July 26, 1960 M. I. WILLIAMSON 2,946,436

MULTICELLULAR FOLDING BOX STRUCTURES

Filed July 19, 1957 3 Sheets-Sheet 1

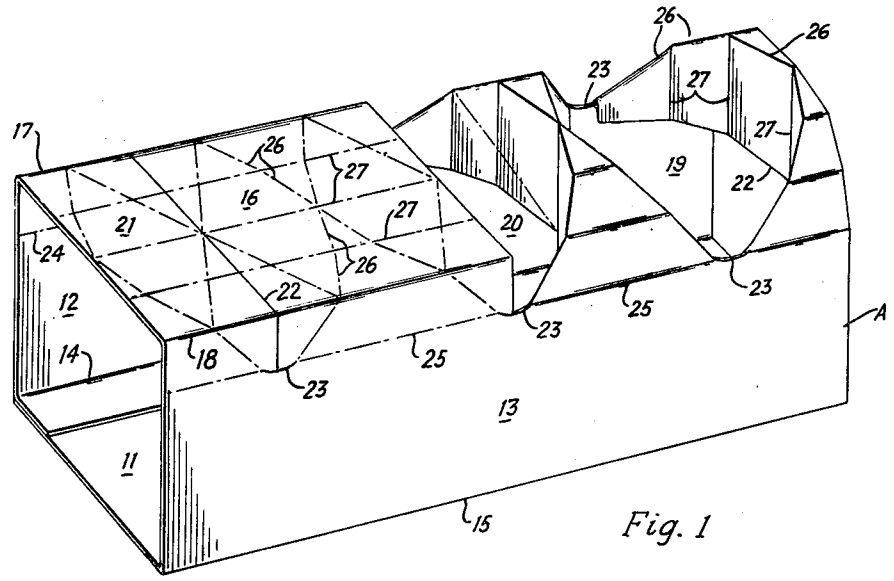


Fig. 1

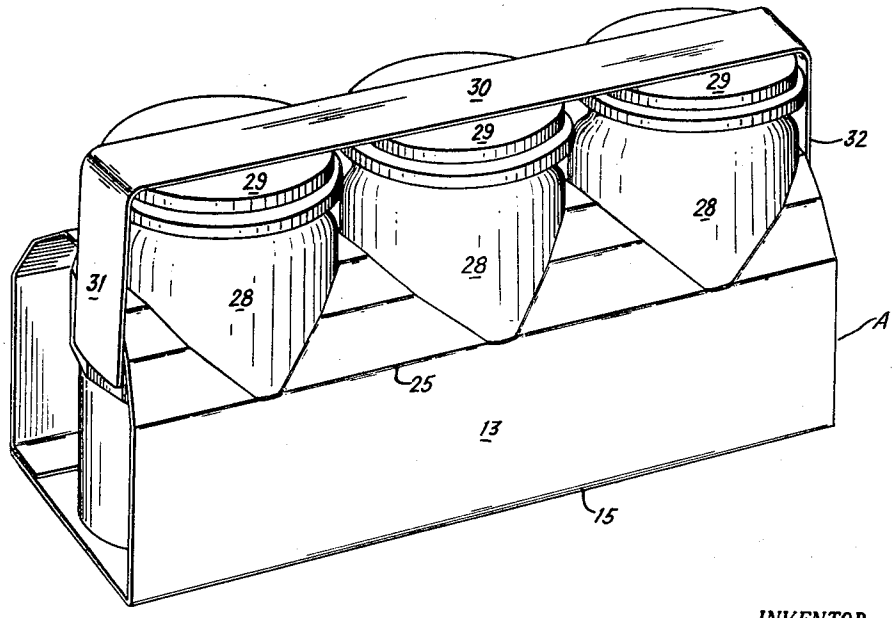


Fig. 2

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3 Sheets-Sheet 2

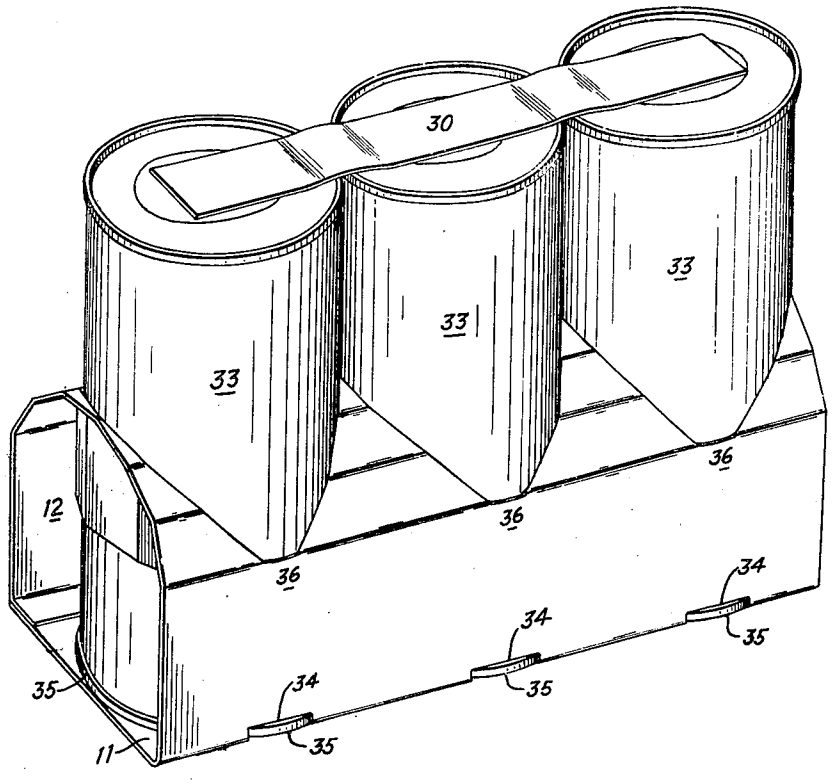


Fig. 3

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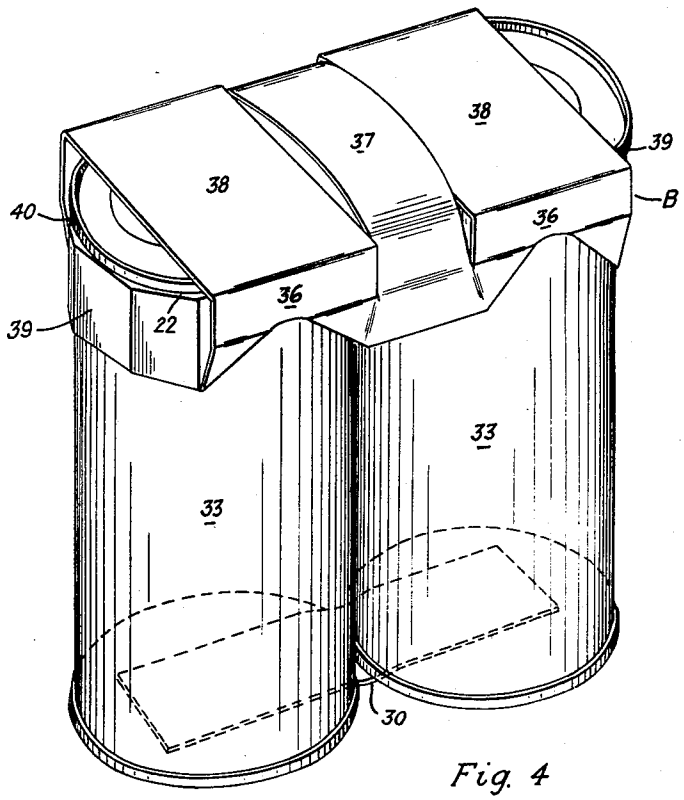


Fig. 4

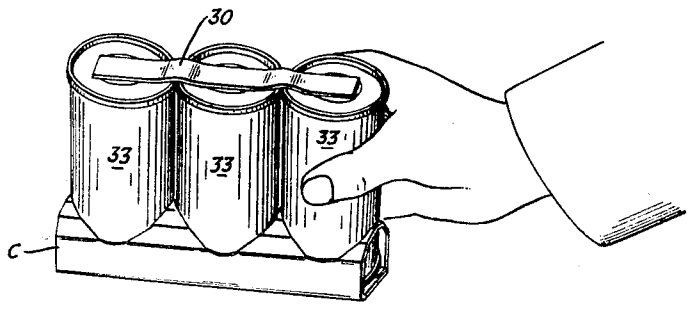


Fig. 5

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MULTICELLULAR FOLDING BOX STRUCTURES

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Filed July 19, 1957, Ser. No. 672,973

6 Claims. (Cl. 206—65)

This invention relates to the art of multiple packaging of receptacles, such as cans or jars for convenience of handling a plurality of receptacles as a single unit or for the purpose of displaying and selling a plurality of receptacles as a unit. The packaged items may be identical, for example, they may be cans of a beverage or jars of baby food, or preserves, or the packaged items may be dissimilar, as in the case of combination sales. A combination of receptacles containing dry and liquid cleaning agents may serve as an example of the latter.

Multicellular folding box structures lend themselves admirably to the packaging of a plurality of cans, jars, or other articles of merchandise as a single unit, and specific forms of multicellular structures have been or are being proposed for locking the articles of merchandise within the multicellular paperboard structure.

The use of multicellular paperboard structures occasionally presents packaging problems arising from the weight, size, or shape of the packaged articles. For example, the packaged receptacles or articles may be relatively tall and the multicellular structure be relatively shallow so that the receptacles protrude a substantial distance from the combining multicellular box structure. In such a case the protruding ends of the receptacles may not be sufficiently well supported to prevent separation, or even damage to the multicellular box structure if the entire package is picked up by the endmost receptacle, for example.

There are also instances where it is difficult, if not impossible, to lock the receptacles within the multicellular structure. Whereas chime-end cans lends themselves readily to locking within the paperboard structure because of the presence of the chime-ends, there are other forms of cans which do not have chime-ends, evaporated milk cans being an example of cans which are not as readily locked within a multicellular box as are chime-end cans. Glass jars present a similar problem.

Multiple packages are occasionally subjected to extraordinary forms of handling. For example, they may be laid on the side or even be inverted. Packages including a multicellular structure engaging the tops of the receptacles so as to form a carrier may not be lifted up by the handle or carrying means expressly provided, but a row of relatively heavy cans, for example, may be picked up and handled by one end can and thereafter be held sideways or even upside down in a way in which the multicellular paperboard structure is subjected to extraordinary stress and danger of tearing.

The invention provides improvements by which such difficulties are eliminated. The invention permits receptacles to be securely held within multicellular box structures irrespective of their shape. Also the separation of the protruding ends of the receptacles is prevented and the receptacles inserted into the cells of the box structure are interconnected so as to prevent withdrawal of individual receptacles, it being optional whether the receptacles are additionally locked or otherwise secured to the multicellular paper box structure. The invention further provides means for reinforcing multicellular folding box

structures of the type in which the cell apertures extend into the side walls in the form of a V-shaped opening, the reinforcement being such that the V portion is relieved from stress tending to tear the V at its vertex.

The various objects, features and advantages of the invention will appear more fully from the detailed description which follows accompanied by drawings showing, for the purpose of illustration, several applications of the invention. The invention also resides in certain new and original features of construction and a combination of elements hereinafter set forth and claimed.

Although the characteristic features of the invention which are believed to be novel will be particularly pointed out in the claims appended thereto, the invention itself, its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part of it, in which:

Figure 1 is a perspective view of the representative form of multicellular paper box structure forming an element of the invention, the structure being shown partially completed;

Figure 2 illustrates the application of the invention to the multicellular structure of Figure 1 loaded with jars;

Figure 3 is a perspective view of a multicellular paperboard structure containing cans;

Figure 4 is a perspective view illustrating the application of the invention to a cellular two-can carrier; and

Figure 5 is a perspective view illustrating the advantages of the invention applied to a cellular three-can carrier which is being subjected to extraordinary stress.

In the following description and in the claims various details will be identified by specific names for convenience. The names, however, are intended to be generic in their application. Corresponding reference characters refer to corresponding parts in the several figures of the drawings.

The drawings accompanying, and forming part of, this specification disclose certain specific details of the invention for the purpose of explanation of its boarder aspects, but it is understood that the details may be modified in various respects without departure from the principles of the invention and that the invention may be applied to other structures than the ones shown.

Figure 1 illustrates a representative form of a multicellular folding box structure A comprising a main panel **11** to which side walls **12** and **13** are articulated along main fold lines **14** and **15**. A cell panel **16** is articulated to the side walls along fold lines **17** and **18**.

Article-receiving cell apertures are formed in the cell panel, cell **19** being shown completed, the cell aperture **20** being shown half completed. A portion of the cell panel prior to the formation of the cell aperture is shown at **21**.

The detailed construction of the cellular apertures is optional, there being various ways of of constructing them. All such constructions are basically characterized by deflection of portions of the originally flat cell panel into a new position in which the deflected portions form cell walls extending substantially normal with respect to the main panel of the box structure.

Figure 1 illustrates structural details of a preferred form of construction disclosed in my co-pending application Serial No. 672,907, filed July 19, 1957.

The illustrated form of construction comprises a plurality of cell cuts **22** extending across the cell panel into the body of the side walls **12** and **13**, where the cell cuts terminate at transverse side cuts **23** whose ends lie on intermediate folding scores **24** and **25**. The cell panel **16** is traversed by a network **26** of folding scores defining areas of polygonal outline about the cell cuts **22**. These folding scores become the mouth of the respective open cell structure, as seen at the right hand portion

of Figure 1. Other longitudinal fold lines 27 form corners in the resulting polygonal cells.

The formation of the cells is self-evident from Figure 1. The portions of the cell panel immediately adjacent the cell cuts 22 are flexed downwardly, whereafter these portions assume a position substantially normal to the main panel 11, ready for the insertion of merchandise.

It will be noted that the formation of the open cells involves the formation of an upwardly arched web structure, accompanied by a drawing together of the fold lines 17 and 18. The top portions of the side walls lying between the intermediate folding scores 24, 25 and the fold lines 17, 18 become part of the arched web structure whose panels are inclined with respect to the lower portions of the side walls 12 and 13.

Figure 2 shows the completed multicellular box structure after insertion of glass jars 28 into the cells. The jars are closed by conventional friction caps 29. The illustrated unit represents a combination of three jars for handling and sale as a single entity.

During shipment, handling in the stores, subsequent sale and placement into the customer's shopping bag, the combination package may be subjected to conditions tending to displace the jars from the cell apertures. For example, the combination package may be put on its side, upended, turned upside down, grasped by a jar top instead of by the multicellular box structure, all of which would tend to disturb the position of the jars 28.

A strip 30 of sheet material, for convenience hereinafter referred to as a "tape," is adhesively secured to the tops 29 of the jars, connecting the three jars along their top portions to supplement the engagement of their bottom portions by the multicellular box structure. As a result, the central jar cannot be removed without pulling the other two jars from their respective cells. For the same reason the jars cannot be laterally displaced, either in the direction towards or away from an adjacent jar, nor at right angles thereto.

The tape 30 is preferably made long enough to permit its ends 31 and 32 to be adhesively secured to the endmost web structures of the folding box. So secured the combination package may be upended, turned upside down, handled by one of the packaged jars without disturbing the arrangement shown in Figure 2.

Assuming that the jars are relatively tall and that the paper box structure is relatively short, so that the jars project a substantial distance above the cell panel, it is conceivable that the jars may be shaken into glass-to-glass contact during transport, leading to chipping or cracking. Such damage is normally prevented by making the multicellular box structure sufficiently tall.

Interconnection of the tops of the jars by the tape 30 effectively prevents rattling and glass-to-glass contact and permits the height of the cellular box structure to be kept low, resulting in a saving of stock.

Figure 3 illustrates the multicellular structure A of Figure 1 containing three chime-end cans 33. The multicellular box structure has cell apertures grasping the cylindrical wall of the cans snugly, and chime-grasping apertures 34 are shown in the side walls immediately above the main panel 11 for grasping and locking the bottom chimes 35 of the can, thereby locking the cans in the box and preventing accidental withdrawal of individual cans.

The tops of the cans are interconnected by a tape 30 adhesively secured to the can tops, thereby locking the top ends of the can together to supplement the gripping action of the multicellular box structure on the bottom ends. It is a preferred practice to sell canned beverages in units of three or six. The beverages are delivered to the stores and displayed in the form shown in Figure 3. Customers or store clerks are tempted to handle the units by one end can in a manner similar to that illustrated in Figure 5, later to be described. Such handling puts an abnormal stress on the end portions of the paperboard structure tending to tear the V-shaped base 36 in the side walls. Such damage may be prevented by making the paperboard structure of considerably heavier caliper, which would also increase its cost. The inventive arrangement prevents the endmost can from being pulled away from the center can by means of the tape 30 which distributes the lifting force equally over the three cans and the three cells. The multicellular box structure supplemented by the tape may be made of relatively light stock since the tape effectively prevents damage to the package unit. The package may be laid on its side, upended, or be turned upside down without danger of removal of individual cans. Furthermore, the tape 30 acts as a safety device in the event a can becomes accidentally disengaged from the chime-locking aperture.

Figure 4 shows the invention in its application to a chime-locking two-can carrier B, having a central handle 37 in the top panel 38. The endmost webs form straps 39, whose top edges 22 engage the underside of the top chimes 40.

Referring to Figure 1, it is seen that the cell cut 22 produces two cut edges at the bottoms of opposite cell walls. The multicellular structure may be so dimensioned that the edges 22 in the formed cell structure are evenly spaced from the top panel 38 by a distance substantially equal to the axial dimensions of the can chimes. As a result the chimes are locked by the cut edges along the entire circumference of the can. Details of such construction are disclosed in my co-pending application, Serial No. 672,907, filed July 19, 1957.

Two-can carries are favored for cans having a volumetric capacity of one quart or more. As a result, the combination package is relatively heavy, each can weighing more than two pounds. If the multicellular structure B is relatively shallow, and the cans 33 are relatively tall, it is readily seen that improper handling of the carrier may result in damage to the paperboard structure. The carrier is designed to support the two cans safely if lifted up by its carrying strap 37. If, however, the carrier is inverted and handled in a manner similar to that shown in Figure 5, the heavy second can tends to pull away from the can held in the hand, subjecting the paperboard structure to abnormal stress at the points 36. The tape 30 applied to the bottom ends of the cans prevents such stress and damage. Also, the tape prevents lateral displacement of the cans in a direction substantially normal to that shown in Figure 5. This would occur if the combination package resting on its side is picked up by one can. The tape 30 permits such handling without danger of damage or disengagement of the cans from the locking edges 22.

Figure 5 shows a combination package comprising a relatively shallow 3-can carrier C in upside down position. The three cans 33 are connected by a tape 30 along their bottom surfaces. The combination package may be arranged in upside down position for stacking purposes, it being conventional in grocery stores to arrange beverages in the form of pyramids. The danger of damaging multicellular paperboard carriers by the illustrated manner of handling is increased in proportion to the number of cans in the carrier which leads to added leverage.

Tests have shown that shallow carriers of the type illustrated at C may safely be handled in the illustrated manner if the protruding ends of the cans are secured against displacement by a strap 30, supplementing the grip exerted by the paperboard structure on the opposite ends of the cans and distributing the lifting force over all cans.

The tape 30 may consist of kraft stock or it may consist of regenerated cellulose or other synthetic sheet material. The adhesive may be of the pressure-sensitive

type or it may be of the heat-sensitized type. Conventional adhesive compositions of the type used in the manufacture of paperboard boxes may also be used.

The application of the tape does not in any way interfere with the forming, loading, and subsequent packaging of the multicellular structures and may therefore be employed without major changes in existing box forming, box loading and packaging equipment.

What is claimed is:

1. A mechandise package unit of cans, jars, and similar receptacles, the package comprising, a plurality of receptacles of a certain height arranged in line; a multicellular box of paperboard of a lesser height than said receptacles engaging one end of said receptacles, the other end of said receptacles protruding from said box, said box comprising, a pair of opposite side walls, a main panel between, and articulated to, said side walls against which main panel said receptacles bear with one end, and a cell panel spaced from said main panel and articulated to said side walls, said cell panel being cut transversely to the side walls by spaced cuts, portions of the cell panel adjacent said cuts being deflected into a position substantially normal with respect to said main panel to form cell walls engaging the sides of said receptacles, thereby preventing separation of the inserted one ends of the receptacles; and a tape extending over, and adhesively secured to, the protruding other ends of said receptacles for securing said receptacles to one another at their other ends, thereby preventing separation and fanning out of the other ends, when the package is handled by gripping one of said protruding receptacles.

2. A mechandise package unit of cans, jars, and similar receptacles, the package comprising, a plurality of receptacles of a certain height arranged in line; a multicellular box of paperboard of a lesser height than said receptacles engaging one end of said receptacles, the other end of said receptacles protruding from said box, said box comprising, a pair of opposite side walls, a main panel between, and articulated to, said side walls against which main panel said receptacles bear with one end, and a cell panel spaced from said main panel and articulated to said side walls, said cell panel being cut transversely to the side walls by spaced cuts, portions of the cell panel adjacent said cuts being deflected into a position substantially normal with respect to said main panel to form cell walls peripherally engaging the sides of said receptacles, thereby preventing separation of the inserted one ends of the receptacles; and a tape extending over, and adhesively secured to, the protruding other ends of the receptacles for securing said receptacles to one another at their other ends, thereby preventing separation and fanning out of the other ends when the package is handled by gripping one of said protruding receptacles, the ends of the tape being adhesively secured to the endmost cell walls, thereby additionally preventing withdrawal of the receptacles from said box.

3. A merchandise package unit according to claim 2 of a plurality of jars arranged in line, and sealed by jar tops, in which package the jars rest on said main panel with the jar bottoms, and in which the said tape extends across the jar tops and is adhesively secured to the walls of the endmost jars above the endmost cell walls to which the ends of the tape are secured.

4. A merchandise unit of chime-end cans, the package comprising, a plurality of chime-end cans of a certain height arranged in line; a multicellular box of paperboard of a lesser height than said cans engaging one end of said cans inserted into said box, the other end of the cans protruding therefrom, said box comprising, a pair of opposite side walls, a main panel between, and articulated to, said side walls against which main panel said cans bear with the inserted chime-end, and a cell panel spaced from said main panel and articulated to said side walls, said cell panel being cut transversely to said side walls by spaced cuts, portions of the cell panel adjacent said cuts being deflected into a position substantially normal

with respect to said main panel to form cell walls engaging the sides of said cans, the edges of said cuts engaging the chime of the inserted end of the can and locking it against withdrawal; and a tape extending over, and adhesively securel to, the protruding other chime-end of the cans to prevent separation and fanning out of the other ends, thereby preventing splitting of the box, if the package is picked up by one can.

5. A merchandise package unit of chime-end cans, the package comprising, in combination, a multicellular box of paperboard, said box comprising, a pair of opposite side walls, a base panel articulated to said side walls along parallel base fold lines, a cell panel articulated to said side walls along two parallel main fold lines, each side wall having an intermediate folding score extending across it parallel to, and between, the respective base and main fold line, said cell panel having spaced substantially parallel cell cuts in it extending at right angles to, across, and beyond said main fold lines into the body of said side walls, at least as far as said intermediate folding scores, said main panel further comprising peripheral folding scores forming polygons bisected by said cell cuts, said polygons including sides extending from said intermediate folding score at angles of 45 degrees with respect to said intermediate folding score, said last-named sides forming two opposite slanted sides of a trapezoid of which the intermediate folding score and the main fold line form the two other parallel sides, further sides of the polygon defining opposite substantially triangular cell panel portions having the top of the trapezoid as a base, and being inclined with respect to the planes of the trapezoid, the cell panel portion between each transverse cell cut and the respective portion of the polygon subtended by said cell cut being folded into substantially normal position with respect to said base panel, thereby forming cell walls whose bottom edge, formed by said cell cuts, is substantially equidistant from said base panel, the distance being of the order of the thickness of the can-chime; chime-end cans inserted with one end into said cells and protruding with the other end from said cells, and bearing with the one end against said base panel, the inserted chime being engaged by said bottom edge; and a tape extending over, and adhesively secured to, the opposite protruding chime-ends of the cans to prevent separation and fanning out of the other ends and tearing of the cellular box, if the package is picked up by one can.

6. A merchandise package unit of chime-end cans, the package comprising, in combination, a can-top gripping carrier of paperboard comprising a pair of opposite side walls, a top panel between, and articulated to, said side walls along parallel top fold lines, a cell panel between, and articulated to, said side walls along parallel main fold lines, said cell panel having parallel cell cuts through it extending at right angles to, across, and beyond said main fold lines into the body of the side walls, said cell cuts dividing the said cell into two marginal portions and an intermediate portion, said side walls having side cuts in them extending from, and substantially transverse to, the ends of said cell cuts, the ends of the side cuts marking apex points approximately midway between said top and main fold lines, the distance of the apex points to the proximate cell cut being at least one-sixteenth of an inch less than the distance from the apex point to the proximate top fold line, said side walls further including diagonal scores extending from said apex points in a direction of 45 degrees with respect to said main fold line towards said main fold line and in a direction away from the respective cell cut, the intersection of the diagonal scores with the main fold lines within the intermediate portion marking base points, the cell panel further including cell scores defining opposite substantially triangular main panel areas having the respective portion of the main fold line between said base points as a base, the cell panel also including a plurality of spaced parallel main scores extending parallel to, and between, said main fold lines,

the stock of the cell panel to either side of the said cell cuts being folded into a position substantially upright with respect to said top panel in which position they form polygonal cell walls; chime-end cans in said carrier, said cans being inserted with one end into said carrier and protruding with the other end from said carrier and being circumferentially held by said cell walls in a position in which the edges formed by said cell cuts engage the inserted can-chime locking the can against withdrawal, said top panel having cuts in its central portion through which cuts fingers may be inserted to lift the package; and a tape extending over, and adhesively secured to, the protruding other chime-ends of the cans to prevent fanning out and separation of the other ends if the package unit is picked up by one can.

References Cited in the file of this patent

UNITED STATES PATENTS

2,605,897	Rundle	Aug. 5, 1952
2,694,488	Crane	Nov. 16, 1954
2,717,115	Vines	Sept. 6, 1955
2,764,284	Arneson	Sept. 25, 1956
2,765,073	Murray	Oct. 2, 1956
2,901,157	Williamson	Aug. 25, 1959