United States Patent

[11] 3,624,776

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[45] Patented **Nov. 30, 1971**
[73] Assignee **International Paper Company**
New York, N.Y.

[54] **CASE FOR SHIPPING ARTICLES IN AN UPRIGHT POSITION AND IN SPACED LATERAL SEPARATION**
26 Claims, 21 Drawing Figs.

[52] **U.S. Cl.** ..... **206/65 Y,** 229/14 C
[51] **Int. Cl.** **B65d 71/00**
[50] **Field of Search** ..... 206/65 Y, 65 E, 65 R; 229/14 C

[56] **References Cited**

UNITED STATES PATENTS

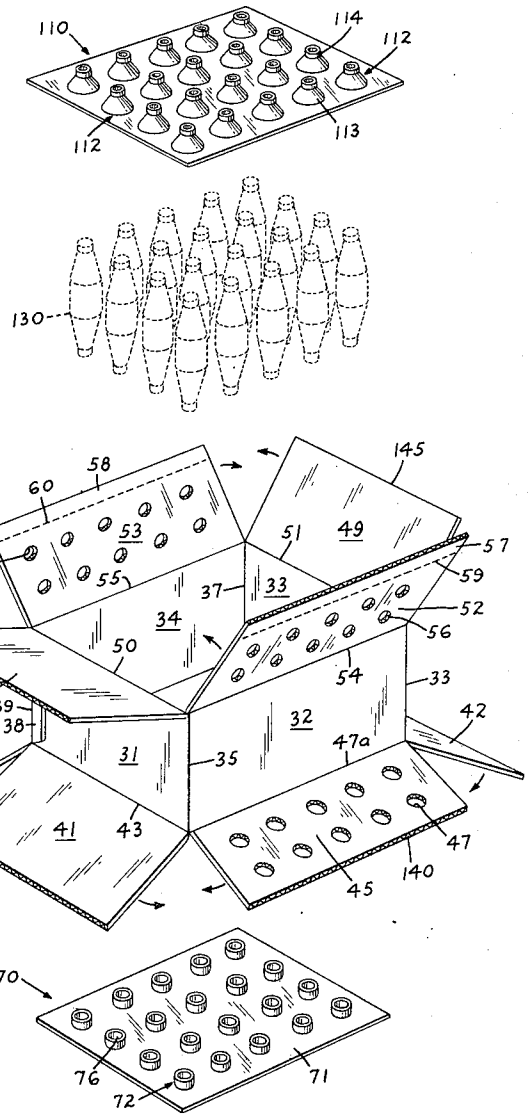
2,216,339	10/1940	Reamer	206/65 E
2,531,090	11/1950	Turner	229/14 C X
2,564,948	8/1951	Beck, Jr. et al.	206/65 Y X
2,792,112	5/1957	Ellis	206/65 Y
3,256,983	6/1966	Lech	206/65 E
3,294,270	12/1966	Geisler	206/65 E

Primary Examiner—Joseph R. Leclair
Assistant Examiner—Stephen P. Garbe
Attorney—Lawrence W. Flynn

ABSTRACT: A case is provided for shipping one or more articles in a substantially upright position and in spaced lateral separation from adjoining articles and portions of said case; the case comprises wall panels, an external bottom panel, a bottom indexing panel for supporting and engaging the bottom of the article by means of one or more projections rising upwardly therefrom, an internal bottom panel foldably connected to a wall panel which contains apertures adapted to fit over the projections on the bottom indexing panel to lock the bottom indexing panel in a sandwich configuration between the external and internal bottom panels.

The shipping case further comprises a top indexing panel containing female recesses projecting upwardly therefrom which are adapted to fit over the top of the article, an internal top panel foldably connected to a wall panel containing apertures which are adapted to fit over the female recesses, to lock the top indexing panel in position, and an external top panel; the internal top panel is sandwiched between the top indexing panel and the external top panel.

The shipping case can be provided with an article separator layer assembly when the case is used to package a plurality of layers of articles.



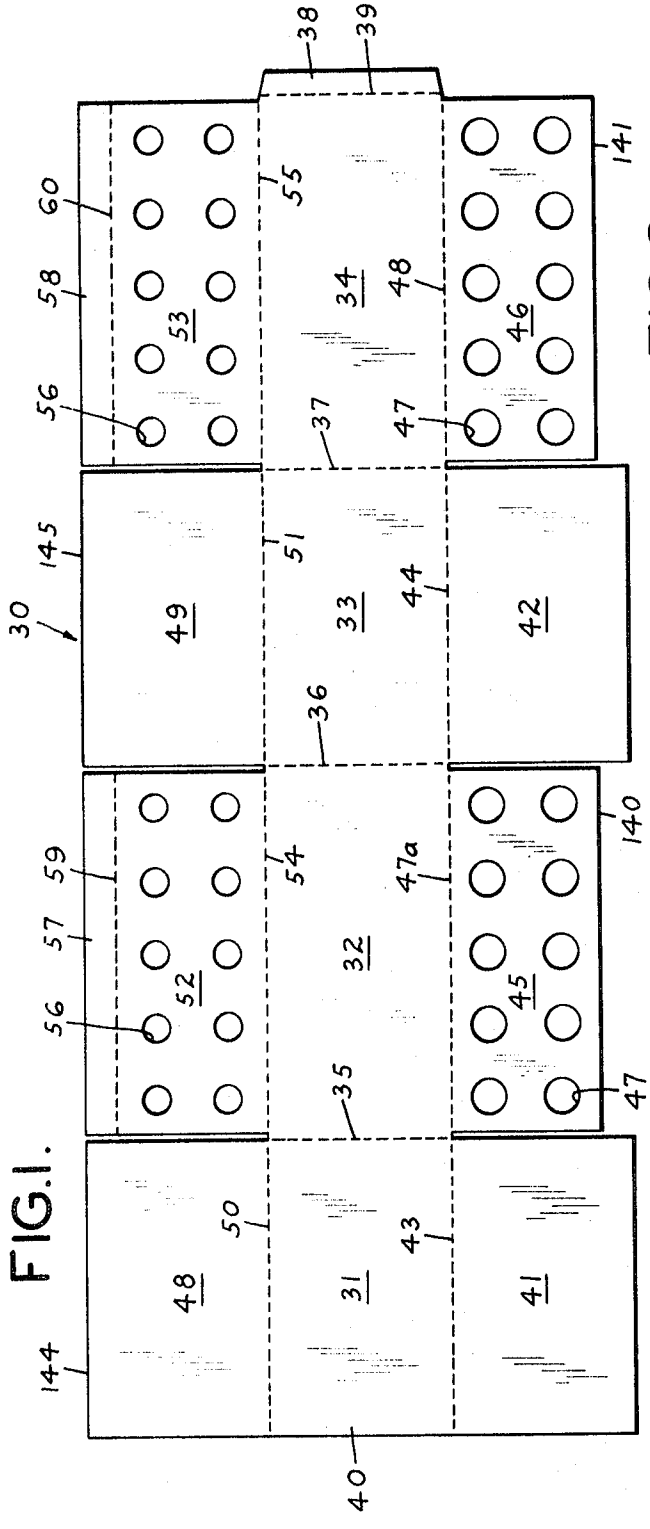


FIG.1.

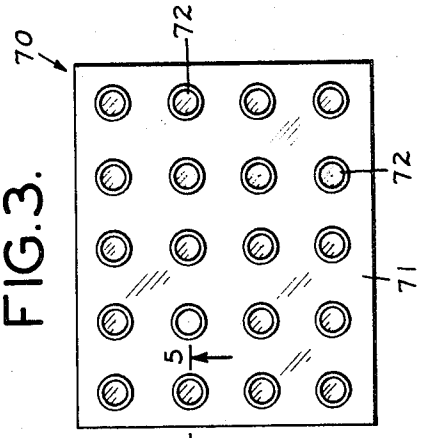


FIG.3.

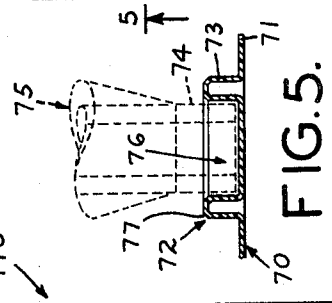


FIG.5.

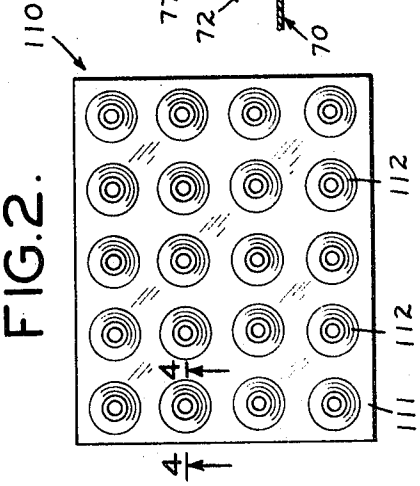


FIG.2.

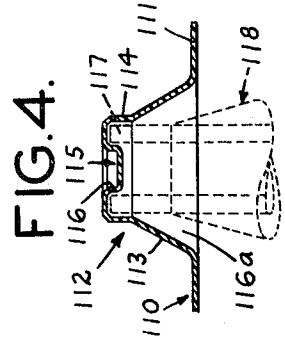


FIG.4.

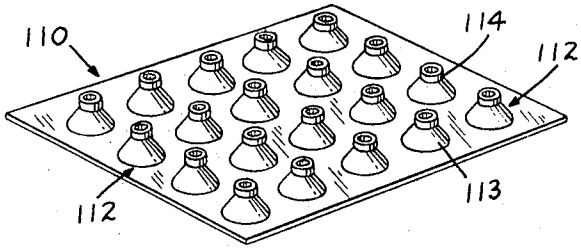
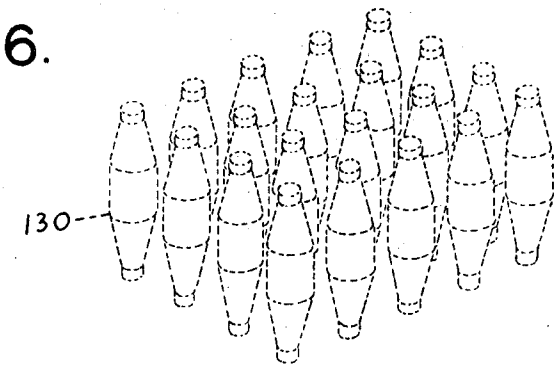
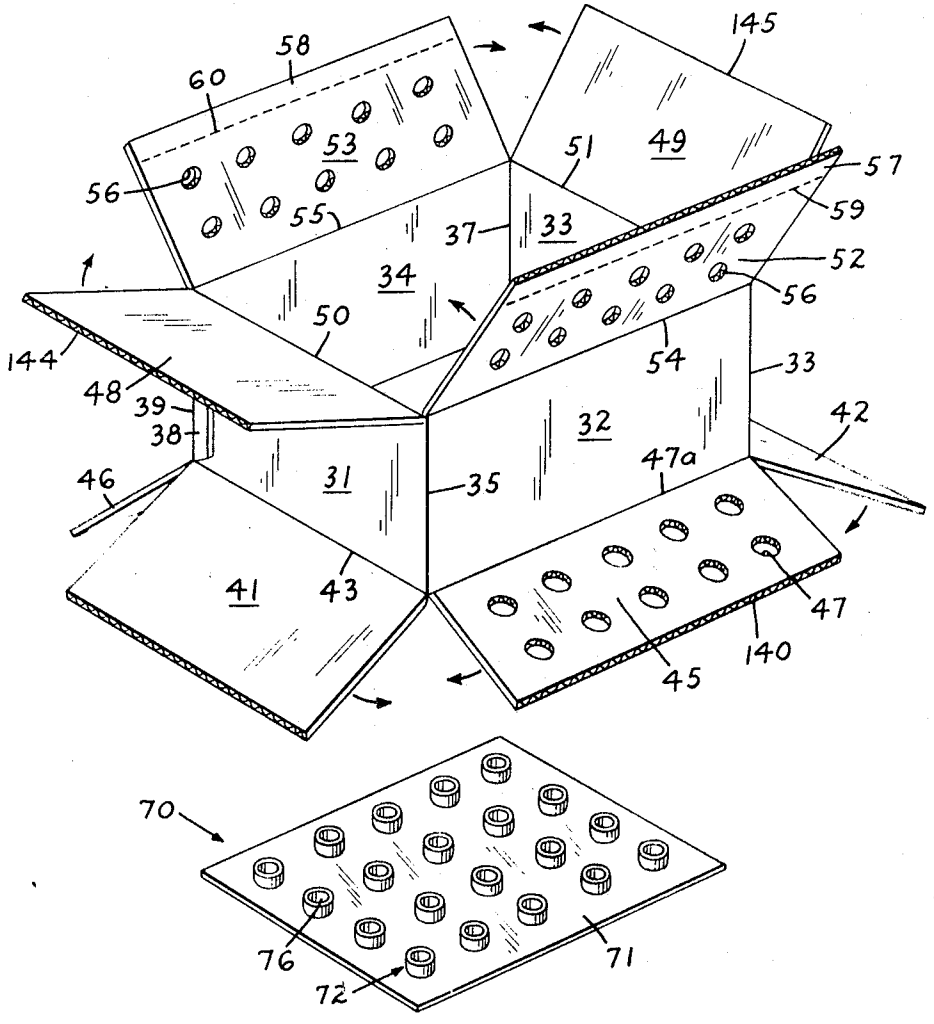

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FIG.6.


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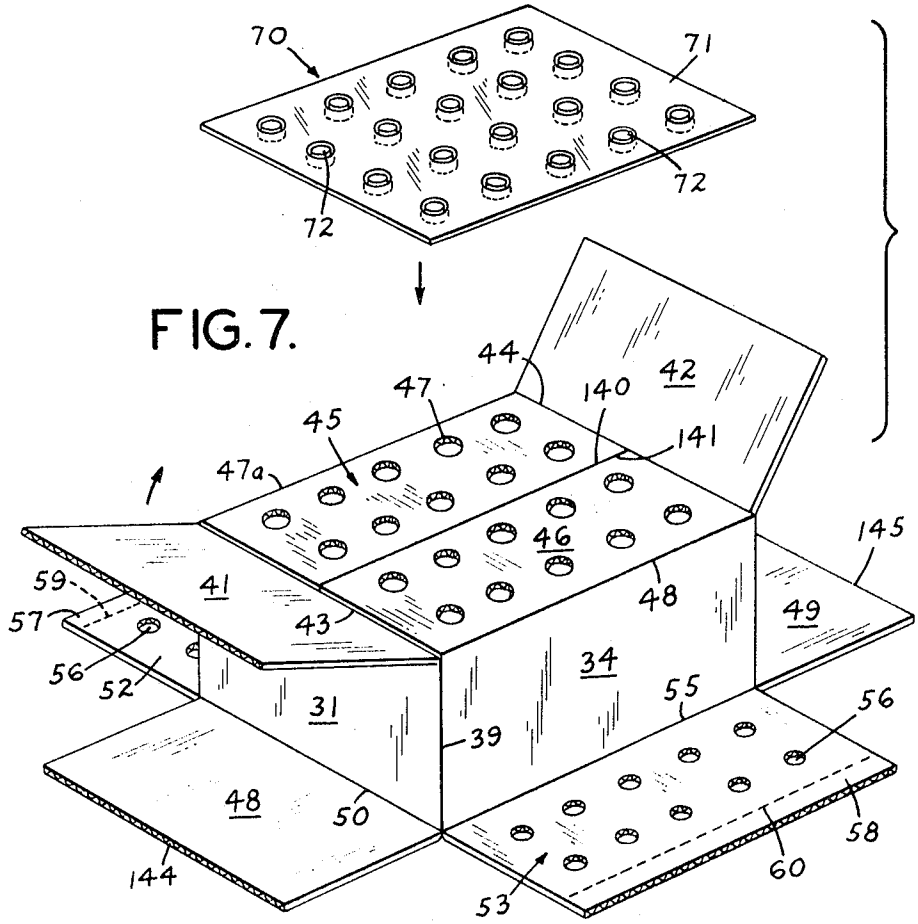

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FIG. 7.

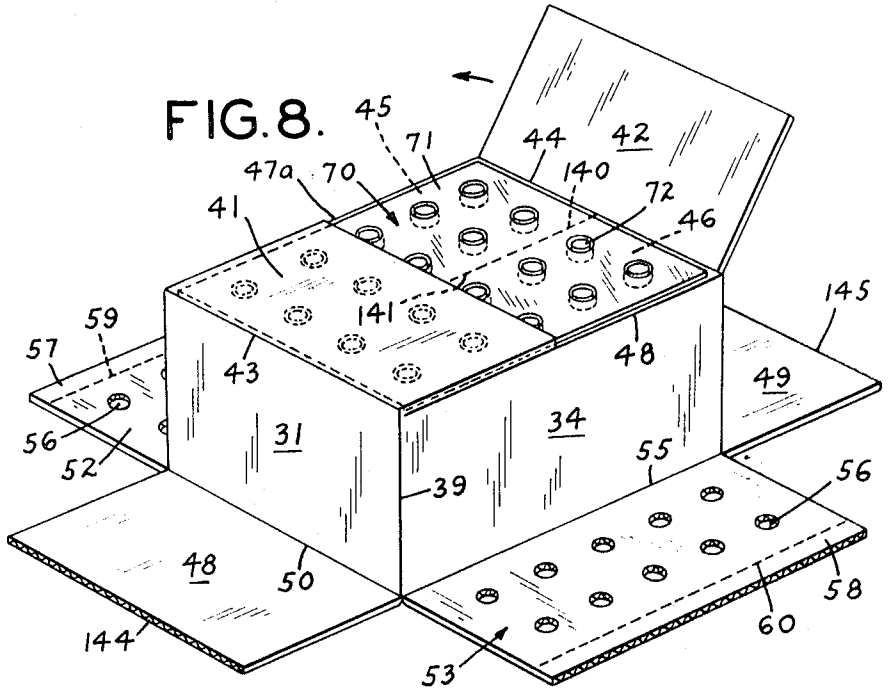

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FIG. 8.

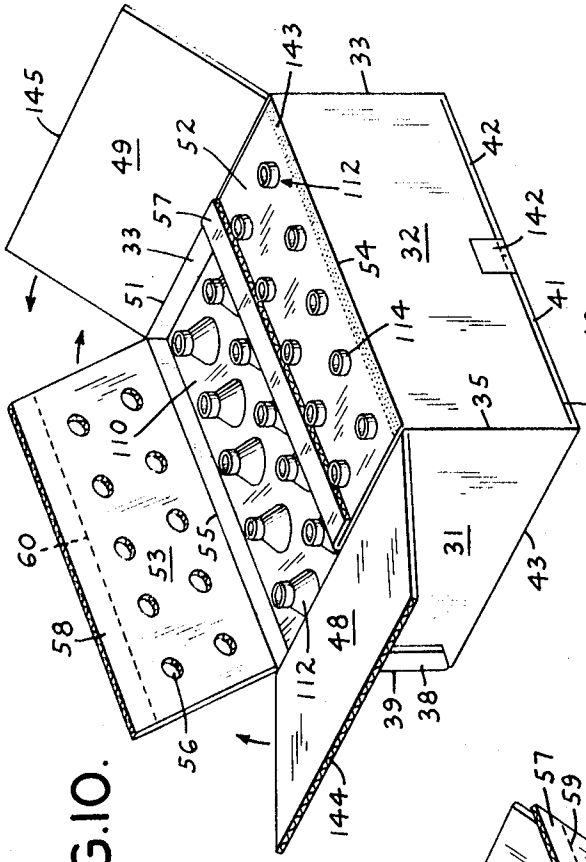


FIG.10.

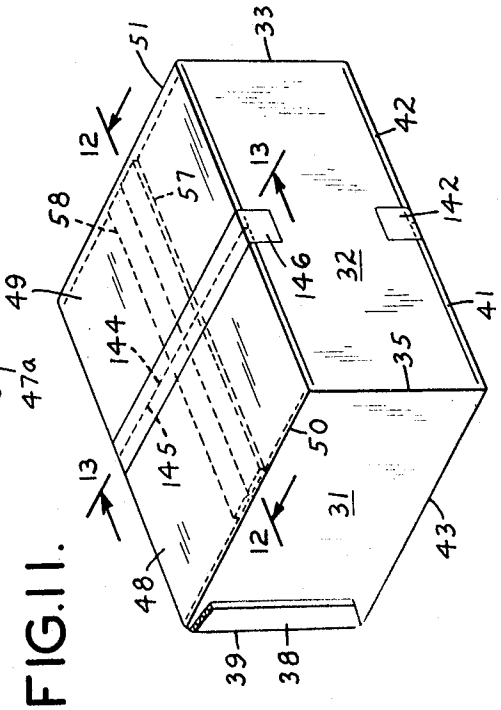


FIG.11.

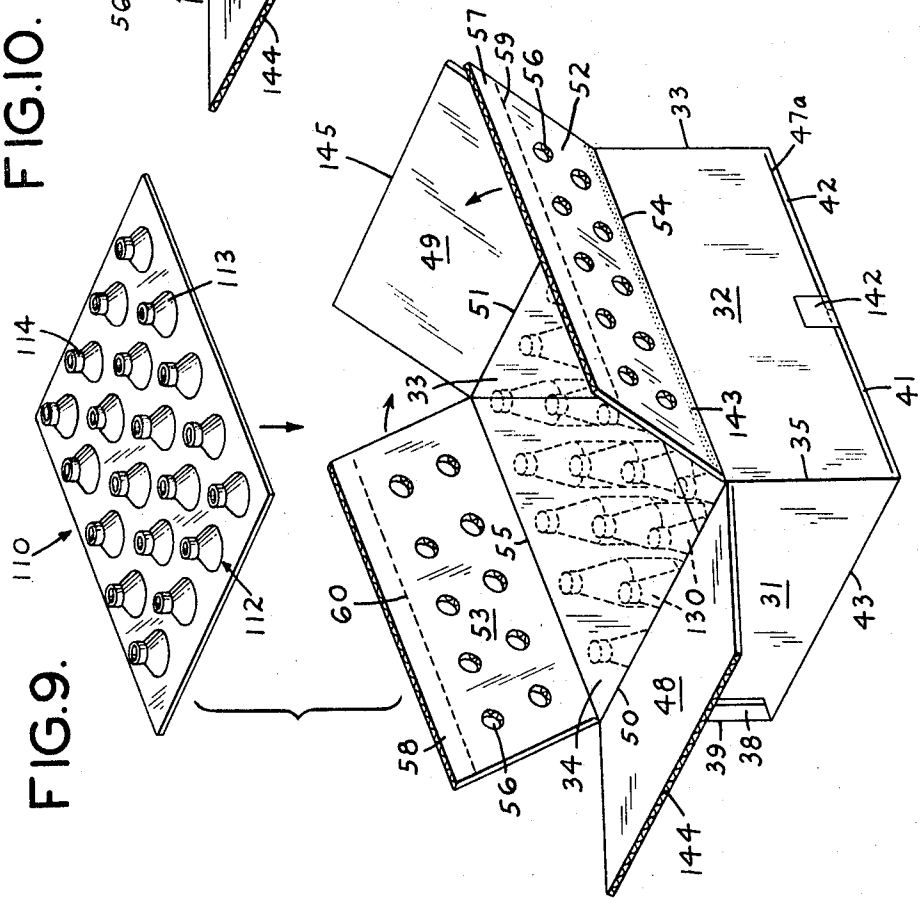


FIG.9.

FIG.12.

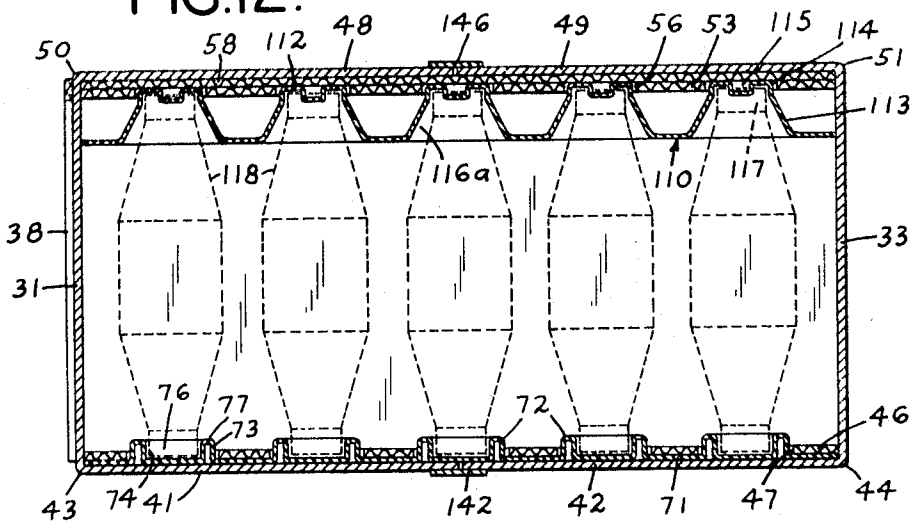


FIG.13.

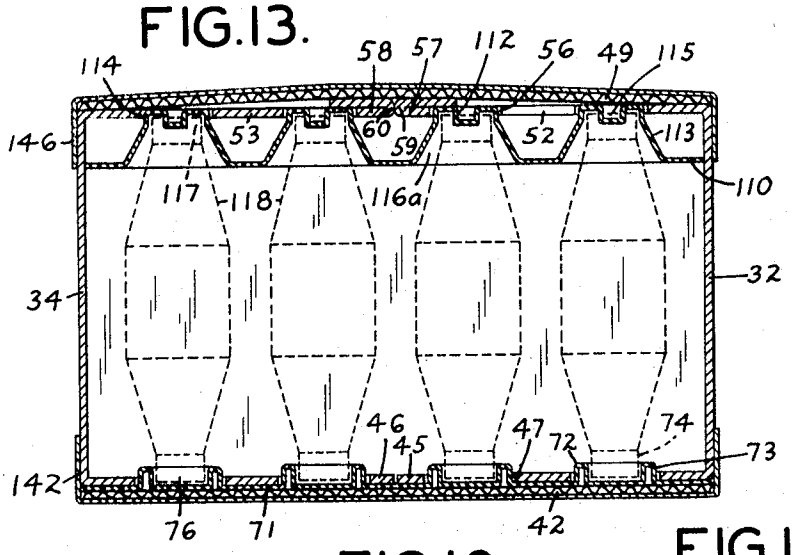
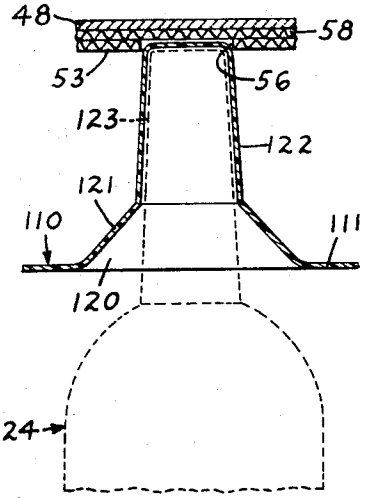


FIG.16.

FIG.18.



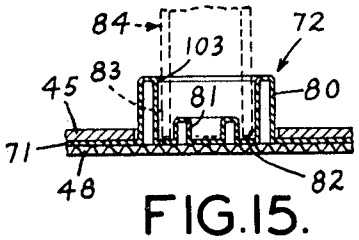
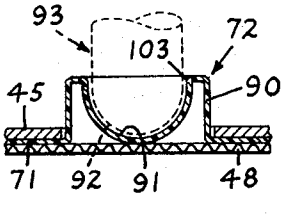


FIG.15.



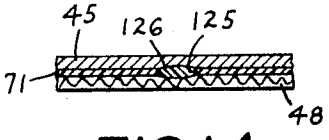


FIG.14.

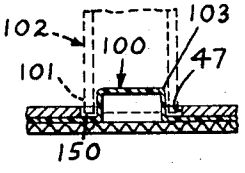


FIG.17.

FIG.19.

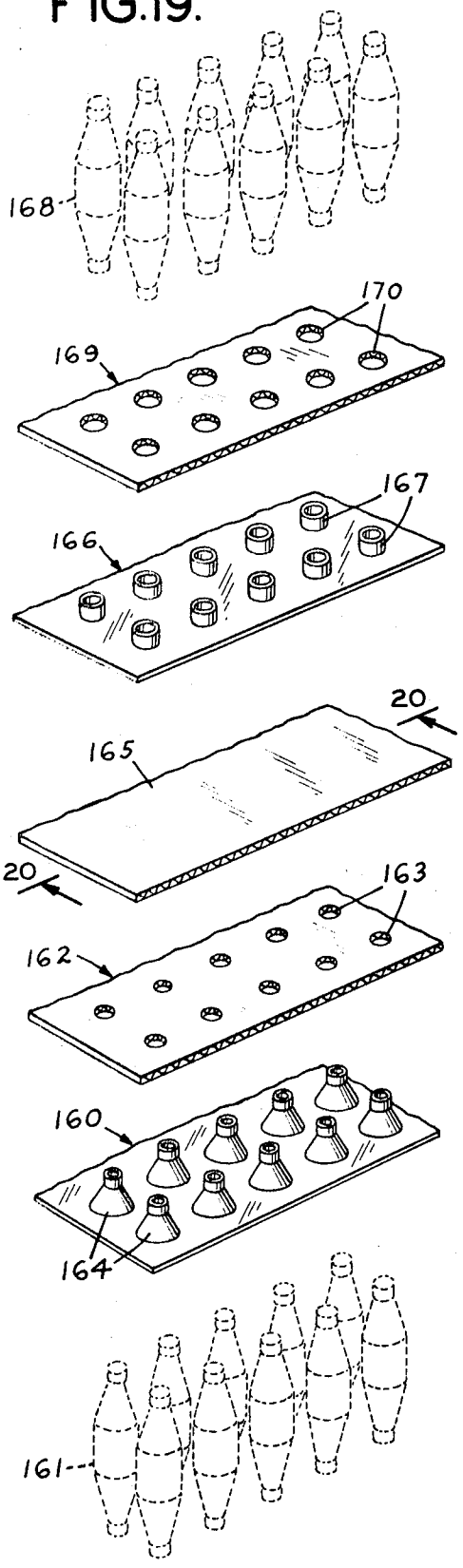


FIG.20.

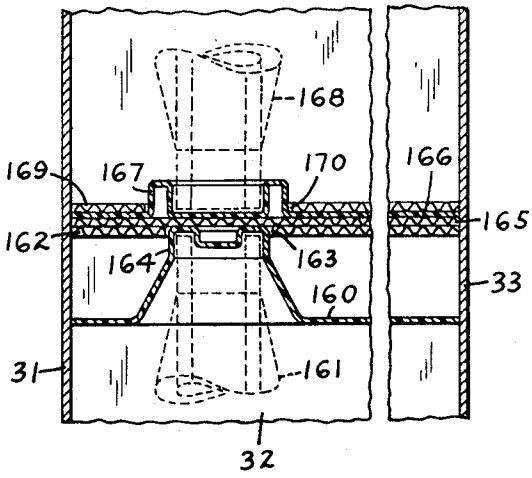
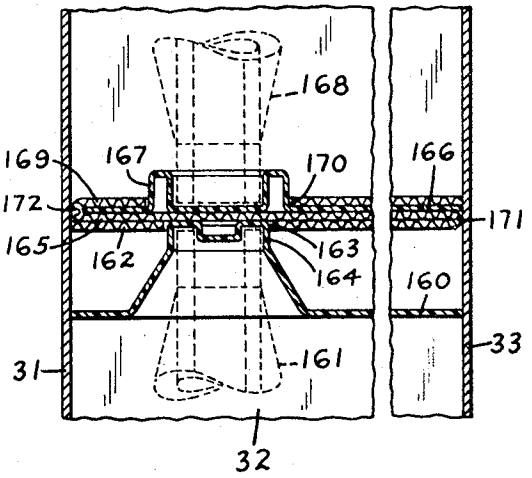


FIG.21.



CASE FOR SHIPPING ARTICLES IN AN UPRIGHT POSITION AND IN SPACED LATERAL SEPARATION

BACKGROUND OF THE INVENTION

This invention relates to shipping cases and, more particularly, to cases for shipping articles wherein, for any of the variety of reasons, it is necessary to maintain the articles in a substantially upright position and in spaced lateral separation from each other and adjoining portions of the case during transit.

Such cases are used for shipping a variety of items such as, for example, pirns or bobbins of natural and synthetic filaments; fragile bottled items such as liquor, medicinals, and drugs; and other articles which can be damaged upon exposure to the impacts normally encountered in transit of the case.

The shipping of certain polyester filaments is an illustrative example of a situation where it is necessary to protect the pirns of fiber from contact during shipment with abrasive articles; certain polyester filaments are extremely sensitive to the very slight abrasive forces and readily fray or break at the surface layers on the pirn if so exposed, often resulting in the total loss of the large quantity of filament on the pirn.

A variety of shipping cases have heretofore been proposed to provide adequate shipping cases for fragile articles. In one such case, the individual articles are packaged between lateral separator partitions and are often further enclosed in a plastic bag to protect them during shipment. Such packages are expensive and are not entirely satisfactory because of the abrasive forces which can be exerted by the lateral partitions against the surfaces of the article upon subjection of the case to impact.

In another package, unrestrained article indexing panels are provided at the top and bottom of the package to grasp the top and bottom portions of the articles in an attempt to prevent lateral movement of the articles upon impact. These indexing panels typically comprise a corrugated cardboard panel containing a plurality of die-cut holes which engage the top and bottom of the articles. Among the disadvantages of such cases are the abrasion to the articles which occurs when the rough die-cut apertures rub against the article. Moreover, since the indexing panels are unrestrained, they have a tendency, upon subjection to impact, to crumple and roll up along their edges with the result that they no longer effectively perform their function of maintaining the articles in an upright position and in spaced lateral relationship from each other.

In yet another prior art case, top and bottom indexing panels are provided which are integrally attached to the walls of the case. These panels contain apertures into which the bottom and top portions of the articles are insertable. While such an arrangement reduces damage to the indexing panels upon lateral impact, the problem still remains of the corrugated die-cut holes abrading the article which they are restraining; moreover, there is a tendency for the holes in the indexing panels to wear away about their periphery during transit and upon impact and no longer firmly restrain the tops and bottoms of the article due to the enlargement of the periphery.

A further disadvantage of cartons employing top and bottom indexing panels occurs in situations where it is desirable to remove only one article from a case containing a plurality of articles; the entire indexing panels must usually be removed and thereupon reinserted over the remaining articles when the case is reclosed. Additionally, inspection of the contents of the case is difficult without removing an indexing panel.

It is apparent that if the articles are not maintained in a substantially upright position, any stacking strength which the assembled case may possess is minimized, at least in the case where the article itself possesses some support strength. If the shipping case will not insure that the articles will remain in the upright position during transit, it becomes necessary to provide for reinforced and stronger wall panels in the package to provide the vertical stacking strength ordinarily required. Such a measure, of course, results in a more expensive package. It is also apparent that great damage can be done to the contents of the case upon subject ion to impact if the contents are thrown against each other or against the walls of the case.

It is a general object of this invention to provide an inexpensive and readily assembled case for shipping one or more articles in a substantially upright position and in spaced lateral relationship from each other and from the adjoining walls of the case.

It is another object of this invention to provide a shipping case wherein the strength of the articles contained therein is employed to provide enhanced stacking strength of the cases.

It is another object of this invention to provide a shipping case which effectively prevents lateral movement of the articles contained therein when the case is subjected to an impact.

It is another object of this invention to restrain the tops and bottoms of packaged articles against lateral movement upon impact by means of indexing panels which are not damaged upon subjection of the carton to impact thereby losing their effectiveness.

It is another object of this invention to restrain the tops and bottoms of the articles of the case against lateral movement by means of an apertured smooth nonabrasive surface whose apertures cannot be worn away and enlarged during transit.

It is another object of this invention to provide a shipping case which effectively minimizes disengagement of the articles from the top and bottom indexing means upon subjection of the case to impact.

It is a further object of this invention to provide flexible indexing panels which are readily disengaged from the article to permit removing one article at a time without the need for removing and then replacing an entire indexing panel.

These and other objects of this invention will be apparent to those skilled in the art from a complete reading of this specification and, in particular, the description of the preferred embodiments of this invention and drawings describing these preferred embodiments which are presented hereinbelow.

SUMMARY OF THE INVENTION

The advantageous features enumerated hereinabove are obtained by providing a shipping case which comprises a plurality of wall panels which are foldably interconnected to form a wall panel unit, with an end panel of this unit having foldably attached thereto a sealing flap which is affixed to the opposed end panel of the unit.

The bottom portion of the case comprises at least one external bottom panel which is foldably connected to a wall panel, and a base panel for supporting and indexing the articles to be packaged in the case. The base panel contains therein at least one projection rising in an upright direction from the plane of the base panel, the projection having any of a variety of configurations which are adapted to communicate with, and engage, at least a portion of the bottom section of the article to be packaged so as to index the articles in spaced lateral separation from adjoining articles and portions of the case and to effectively prevent any substantial lateral movement of the bottom section of the article relative to the base panel. There is also provided at least one internal bottom panel which is foldably connected to a wall panel; this internal bottom panel contains therein at least one aperture which is adapted to fit snugly over the projection of the base indexing panel to lock the base indexing panel in a sandwiched configuration between the external and internal bottom panels. It will be seen that this locking feature effectively eliminates the possibility of any substantial lateral movement of the bottom indexing panel when the carton is subject to impact thereby assuring maintenance of the desired spaced lateral relationship between the articles during transit.

The top portion of the carton comprises a top panel for indexing the upper portion of the articles in the carton, the top indexing panel containing therein at least one female recess projecting upwardly from the plane of the cover panel; this

recess is adapted to fit snugly over at least a portion of the top section of the article. There also is provided at least one internal top panel which is foldably connected to a wall panel and which contains therein at least a single aperture which is adapted to fit snugly over that portion of the female recess of the top indexing panel into which the top portion of the article is inserted. The case further comprises at least one external top panel which is foldably connected to a wall panel. The internal top panel is sandwiched between the cover indexing panel and the external top panel. It will be seen that the effect of the sandwich configuration is to effectively prevent any substantial lateral movement of the top indexing panel when the case is subjected to impact by locking the cover indexing panel firmly in position.

The shipping case of this invention can be modified in a variety of ways. For example, it can be provided with a rigid member which communicates with both the internal and external top panels and which functions to maintain the internal top panel apertures firmly emplaced over the female recesses of the cover indexing panel when the external top panels of the carton are sealed. This feature provides a downward pressure on the top indexing panel which insures that the female recesses of the top indexing panel remain firmly engaged with the top of the article and do not dislodge or separate from the top of the article upon subjection of the case to impact.

The shipping case of this invention can be employed to ship a plurality of articles either in a single layer or in a plurality of layers. Multilayer shipping cases are readily prepared by providing a separator layer assembly between each layer of articles. Typical separator layer assemblies are described in greater detail hereinbelow.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a blank of the wall, top, and bottom panels of a preferred embodiment of a shipping case of this invention.

FIG. 2 is a top view of a preferred embodiment of a cover indexing panel for engaging and indexing the tops of the articles to be packaged.

FIG. 3 is a top view of a preferred embodiment of a base panel for supporting and indexing the bottoms of the articles to be packaged.

FIGS. 4 and 5 are sectional views taken along lines 4—4 and 5—5 of FIGS. 2 and 3, respectively.

FIG. 6 is an exploded view in perspective of a preferred embodiment of a shipping case of this invention and illustrates fiber pirns as a typical article for packaging in the case.

FIGS. 7 and 8 are perspective views showing sequentially the assembly of the bottom portion of the carton and, in particular, the sandwiching of the bottom indexing panel between the internal and external bottom panels of the case.

FIGS. 9 to 11 are perspective views illustrating mounting of the pirns in the bottom of the case, placement of top indexing panel over the articles, closing and sealing of the internal and external top panels to thereby lock the top indexing panel in position.

FIGS. 12 and 13 are sectional views taken along the lines 12—12 and 13—13 of the assembled shipping case of FIG. 11.

FIG. 14 is a partial sectional view taken along the line 12—12 of FIG. 11 of the three panels comprising the bottom of the case and illustrates an embodiment of the case wherein the external and internal bottom panels are adhesively attached together through perforations in the bottom indexing panel.

FIGS. 15 through 17 are side sectional views of a mounted pirn of FIG. 11 and illustrate several embodiments of the bottom indexing panel.

FIG. 18 is a side sectional view of a mounted pirn of FIG. 11 and illustrates another embodiment of a cover indexing panel.

FIG. 19 is a partial exploded view in perspective illustrating an embodiment of a separator layer assembly used to separate adjoining layers of articles in a multilayered shipping case.

FIG. 20 is a sectional view of the assembled layer of FIG. 19 taken along the line 20—20 of FIG. 19.

FIG. 21 is a sectional view taken along the line 20—20 of FIG. 19 illustrating a second embodiment of the separator layer assembly of FIG. 19.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A preferred embodiment of the shipping case of this invention is conveniently prepared from three basic parts,

1. a single unit blank from which the external and internal bottom panels, the external and internal top panels, and the wall panels of the case are fabricated;
2. a top indexing panel; and
3 a bottom indexing and support panel.

The Shipping Case Blank

The single unit blank is shown in FIG. 1 whereas the separate bottom and top indexing panels are shown in FIGS. 3 and 2, respectively.

Referring to FIG. 1, it is seen that blank 30 comprises panels 31, 32, 33 and 34 which form a wall panel unit and which are foldably interconnected by means of hinges 35, 36 and 37, respectively. End panel 34 of the wall panel unit is provided with sealing flap 38 which is foldably connected to panel 34 by means of hinge 39. In the assembled case, flap 38 is affixed to the outer edge area 40 of opposed end panel 31 of the unit by means of staples, adhesive, glue or other adhesive means. It is seen that opposed wall panels 31 and 33 and 32 and 34 are of substantially the same width so as to provide an assembled shipping case of a substantially rectangular configuration. The dimensions of the wall panels are in no way significant although it is preferred that opposed wall panels have a substantially equal width.

External bottom panels 41 and 42 are foldably connected to opposed wall panels 31 and 33 by means of hinges 43 and 44, respectively. Apertured internal bottom panels 45 and 46 are foldably connected to opposed wall panels 32 and 34 by means of hinges 47*a* and 48, respectively.

It is seen that internal bottom panels 45 and 46 each contain therein a plurality of substantially evenly spaced circular apertures 47 aligned in two horizontal rows, which, as is more fully discussed hereinbelow, are adapted to fit snugly over the projecting female recesses of the bottom indexing panel. The shape, form, alignment or other configuration of apertures 47 is not significant since these factors are predicated upon the shape, form, alignment and such of the projections 72 extending upwardly from the bottom indexing panel which apertures 47 peripherally engage as made clear hereinbelow.

External top panels 48 and 49 are foldably connected to opposed wall panels 31 and 33 by means of hinges 50 and 51, respectively. Internal top panels 52 and 53 are foldably connected to opposed wall panels 32 and 34 by means of hinges 54 and 55, respectively. Internal top panels 52 and 53 contain a plurality of substantially evenly spaced circular apertures 56 aligned in two horizontal rows whose shape, form, alignment or other configuration are adapted to insure their insert about the periphery of the upwardly projecting female recesses of the top indexing panel as made clear hereinbelow.

Flaps 57 and 58 are foldably connected to internal top panels 52 and 53 by means of hinges 59 and 60, respectively. In the assembled shipping case, flaps 57 and 58 are folded towards the upper surface of panels 52 and 53 in order to provide communication between these upper surfaces and the bottom surfaces of external top panels 48 and 49. The function of flaps 57 and 58 will become clearer from the ensuring description.

The blank of FIG. 1 can be prepared from a variety of known packaging materials. It is preferably prepared from a single unit of die-cut corrugated board. The thickness of the blank is not significant and is ordinarily selected to provide the strength required for the envisioned use of the case.

The Bottom Indexing-Support Panel

The bottom indexing and support panel 70 is shown in FIGS. 3 and 5. Referring to these figures, it is seen that panel 70 comprises an essentially planar sheet 71 having a trans-

verse area adapted to fit snugly between the walls of the shipping case. Panel 70 contains thereon a plurality of substantially evenly spaced circularly shaped projections 72 in the form of a hollow cylindrical wall 73 rising vertically from the plane of sheet 71. The function of projections 72 is to communicate with, and snugly engage, the bottom portion 74 of the article 75 to be packaged as best seen in FIG. 5. The engagement between projection 72 and portion 74 of member 75 is sufficiently snug to eliminate any substantial lateral movement of portion 74 with respect to sheet 70. The geometric configuration of projection 72 may take any of a variety of forms provided that the form of the projection accomplishes the aforementioned function.

Referring to FIG. 5, it is seen that projection 72 is of a substantially cylindrical configuration and contains disposed therein a female recess 76 into which the bottom portion 74 of article 75 is snugly insertable. The dimensions and exact configuration of female recess 76 are determined by the dimensions and configuration of the bottom portion of the article to be shipped and which is to rest in recess 76. For example, the configuration of recess 76 can be rectangular, triangular, and square shaped in addition to the cylindrical configuration shown in FIGS. 3 and 5. The upper edges of wall 76 of projection 72 are provided with a slight bevel 77 to facilitate insertion and indexing of portion 74 of article 75 into recess 76.

A variety of other embodiments of projections 72 are shown in FIGS. 15 through 17. Referring to FIG. 15, it is seen that projection 72 comprises an external cylindrical wall 80 encompassing therein an internal cylindrical wall 81, walls 80 and 81 being in spaced relationship from one another to define an annular chamber 82 into which the bottom portion 83 of a cylindrical tubular article 84 is snugly insertable. The height of wall 81 is illustratively approximately one-third that of wall 80. However, the height of wall 81 could be greater, equal to, or less than that of wall 80.

Referring to FIG. 16, it is seen that projection 72 is in the form of a plug which comprises a cylindrical wall 90 containing disposed therein a hemispherical female recess 91 which snugly receives the bottom portion 92 of article 93.

Referring to FIG. 17, it is seen that projection 72 comprises a cylindrical male plug 100 which is snugly insertable into the hollow interior of the bottom portion 101 of article 102. In all of the projections 72 shown in FIGS. 15 through 17, it is desirable to provide a slight bevel 103 in areas of the walls of projections 72 which are adjacent to the bottom portion of the article to be mounted in order to facilitate mounting of the article onto projections 72.

The Top Indexing Panel

A preferred embodiment of a top indexing panel is shown in FIGS. 2 and 4, respectively. Referring to these figures, it is seen that top indexing panel 110 comprises a flat planar sheet 111 having a transverse area adapted to fit snugly between the walls of the assembled shipping case. Panel 110 contains disposed therein a plurality of substantially evenly spaced circular projections 112 extending vertically upward from the plane of sheet 111. The nature of an illustrative projection 112 is best shown in FIG. 4. Referring to FIG. 4, it is seen that projection 112 comprises a frustoconical wall portion 113 atop of which integrally attached a cylindrical wall member 114 containing disposed therein a recess 115 which defines a downwardly projecting male plug 116. The frustoconical and cylindrical wall portions 113 and 114 define a female recess 116*a* extending upwardly from sheet 111. The upper portion 117 of article 118 is snugly inserted into the female recess 116*a* of projection 112 engaging only the inner surfaces of the cylindrical wall 114. The frustoconical section 113 of projection 112 is provided as a means for effectively guiding panel 110 over the top portions 117 of article 118.

FIG. 18 depicts another embodiment of a top indexing panel for use with articles having an enlarged upper neck portion such as, for example, a whisky bottle. Referring to FIG. 18, it is seen that female recess 120 rising upwardly from sheet 111 is defined by a frustoconical wall section 121 on top of which is integrally attached an elongated cylindrical wall member 122. The upper portion 123 of article 124 is snugly insertable only into that portion of recess 120 defined by cylindrical wall member 122. Cylindrical wall member 122 can be provided with a slight taper (as shown in FIG. 18) to accommodate the taper of portion 123 of the article 124. Frustroconical wall member 121 again functions as a means for effectively guiding the placement of top indexing panel 110 on top of the articles 124 in assembling the case.

Bottom indexing panel 70 and top indexing panel 110 can be fabricated from a variety of known materials. However, they are preferably fabricated from a plastic material which will draw well on thermo-forming equipment, and which has a smooth surface so that any contact which may occur between indexing panels 70 and 110 and the articles in the shipping case will not cause abrasion or other damage to the articles. It is likewise preferred that the plastic be flexible and gives somewhat upon impact so as the to not cause shattering or cracking of the plastic upon subjection of the shipping case to impact.

A certain amount of clarity is also preferred to permit inspection, at a glance, of the contents of the case. Flexibility of the plastic is additionally preferred to permit one end of the top indexing panel to be peeled away so as to allow removal of a single article from the package without the necessity of removing the entire panel. Among the plastics which may be employed in preparing panels 70 and 110 are polyethylene, styrene, and polypropylene; polyethylene is a preferred fabrication material.

Assembly of the Case

At this point, it becomes convenient to discuss a convenient method for assembling the preferred embodiment of the case of this invention. FIG. 6 is an exploded view of a preferred embodiment of a partially assembled shipping case of this invention showing the packaging therein, in a single layer, of a plurality of typical fiber pirns 130 and the positioning of the bottom and top indexing panels 70 and 110.

The package is assembled by first forming the bottom layers of the package as most clearly shown in FIGS. 7 and 8 wherein, it should be noted, the case has been turned upside down from the view shown in FIG. 6 in order to more clearly detail the assembly of the bottom of the case. The first step in assembling the case is to crease hinges 35, 36 and 37 to thereby permit joining wall panels 31, 32, 33 and 34 together by means of flap 38, as heretofore discussed, to produce the basic case assembly shown in upside down position in FIG. 7.

Referring to FIG. 7, internal bottom panels 45 and 46 are thereupon folded inwardly in the direction of wall panels 32 and 33, respectively, to form a bottom panel plane wherein the edges 140 and 141 of panels 45 and 46 abut. Bottom indexing panel 70 is then placed onto abutting internal bottom panels 45 and 46 with projections 72 of panel 70 aligned with apertures 47 of panels 45 and 46. Panel 70 is pressed down against bottom panels 45 and 46 to insert projections 72 snugly into apertures 47, thereby locking bottom indexing panel 70 into internal bottom panels 45 and 46. External bottom panels 41 and 42 are then folded inwardly in the direction of wall panels 31 and 33, respectively, as shown most clearly in FIG. 8 to complete the assembly of the bottom of the shipping case. External bottom panels 41 and 42 are maintained in a closed position by placing a piece of tape 142 or other suitable adhesive means across their abutting edges as shown in FIG. 9.

In another embodiment shown in FIG. 14, sheet 71 of bottom indexing panel 70 can be provided with a plurality of apertures 125, the function of which is to permit internal bottom panel 45 and external bottom panel 48 to be adhesively joined by means of a dab 126 of adhesive or glue so as to even more firmly lock sheet 71 of bottom indexing panel 70 between the internal and external bottom panels. The shape, form, dimensions, number, and configuration of apertures 125 is not significant and can be varied to suit the needs of each shipping case.

The partially assembled case is then turned 180° into the upright position to rest the bottom on a support surface as shown in FIG. 9 for loading of the articles into the case. The articles to be packaged, in this case fiber pirns 130, are then mounted into projections 72 of bottom indexing panel 70 as shown in FIG. 9 and as more clearly shown in FIG. 5 until the case is filled with a layer of pirns. Top indexing panel 110 is then placed over the tops of the pirns as shown in FIG. 9 and pressed downwardly to firmly insert the top portion of the pirns, as best seen in FIG. 4, into that portion of female recess 116*a* defined by the cylindrical wall 114 of projection 112. It an be seen that frustoconical section 113 of projection 112 provides a convenient guide mechanism for readily and quickly inserting panel 110 onto the tops of the pirns.

Internal top panels 52 and 53 are then folded inwardly towards wall panels 32 and 34 until circular apertures 56 of panels 52 and 53 fit peripherally about the cylindrical wall 114 of projections 112 of top indexing panel 110, as shown in FIG. 10. The snug communication between the cylindrical periphery 114 of projection 112 and the periphery of apertures 56 of panels 52 and 53 locks top indexing panel 110 in a secure manner which prevents any substantial lateral movement of the panel upon subjection of the case to impact.

When internal top panels 52 and 53 have been fitted about the cylindrical walls 114 of projections 112, flaps 57 and 58 of panels 52 and 53 are folded outwardly in the direction of the outer surface of panels 52 and 53 along hinges 59 and 60, respectively, as shown in FIG. 10. External top panels 48 and 49 are then folded inwardly in the direction of wall panels 31 and 33 as shown in FIG. 11 and the case is sealed either by means of a fine layer of adhesive 143, glue, or other sealing means along the outer edge of panels 52 and 53 and/or by joining the abutting edges 144, 145 of panels 48 and 49 by tape 146 as shown in FIG. 11.

FIGS. 12 and 13 are longitudinal and transverse sectional views of the assembled case. Referring to theses figures, it can be seen how the apertures 47 and 56 in both the internal bottom and top panels function to peripherally enclose the projections 72 and 112 of both the bottom and top indexing panels 70 and 110 to effectively lock panels 70 and 110 in place and prevent any substantial movement in the event of impact.

Referring to FIG. 17, it is seen in the case where the lower portion 101 of article 102 fits over the periphery of the projection 72 instead of being inserted into the projection 72 as is the case in FIG. 16, that the apertures 47 in bottom panels 45 and 46 are dimensioned to provide an annular groove 150 between the inner periphery of apertures 47 and the outer periphery of projection 72 into which the bottom portion 101 of member 102 is inserted. In such a case, bottom indexing panel 70 is held into position by the combined restraining influences of bottom portion 101 of member 102 and apertures 47 of bottom panels 45 and 46 whereby lateral movement of bottom indexing panel 70 is effectively prevented.

The functions of flaps 57 and 58 of internal top panels 52 and 53 is best seen in FIG. 13. Flaps 57 and 58 each communicate with both internal top panels 52, 53 and external top panels 48, 49 while internal top panels 52, 53 directly communicate with top indexing panel 110. When external top panels 48 and 49 are sealed shut, a downward force is exerted by these panels which is transmitted through flaps 57 and 58 to internal top panels 52 and 53 which in turn transmit this force to adjacent top indexing panel 110 to assure the continued engagement of female recesses 116*a* of projections 112 of panel 110 with the tops of the packaged pirns. This feature minimizes disengagement of top indexing panel 110 from the tops of the pirns during shipment when the case is subjected to impact.

Multilayered Shipping Cases

The shipping cases of this invention are adaptable for packaging a plurality of articles in a plurality of adjoining layers. In such a case, the blank used is identical in all respects to that already described except that wall panels 31, 32, 33, and 34 are of extended length to accommodate whatever case height is necessitated by the plurality of layers of articles present therein. In a multilayered shipping case, the bottoms of the articles comprising the bottom layer of the case are mounted on bottom indexing panel 70 in a manner similar to that already described. However, it becomes necessary to provide a separator layer assembly between each adjoining layer as the additional layers are added. In general, such an assembly consists of a multitiered layer which comprises a top indexing panel, as heretofore described, engaging the tops of the articles of the bottom layer, an apertured first separator pad on top of the top indexing panel with the apertures peripherally circumscribing the upright female recesses of the top indexing panel, a bottom indexing panel as heretofore described resting atop the first separator pad containing upright projections to engage the bottoms of the adjoining upper layer of articles, and an apertured second separator pad on top of the bottom indexing panel whose apertures peripherally circumscribe the projections of the bottom indexing panel. The tops of the articles comprising the uppermost layer of the case are secured in the manner heretofore discussed for single layered cases. If more than two layers of articles are contemplated, the number of such separator assemblies required in the finished case is one less than the number of layers of articles in the case.

An exploded view of a preferred embodiment of a separator layer assembly is shown in FIG. 19 with FIG. 20 showing a sectional view of the assembled separator layer. Referring to these Figures, the separator layer assembly comprises to top layer indexing panel 160 which is substantially identical to panel 110 and which fits over the tops of the pirns 161 which make up the lower layer of the case in the manner shown in FIG. 4. Resting atop top indexing panel 160 is a first separator panel 162 containing a plurality of circular apertures 163 which fit about the periphery of the projections 164 arising from top indexing panel 160 in a manner similar to that discussed hereinabove with respect to internal top panels 52 and 53. Resting atop apertured first separator layer 162 is a second separator panel 165. The inclusion of panel 165 is preferred but is optional. Resting on top of panel 165 is bottom indexing panel 166 which is substantially identical to bottom indexing panel 70 already described. Projections 167 rise upwardly from panel 166 to receive and support the bottoms of pirns 168 which form the upper layer, in a manner substantially identical to that shown in FIG. 5. Resting on top of bottom indexing panel 166 is a third separator layer 169 containing therein a plurality of circular apertures 170 which peripherally circumscribe projections 167 of panel 166 in a manner similar to that discussed hereinabove with respect to internal bottom panels 45 and 46. Once the uppermost layer of pirns is mounted on bottom indexing panel 166 of the separator layer assembly, the top of the package is formed, closed, and sealed in a manner substantially identical to that already described hereinabove and shown in FIGS. 9 through 11.

FIG. 21 shows another embodiment of a separator layer assembly which is substantially the same as that shown in FIGS. 19 and 20 except that the three separator layers 162, 165, and 169 are foldably interconnected along hinges 171 and 172 to form an integral unit.

The specific embodiments and structure shown therein by way of example are illustrative only and such modifications and alterations thereof as would be suggested to those skilled in the art are contemplated to fall within the scope and spirit of the claims appended hereto.

What is claimed is:

1. A case for the shipment of an article in a substantially upright position and in spaced lateral separation from adjoining articles and portions of said case, comprising:

1. A plurality of wall panels, said wall panels foldably interconnected to form a wall panel unit, an end panel of said unit being affixed to the opposed end panel of said unit;

2. at least one external bottom panel foldably connected to a wall panel;

3. a bottom indexing and support panel, said indexing bottom panel having at least one projection rising in an upright direction from said panel, said projection adapted to engage at least a portion of the bottom of said article so as to prevent any substantial lateral movement of the bottom of said article relative to said bottom indexing panel;
4. at least one internal bottom panel foldably connected to a wall panel, said internal bottom panel containing therein at least one aperture which is adapted to peripherally circumscribe the projection of said bottom indexing panel, said bottom indexing panel being sandwiched between said external and said internal bottom panels.
5. a top indexing panel containing therein at least one female recess projecting in a substantially upright direction from said top indexing panel, said recess adapted to peripherally circumscribe at least a portion of the top of said article;
6. at least one internal top panel foldably connected to a wall panel, said internal top panel containing therein at least a single aperture which is adapted to peripherally circumscribe the portion of said female recess into which said portion of the top of said article is inserted; and
7. at least one external top panel foldably connected to a wall panel, said internal top panel being sandwiched between said top indexing panel and said external top panel.

2. The case of claim **1** wherein said bottom indexing and support panel and said top indexing panel are fabricated from a thermoformed plastic material.

3. The case of claim **2** wherein said plastic material is polyethylene.

4. The case of claim **1** wherein said bottom indexing and support panel contains a plurality of said projections and wherein said top indexing panel contains a plurality of female recesses, and wherein said internal bottom panel and internal top panel contain a plurality of apertures corresponding, respectively, to the number of said projections and female recesses.

5. The case of claim **1** wherein said projection comprises an outer cylindrical wall and an inner cylindrical wall disposed within said outer wall to define a circumferential groove between said inner and outer cylindrical walls into which the bottom of the article is insertable.

6. The case of claim **1** wherein said projection comprises a cylindrical plug which provides a male plug for insertion into the bottom of the article.

7. The case of claim **6** wherein the aperture of said internal bottom panel is dimensioned to provide an annular groove between the periphery of the plug and the periphery of the aperture, the bottom of the article being insertable into said groove.

8. The case of claim **1** wherein said projection comprises a plug having disposed therein a recess of hemispherical configuration into which the bottom of the article is insertable.

9. The case of claim **1** wherein said bottom indexing and support panel contains therein at least one aperture to provide communication between the internal and external bottom panels.

10. The case of claim **9** wherein internal and external bottom panels are attached to each other by an adhesive disposed in said aperture of said bottom indexing and support panel.

11. The case of claim **1** wherein said case contains a plurality of internal and external top panels and a plurality of internal and external bottom panels.

12. The case of claim **1** further including a flap foldably connected to the internal top panel, said flap being folded onto the upper surface of said internal top panel to provide communication between the internal and external top panels.

13. The case of claim **11** further including a plurality of flaps each foldably connected to an internal top panel, each of said flaps being folded onto the upper surface of an internal top panel to provide communication between the internal and external top panels.

14. The case of claim **1** wherein a plurality of layers of packaged articles are employed further including a separator layer assembly disposed between adjacent layers of articles, said assembly comprising:

a. a top indexing panel containing therein at least one female recess projecting in a substantially upright direction from said top indexing panel, said recess adapted to peripherally circumscribe at least a portion of the top section of an article in a first lower layer of the case;
b. a first separator panel containing therein at least a single aperture adapted to peripherally circumscribe the portion of said female recess of (a) into which said portion of the top section of said article in the lower layer is inserted, panel (b) resting atop panel (a);
c. a bottom indexing and support panel resting atop said first separator panel, said bottom support panel having at least one projection rising in an upright direction from said bottom support panel, said projection adapted to engage at least a portion of the bottom of an article in a second upper layer in the case so as to prevent any substantial lateral movement of the bottom of the article relative to said panel (c), said second upper layer being vertically disposed above said first lower layer; and
d. a second separator panel containing therein at least a single aperture adapted to peripherally circumscribe the projections of said bottom indexing panel (c), said panel (c) being sandwiched between said first and second separator panels.

15. The case of claim **14** wherein said bottom indexing and support panel (c) contains a plurality of projections and wherein said top indexing panel (a) contains a plurality of female recesses, and wherein the first and second separator panels contain a plurality of apertures corresponding, respectively, to the number of said female recesses and projections.

16. The case of claim **14** wherein said panels (a) and (c) are fabricated from a thermoformed plastic material.

17. The case of claim **14** wherein said first and second separator panels are foldably interconnected.

18. The case of claim **14** further including a third separator panel sandwiched between said first separator panel and said bottom indexing and support panel (c).

19. The case of claim **18** wherein said first, second, and third separator panels are foldably interconnected.

20. A shipping case for the shipment of an article in a substantially upright position and in spaced lateral separation from adjoining articles and portions of said case, comprising:

1. four wall panels foldably interconnected to form a wall panel unit, an end panel of said unit having foldably attached thereto a sealing flap which is affixed to the opposed end panel of said unit;
2. a pair of external bottom panels foldably connected to opposed wall panels;
3. a bottom indexing and support panel containing therein a plurality of substantially uniformly spaced projections rising in an upright direction from said panel, each of said projections containing disposed therein a recess adapted to engage at least a portion of the bottom section of said article so as to prevent any substantial lateral movement of said article relative to said bottom indexing and support panel.
4. a pair of internal bottom panels foldably connected to opposed wall panels, each of said panels containing therein a plurality of substantially uniformly spaced apertures, said apertures adapted to fit around the periphery of the projections of the bottom article indexing panel, said bottom article indexing panel being sandwiched between said external and said internal bottom panels;
5. a top indexing panel containing therein a plurality of substantially uniformly spaced female recesses projecting upwardly from said top indexing panel, said recesses adapted to peripherally circumscribe at least a portion of the top section of said article;

6. a pair of internal top panels foldably connected to opposed wall panels, said internal top panels each containing therein a plurality of substantially evenly spaced apertures adapted to peripherally circumscribe said portions of said female recesses into which said portion of said top section of said article is inserted; and
7. a pair of external top panels foldably connected to opposed wall panels, said internal top panels being sandwiched between said top panel and said external top panels.

21. The case of claim **20** wherein the bottom indexing and support panel and the top indexing panel are flexible and are fabricated from polyethylene.

22. The case of claim **20** wherein a plurality of layers of packaged articles are employed, said case further including a separator layer assembly disposed between adjacent layers of articles, said assembly comprising:

a. a top indexing panel containing therein at least one female recess projecting in an upright direction, said recess adapted to peripherally circumscribe at least a portion of the top section of an article of a first lower layer in the case;
b. a first separator panel containing therein at least a single aperture adapted to peripherally circumscribe the portion of the female recess of (a) into which said portion of the top section of the articles in said lower layer is inserted;
c. a bottom indexing and support panel resting atop said first separator panel, said bottom support panel having at least one projection rising in an upright direction from said bottom support panel, said projection being adapted to engage at least a portion of the bottom section of an article in a second upper layer in the case, said second upper layer being vertically disposed above said first lower layer, so as to prevent any substantial lateral movement of the bottom of said article relative to said bottom indexing and support panel; and
d. a second separator panel containing therein at least a single aperture adapted to fit over the projections of said bottom indexing panel (c), said panel (c) being sandwiched between said first and second separator panels.

23. THe case of claim **22** further including a third separator panel sandwiched between said first separator panel and said bottom indexing and support panel (c).

24. The case of claim **22** wherein panels (a) and (c) are fabricated form a plastic material.

25. The case of claim **24** wherein said plastic material is polyethylene.

26. The case of claim **22** wherein said panel (a) contains a plurality of substantially uniformly spaced female recesses and panel (c) contains a plurality of substantially uniformly spaced projections and wherein said first and second separator panels each contain a plurality of apertures corresponding, respectively, to the number of said female recesses and projections.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,624,776 Dated November 30, 1971

Inventor(s) Robert Louis Gordon

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

Col. 4, line 65, "ensuring" should be -- ensuing --;

Col. 6, line 18, delete "the" before "to";

Col. 7, line 12, "an" should be -- can --;

Col. 8, line 29, "to" after "comprises" should be -- a --;

Col. 11, line 9, "top panel" (first occurrence) should be -- top indexing panel --.

Signed and sealed this 18th day of July 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

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