

United States Patent

[11] 3,559,867

- | | | |
|------|-----------|---|
| [72] | Inventors | Billy J. Muskopf
Houston;
Arthur T. Edwards, III, Dallas, Tex. |
| [21] | Appl. No. | 811,553 |
| [22] | Filed | Mar. 28, 1969 |
| [45] | Patented | Feb. 2, 1971 |
| [73] | Assignee | Crown Zellerbach Corporation
San Francisco, Calif.
a corporation of Nevada |

- | | | | |
|-----------|---------|--------------------|------------|
| 1,136,479 | 4/1915 | Motz | 229/14(BW) |
| 2,208,268 | 7/1940 | Snyder et al. | 229/23(B) |
| 2,634,038 | 4/1953 | George et al. | 229/14C |
| 2,836,338 | 5/1950 | Daniels..... | 229/14C |
| 3,007,622 | 11/1961 | George..... | 229/23B |
| 3,145,900 | 8/1964 | Franklin..... | 229/14C |
| 3,146,932 | 9/1964 | Mayer | 229/14C |

Primary Examiner—Davis T. Moorhead

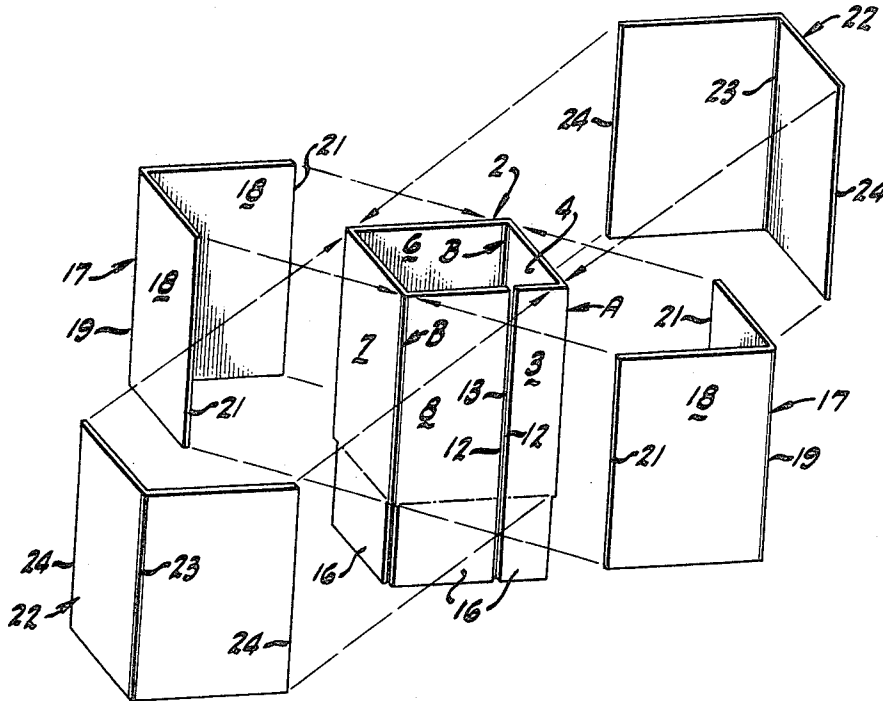
Attorneys—Stanley Bialos, Corwin R. Horton and William K. Quarles

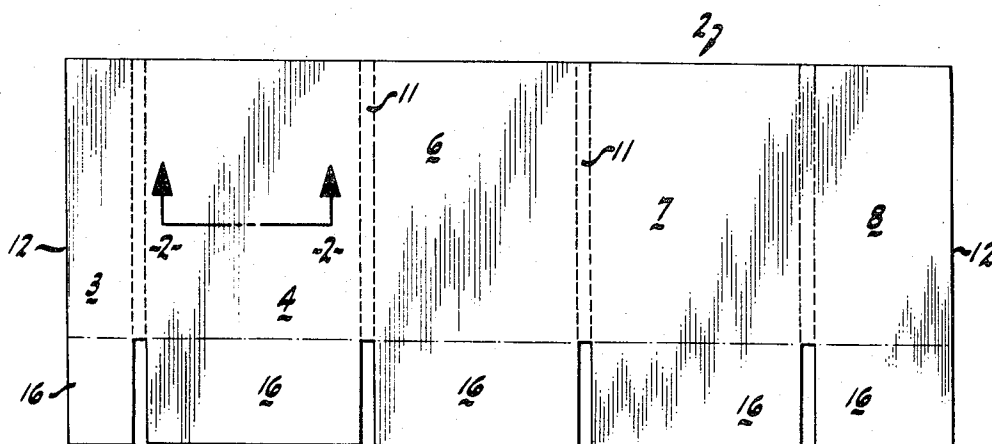
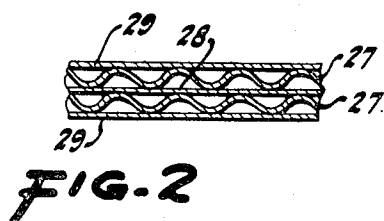
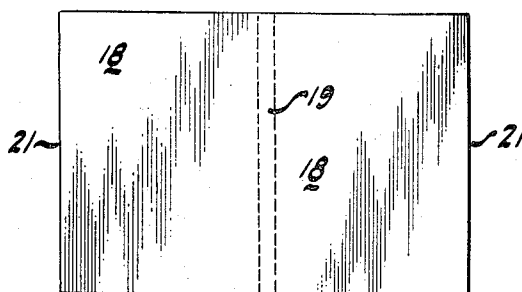
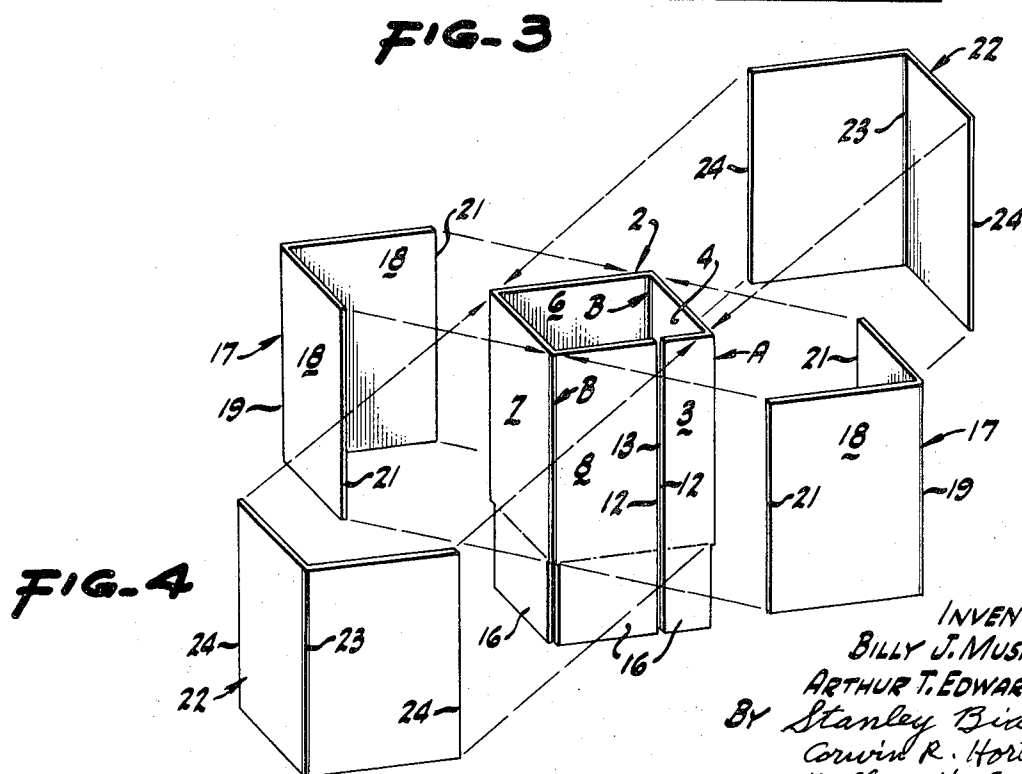
- [54] **MULTI-PLY CONTAINER**
15 Claims, 17 Drawing Figs.

- | | | |
|------|----------------------|------------------------------------|
| [52] | U.S. Cl..... | 229/14,
229/23 |
| [51] | Int. Cl..... | B65d 25/14,
B65d 5/56 |
| [50] | Field of Search..... | 93/36;
229/14C, BI, DL, BW, 23B |

- | | |
|-----------|-------------------------|
| [56] | References Cited |
| | UNITED STATES PATENTS |
| 1,121,947 | 12/1914 Surmann |

- ABSTRACT:** A multi-ply container desirably of paperboard panels laminated together, has a corner construction comprising facing unattached end edges of a ply covered by an integral hinge connection between wall panels of another ply thereby eliminating a so-called manufacturer's joint. The corner construction and plurality of laminated plies provide bulge resistance rendering the container particularly advantageous for the packaging of flowable products such as synthetic rubber blocks.





INVENTORS
BILLY J. MUSKOPF
ARTHUR T. EDWARDS III
BY Stanley Bialos
Corwin R. Horton
William R. Quarles
ATTORNEYS

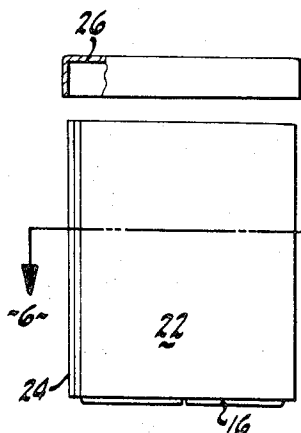


FIG. 5

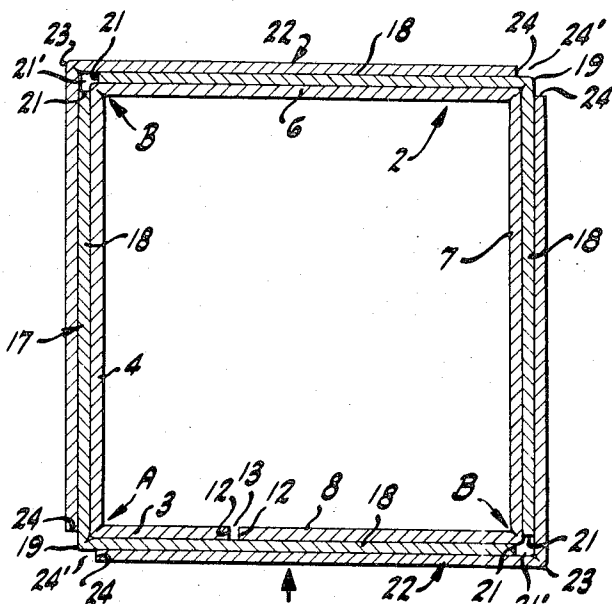


FIG. 6

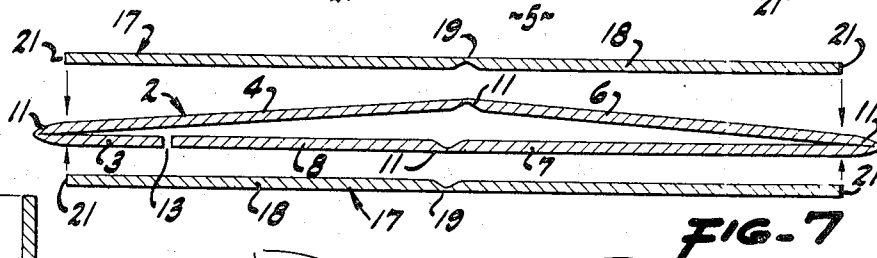


FIG. 7

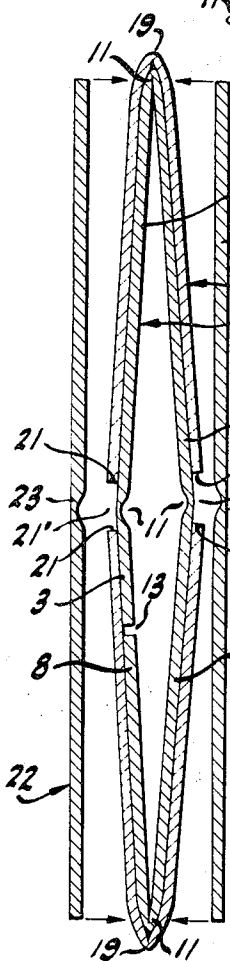


FIG. 8

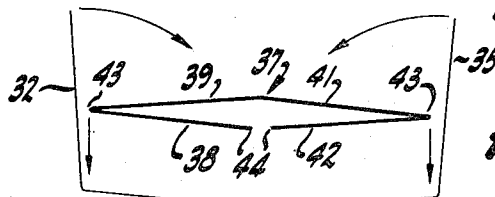


FIG. 9

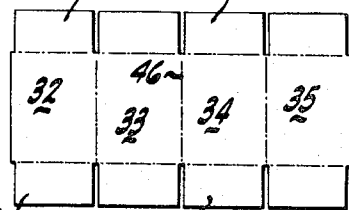


FIG. 10

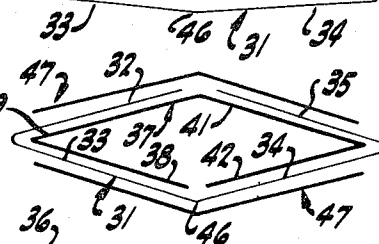


FIG. 11

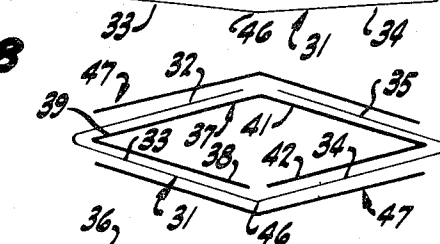


FIG. 12

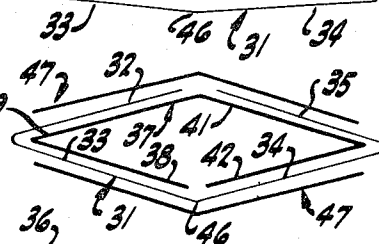
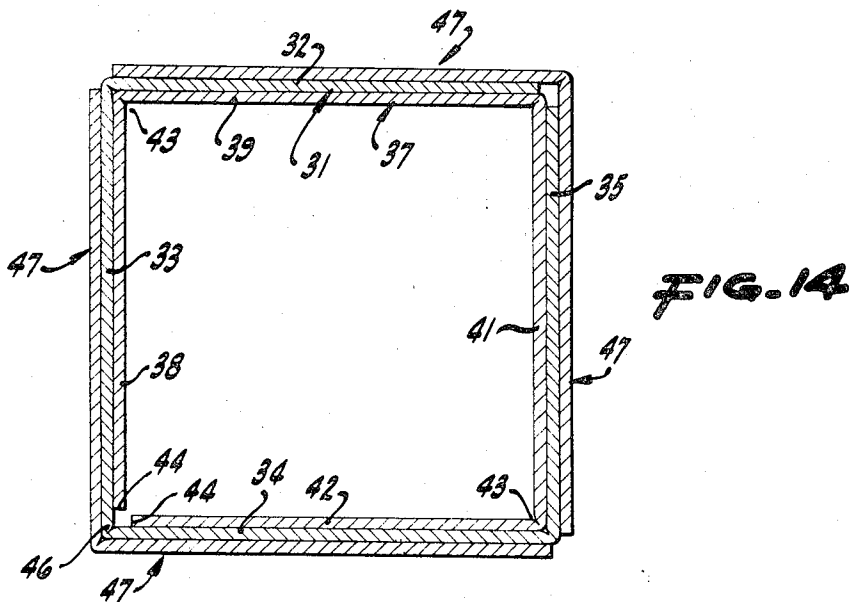
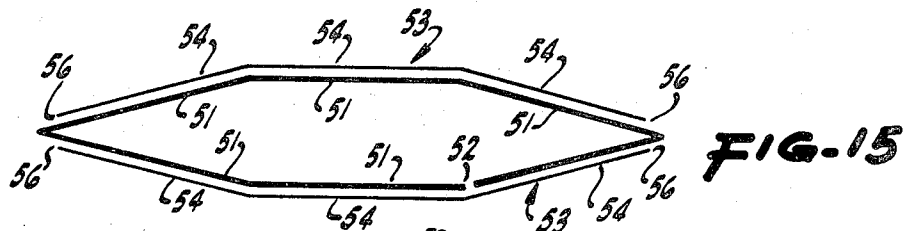
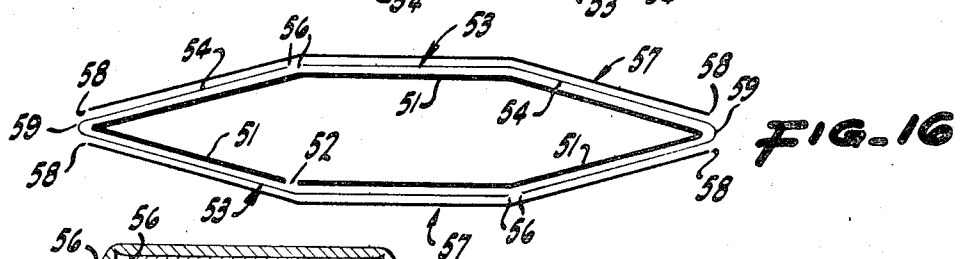
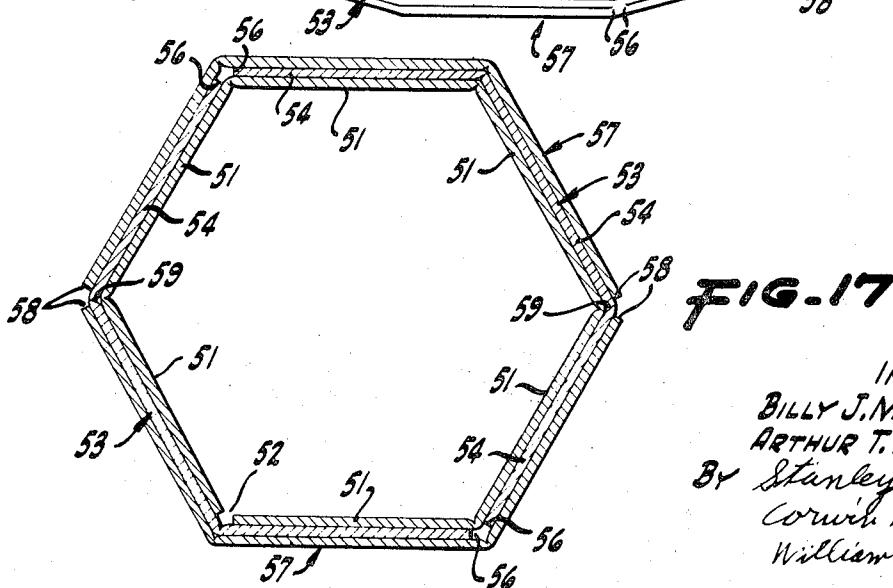


FIG. 13

INVENTORS
 BILLY J. MUSKOPF
 ARTHUR T. EDWARDS III
 BY Stanley Bialos
 Counsel R. Horton
 William K. Guarino
 ATTORNEYS



INVENTORS
 BILLY J. MUSKOPF
 ARTHUR T. EDWARDS III
 BY Stanley Bialos
 Corwin R. Horton
 William R. Quarles
 ATTORNEYS

MULTI-PLY CONTAINER

BACKGROUND OF THE INVENTION

As is disclosed in the U.S. Pat. to George et al., No. 2,634,038, dated Apr. 7, 1953, certain types of materials have inherent cold flow characteristics after being packaged in containers. For example, synthetic rubber has a tendency to flow and spread out laterally exerting great pressure against the walls of the container. The container disclosed in such patent is of such character as to provide strength for withstanding such lateral pressure, and comprises a plurality of telescoped sleeves of varying heights providing increasing thickness of the container walls from the top to the bottom. Each sleeve is a continuous strip of wall panels secured together at their end edges by a so-called manufacturer's joint, such as tape, which increases manufacturing costs in the application thereof.

SUMMARY AND OBJECTS

Summarizing the invention hereof, an improved container is provided. Although it is particularly adapted for shipping and storing material, such as synthetic rubber which has the aforementioned cold flow characteristics and hence exerts great pressure against the container walls, it may be employed for the packaging of other types of material which require a container of great strength. The container is desirably made of a plurality of plies of paperboard, advantageously so-called double wall corrugated paperboard.

The respective plies have wall panels which are adhesively laminated to each other to form container walls of multi-ply substantially uniform thickness throughout. The plies are so arranged that so-called manufacturer's joints such as corner tape, stitching or glue flaps are not required to fasten end edges of panels together, as the panels of the plies provide at least an integral corner construction at each of the upright corners of the container. Advantageously, the container walls are of at least three-ply thickness with each upright corner of at least two-ply thickness, which provide not only bulge resistance but also marked stacking strength.

Also, at least one of the plies advantageously comprises a plurality of pads; each pad having upright end edges and wall panels integrally connected along an upright hinge connection line positioned at an upright corner of the container. The end facing edges of adjacent pads are adjacent to but spaced apart at another corner, being free of attachment whereby a gap is provided between such edges; and the space between these facing edges is closed by an integral corner of a contiguous ply.

A special method is provided for forming the container from a collapsed state of the plies, comprising adhesively uniting strips having wall panels which form an inner ply and an intermediate ply, and adhesively uniting pads to the outer faces of the intermediate ply; each pad being composed of wall panels integrally connected together along a corner forming hinge connection line. The pads are so positioned that a hinge connection line thereof is at a corner of the container and the ends thereof adjacent to but unsecured to each other at another corner of the container.

From the preceding, it is seen that the invention has as its objects among others, the provision of an improved multi-ply container construction having walls of substantially uniform thickness throughout and in which the manufacturer's joint commonly employed for securing ends of panels together at an upright corner of the container, is not required, which has great strength including stacking strength, and is of economical and simple construction, and the provision of an improved method for forming such container. Other objects of the invention will become apparent from the following more detailed description and accompanying drawings in which:

DESCRIPTION OF FIGURES

FIG. 1 is a plan view of a paperboard blank forming the inner liner of one embodiment of the invention;

FIG. 2 is a transverse fragmentary cross-sectional view on an enlarged scale taken in a plane indicated by line 2-2 in FIG. 1;

FIG. 3 is a plan view of an L-shaped reinforcing pad;

FIG. 4 is an exploded isometric view illustrating the relationship of various parts of the container;

FIG. 5 is an elevational view of the container looking in the direction of arrow 5 in FIG. 6;

FIG. 6 is an enlarged horizontal cross section taken in a plane indicated by line 6-6 in FIG. 5;

FIG. 7 is a cross-sectional exploded view illustrating the relationship of certain of the parts in the method of assembling the container;

FIG. 8 is a similar view illustrating the parts of FIG. 7 after they have been collapsed to another position, and illustrating the relationship of pads which form an outer ply;

FIG. 9 is a plan view on a reduced scale of a blank which forms an intermediate ply in another embodiment of the invention;

FIG. 10 is a plan view of a blank which forms the inner ply of such embodiment;

FIG. 11 is a similar view of L-shaped pads which form an outer ply;

FIG. 12 is a schematic end elevational exploded view illustrating steps in the method of assembling such embodiment;

FIG. 13 is a similar view illustrating further steps;

FIG. 14 is an enlarged horizontal cross section of the embodiment formed by the blanks of FIGS. 9 through 11;

FIG. 15 is a schematic view of an additional embodiment illustrating the relationship of inner and intermediate plies of a container of hexagonal horizontal cross section;

FIG. 16 is a similar view illustrating the relationship of the outer ply to the remaining plies, and;

FIG. 17 is an enlarged horizontal cross section of the container.

FIGS. 1 through 8 disclose an embodiment of the invention in which the container has four upright walls and is rectangular in cross section; the walls being formed of three plies and are of uniform thickness throughout. Desirably the respective plies are of double wall corrugated paperboard, although solid paperboard of any other suitable type of strong sheet may be employed.

An inner ply 2 of the container comprises a continuous strip of integrally connected wall panels 3, 4, 6, 7 and 8 as can be seen from FIG. 1, which are integrally hinged together along respective hinge connection lines 11. End panels 3 and 8 of the strip are not full wall panels but in the setup container which is rectangular in cross section, end edges 12 of these end panels face each other, being unattached to each other but in substantial abutment to form substantially an abutment joint 13. Bottom closure flaps 16 are hingedly connected to the lower edge of inner ply 2 to form a bottom closure in the setup container. The blank from which inner ply 2 is formed is known in the trade as a half slotted container (HSC) blank.

Adhesively bonded to the outer face of inner ply 2 is a plurality of L-shaped pads 17 which provide an intermediate ply of the container; each pad being composed of a continuous strip of wall panels 18 integrally hingedly connected along an upright hinge connection line 19 positioned substantially in alignment with an upright corner A of the container. Each panel 18 is substantially a full wall panel, being of such length that its end edge 21 is located closely adjacent another corner B. The adjacent facing edges 21 of adjacent panels 18 are also unsecured together with a space or gap 21' existing between such facing edges 21 of adjacent pads. From FIG. 6 it will be noted that the abutment joint 13 of inner ply 2 is covered or closed by a panel 18 of a pad 17.

A pair of L-shaped pads 22, each pad being similar to an intermediate pad 17, forms an outer ply of the container and is adhesively bonded to outer faces of pads 17 with the upright integral hinge connection line 23 of each pad 22 overlying the space 21' at a corner between the adjacent edges 21 of intermediate pads 17. As with respect to edges 21 of intermediate

pads 17, the upright end edges 24 of adjacent outer pads 22 form a gap 24' at the corner A defined by an integral hinge connection of an intermediate pad 17.

From the preceding and as can be seen from FIG. 6, the container walls are all of uniform thickness, and comprise three plies laminated together by adhesive. Each upright corner of the container is of two-ply thickness making for strength even though spaces 21' and 24' are formed between the free or facing unsecured edges of adjacent pads. Also, in each instance corner spaces 21' and 24' are covered or closed by an integral corner hinge connection of a contiguous ply.

Stitching or glue flaps, or tape are not required to secure corners of the respective plies together, thus making for manufacturing economy, and for improved strength and quality. Although abutment joint 13 of inner ply 2 is located between adjacent corners of the container, it could also be formed at any corner instead but then in the embodiment thus far described, there would only be one-ply thickness at one corner and two-ply thickness at the remaining three corners.

A top closure formed of closure flaps similar to bottom flaps 16 may be provided if so desired, or the top end may be closed with a paperboard cap 26 as shown in FIG. 5. Also, flaps 16 may be eliminated and the bottom closed with a cap. For the type of product for which the container has found special utility, it is usually transported and mounted on a pallet because of the heavy weight of the contents. Hence, a single-ply bottom closure formed by flaps 16 is all that is required for bottom strength because of the reinforcing effect of the pallet.

In the particular embodiment disclosed in FIGS. 1 through 8, the container is about 41 inches in height and 33 x 34 inches (inside dimensions) in rectangular cross section. However, such dimensions are not critical and may vary widely. Although any suitable thickness for the plies may be employed depending upon the material to be packaged, for synthetic rubber blocks the plies are made of conventional double wall corrugated paperboard comprising two corrugated mediums 27 adhesively bonded to an intermediate paperboard liner 28 and to outer liners 29 as can be seen from FIG. 2. A suitable weight of each of the corrugated mediums is about 26 pounds per thousand square feet, and a suitable weight for each of the liners is about 42 pounds per thousand square feet. To enhance strength, the plies are desirably arranged so that at least two plies have their corrugations run transversely with respect to each other. The corrugations of the outer ply desirably extend vertically, the intermediate ply horizontally, and the inner ply vertically. However, the intermediate ply corrugations may extend vertically; and either of the inner or outer ply corrugations or both may extend horizontally.

FIGS. 7 and 8 illustrate the method of making the container. The continuous strip which provides inner ply 2 is collapsed to bring panels 8 and 3 together and form abutment joint 13. Adhesive is applied to the inner faces of pads 17 which provide the intermediate ply, and they are secured to the outer faces of intermediate ply 2 with a hinge connection line 19 of each pad 17 in substantial alignment with an integral hinge connection line or corner 11 of inner ply 2, thus forming a laminated two-ply construction. Then the two-ply construction is collapsed from the position shown in FIG. 7 to the position shown in FIG. 8 wherein the hinge connection corner 11 between panels 7 and 8 and the hinge connection corner 11 between panels 4 and 6 are on opposite faces of the two-ply construction. Outer pads 22 with adhesive on their inside faces are then adhesively united to the thus folded two-ply structure with an integral corner 23 of each pad in substantial alignment with a corner 11 of inner ply 2 over the space 21' between adjacent pads 17. The united three plies are then run through a compressor to firmly bond all the plies together, thus forming the described container when the structure is set up from collapsed state.

FIGS. 9 through 13 illustrate a modified construction which is substantially the same as that described except that the intermediate ply 31 is formed of a continuous strip, and the abutment joint of the inner ply is at a corner. Intermediate ply

31 comprises four hingedly connected full wall panels 32, 33, 34 and 35 having hingedly connected closure flaps 36 at top and bottom. Inner ply 37 also comprises four full wall panels 38, 39, 41 and 42. In making the container, adhesive is applied to the inside face of intermediate ply 31, and end panels 38 and 42 of inner ply 37 are turned inwardly along end score lines 43 and secured to panels 33 and 34 of intermediate ply 31, with their end edges 44 in substantial alignment with the central score line 46 of intermediate ply 31. Then end panels 32 and 35 of intermediate ply 31 are turned inwardly and secured to the outside faces of panels 39 and 41 of the inner ply, thus forming a two-ply construction.

With adhesive applied to two L-shaped pads 47 of the character previously described, they are secured to the outside faces of intermediate ply 31 with the panels of one pad 47 overlying panels 32 and 35 of intermediate ply 31, and the panels of the other pad 47 overlying panels 33 and 34 of such intermediate ply. The three-ply structure is then passed through a compressor, as previously related.

As can be seen from FIG. 14, the described construction also results in at least two-ply thickness at each corner. Also, all gaps and joints between adjacent wall panels at each corner are covered by an integral corner of a contiguous ply. Since the modification thus described has a plurality of pads forming only the outside ply, the two pads of the intermediate ply of FIGS. 1 through 8 are eliminated, it has the manufacturing advantage of enabling the structure to be assembled faster in the box plant.

In the described modification, closure flaps 36 are provided at both top and bottom but caps of the type shown in FIG. 5 may be employed in place of either set of bottom or top closure flaps. Although in the modification of FIGS. 1 through 8, the closure flaps are on the inner ply, they may be provided on the intermediate or outer ply if so desired, and vice versa with respect to the modification of FIGS. 9 through 13.

The principle of construction is applicable to any polygonal cross-sectionally shaped container. FIGS. 15 through 17 illustrate schematically such construction for a hexagonal cross-sectionally shaped container. The inner ply comprises a continuous strip of hingedly connected panels 51, the end panels of which are in substantial abutment to provide abutment joint 52.

An intermediate ply is formed of two pads 53 of a strip of three hingedly connected panels 54, the end edges 56 of which are unattached and extend to a corner of the container. The outer ply also comprises a pair of pads 57 similar to pads 53, the end edges 58 of which extend to an integral corner 59 of intermediate pad 53 and are unattached together at such corner. Thus a so-called manufacturer's joint is not required, and there is at least two-ply thickness at all corners of the container with gaps between adjacent end edges of adjacent panels of a ply covered by an integral corner of a contiguous ply.

We claim:

1. A multi-ply container having upright corners and walls composed of a plurality of plies laminated together, at least one of said plies being a continuous strip of integrally connected panels with all adjacent panels hingedly connected together except at the edges of the end panels, at least another of said plies comprising a plurality of separate pads nonintegral with any of the other components of said container, each pad having upright end edges and wall panels integrally connected along an upright hinge connection line positioned substantially in alignment with an upright corner of the container, and the length of each pad being such that each end edge thereof is located at another corner of the container with a space between the end edges of adjacent pads.

2. The multi-ply container of claim 1 wherein a ply contiguous to said another ply comprises adjacent panels integrally connected along an upright hinge connection line closing each of said spaces.

3. The multi-ply container of claim 2 comprising at least three plies a first of which being an inner ply comprising

panels hingedly connected together except at the edges of the end panels thereof, said edges being unattached and forming substantially an abutment joint, a second of said plies is an intermediate ply which covers said abutment joint, and a third of said plies is an outer ply which comprises said plurality of pads.

4. A multi-ply container having upright corners and comprising an inner ply, an intermediate ply and an outer ply adhesively bonded together, said inner ply being composed of a plurality of hingedly connected wall panels the end panels of which have upright facing edges unattached to each other, said intermediate ply covering said facing edges of said inner ply and having at at least one corner of the container upright edges which are unattached to each other, said outer ply including a plurality of wall panels integrally connected along an upright hinge connection line substantially in alignment with and covering a corner of the container, end edges of adjacent panels of said outer ply being unattached to each other at a corner of the container, and said container having at least two-ply thickness at each corner thereof.

5. The container of claim 4 wherein said intermediate ply comprises a plurality of pads.

6. The container of claim 4 wherein said intermediate ply is a continuous strip of wall panels the end panels of which are the ones that have said unattached edges.

7. The container of claim 4 in which the plies are of paper-board, and at least two of said plies have their corrugations extending transversely with respect to each other.

8. The container of claim 4 wherein at least one of said plies has hingedly connected closure flaps to provide a closure for the container.

9. A multi-ply container composed of at least three plies adhesively bonded together and having upright walls and an upright corner construction of two-ply thickness provided by

two of the plies, the remaining ply having adjacent end edges unattached to each other at said corner.

10. The construction of claim 9 wherein the inner of said plies has end edges substantially in abutment and unattached to each other.

11. A multi-ply container comprising at least three plies laminated together, a first one of which being an inner ply comprising panels hingedly connected together except at the edges of the end panels thereof, said edges being unattached and forming substantially an abutment joint, a second of said plies being an intermediate ply which covers said abutment joint, and a third of said plies being an outer ply comprising a plurality of pads with each pad having upright end edges and wall panels integrally connected along an upright hinge connection line positioned substantially in alignment with an upright corner of the container, the length of each pad being such that each end edge thereof is located at another corner of the container with a space between the end edges of adjacent pads, and a ply contiguous to said pads which form said outer ply comprising adjacent panels integrally connected along an upright hinge connection line closing each of said spaces between such pads.

12. The multi-ply container of claim 11 wherein said intermediate ply is also comprised of a plurality of said pads.

13. The multi-ply container of claim 11 wherein said joint of said inner ply is located between adjacent corners of the container.

14. The multi-ply container of claim 11 wherein said joint of said inner ply is located at a corner of the container.

15. The multi-ply container of claim 11 wherein said intermediate ply comprises panels hingedly connected together along integral hinge connection lines except the end panels the edges of which are unattached at a corner of the container.

40

45

50

55

60

65

70

75