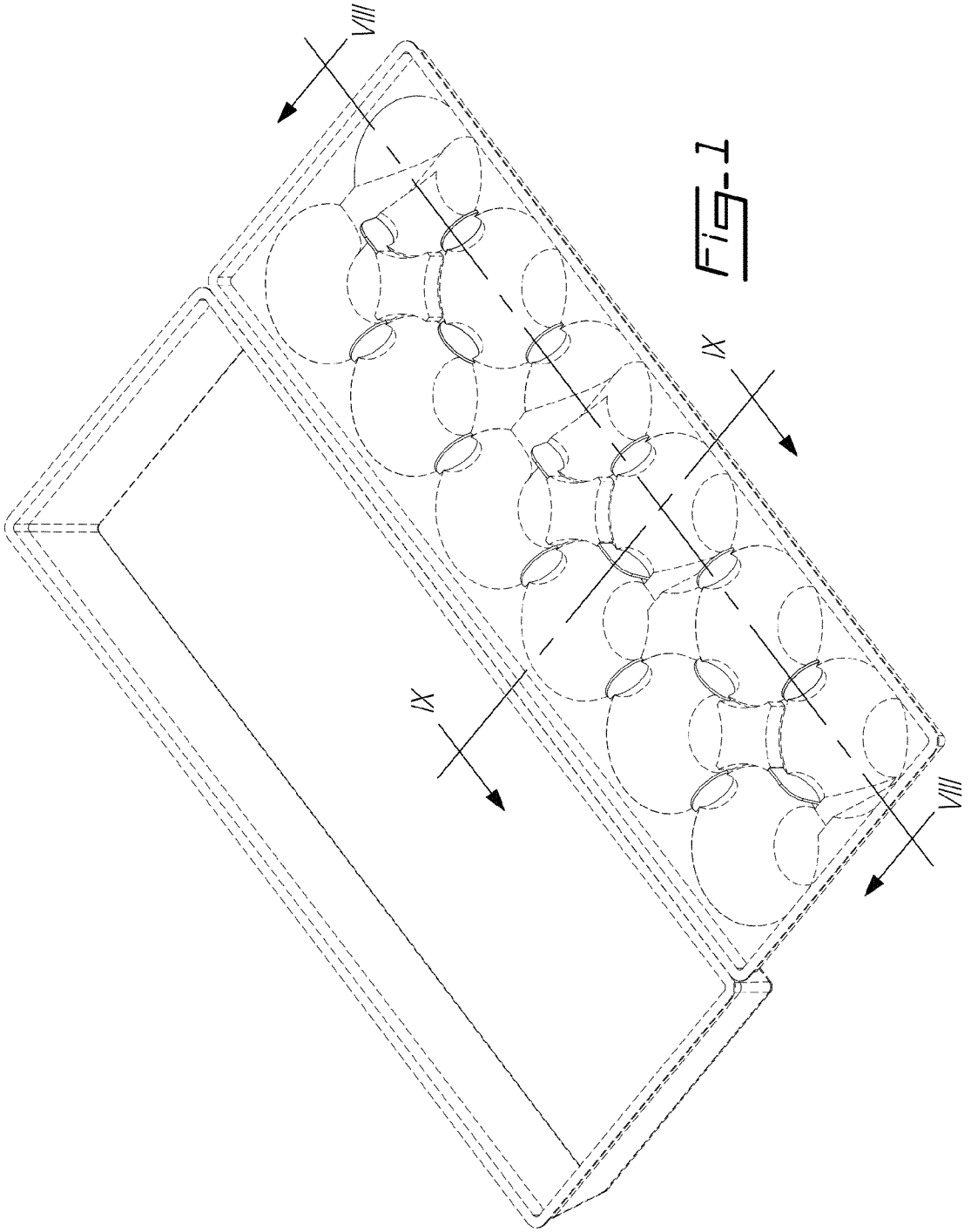

Fig. 1

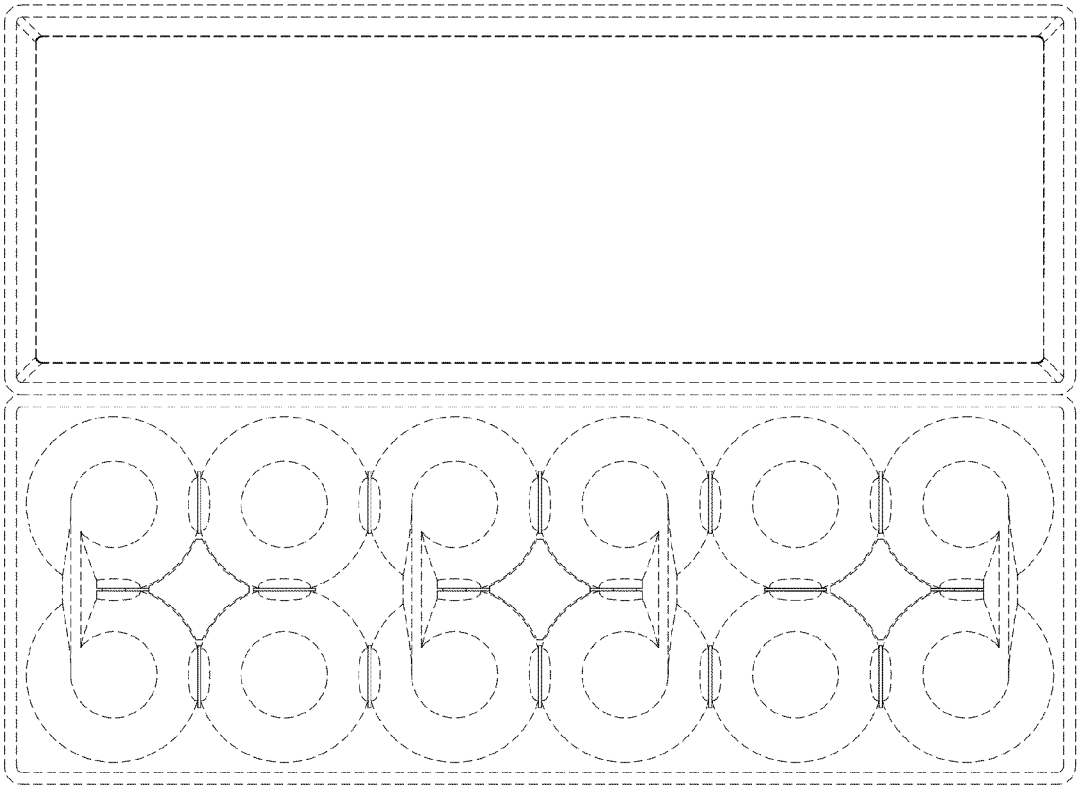

Fig. 2

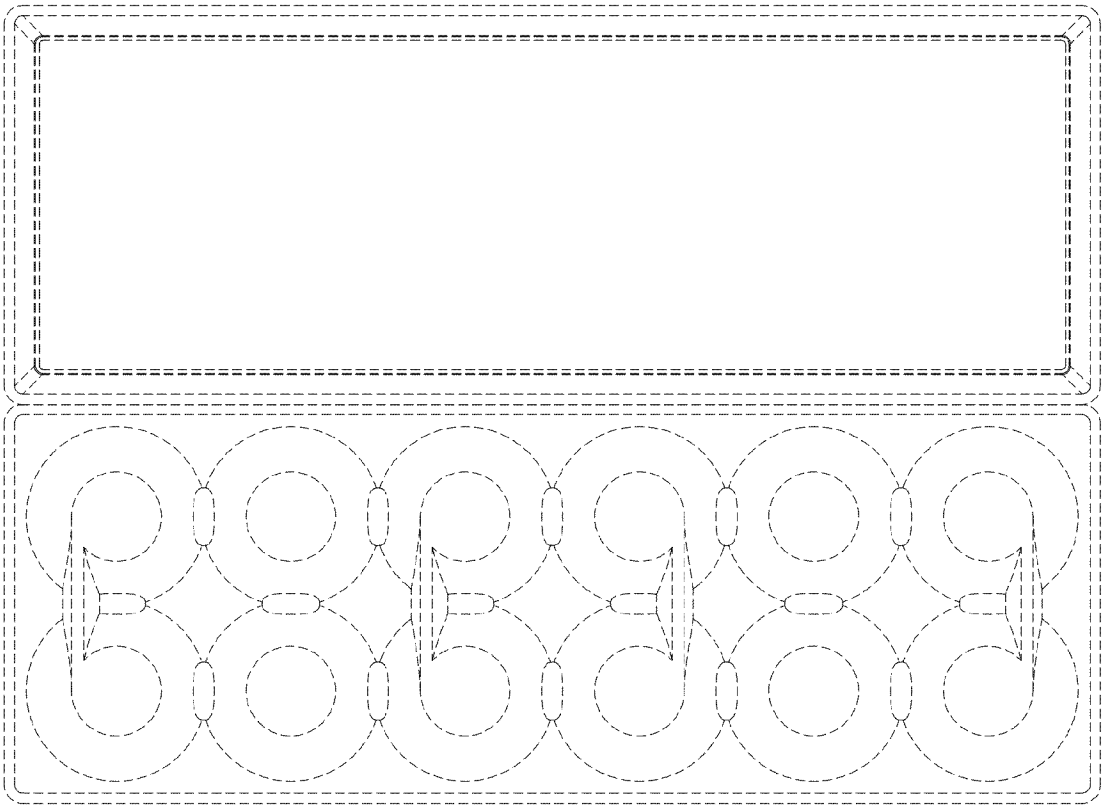

Fig. 3

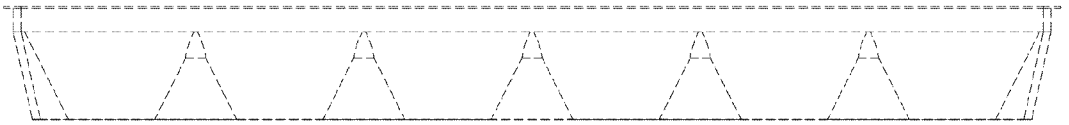

Fig. 4

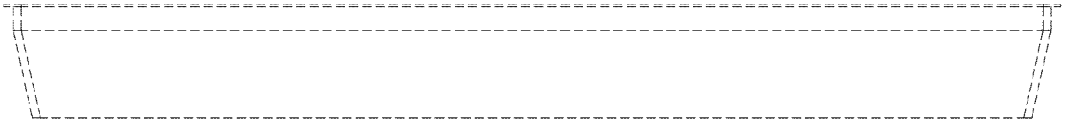

Fig. 5

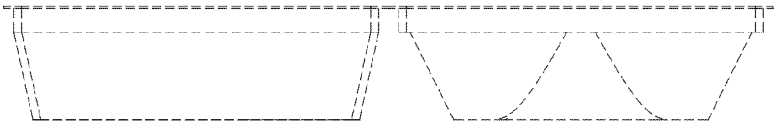

Fig. 6

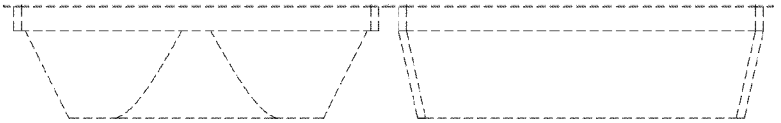

Fig. 7

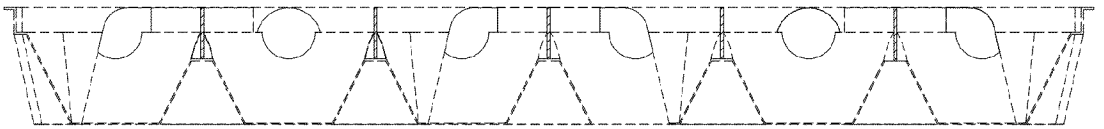

Fig. 8

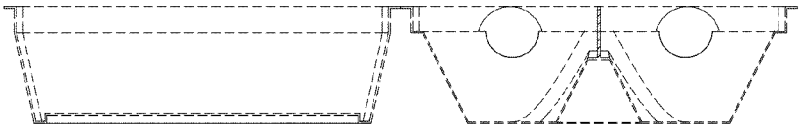

Fig. 9

EXHIBIT D

US008640872B2

(12) **United States Patent**
Archambault et al.

(10) **Patent No.: US 8,640,872 B2**
(45) **Date of Patent: Feb. 4, 2014**

(54) **EGG CONTAINER WITH STACK-SPACING SYSTEM**

(75) Inventors: **Germain Archambault**, Saint-Hubert (CA); **François Blanchette**, Mirabel (CA); **François St-Louis**, Sainte-Julie (CA)

(73) Assignee: **Pactiv Canada Inc.**, Scarborough, Ontario (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 181 days.

(21) Appl. No.: **12/726,634**

(22) Filed: **Mar. 18, 2010**

(65) **Prior Publication Data**

US 2011/0226656 A1 Sep. 22, 2011

(51) **Int. Cl.**
B65D 85/32 (2006.01)

(52) **U.S. Cl.**
USPC **206/521.1**; 206/521.8

(58) **Field of Classification Search**
USPC 206/521.1, 521, 521.15, 521.3, 521.6, 206/521.8
See application file for complete search history.

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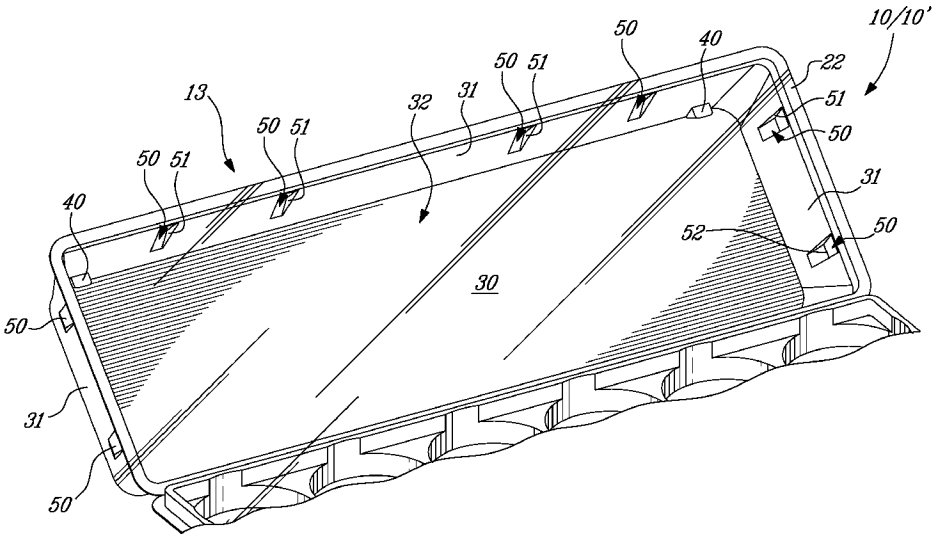
Primary Examiner — Steven A. Reynolds
Assistant Examiner — Ernesto Grano
(74) *Attorney, Agent, or Firm* — Baker Botts L.L.P.

(57) **ABSTRACT**

A container for receiving frangible items comprising a sheet of polymer formed into: a base portion and at least one cover portion with a hinge between the base portion and the cover portion. Abutment spacer are formed at an edge between the peripheral walls and the top wall and each comprise an abutment surface projecting into the concavity from one of the peripheral walls, and support walls relating the abutment surface to the top wall, with at least one of the support walls being in an acute angle relation with the top wall of the cover portion. Alignment channels are in at least one of the peripheral walls defining an alignment protrusion through the sheet of polymer, the alignment channel/protrusion being oriented vertically for guiding the nesting of an upper one of the cover portion descending into a lower one of the cover portion.

13 Claims, 6 Drawing Sheets



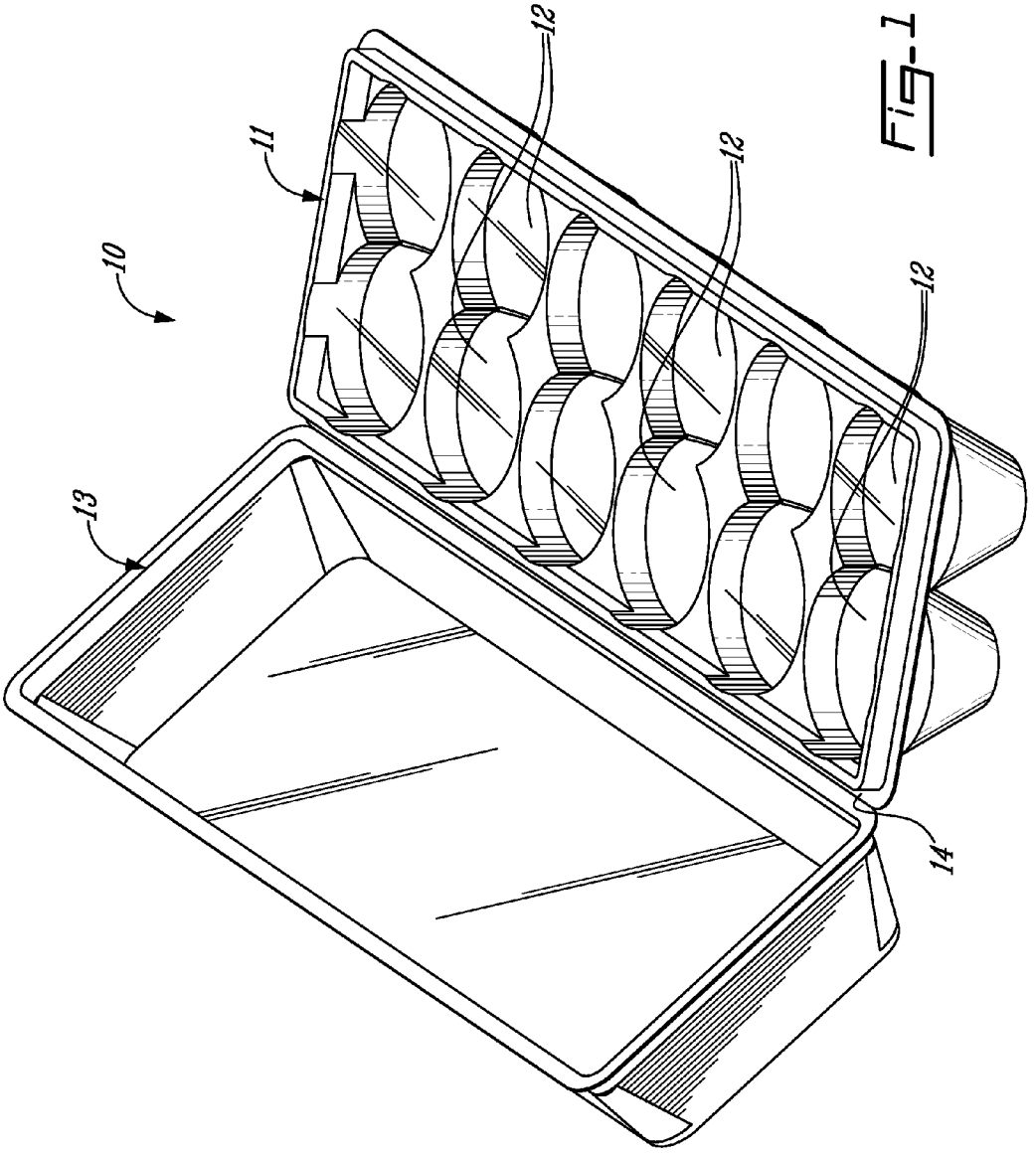


Fig. 1

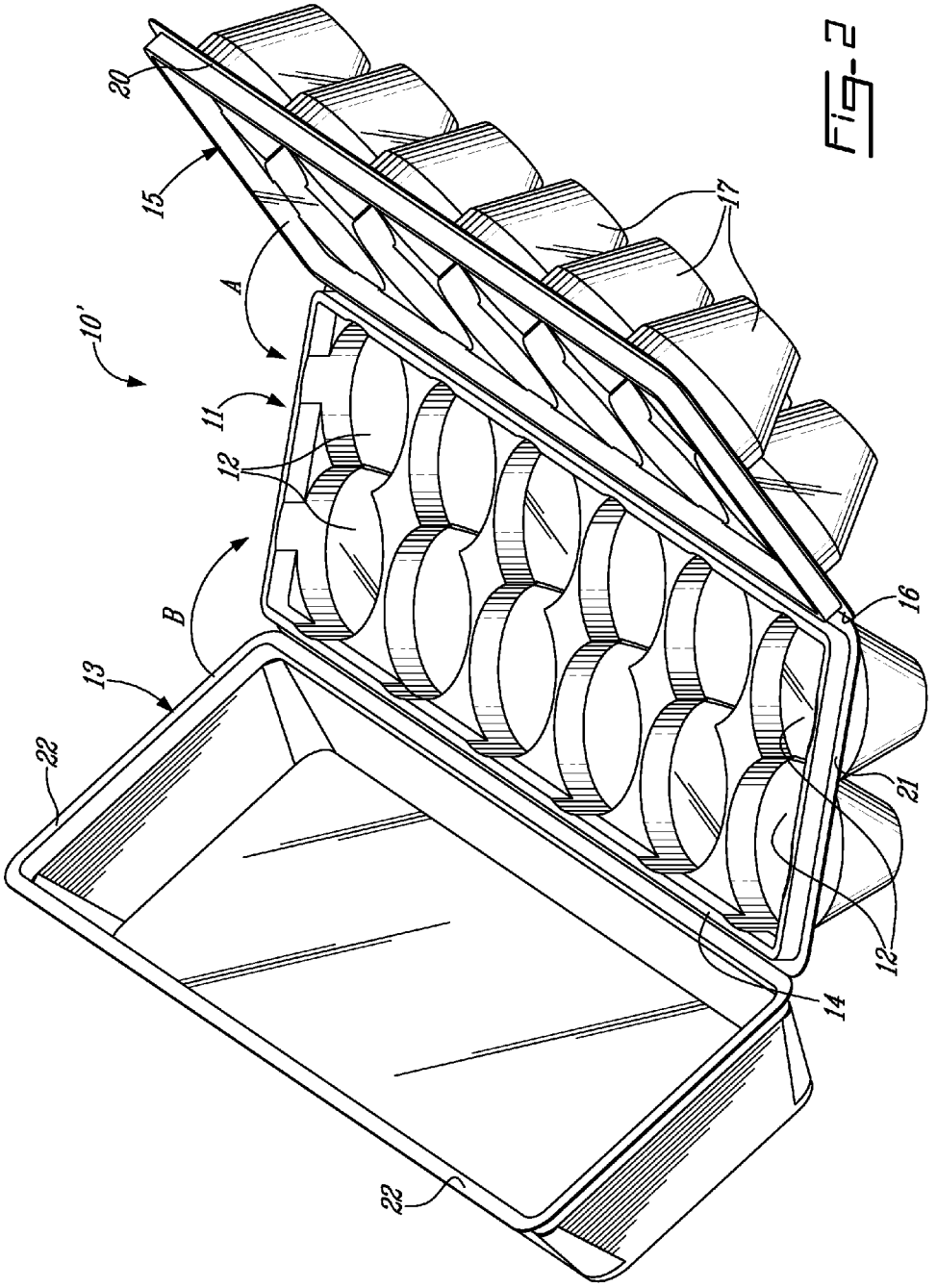


Fig. 2

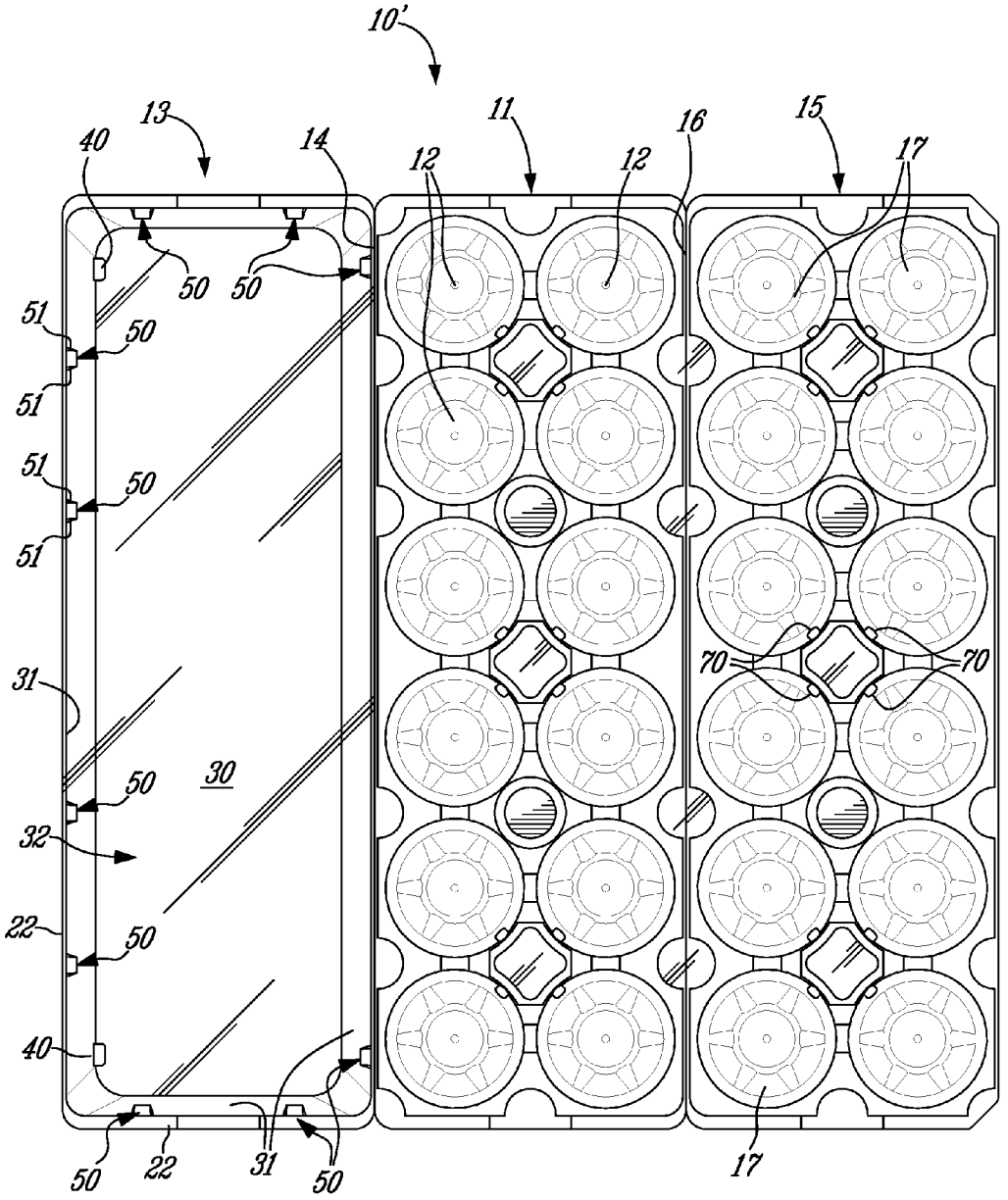

10'
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Fig. 3

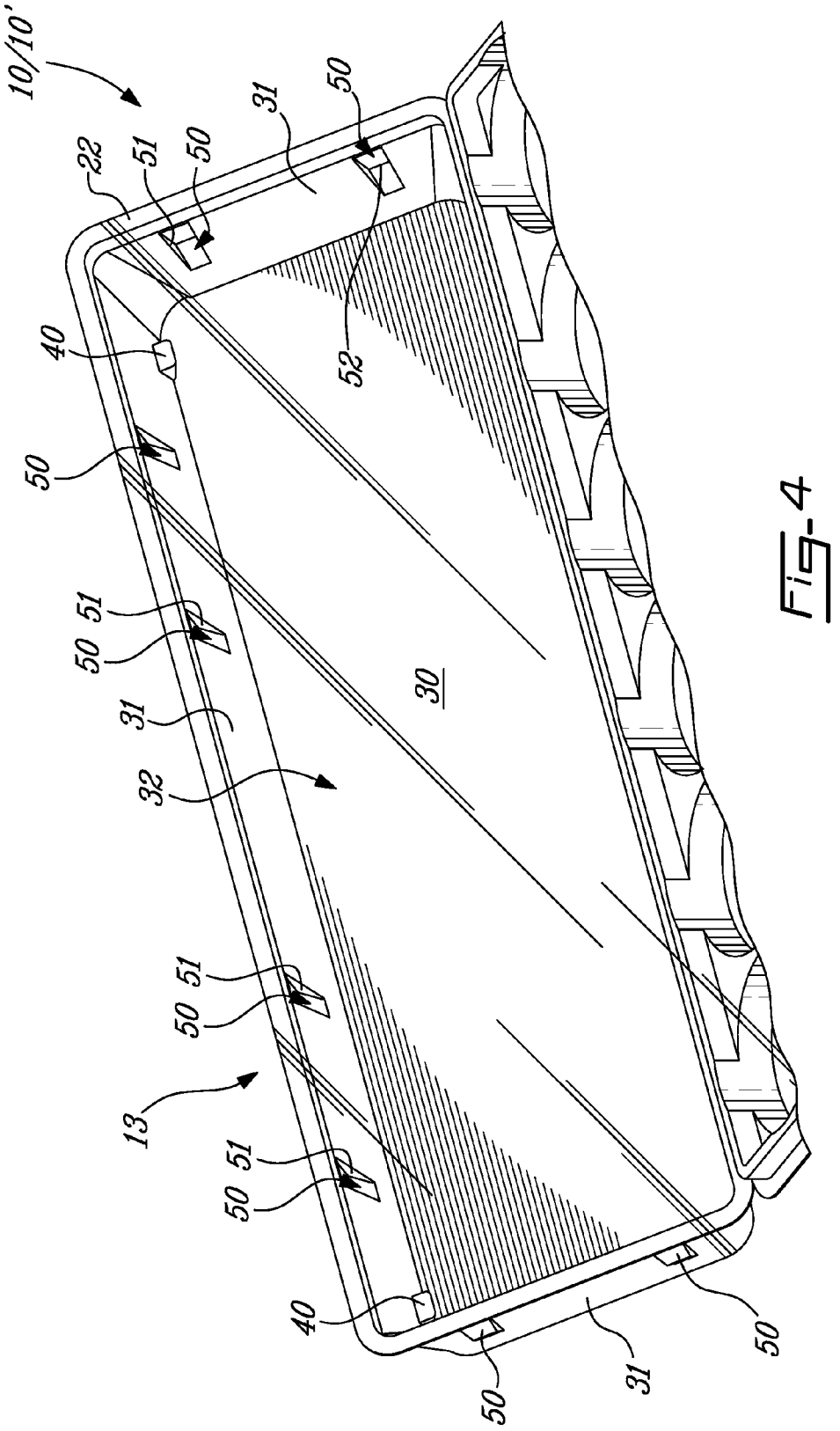

Fig-4

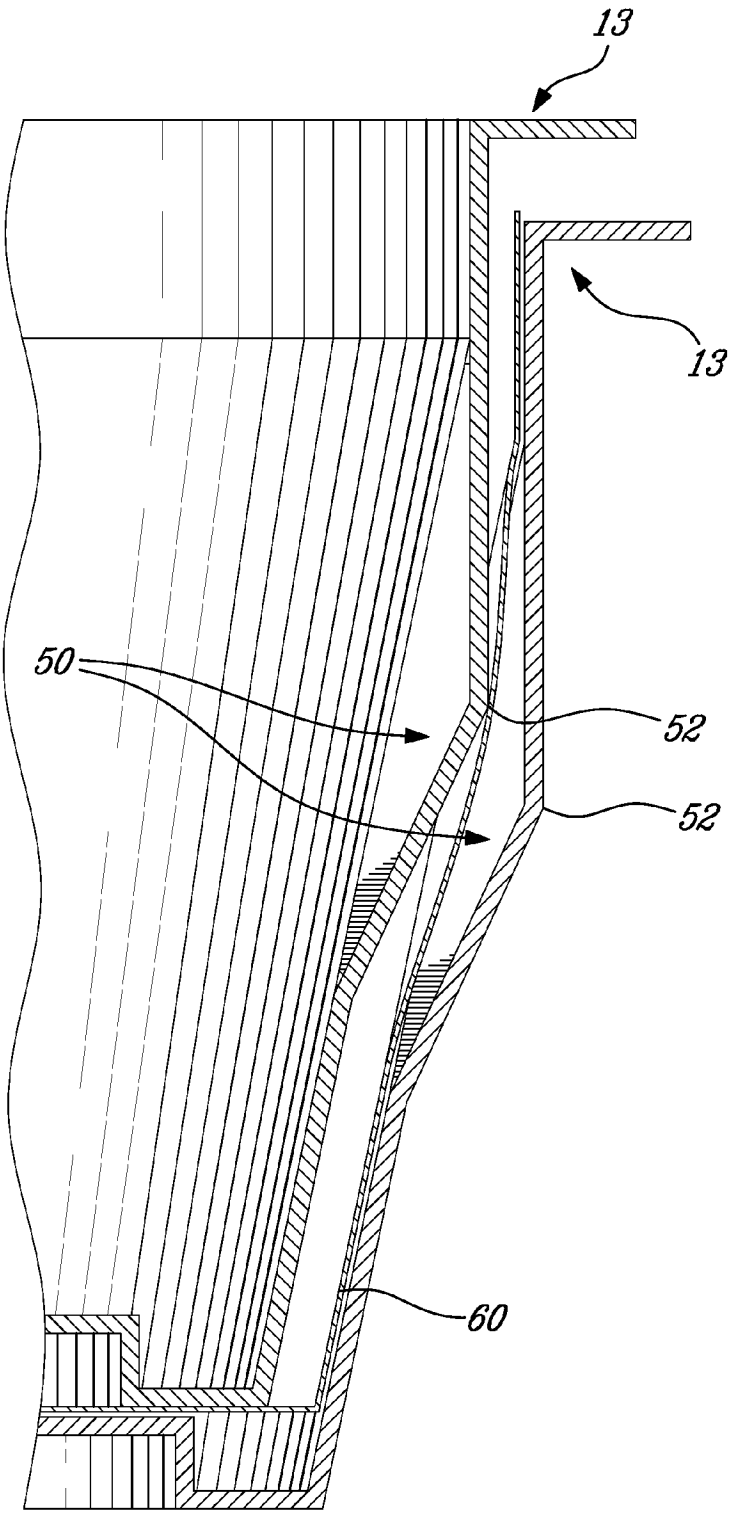

Fig. 5

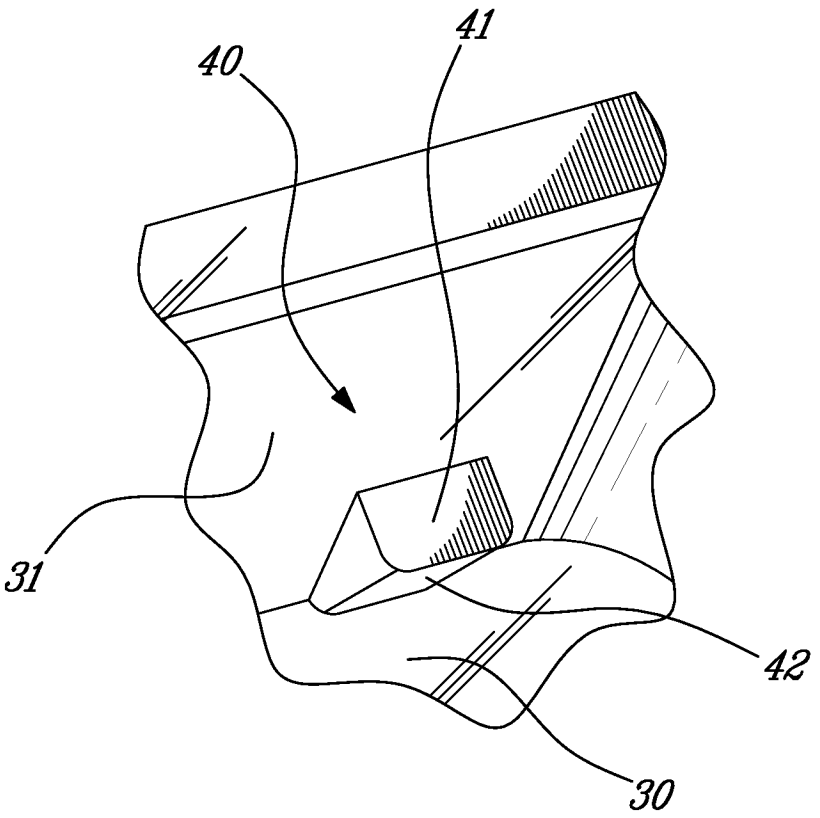

Fig. 6

EGG CONTAINER WITH STACK-SPACING SYSTEM

FIELD OF THE APPLICATION

The present application relates to containers for receiving frangible objects such as eggs, and to structural components of such containers for allowing the stacking of such containers in an opened position.

BACKGROUND OF THE ART

Egg containers of all kinds have been developed for the transportation and sale of frangible items such as eggs. As eggs are relatively fragile, the egg containers must protect the eggs from the various manipulations involved from the packaging of the eggs to the consumer's refrigerator.

One significant improvement in egg containers is the use of thermoformed plastics as material for the egg containers. Thermoformed plastics are typically transparent, which allows the eggs to be visible, and are relatively inexpensive to produce. As they can inspect the eggs by seeing through the material of the egg container, the consumers do not need to open the egg container, as is the case with cardboard egg containers, for instance. In the case of cardboard boxes, it may occur that the boxes are not closed properly after inspection. This may cause the breakage of eggs if the improperly closed egg container is subsequently manipulated by another consumer.

One of the advantages with containers of thermoformed plastics pertains to the stacking of the containers in an open position. Containers in the open position may be nested one into the other to form stacks requiring a relatively small volume when compared to stacks of closed containers. However, the separation of containers nested one into the other is often performed by automated equipment. Accordingly, containers must have components to ensure that stacks of open containers are upright. Moreover, an equidistant spacing between a plurality of open containers nested one into the other facilitates their separation by the automated equipment.

SUMMARY OF THE APPLICATION

It is therefore an aim of the present disclosure to provide a container for frangible items addressing issues associated with the prior art.

Therefore, in accordance with the present application, there is provided a container for receiving frangible items comprising: a sheet of polymer formed into: a base portion having a plurality of item-receiving cavities for supporting frangible items; at least one cover portion having at least one item-covering concavity for covering the frangible items, the cover portion having a generally flat top wall and peripheral walls concurrently defining the at least one item covering concavity; a first hinge between the base portion and the cover portion for rotating the cover portion onto the base portion to hold the frangible items captive in the item-receiving cavities; at least one abutment spacer formed at an edge between the peripheral walls and the top wall, the at least one abutment spacer comprising an abutment surface projecting into the concavity from one of the peripheral walls, and support walls relating the abutment surface to the top wall, with at least one of the support walls being in an acute angle relation with the top wall; at least one alignment channel in at least one of the peripheral walls defining an alignment protrusion through the sheet of polymer, the alignment channel/protrusion being oriented vertically for guiding the nesting of an upper one of the cover portion descending into a lower one of the cover portion, by the alignment protrusion of the upper one received in the alignment channel of the lower one, when a stack of the containers in an opened state is formed, whereby a spacing between nested containers is defined by the abutment spacers of the upper one seated on the abutment spacers of the lower one.

Further in accordance with the present application, there is provided a container for receiving frangible items comprising: a sheet of polymer formed into: a base portion having a plurality of item-receiving cavities for supporting frangible items, with a post centered between each set of four of the item-receiving cavities, the post projecting upwardly from the base portion to support a structural component of the cover portion when the container is closed; at least one cover portion having at least one item covering concavity for covering the frangible items, and a structural component extending into the concavity for contacting the post when the container is closed; a first hinge between the base portion and the cover portion for rotating the cover portion onto the base portion to hold the frangible items captive in the item-receiving cavities; spacers formed between at least one of the posts and the four item-receiving cavities surrounding the post, the spacers each defining a subcavity on one side of the sheet of polymer and a bump on the other side of the sheet of polymer, the spacers having a wider central portion for narrower ends along a vertical axis of the container, such that the nesting of an upper one of the base portion descending into a lower one of the base portion results in the spacers of the upper one seated on the spacers of the lower one when a stack of the containers in an opened state is formed, whereby a spacing between nested containers is defined by the spacers of the upper one seated on the spacers of the lower one.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic perspective view of a two-fold egg container;

FIG. **2** is a schematic perspective view of a three-fold egg container;

FIG. **3** is a top plan view of a three-fold egg container with a stack-spacing system in accordance with an embodiment of the present disclosure;

FIG. **4** is an enlarged fragmented view of a top cover portion of the egg container of FIG. **3**;

FIG. **5** is a sectional view of two of the top cover portions of FIG. **4**, nested one into the other, with the stack-spacing system; and

FIG. **6** is an enlarged perspective view of an abutment spacer of the stack-spacing system.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings and more particularly to FIG. **1**, a container for frangible items is generally shown at **10**, and is referred to as an egg container. The egg containers described hereinafter are preferably made of transparent or translucent plastics, for instance, using a thermoforming process or other molding process. In one embodiment, the egg containers are formed from a single, flat sheet of plastic. Other materials and/or processes may be used as well. The containers described hereinafter may be used to contain eggs or any other frangible items (e.g., tomatoes), in any suitable number (e.g., 6, 12, 18, 24).

The egg container **10** of FIG. **1** is a two-fold egg container, as it has two portions hinged to one another. The egg container

10 has a base portion 11 having a plurality of egg-receiving cavities 12 (e.g., 6, 12, 18, 24,or any other suitable number), with each cavity 12 supporting an egg. A top cover portion 13 is hinged to the base portion 11 by hinge 14, in a longitudinal dimension of the egg container 10. The top cover portion 13 presents a flat top surface part of a top wall as in FIG. 1, with or without strengthening components (e.g., arches, posts). Although not shown, mating connectors or any other suitable type of connectors are provided on the periphery of the base portion 11 and top cover portion 13 for interlocking them when the egg container 10 is closed.

Referring to FIG. 2, a three-fold egg container is generally illustrated at 10'. The egg container 10' is similar to the egg container 10 of FIG. 1, but has an intermediate cover portion 15. The intermediate cover portion 15 is hinged to the base portion 11 by hinge 16, in a longitudinal dimension of the egg container 10'. The hinges 14 and 16 are preferably on opposite edges of the base portion 11. The intermediate cover portion 15 typically has egg cavities 17 to cover a top portion of the eggs supported by the egg-receiving cavities 12. Although not shown, mating connectors or any other suitable type of connector are provided on the periphery of the top cover portion 13 and the intermediate cover portion 15 for interlocking them when the egg container 10' is closed.

The egg containers 10/10' of FIGS. 1 and 2 may have peripheral flanges 20-22, that lie one against the other when the egg containers 10/10' is closed. The flanges 20-22 provide structural stability to stacks of closed containers, by spreading the weight between base portion 11, top cover portion 13 and intermediate cover portion 15, if applicable.

In order to close the egg container 10', the intermediate cover portion 15 is firstly hinged into contact with the base portion 11, as illustrated by arrow A. The top cover portion 13 is then hinged onto the intermediate cover portion 15, as illustrated by arrow B.

The egg containers of the present disclosure may contain any suitable number of item-receiving cavities. One suitable material for the egg containers of the present application is polyethylene terephthalate (PET). PET has many advantages, as this material can be transparent or opaque and can be produced at high volume and at low cost. Wall thicknesses of PET cases in a contemplated embodiment are 0.0175 inch in thickness, but other thicknesses as low as 0.012 to as high as 0.022 inch are also contemplated. However, this thickness may vary, for instance, once the sheet is formed into the egg container 10/10'.

Referring concurrently to FIGS. 3 and 4, a stack-spacing system is shown in the top cover portion 13, for the stacking of top cover portions 13. The stack-spacing system is present in a top cover portion of the type having a top wall 30 that is generally flat and horizontal when the egg container 10/10' is open or closed and rests on a horizontal surface. In FIGS. 3 and 4, the top wall 30 is illustrated as defining a single flat surface, but may alternatively be separated into multiple surfaces, or may be disrupted with ribs or other protuberances projecting into the top cover portion 13.

Peripheral walls 31 are provided between the top wall 30 and the peripheral flange 22. The peripheral walls 31 are concurrently tapered from the peripheral flange 22 to the top wall 30 for nesting of top cover portions 13 one into another. An inner concavity 32 of the top cover portion 13 is defined concurrently by the top wall 30 and the peripheral walls 31, and covers a top portion of frangible items received in the egg-receiving cavities 12 (FIGS. 1 and 2).

Components of the stack-spacing system are now described. The components are described with reference to the inner concavity 32. Due to the thin-wall nature of the material used in the containers 10/10', these components projecting into the inner concavity 32 are indentations from an exterior of the top cover portion 13.

Referring to FIGS. 3, 4 and 6, abutment spacers 40 are provided in the inner concavity 32. In an embodiment, the abutment spacers 40 are at the intersection of the top wall 30 and the peripheral walls 31. Each of the abutment spacers 40 has an abutment surface 41 and support walls 42. The abutment surface 41 may be generally horizontal when the egg container 10/10' is closed or opened, whereas the support walls 42 are slanted. As best seen in FIG. 6, the support walls 42 taper toward the top wall 30, thereby defining an acute angle relation with the top wall 30, whether connected to the top wall 30 or distanced from the top wall 30. Therefore, the abutment spacers 40 are said to be negative spacers (i.e., negative stops). Accordingly, when the top cover portions 13 are nested one into the other, a top one of the abutment spacers 40 is seated on a bottom one of the abutment spacers 40. More specifically, an edge between the top wall 30 and the support wall 42 for the top one is seated on the abutment surface 41 of bottom one. The height of the support walls 42 is selected as a function of a desired spacing between top cover portions 13. More specifically, the height of the vertical surfaces 42 is selected as a function of the desired spacing between nested top cover portions 13, which spacing is for instance equal to the spacing between base portions 11 when nested one into the other.

The abutment spacers 40 may be positioned at any point along the edge between the top wall 30 and the peripheral walls 31, or in the peripheral walls 31. In one embodiment, the abutment spacers 40 are positioned at the edge that is farthest from the base portion 13. In placing the abutment spacers 40, a positioning of a label should be taken into consideration, as labels covering the full width of the top wall 30 are commonly used for identification, labeling and/or marketing purposes. As shown in FIG. 3, the positioning of the abutment spacers 40 at corners of the top cover portion 13 provides little interference for a wide label positioned therein.

The stack-spacing system of the top cover portion 13 also features a plurality of alignment channels 50 defined in the peripheral walls 31, which channels 50 may be from an interior or an exterior of the top cover portion 13, with a corresponding alignment protrusion formed on the other of the interior or exterior of the top cover portion 13, due to the fact that the container 10/10' is formed from a sheet. The alignment channels 50 are in the peripheral walls 31 so as to ensure that the abutment spacers 40 are vertically aligned when the top cover portions 13 are brought one into the other. This reduces the risk that the abutment spacers 40 of nested top cover portions 13 lock one into the other.

As seen in FIG. 3, the alignment channels 50 may have a tapering shape by way of edges 51 tapering from the peripheral flange 22 to the top wall 30. Accordingly, when one alignment channel 50 is lowered toward another alignment channel 50, the tapering edges 51 result in mating engagement and gradual alignment of the channels 50 one into the other. The tapering shape of the channels 50 also facilitates the denesting of a top cover portion 13 from another by pivoting movement about the base portion 11. The edges 51 may also be parallel to one another.

Referring to FIG. 5, the alignment channels 50 define a projecting portion such as a projecting edge 52, projecting toward an exterior of the peripheral walls 31. The projecting edges 52 are generally horizontal. The projecting edges 52 are used to ensure that the alignment channels 50 fit one into the other despite the presence of a label 60. More specifically, the projecting edge 52 of the top cover portion 13 nested into

another will push the material of the label **60** into the alignment channel **50** of the bottom top cover portion **13**. Alternatively, any shape of projection may be used. Although the projecting edges **52** are shown projecting toward the exterior as part of the channels **51**, the projecting edges or portion **52** may extend into the concavity **32** if used with channels defined from an exterior of the egg container **10**/**10'**.

Referring to FIG. **3**, tear-shaped post spacers **70** are provided at central posts between four egg-receiving cavities **12**. The spacers **70** define the spacing between base portions **11** nested one into the other and intermediate cover portion **15** nested into the other, if applicable. The tear-shaped spacers **70** are at four corners of the central posts, as the central posts are the main structural members inside the egg containers **10**/**10'**, and thus bear a substantial part of the weight of closed egg containers stacked thereon. The spacers **70** may be in the egg-receiving cavities **12**, on the post, or at the intersection between cavities **12** and post. The tear shape of the spacers **70** is suited for spacers **70** to sit one on another, with the wide central section and narrower ends, along a vertical axis of the container **10**/**10'**. In FIG. **3**, the spacers **70** are in the form of a subcavity with respect to an interior of the container **10**/**10'**, and thus result in a bump from an exterior of the container **10**/**10'**, due to the generally uniform thickness of the sheet. However, the bump may be inward of the container **10**/**10'** while the subcavity is outward of the container **10**/**10'**.

In an embodiment of the present disclosure, the containers **10**/**10'** are provided with all of the abutment spacers **40**, the alignment channels **50** (and corresponding protrusions), and the post spacers **70**. Although the egg containers **10**/**10'** need not have all these components simultaneously, the stacking of open containers **10**/**10'** featuring all of these components is efficient. The abutment spacers **40** and the post spacers **70** are concurrently sized so as to cause a uniform spacing between cover portions **13** and base portions **11**, such that stacks of open containers **10**/**10'** are substantially upright.

The invention claimed is:

1. A container for receiving frangible items comprising: a sheet of polymer formed into:

a base portion having a plurality of item-receiving cavities for supporting frangible items;

at least one cover portion having at least one item-covering concavity for covering the frangible items, the cover portion having a generally flat top wail and peripheral walls concurrently defining the at least one item covering concavity;

a first hinge between the base portion and the cover portion for rotation of the cover portion onto the base portion to hold the frangible items captive in the item-receiving cavities;

at least one abutment spacer formed proximate an edge between the peripheral walls and the top wall, the at least one abutment spacer comprising an abutment surface projecting into the concavity from one of the peripheral walls, and support walls relating the abutment surface to the top wall, at least one of the support walls being in an acute angle relation with the top wall; and

at least one alignment channel in at least one of the peripheral walls defining an alignment protrusion through the sheet of polymer, the alignment channel being vertically offset from the at least one abutment spacer and oriented vertically to guide nesting of the cover portion into a similarly-configured cover portion with the alignment protrusion of the cover portion received in the alignment channel of the similarly-configured cover portion to form a stack of nested containers in an open position, whereby a spacing between the nested containers is defined by the at least one abutment spacer of the cover portion seated on the at least one abutment spacer of the similarly-configured cover portion, wherein the alignment channel has a projecting edge configured to hold a label captive in the cavity between the alignment protrusion of the cover portion and the alignment channel of the similarly-configured cover portion when the cover portion and the similarly-configured cover portion are nested together.

2. The container according to claim **1**, wherein the abutment surface of the at least one abutment spacer is parallel to the top wall.

3. The container according to claim **1**, wherein the edge proximate the at least one abutment spacer is disposed between the top wall and the peripheral wall opposite the first hinge.

4. The container according to claim **3**, comprising two of said abutment spacer, the abutment spacers being located at opposed ends of the edge.

5. The container according to claim **1**, comprising a plurality of the alignment channels, at least one of the plurality of alignment channels being disposed in each of said peripheral walls.

6. The container according to claim **1**, wherein at least one edge of the at least one alignment channel tapers toward the top wall.

7. The container according to claim **1**, further comprising a label in the concavity and covering at least partially the top wall and the peripheral walls.

8. The container according to claim **1**, wherein the at least one alignment channel is disposed in the concavity, and the alignment protrusion is disposed on an exterior surface of the top cover portion.

9. The container according to claim **1**, wherein the base portion has a post centered between each set of four of the item-receiving cavities, the post projecting upwardly from the base portion to support a structural component of the cover portion when the container is closed, and further comprising post spacers formed between at least one of the posts and the four item-receiving cavities surrounding the post, the post spacers each defining a subcavity on one side of the sheet of polymer and a bump on the other side of the sheet of polymer, the post spacers having a wider central portion for narrower ends along a vertical axis of the container, such that the nesting of an upper one of the base portion descending into a lower one of the base portion results in the post spacers of the upper one seated on the spacers of the lower one when a stack of the containers in an opened state is formed, whereby a spacing between nested base portions is defined at least by the post spacers of the upper one seated on the post spacers of the lower one.

10. The container according to claim **9**, wherein the post spacers each have a teardrop shape.

11. The container according to claim **9**, wherein the subcavities are disposed inside the container, and the bumps are disposed on an exterior surface of the base portion.

12. The container according to claim **1**, further comprising: two of the cover portion, with an intermediate one of the cover portions having item-covering cavities for covering the frangible items on the item-receiving cavities;

a second hinge between the second longitudinal edge of the base portion, and the intermediate cover portion for rotating the intermediate cover portion onto the base portion, a top one of the cover portions being hinged about the first longitudinal edge to hold the base portion, the intermediate cover portion and the top cover portion in a closed configuration.

13. The container according to claim **1**, wherein the frangible items are eggs, and each of the egg-receiving cavities receives one egg.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.	: 8,640,872 B2
APPLICATION NO.	: 12/726634
DATED	: February 4, 2014
INVENTOR(S)	: Germain Archambault, Francois Blanchette and Francois St-Louis

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

At column 5, line 44:

"portion having a generally flat top wail and peripheral" should read

- portion having a generally flat top wall and peripheral -

Signed and Sealed this
Third Day of June, 2014

Michelle K. Lee

Michelle K. Lee
Deputy Director of the United States Patent and Trademark Office

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.	: 8,640,872 B2
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INVENTOR(S)	: Germain Archambault, François Blanchette and François St-Louis

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

At column 7, line 2:
"gible items are eggs, and each of the egg-receiving cavities" should read
-- gible items are eggs, and each of the item-receiving cavities --

Signed and Sealed this
Twenty-first Day of April, 2015

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office

EXHIBIT E

US00D732401S

(12) United States Design Patent

Blanchette et al.

(10) Patent No.: US D732,401 S
(45) Date of Patent: ** Jun. 23, 2015

(54) **SHEET-FORMED CONTAINER FOR FRANGIBLE ITEMS**

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(72) Inventors: **François Blanchette**, Mirabel (CA); **François St-Louis**, Sainte-Julie (CA); **Germain Archambault**, Saint-Hubert (CA)

(73) Assignee: **PACTIV CANADA INC**, Ontario (CA)

(**) Term: **14 Years**

(21) Appl. No.: **29/435,344**

(22) Filed: **Oct. 23, 2012**

(51) **LOC (10) Cl.** **09-03**

(52) **U.S. Cl.**
USPC **D9/757**; D9/762

(58) **Field of Classification Search**
USPC D9/762, 757, 737, 761, 420, 425, 426, D9/456; D7/611; 220/508; 206/521, 521.1, 206/521.3, 521.4, 521.6, 521.8, 521.9, 564; 229/406
See application file for complete search history.

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(Continued)

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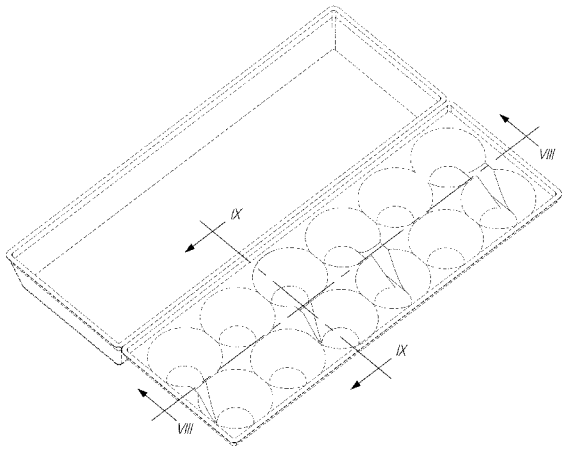
(57) **CLAIM**

The ornamental design for a sheet-formed container for frangible items, as shown and described.

DESCRIPTION

FIG. **1** is an isometric view of a sheet-formed container for frangible items in accordance with the present design;
FIG. **2** is a top plan view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **3** is a bottom plan view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **4** is a front view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **5** is a rear view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **6** is a right-side view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **7** is a left-side view of the sheet-formed container for frangible items of FIG. **1**;
FIG. **8** is a cross-section view taken along cross-section lines VIII-VIII of the sheet-formed container for frangible items of FIG. **1**; and,
FIG. **9** is a cross-section view taken along cross-section lines IX-IX of the sheet-formed container for frangible items of FIG. **1**.
The broken line showing of a container is included for the purpose of illustrating environmental structure only and forms no part of the claimed design.

1 Claim, 5 Drawing Sheets



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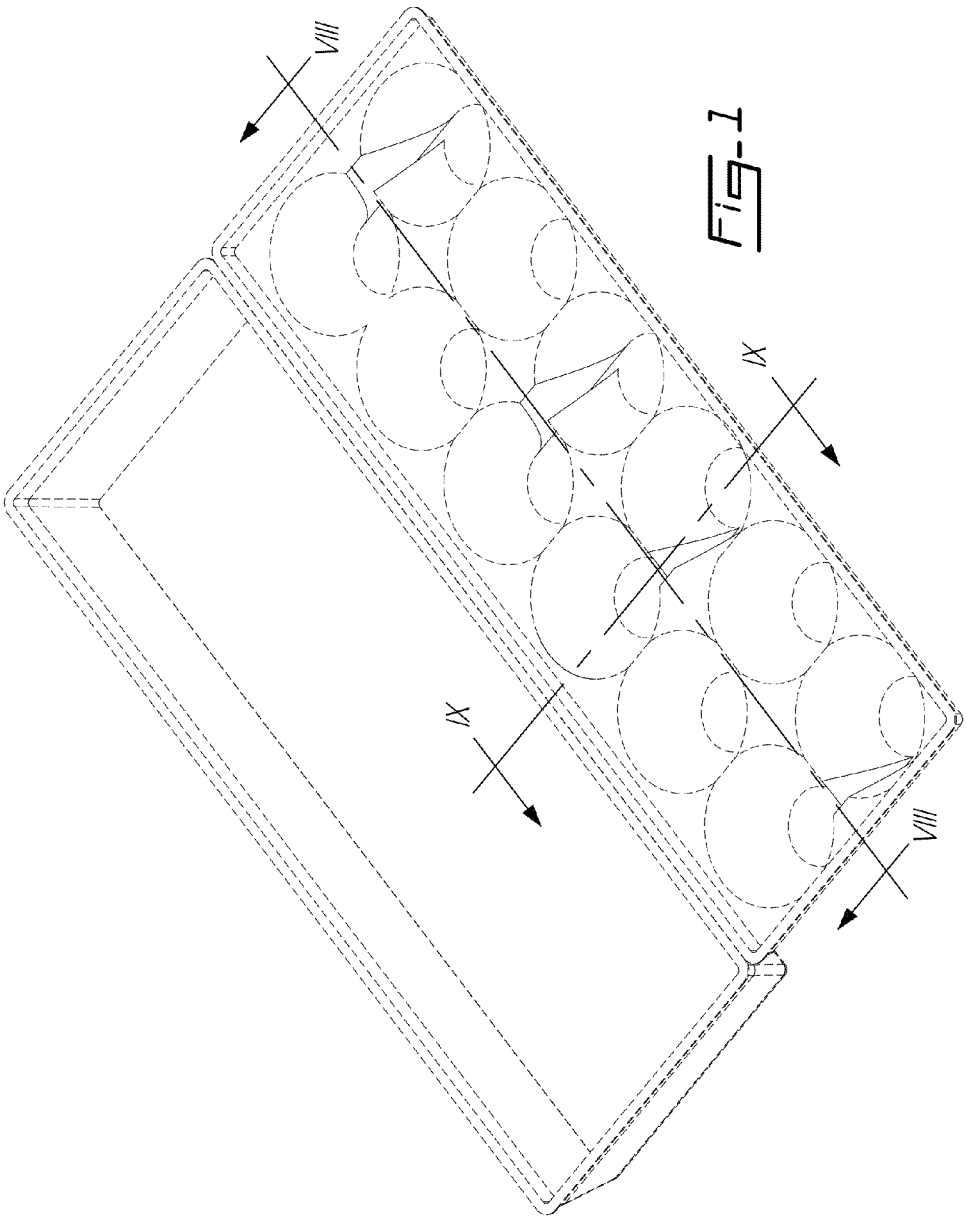

Fig. 1

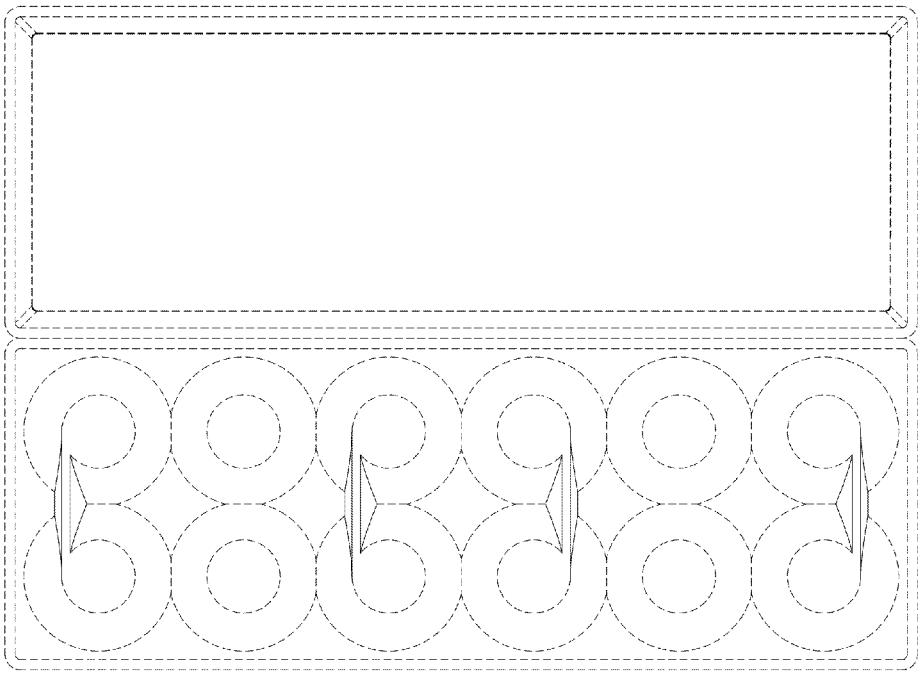

Fig. 2

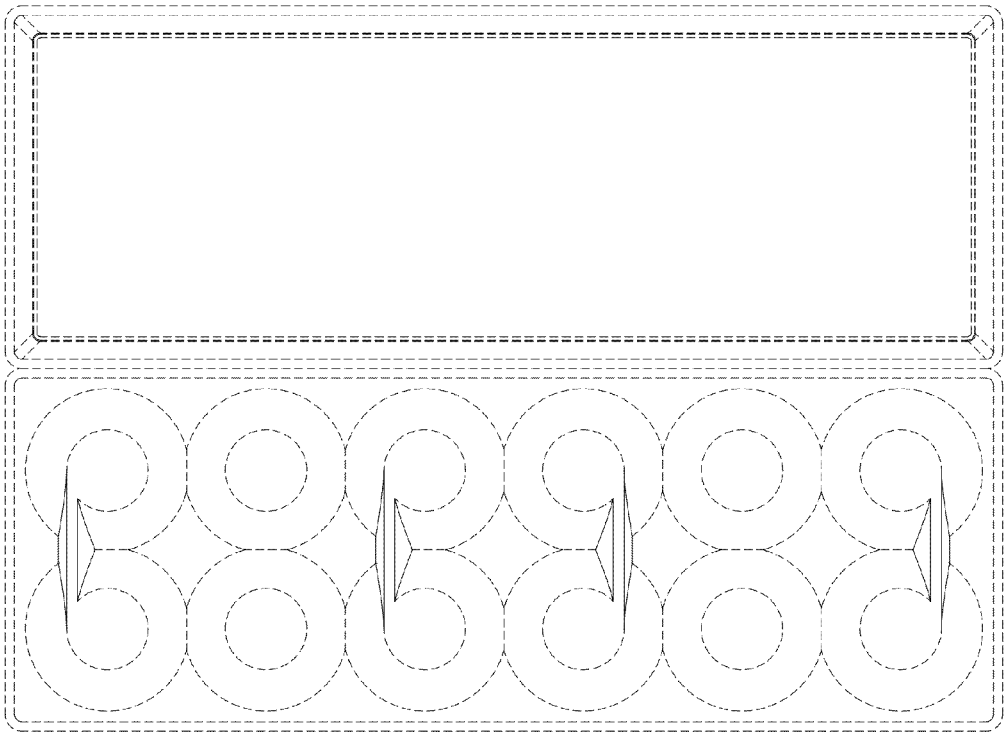

Fig. 3

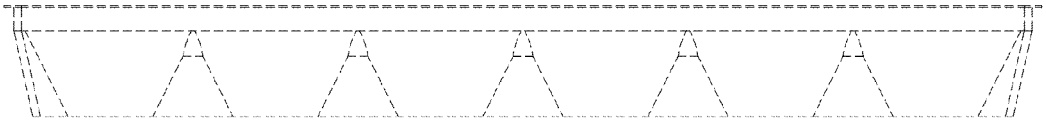

Fig. 4

Fig. 5

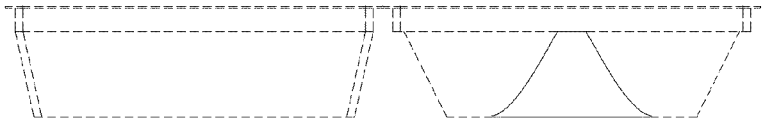

Fig. 6

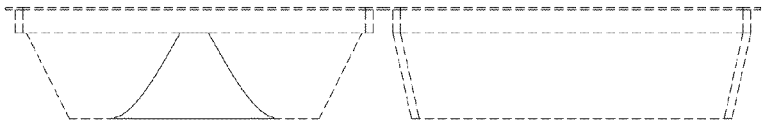

Fig. 7

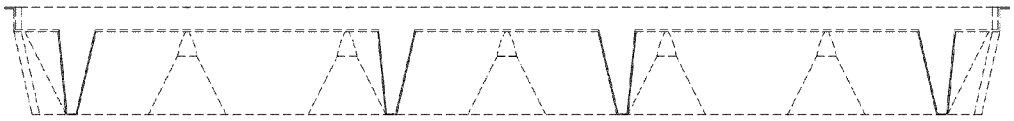

Fig. 8

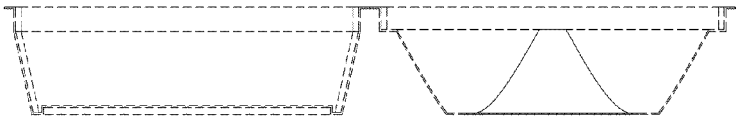

Fig. 9