United States Patent

[11] 3,599,822

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Chagrin Falls, Ohio

[54] KNOCKDOWN CONTAINER
13 Claims, 35 Drawing Figs.

[52] U.S. Cl. 217/12, 217/65
[51] Int. Cl. B65d 9/34
[50] Field of Search ..... 35/72; 217/65, 69, 12; 206/DIG. 18; 220/4, 6; 229/49, 45, 48 SB; 46/31, 25

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Primary Examiner—Raphael H. Schwartz
Attorney—Baldwin, Egan, Walling & Fetzer

ABSTRACT: An economical knockdown reusable container for use as a shipping and/or storage container which is rigid in assembled form and when disassembled can be collapsed into a flat return package, comprising separable end, side, bottom and top wall panels formed of low cost materials. The wall panels are uniformly recessed along predetermined portions of their peripheries for forming an interlocking relationship between the panels to aid in maintaining a rigid assembly. In certain embodiments high strength pressure sensitive tape sections are used for positively holding the wall panels of the assembled container together, and in some embodiments, certain of the panels have bracket means thereon for aiding in the assembly of the panels and for maintenance of the assembled container.

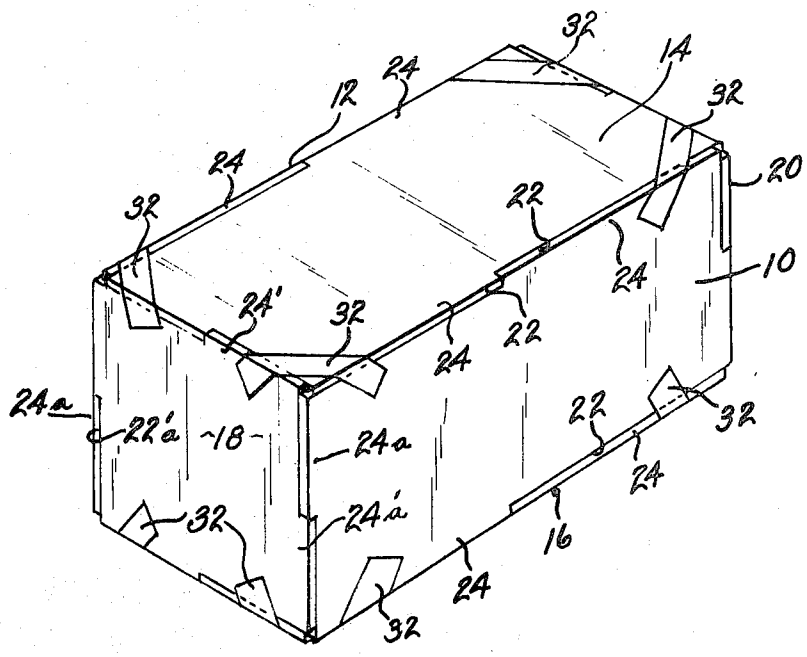


FIG. 1

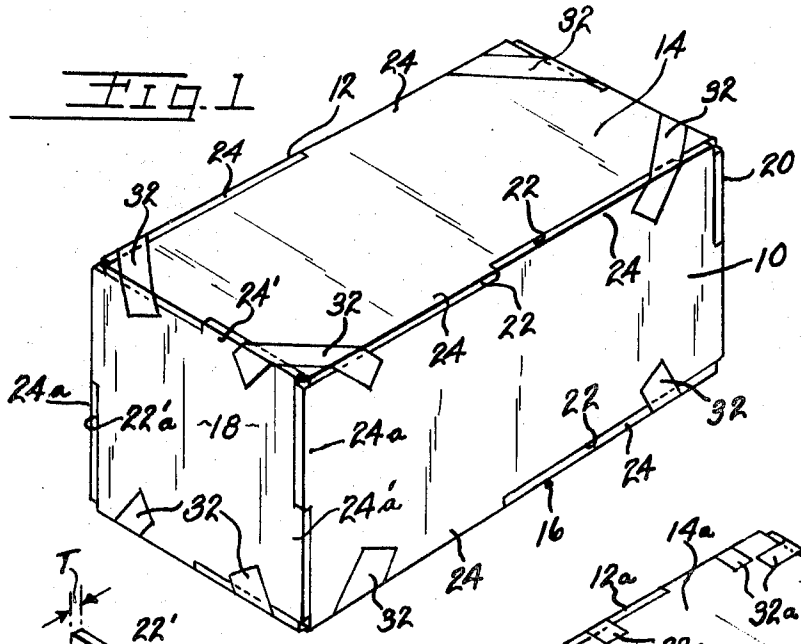


FIG. 2

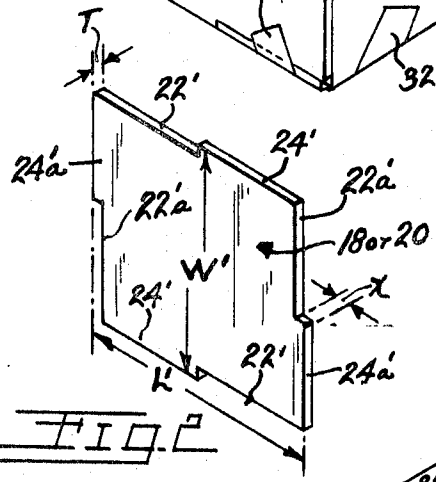


FIG. 4

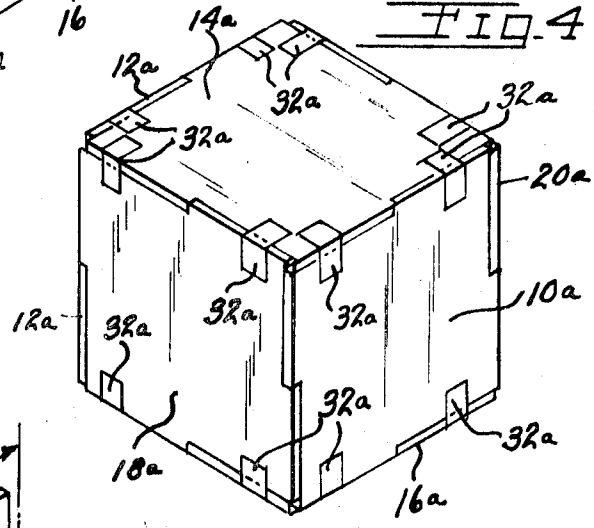


FIG. 3

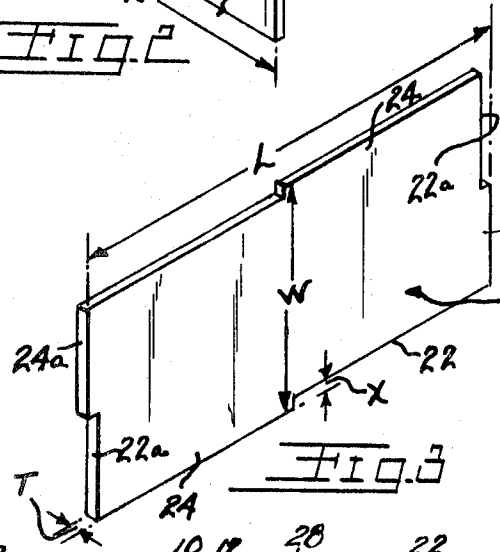


FIG. 5

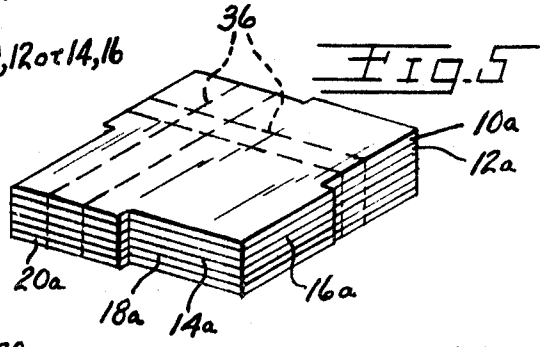
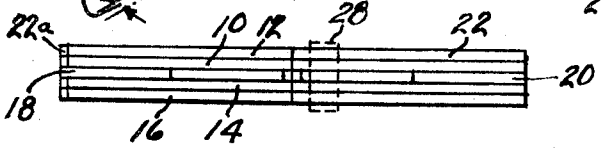


FIG. 6



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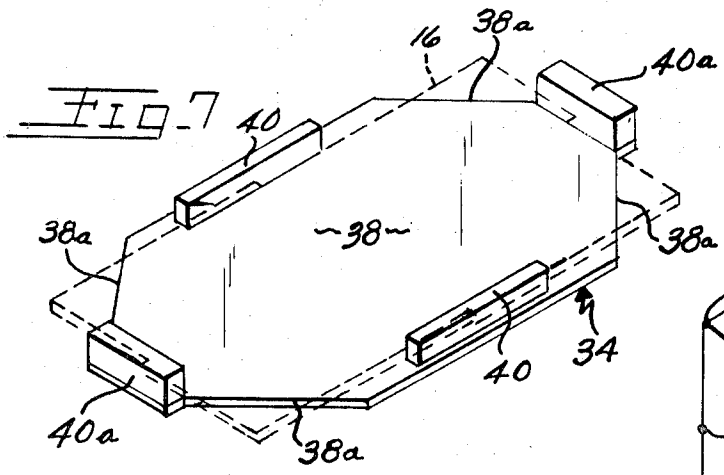


FIG. 7

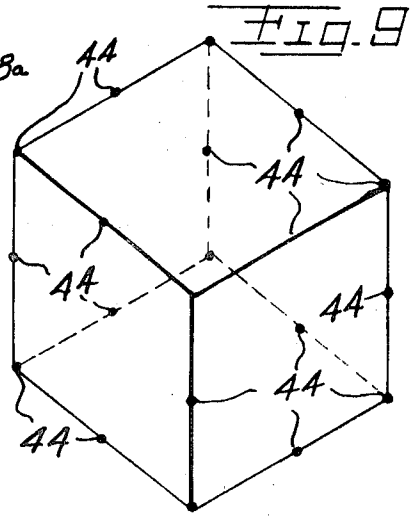


FIG. 9

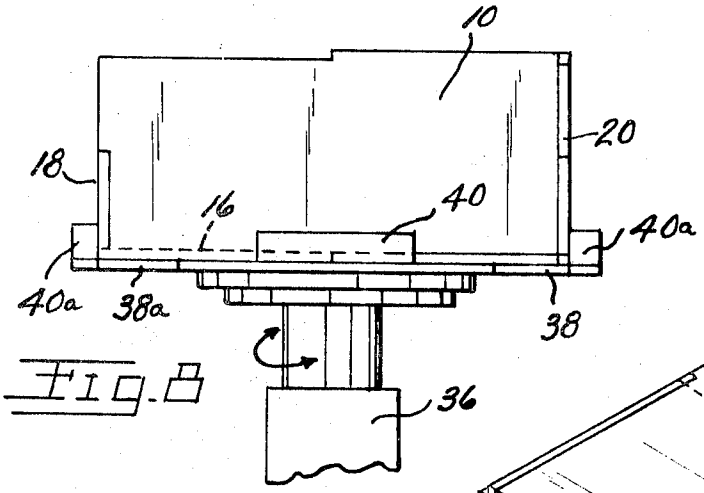


FIG. 8

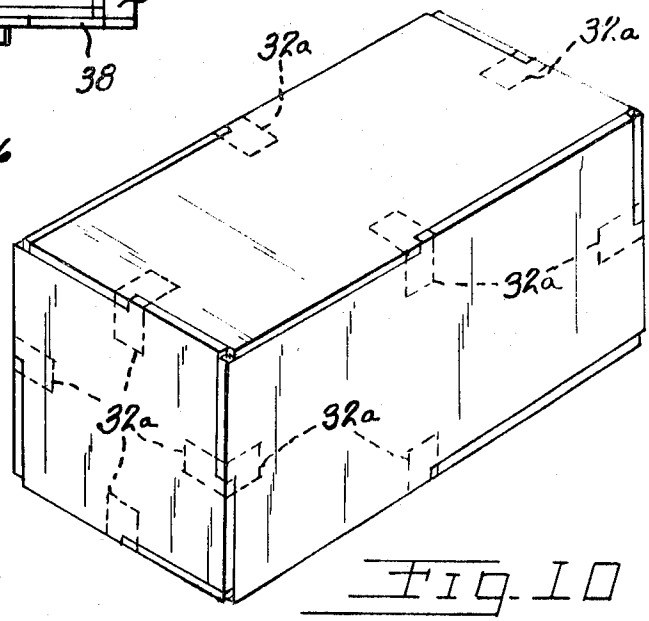


FIG. 10

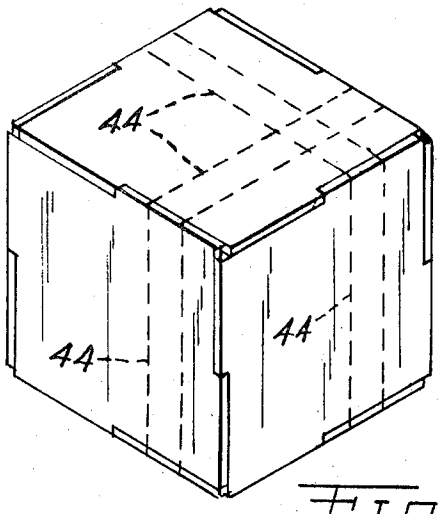
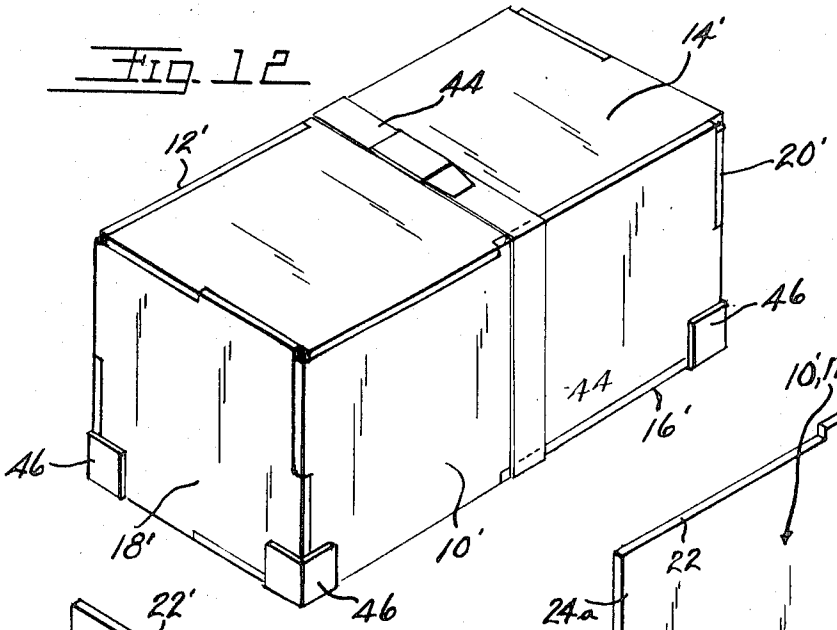


FIG. 11

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FIG. 12



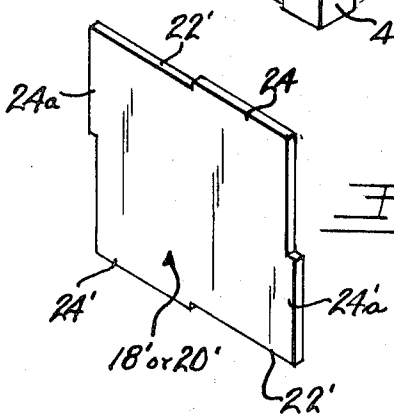


FIG. 14

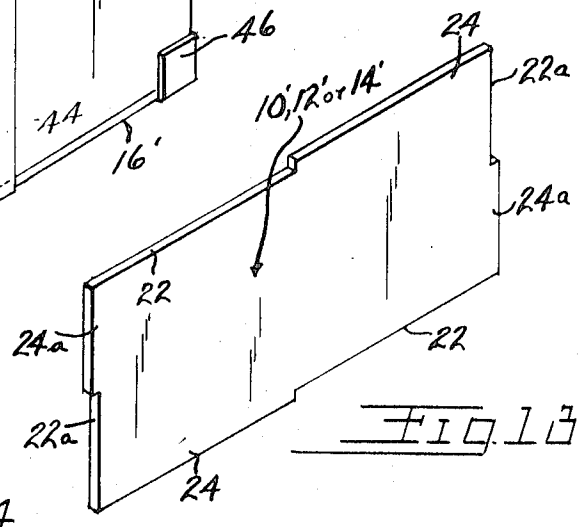


FIG. 13

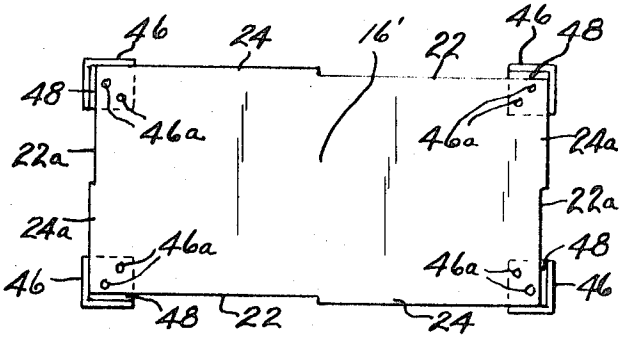


FIG. 15

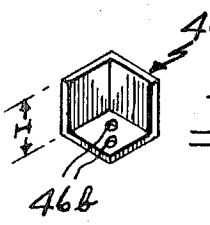


FIG. 16

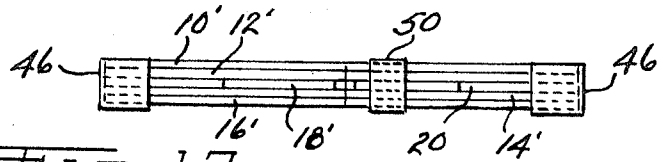
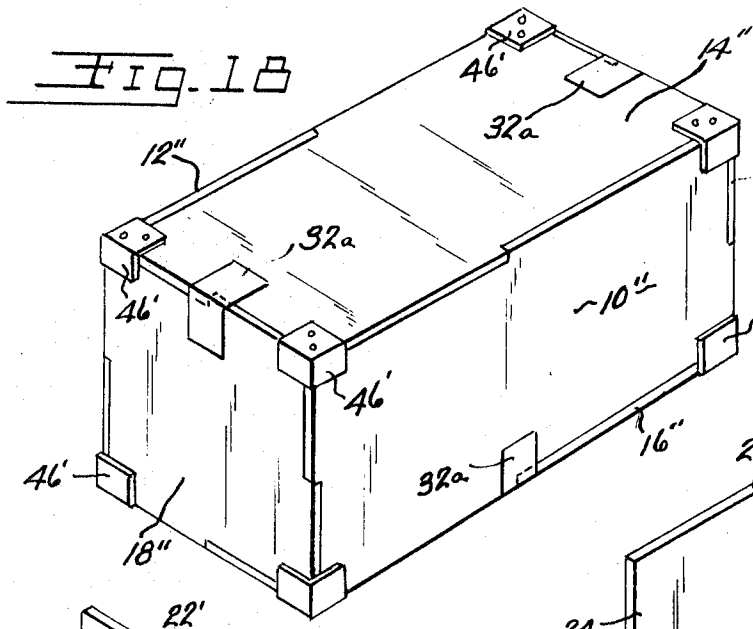


FIG. 17

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FIG. 18



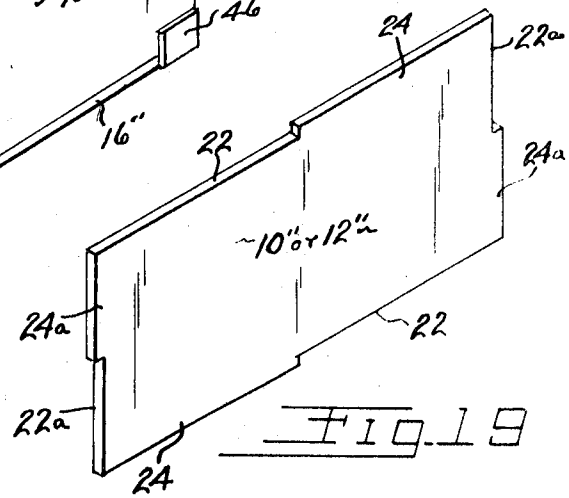


FIG. 19

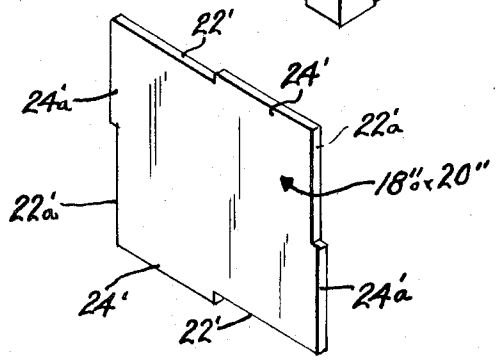


FIG. 20

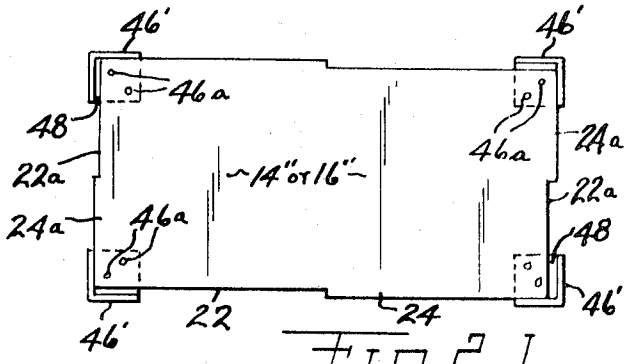


FIG. 21

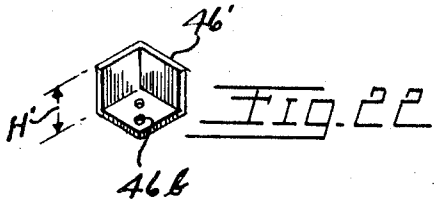


FIG. 22

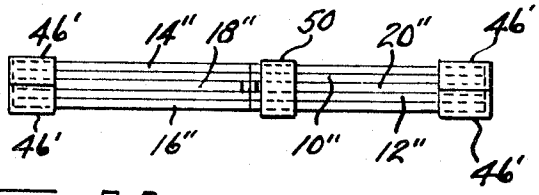
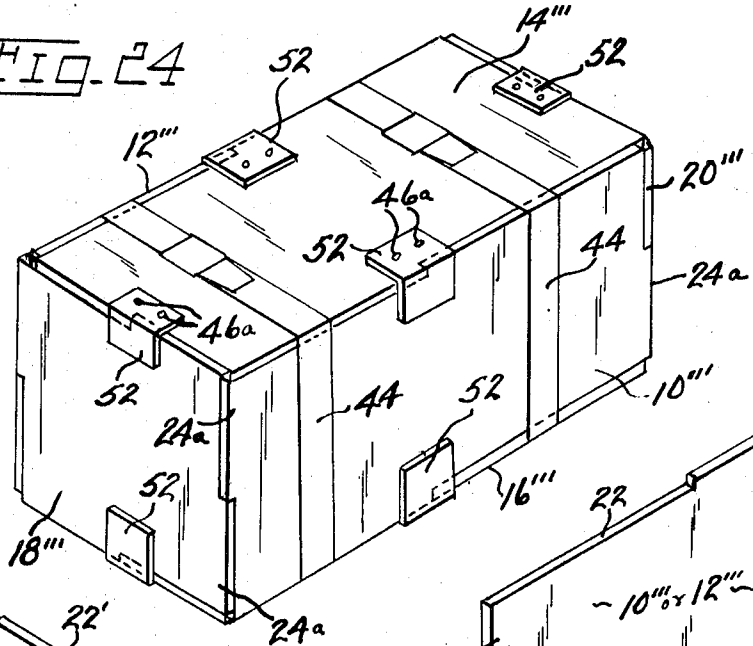


FIG. 23

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FIG. 24



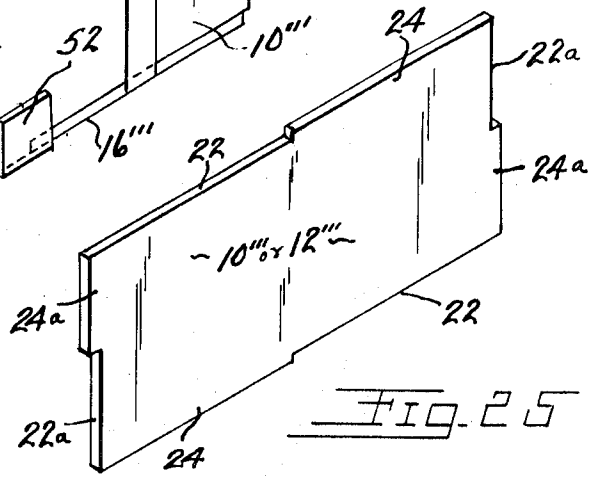


FIG. 25

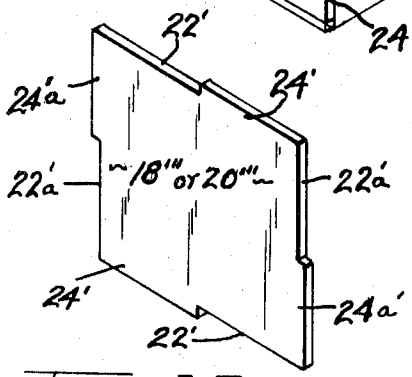


FIG. 26

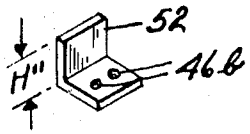


FIG. 28

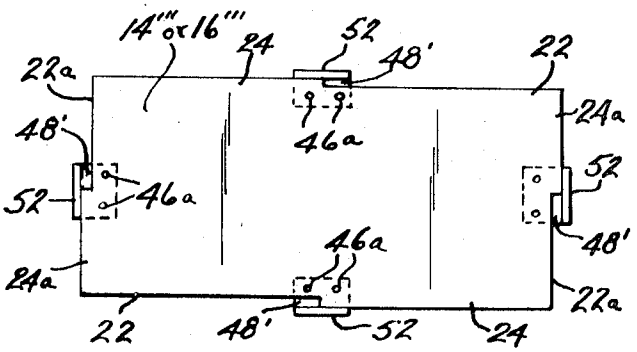


FIG. 27

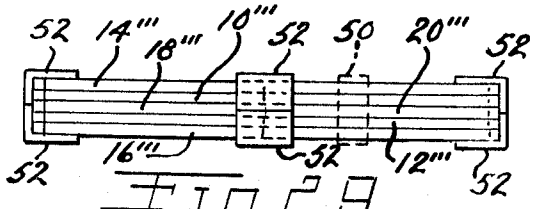
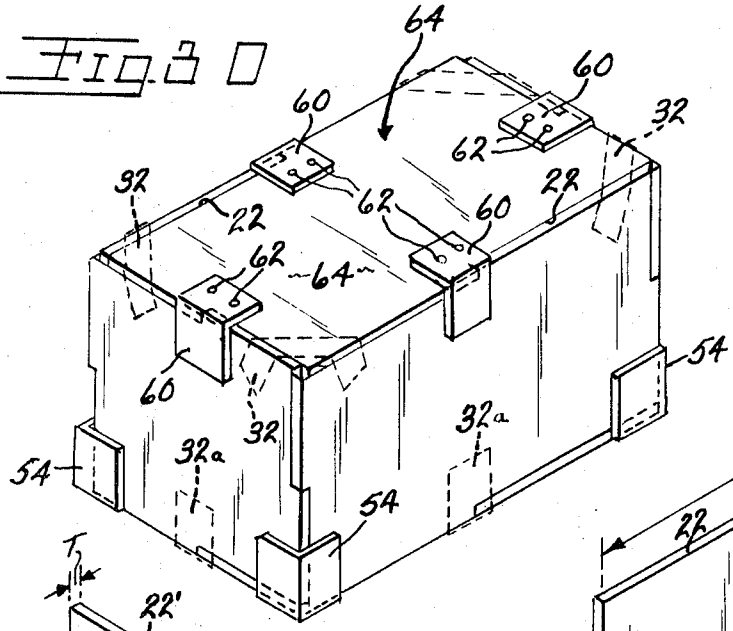


FIG. 29

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FIG. 30



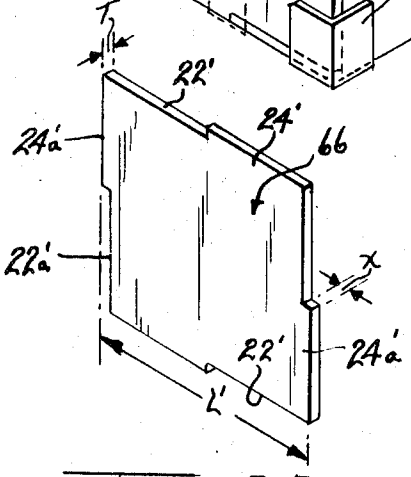


FIG. 32

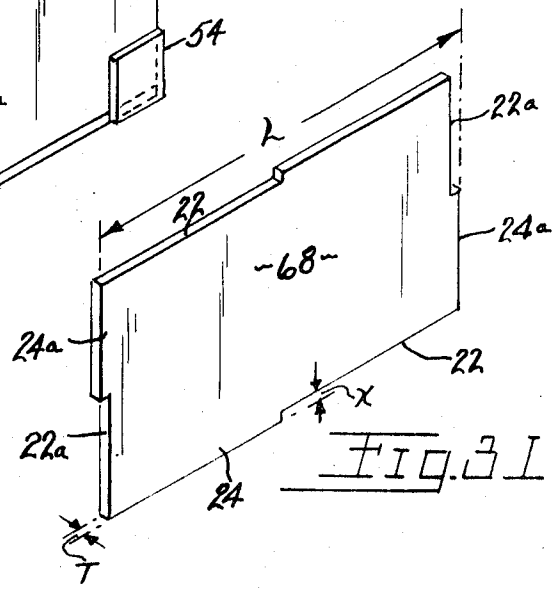


FIG. 31

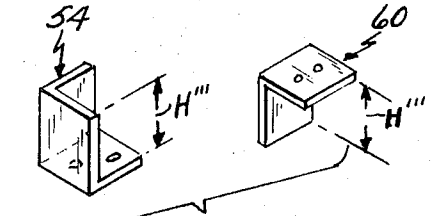


FIG. 34

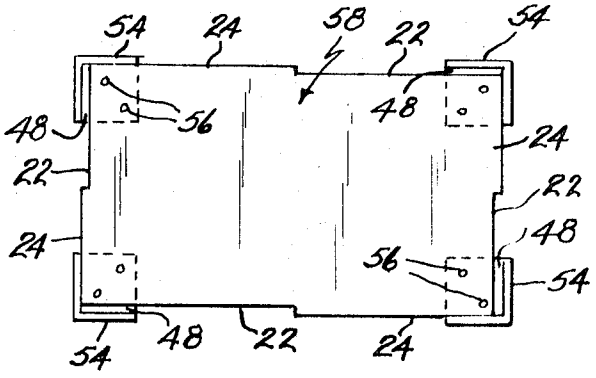


FIG. 33

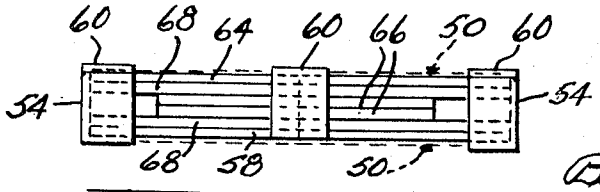


FIG. 35

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KNOCKDOWN CONTAINER

This invention relates in general to knockdown reusable containers for use as a shipping and/or storage container which is rigid in assembled form and when disassembled can be collapsed into a compact return package, and more particularly relates to knockdown containers of the aforespecified type which are of economical construction, and which can be readily assembled for use and disassembled for returning in compact knockdown condition.

Various types of knockdown containers are known in the prior art. However, such prior art type of containers are generally unduly expensive due to their construction, and are not as easily assembled and disassembled as the knockdown container constructions of the present invention or do not possess sufficient rigidity and strength in assembled condition.

The present invention provides knockdown containers of simplified economical construction, comprising separable end, side, top and bottom wall panels of relatively low cost materials, with the panels being recessed along predetermined portions of their peripheries for forming a simplified interlocking means on each panel so that when the panels are disposed in assembled relation, a high strength rigid container is provided for use in shipping and/or storing articles. The invention also provides a novel arrangement for releasably securing the panels in assembled relationship, which securing means can be readily removed for opening the container to provide access to the contents thereof and for providing for expeditious disassembly of the container when it is desired to return the container in knockdown compact form to the source from whence they came.

Accordingly, it is an object of the present invention to provide a knockdown reusable container which is of generally rigid construction in assembled condition, and which is capable of being readily collapsed and reduced to a comparatively small volume relative to its bulk in assembled condition.

Another object of the invention is to provide a knockdown container of the above type which permits the use of relatively low cost materials in its construction, but which provides a high strength container in use.

A still further object of the invention is to provide a knockdown container having means formed thereon for interlocking the panels of the container to increase the rigidity thereof in assembled condition, and with such interlocking means being readily disengaged when it is desired to disassemble the container into a generally flat return package.

A still further object of the invention is to provide a knockdown container of the above described type which is adapted for use with assembly means for positively holding the container panels in assembled relationship, and wherein such assembly means can be readily removed from the container to permit its rapid opening and/or disassembly.

A still further object of the invention is to provide a knockdown container comprised of panels of complementary formed peripheral configuration wherein such peripheral means thereon coacts to interlock the panels together into rigid assembled relationship.

A still further object of the invention is to provide a knockdown container of the above type wherein certain of the panels have bracket means secured thereto for facilitating the assembly of the container and for increasing the rigidity of the container in its assembled condition.

A still further object is to provide a novel jig arrangement for facilitating the assembly of the knockdown containers of the invention.

A still further object of the invention is to provide a knockdown container which is formed of panel members of relatively light weight economical material, and having means for interlocking the panels into generally rigid relationship, and wherein pressure sensitive tape means is expeditiously utilized for holding the panels in positive assembled relationship, with the tape means being readily removable from the assembled container for disassembly of the container or for opening the container to provide accessibility to the contents therein.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a generally perspective view of a knockdown container formed in accordance with the present invention, and illustrating the use of pressure sensitive tape means for holding the container panels in assembled relationship;

FIG. 2 is a perspective view of one of the end panels of the container of FIG. 1;

FIG. 3 is a perspective view of one of the side or top and bottom panels of the knockdown container of FIG. 1;

FIG. 4 is a perspective view of a knockdown container formed in accordance with the present invention wherein all of the panels are of the same size and configuration;

FIG. 5 is a perspective view of the panels for the knockdown container of FIG. 4 showing them in knocked-down condition and formed into a generally flat return package for convenient handling and/or returning of the knockdown container panels to the source from whence they came;

FIG. 6 is a side elevational view of the panels used in the rectangular knockdown container illustrated in FIGS. 1 through 3, as formed into a flat return package for storage and/or for convenient return to the source of origination of the assembled container;

FIG. 7 is a perspective, generally diagrammatic illustration of a jig fixture which is adapted for use with the knockdown container panels of FIG. 1, to facilitate the assembly of the container; in phantom lines there is shown the bottom panel of a container of the FIGS. 1—3 type as placed on the jig for commencement of the assembly of the container;

FIG. 8 is a diagrammatic, side elevational view of the jig of FIG. 7 as mounted on a rotatable table, for facilitating the assembly and taping of the knockdown container of FIG. 1;

FIG. 9 is a diagrammatic illustration of a polygon showing general locations thereon by means of dots, which may be expeditiously utilized for taping, for maintaining a knockdown container of the invention in assembled condition;

FIG. 10 is a generally perspective view of rectangular knockdown container of the type illustrated in FIGS. 1 through 3, and illustrating securing means attached thereto in the form of preferably pressure sensitive tape sections, for maintaining the container in assembled relationship, with the securing means or tape being applied to the container at different locations as compared to those shown in FIG. 1;

FIG. 11 is a perspective view of a knockdown container of the general cubical type illustrated in FIG. 4, and illustrating in dashed lines continuous strap means for securing the container panels in assembled relationship when the container has a load of articles stored therein;

FIG. 12 is a generally perspective view of a knockdown container showing a further embodiment and wherein bracket means are attached to the bottom panel of the container for facilitating the assembly of the container and increasing the rigidity and strength of the container in use; a single strap means is illustrated in the FIG. 12 arrangement for maintaining the container panels in assembled relationship;

FIG. 13 is a perspective view of the side and top panels of the container of FIG. 12;

FIG. 14 is a perspective view of the end panels of the container of FIG. 12;

FIG. 15 is a top plan view of the bottom panel of the container of FIG. 12 and illustrating the bracket means assembled therewith;

FIG. 16 is a perspective view of one of the bracket means illustrated in FIGS. 12 and 15;

FIGS. 17 is a side elevational view of the panels of the container of FIG. 12 as disposed in a flat return package for convenient storing and/or return to the source of origination thereof;

FIG. 18 is a perspective view of a further embodiment of knockdown container having bracket means incorporated therein and with such bracket means being coupled or attached to both the bottom and top panels of the container; pressure sensitive tape means is illustrated in the FIG. 18 embodiment for positively holding the container panels in assembled interlocking relationship;

FIG. 19 is a perspective view of one of the side panels of the container of FIG. 18;

FIG. 20 is a perspective view of one of the end panels of the container of FIG. 18;

FIG. 21 is a plan view of either the top or bottom panels of the container of FIG. 18;

FIG. 22 is a perspective view of one of the brackets shown attached to the panel of FIG. 21;

FIG. 23 is a side elevational view of the panels of the container of FIG. 18 shown in knocked-down, flat return condition;

FIG. 24 is a perspective view of a further embodiment of knockdown container embodying bracket means therewith;

FIG. 25 is a perspective view of one of the side panels of the knockdown container of FIG. 24;

FIG. 26 is a perspective view of one of the end panels of the knockdown container of FIG. 24;

FIG. 27 is a plan view of either the top or the bottom panel of the container of FIG. 24, showing the bracket means secured thereto;

FIG. 28 is a perspective view of one of the brackets illustrated in FIG. 27;

FIG. 29 is a side elevational view of the panels of the container of FIG. 24 as assembled in knockdown, flat, return package condition;

FIG. 30 is a perspective view of a further embodiment of knockdown container embodying bracket means therewith;

FIG. 31 is a perspective view of one of the side panels of the knockdown container of FIG. 30;

FIG. 32 is a perspective view of one of the end panels of the knockdown container of FIG. 30;

FIG. 33 is a top plan view of the bottom panel of the container of FIG. 30 showing bracket means at the corner portions of the bottom panel;

FIG. 34 illustrates a perspective view of one of the triplanar corner brackets for the bottom panel of the container of FIG. 30 and a perspective view of one of the biplanar intermediate brackets for the top panel of the container of FIG. 30; and

FIG. 35 is a side elevational view of the panels of the container of FIG. 30 as assembled in knockdown stacked return packaged condition, and illustrating the two end panels of the container disposed in stacked relation intermediate the side and top and bottom panels.

Referring now again to FIGS. 1 to 3, there is illustrated a knockdown container of the invention which is of a rectangular configuration, comprising side panels 10 and 12, top and bottom panels 14 and 16, and end panels 18 and 20. The side panels 10 and 12 are of identical configuration and size, the top and bottom panels 14 and 16 are of identical size and configuration, and the end panels 18 and 20 are of identical configuration and size. In other words, three sets of panels provide the knockdown container, with the two panels of each set being of identical size and configuration. In the embodiment illustrated in FIGS. 1—3, the top, bottom and side panels are of identical size and configuration and each of the end panels 18 and 20 are of a length L' which is one-half the length L of each of the side and top and bottom panels, with the end panels being of the same width W' as the width W of each of the side, top and bottom panels. In the FIG. 4 embodiment, all of the panels are of equal size and configuration.

All of the panels are of generally identical thickness T and may be formed of any suitable relatively economical material such, as for instance pressed hardboard, or plywood, or plastic, or any other suitable material which is of relatively low cost, generally rigid construction. While for most purposes, the panels should be of generally rigid, solid construction, in certain instances and for certain purposes the panels may be formed of cardboard paper which has a certain amount of rigidity and strength and which may be constructed so as to have a corrugated interior filler portion with air spaces therein, rather than being of a solid material in thickness.

The panels can be simply and economically formed, and with the periphery of each of the panels being recessed along approximately one-half of the length of each peripheral edge, and as 22, 22*a* for the side, top and bottom panels (FIG. 3), and as at 22', 22*a*' for the end panels, for forming the recessed portions. The depth X of each recessed portion is an amount corresponding to the thickness T of the respective panel. Such recessed portion on each edge of each panel results in a tab or shoulder 24, 24*a* or 24', 24*a*' extending in the plane of the respective panel along the remainder of the periphery of the respective panel edge. In other words, the length of each recessed portion 22=*L*/2; the length of each recessed portion 22'=*L*'/2; the length of each recessed portion 22*a*=*W*/2; the length of each recessed portion 22*a*'=*W*'/2; the length of each shoulder portion 24=*L*/2−*X*; the length of each shoulder portion 24'=*L*'/2−*X*; the length of each shoulder portion 24*a*=*W*/2−*X*; and the length of each shoulder portion 24*a*'=*W*'/2−*x*. As can be best seen from FIGS. 2 and 3, the recess portions and the tab portions on opposite edges are diagonally opposed with respect to one another.

When the panels are in assembled relationship as shown in FIG. 1, the shoulders 24, 24*a* or 24', 24*a*' on each panel are received in the confronting recessed portions 22, 22*a* or 22', 22*a*' of the adjacent panels, thus resulting in interlocking the panels together in directions longitudinally, vertically and transverse of the assembled container. Thus a high strength, rigid, relatively lightweight container is provided which is suitable for receiving heavy stock without deformation of the container, and yet a container which can be readily assembled into container form and can be readily disassembled into a flat knockdown package for convenient storage and/or return of the knocked-down package to the source from whence the container originated. The knockdown condition of the panels of the container of FIG. 1 is illustrated in FIG. 6, and it can be seen that any suitable means such as a strap 28 can be provided for extension around the stacked container panels, for maintaining them in packaged condition for convenient handling. The end panels 18 and 20 of the container can be assembled intermediate the side and top and bottom panels, as shown in FIG. 6 for retaining the end panels in assembled relationship with the top and bottom panels utilizing a minimum of retaining means 28. It will be seen that since all of the panels of the knockdown container are of the same basic configuration having recessed edge portions one-half the length of the respective edge with the depth of the recessed portion equaling the thickness of the panel and with the only difference if any, being in the dimensional area size of the panels, that such panels can be readily manufactured using mass production methods. In the embodiments illustrated having the same size top, bottom and side panels (and in the FIG. 4 embodiment the same size and panels) a further advantage exists in that in assembling the panels, it makes no difference which of the panels is used for the sides and top and bottom panels, with these side, and top and bottom panels being readily interchangeable, so that unskilled labor can be expeditiously utilized in assembling the panels into containers and filling them with articles for shipment. It will be understood however, that the invention is not limited to having the same size of top, bottom and side panels, it only being required to have three sets of paired panels, and with the panels having recessed edge portions of one-half the length of the respective edge.

In assembling the panels, the bottom panel may be placed on a surface and then the side and end panels may be readily assembled with the bottom panel, with the shoulders on the lower edge of the side and end panels being received in the confronting recesses in the bottom panel and with the shoulders on the bottom panel being received in the confronting

recesses in the side and end panels and with the shoulders on side and end panels being received in the confronting recesses in the adjacent side and end panels, which produces an interlocking coaction between the panels maintaining them in assembled relationship, for subsequent securement together, such as for instance by pressure-sensitive tape means **32** illustrated in FIG. **1**.

Tape means **32** is preferably of the high strength filament type, such as that commercially available for instance from the Minnesota Mining & Manufacturing Company, which provides a high strength securement of the panels in assembled relation and which tape means **32** can be readily and quickly applied. In the embodiment illustrated in FIG. **1** the tape is applied to corner portions of the assembled container which provides a high-strength securement pattern to the taped container, and which provides an arrangement whereby the container can be rapidly opened and/or disassembled by merely tearing the tape sections from the panels, or by cutting the tap e sections along the junctures of the edges of the panels, such as for instance by inserting a sharp instrument such as a knife or screw driver and running it along the taped junctures between the panels. The application of the tape to the corner portions of the container provides for rapid securement of all of the panels together and utilizes as a general rule a minimum amount of tape. The aforedescribed shoulder and recess interlock construction of the panels is, of course, also highly advantageous in the event that nails, screws or other types of fasteners are used instead of the aforementioned tape, to hold the container panels together in an assembled condition of container.

Referring now to FIG. **7**, there is illustrated a jig member **34** which may be conveniently utilized to assemble the panels of the FIG. **1** container. Such jig **34** may be mounted on a rotatable platform **36** (FIG. **8**) which enables the workman to conveniently turn the jig **34** and thus readily assemble the various side and end panels to the bottom panel in the production of an assembled container. As shown in FIG. **7**, the jig comprises a generally horizontal bottom wall or support **38** having beveled corners **38***a* and having upwardly projecting support means **40**, **40***a* disposed along the side and end portions of the wall **38**. The wall **38** is of a greater length and width as compared to the bottom panel (e.g. **16**) for a container assembly (such bottom panel being shown in phantom lines in FIG. **7**) so that the support members **40**, **40***a* can be secured to the wall **38** and spaced apart with respect to one another distances corresponding to the length and the width of the bottom panel of the container assembly. The side and end panels can then be readily assembled with the bottom panel **16** with the tabs **24**, **24'** on the side and end panels being received in the recess portions **22**, **22***a* on the bottom panel and the tabs **24***a*, **24***a'* on the side and end panels being received in the confronting recess portions **22***a*, **22***a'* on such side and end panels, and in generally snug relation, to form a high strength interlock, resulting in a light weight, rigid container. Since the corners of the jig **38** are beveled as at **38***a*, the securing means or tape strip sections **32** can be readily and rapidly applied into coacting relationship between the bottom panel **16** and the side and end panels of the container, thus forming the container walls in secured relation with the top of the container still open. The container is then in condition for receiving articles to be shipped, or stored, and after it is filled with the articles of stock, the top panel (e.g. **14**) can be applied to the container assembly and tape sections applied thereto, coacting between the side and end panels and the top panel, to positively hold the top panel to the side and end panels. The container is then in condition for shipping, and due to the interlocking nature of the shoulders or tabs and recesses on the panels and the panel coacting securing means or tape sections **32**, the result in a high-strength, rigid assembly. When the container arrives at its destination the tape, or other securing means, can be readily removed either by tearing or cutting from the top panel, and then the container can be opened for providing accessibility to the contents thereof.

Referring to FIG. **4** there is illustrated a cubical configuration of container wherein all of the panels are of generally identical configuration and size, including the side panels **10***a*, **12***a*, the top and bottom panels **14***a* and **16***a*, and the end panels **18***a* and **20***a*. As shown in FIG. **5** such identical panels can be readily formed into a flat return package and held, such as for instance by straps or bands **36**, or any other suitable means, for storage and/or return to the source for reuse.

In the embodiment illustrated in FIG. **4**, the securing means **32***a* which is illustrated as being the pressure-sensitive tape aforedescribed, is not applied across the corners of the container but to the edges of the container adjacent the corners, which results in a high strength container, but which necessitates a slightly greater amount of time to apply and/or remove the securing tape to and from the container, since more tape sections are involved.

FIG. **9** diagrammatically illustrates by means of dots **44** on polygon, advantageous locations for applying tape sections to a knockdown container of the type of the invention, illustrating that the tape may be applied either adjacent the corners of the container or intermediate the end corners of the container panels. If tape is applied intermediate the end corners, then it is not generally necessary to apply tape adjacent the corners of the panels. FIG. **10** illustrates a knockdown container of the rectangular type of FIG. **1** wherein as shown in phantom lines, tape sections **32***a* are applied generally centrally intermediate the end corners of the panels along each edge portion thereof, resulting in a high-strength positive securement arrangement.

FIG. **11** illustrates a container of the structural type of the invention wherein strap means **44** are applied to the assembled container for positively holding the panels of a filled container in assembled condition. Such strap means may be pressure-sensitive tape extending completely about the container, or it may be any other suitable strap means, such as for instance plastic or metal strap means, many types of which are known in the packaging art.

Referring now to FIGS. **12** through **17**, there is shown a further embodiment of knockdown container wherein bracket means **46**, which may be formed of metal, or plastic, or any other suitable material, are secured as at **46***a* to the bottom panel of the container assembly, for not only facilitating the assembly of the side and end panels to the bottom panel but which also results in a high-strength rigid arrangement of container which is resistant to considerable abuse without resulting in injury to the bottom panel or to the bottom corners of the container.

Brackets **46** are preferably provided on each on the corners of the bottom panel **16'** of the container assembly, and may be suitably attached with any conventional fastening means, such as rivets, threaded fasteners adhesives, or the like. The brackets may have openings **46***b* (FIG. **16**) formed therein for facilitating the attachment of the brackets to the bottom panel. As can be seen in FIG. **15**, the brackets on opposite sides of the bottom panel are in direct alignment with one another which results in the spacing, as at **48**, of one of the upstanding walls of each bracket from the confronting surface of the associated recess portion **22** of the bottom panel. This spacing **48** is just sufficiently wide to receive in snug relation the tab portion of the associated end or side panel.

Assembly of the side and end panels and the top panel may occur in the identical way aforedescribed in connection with the first described embodiments, with the brackets **46** facilitating the assembly of the side and end panels to the bottom panel, since the upstanding walls of the brackets provide support for the panels during the assembly thereof to the bottom panel. Any suitable means such as the aforediscussed pressure-sensitive tape means, or conventional removable strap means **44** aforediscussed in connection with FIG. **11**, can be utilized to maintain the container in positive assembled relationship. It will be seen that the upstanding walls of the brackets prevent outward movement of the end and sidewalls with respect to the bottom wall, to provide a highly rigid assembly.

As illustrated in FIG. 17, the brackets 46 secured to the bottom panel 16' also facilitate the retention of the panels in a flat return packaged condition, with the height H of the bracket walls preferably being such that all of the three sets of panels will fit within the confines of the brackets when disposed in stacked condition and held in flat packaged form by retaining means, such as strap 50.

Referring now to FIGS. 18—23, there is shown a further embodiment of knockdown container wherein bracket means 46' is secured to both the top and bottom panels 14'' and 16'' of the container. The interior height H' of each of these brackets is only approximately one-half the interior height of the brackets utilized in FIGS. 15 and 16 embodiment, so that when the panels are disposed in knocked-down stacked condition in the flat return package illustrated in FIG. 23, the brackets encompass the thickness of the stacked panels but without interference between the brackets. Accordingly, a flat knockdown package of the stacked panels is provided which can be readily shipped back to the source of origin, or which may be stored, and which has the corners thereof protected from injury. In other respects, the knockdown container of the FIGS. 18—23 embodiment is generally similar to that of the FIGS. 1—3 embodiment. As can be seen from FIG. 18, with this arrangement, securing means, such as the pressure-sensitive tape sections 32*a*, may be utilized intermediate the corners for maintaining the container in assembled condition, with the tape in the FIG. 13 embodiment being applied only to the ends of the top panel and adjacent end panels and only to the side edges of the bottom panel and adjacent side panels. However, the amount of tape sections utilized will of course depend on the nature of the contents of the container, but due to the rigidifying nature of the brackets 46' on both the top and bottom panels, and due to the interlocking coaction between the shoulders and the recessed portions in each of the panels with the respective adjacent panels, a highly rigid high strength knockdown container is provided, even with utilization of a minimum amount of tape or securing means.

Referring now to FIGS. 24—29, there is shown a further embodiment of knockdown container wherein brackets 52 are applied to both the top and bottom panels 14''' and 16''' the same as in the FIGS. 18—23 embodiment, but wherein the brackets are of a biplanar type rather than the triplanar type of bracket utilized in FIGS. 18—23 embodiment, and wherein the brackets 52 are secured to the respective top and bottom panel intermediate the corners thereof and generally centrally of each respective edge. The brackets on opposite edges are disposed in generally aligned relation with one another, with approximately one-half of the bracket being spaced as at 48' from the confronting face of the associated recessed portion in the respective edge. As can be seen in FIG. 29, when the panels are disposed in stacked relation to form a flat return package, the brackets coact with one another to encompass the panels including the side, top and bottom and end panels, to form a convenient return package. Accordingly, it will be seen that the interior height H'' of each of the brackets 52 is approximately one-half of the interior height of the bracket 46 illustrated in FIG. 16 embodiment.

Referring now to FIGS. 30 through 35, there is shown a further embodiment of knockdown container wherein triplanar corner brackets 54 are secured as at 56, to the bottom panel 58 and wherein biplanar brackets 60 are secured as at 62, to the top panel 64 of the container generally centrally of each respective edge. The brackets on the opposite edges of the respective panel are disposed in generally aligned relation with one another, with one of the upstanding walls of each corner bracket being spaced as at 48 from the confronting surface or face of the associated recessed portion 22 of the bottom panel, and similar for instance to the bracket arrangement in the FIGS. 15 and 21 embodiments. The brackets on opposite edges of the top panel are disposed with approximately one-half the bracket being spaced from the confronting face of the associated recessed portion 22 in the respective edge, and generally similar to the bracket arrangement shown in FIGS. 24 through 29 embodiment. Tape sections 32, 32*a* may be provided similarly to the prior discussed embodiments, for holding the panels of the container in positive assembled relation. When the end panels 66 and side panels 68 are disposed in assembled relation with the top and bottom panels 64, 58, a highly rigid, high-strength container is provided.

As can be seen in FIG. 35, when the panels are disposed in knocked-down stacked relation to form a flat return package, the interior height H''' of each of the brackets is preferably such that all of the stacked panels may be encompassed by the brackets secured to respectively the bottom panel 58 and the top panel 64, and any suitable means such as a strap 50 or tape can be bound around the stacked panels to hold them in knockdown packaged condition. It will be seen that due to the fact that in the embodiment illustrated, the length L' of each end panel 66 is greater than half the length L of the side and top and bottom panels, that such end panels will not fit in side-by-side coplanar relationship in the stacked assembly, and thus such end panels 66 are stacked one on top of the other in the return package. With the arrangement of intermediate brackets 60 on the top panel and corner brackets 54 on the bottom panel, the end panels are positively retained by the intermediate brackets in the stacked return package assembly of panels, and are prevented from inadvertently moving out of the stacked assembly. The corner brackets in conjunction with the intermediate brackets 60 positively prevent inadvertent movement of the side panels and the top and bottom panels out of the stacked assembly. Accordingly, there is no danger of losing the end panels from the stacked assembly during handling of the knockdown package.

From the foregoing discussion and accompanying drawings it will be seen that the invention provides a novel reusable knockdown container arrangement for use as a shipping and/or storage container, which is extremely rigid in assembled form and which can be expeditiously disassembled and collapsed into a flat return package, and wherein the peripheral edges of the panels forming the container are recessed a predetermined amount along their lengthwise dimension, for providing a novel interlocking arrangement between the adjacent panels, to greatly rigidify the assembled container. The invention also provides an economical knockdown container arrangement utilizing securing means such as pressure sensitive tape sections, for maintaining the container in assembled condition, and a knockdown container embodying bracket means secured to one or more of the panels thereof, for aiding in the assembly and increasing the rigidity and strength characteristics of the container.

The terms and expressions which have been used are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalents of any of the features shown or described, or portions thereof, and it is recognized that various modifications are possible within the scope of the terms and expressions utilized.

What I claim is:

1. In a collapsible, reusable container for shipping, storage and the like comprising separate defining side, end, and top and bottom panels, and unitary means on the periphery of each of said panels for interlocking coaction with said means on the adjacent panels in the assembled condition of said container, said means comprising a peripheral recess portion on each edge portion of each panel extending lengthwise along said edge portion a distance of approximately one-half of the corresponding dimension of said panel, said recess portion partially defining a peripheral tab portion on the respective edge portion extending for the remainder of the distance of extension of said edge portion, and wherein all of the said panels are of the same size and configuration.

2. A container in accordance with claim 1 wherein said recess portion on each peripheral edge of the respective panel has a depth which substantially equals the thickness dimension of the adjacent panel, said tab portions on each panel being received in the recess portions of the adjacent panels.

3. A container in accordance with claim 1 including securing means extending between the panels and tying the latter together.

4. A container in accordance with claim 3 wherein said securing means comprises pressure-sensitive tape sections.

5. A container in accordance with claim 3 wherein said securing means comprises relatively short pressure-sensitive tape sections extending about the edge portions of the container and engaging paired panels, said tape sections extending generally perpendicular to the respective edge portions.

6. A container in accordance with claim 5 wherein said tape sections are disposed generally centrally of the respective edge portions.

7. A container in accordance with claim 1 wherein at least one of said top and bottom panels comprises bracket means thereon extending outwardly from the plane thereof, said bracket means being adapted to engage in retaining relation the adjacent side and end panels.

8. A container in accordance with claim 7 wherein said bracket means comprises brackets secured to the corner portions of said one panel and extending generally perpendicularly therefrom in planes disposed approximately 90 degrees with respect to one another.

9. A container in accordance with claim 7 wherein said bracket means comprises brackets fastened to said one panel so as to be disposed generally centrally of the respective peripheral edge portion thereof, and extending generally perpendicularly outwardly from the plane of said one panel.

10. In a collapsible reusable container for shipping, storage and the like comprising separate defining side, end and top and bottom panels, and unitary means on the periphery of each of said panels for interlocking coaction with said means on the adjacent panels in the assembled condition of said container, said means comprising a peripheral recess portion on each edge portion of each panel extending lengthwise along said edge portion a distance of approximately one-half the corresponding dimension of said panel, said recess portion partially defining a peripheral tab portion on the respective edge portion extending for the remainder of the distance of extension of said edge portion, bracket means on at least one of said top and bottom panels adapted to engage in retaining relation the adjacent end and side panels in the assembled condition of the container, said bracket means comprising brackets projecting outwardly generally perpendicularly from the plane of the respective mounting panel, each of said edge portions having a bracket associated therewith disposed in coacting relation with the respective recess portion, said bracket being spaced outwardly from the confronting face of the respective recess portion a distance substantially corresponding to the thickness of the respective mounting panel and receiving in snug abutting relation between said bracket and said confronting face an adjacent end or side panel, securing means extending between the panels and tying the latter together, and wherein said bracket means extends generally perpendicularly outwardly from the plane of said one panel a sufficient distance to encompass the panels of said container when the panels are in knocked-down vertically stacked condition, with the panels being adapted to be received within the confines of the bracket means in said stacked condition of said panels.

11. A container in accordance with claim 10 wherein said bracket means comprises brackets on both the top and bottom panels.

12. In a collapsible reusable container for shipping, storage and the like comprising separate defining side, end and top and bottom panels, and unitary means on the periphery of each of said panels for interlocking coaction with said means on the adjacent panels in the assembled condition of said container, said means comprising a peripheral recess portion on each edge portion of each panel extending lengthwise along said edge portion a distance of approximately one-half the corresponding dimension of said panel, said recess portion partially defining a peripheral tab portion on the respective edge portion extending for the remainder of the distance of extension of said edge portion, bracket means on both said top and bottom panels adapted to engage in retaining relation the adjacent end and side panels in the assembled condition of the container, said bracket means comprising brackets projecting outwardly generally perpendicularly from the plane of the respective mounting panel, each of said edge portions having a bracket associated therewith disposed in coacting relation to the respective recess portion, said bracket being spaced outwardly from the confronting face of the respective recess portion a distance substantially corresponding to the thickness of the respective mounting panel and receiving in snug abutting relation between said bracket and said confronting face an adjacent end or side panel, securing means extending between the panels and tying the latter together, said brackets on one of said top and bottom panels are disposed in confronting relation with the brackets on the other of said top and bottom panels in the knocked-down vertically stacked condition of said panels, said brackets extending outwardly from the plane of the respective panel a sufficient distance so that in conjunction with the brackets on the other panel, all of the panels of said container will be encompassed by said brackets in the knocked-down vertically stacked condition of said panels.

13. In a collapsible reusable container for shipping, storage and the like comprising separate defining side, end and top and bottom panels, unitary means on the periphery of each of said panels for interlocking coaction with said means on the adjacent panels in the assembled condition of said container for rigidifying the latter, said means comprising a peripheral recess portion on each edge portion of each panel extending lengthwise along said edge portion a distance of approximately one-half the corresponding dimension of said panel, said recess portion partially defining a peripheral tab portion on the respective edge portion extending for the remainder of the distance of extension of said edge portion, said recess portion on each peripheral edge of the respective panel having a depth which substantially equals the thickness dimension of the adjacent panel, said tab portions on each panel being received in the recessed portions of the adjacent panels, bracket means on at least one of said top and bottom panels extending generally perpendicularly outwardly therefrom from the plane of the respective panel and adapted to engage in retaining relation the adjacent end and side panels in the assembled condition of said container, said bracket means comprising triplanar brackets secured to each corner portion of said one panel and comprising sections extending generally perpendicularly outwardly from the mounting panel in planes disposed approximately 90° with respect to one another, one of said sections of each of said triplanar brackets being disposed in coacting relation with the respective recess portion, each said one bracket section being spaced from the confronting face of the respective recess portion a distance substantially corresponding to the thickness of the respective mounting panel and with the other bracket section of the respective bracket engaging the confronting tab portion of the respective panel, said one bracket section receiving in snug abutting relation between said one bracket section and said confronting face an adjacent end or side panel, securing means extending between the panels and tying the latter together, said bracket means including biplanar brackets on the periphery of the other panel of said top and bottom panels which is disposed opposite to said one mounting panel in the assembled condition of said container, said biplanar brackets extending generally perpendicularly outwardly from the plane of said other panel and being secured to the latter, each of said biplanar brackets coacting with a respective edge portion of said other panel and being spaced from the confronting face of the respective recess portion a distance substantially corresponding to the thickness of said other panel, each of said biplanar brackets receiving in snug abutting relation between the biplanar bracket and said confronting face of the respective recess portion a tab portion of an adjacent end or side panel, and wherein the interior height of each of said triplanar corner and

biplanar brackets is of substantially the same dimension, and being such so as to encompass all six panels of a stacked knocked-down package assembly of panels, with said bottom panel and said top panel being the bottom and top panels in the stacked assembly, with said brackets being secured to respective of said top and said bottom panels.