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Crane

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[54] **STABILIZING MEANS FOR PLASTIC REINFORCED PAPERBOARD LUG BOX**

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[52] **U.S. Cl.** ..... **229/23 R**; 229/45

[51] **Int. Cl.**[2] **B65D 5/02**; B65D 45/00

[58] **Field of Search** ..... 217/40, 42; 229/23 R, 36, 229/44 R, 45, 43

[56] **References Cited**

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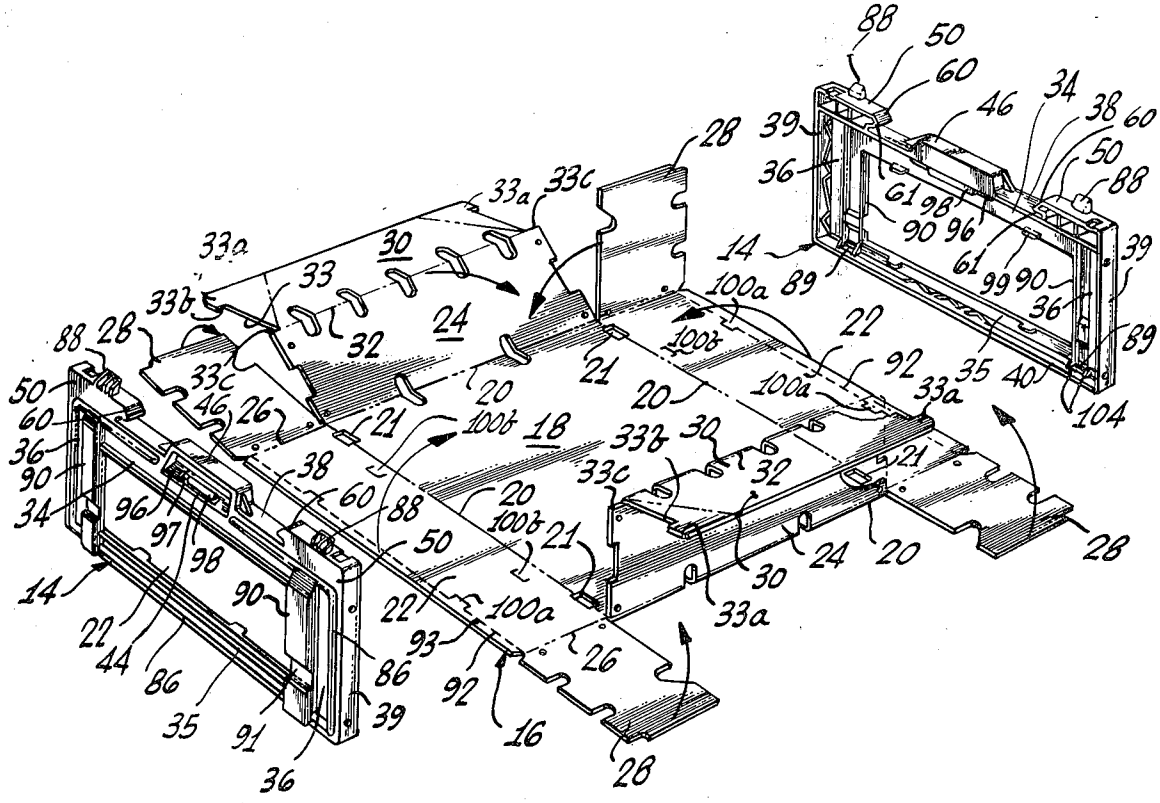
Primary Examiner—Davis T. Moorhead

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[57] **ABSTRACT**

A plastic and paperboard lug box type produce container, comprised of a rectangular paperboard container having sides and ends, a bottom, and lids hinged to the upper edges of the sides, and rectangular, plastic end frames forming caps to receive limited portions of opposite ends of the container, the end walls of the container being stiffened against warpage out of their normal planes by bending a narrow flap therefrom on a horizontal hinge line, and there being lugs formed on the end frame to penetrate apertures in the end walls of the container, with hook ends thereon to engage over edges of these apertures and hold the end walls snugly against the end frames. The end frame has flanges which engage and overlap end portions of the container side walls, and rivets or staples secure these overlapped parts to secure the end frames and boxes in proper assembly notwithstanding repeated stresses in shipment over long hauls.

7 Claims, 8 Drawing Figures



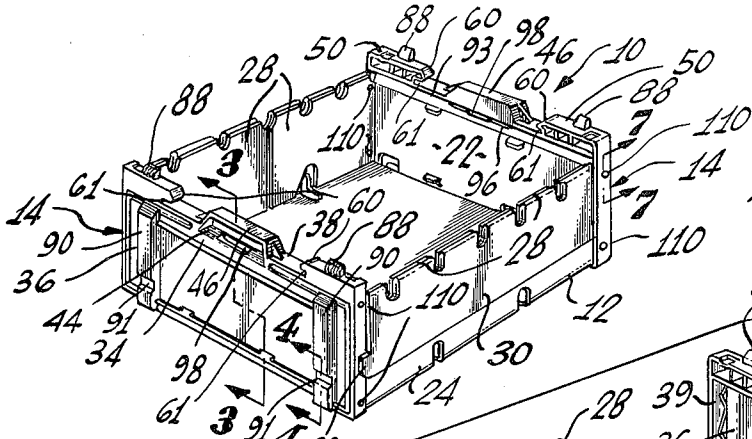


Fig. 1

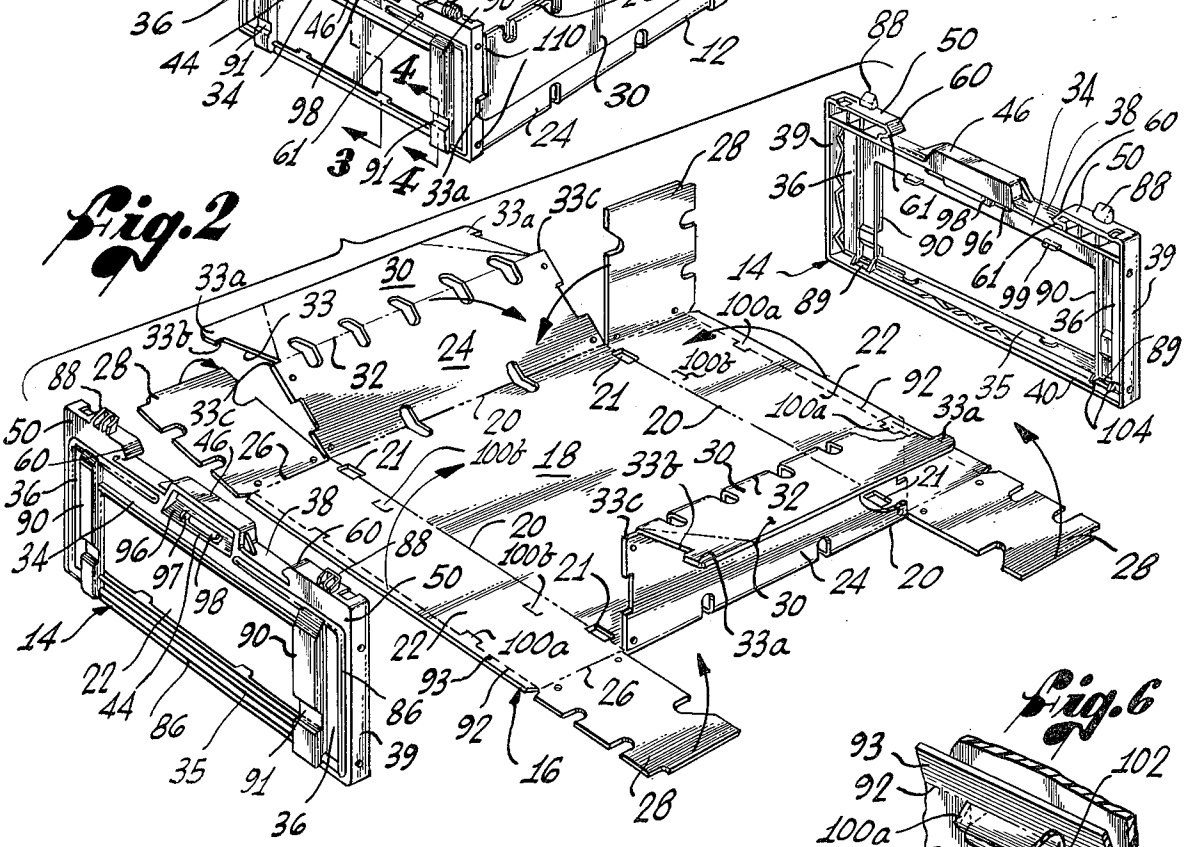


Fig. 2

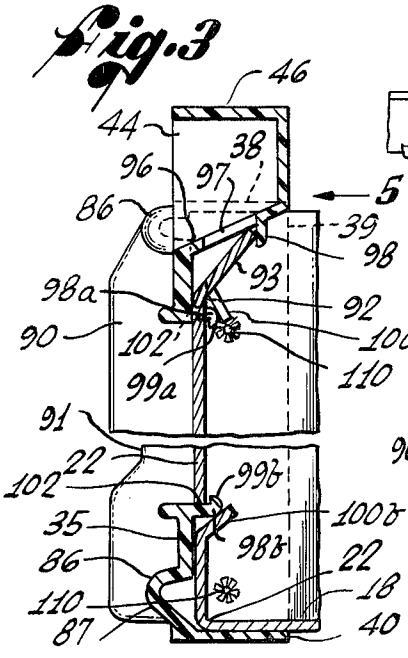


Fig. 3

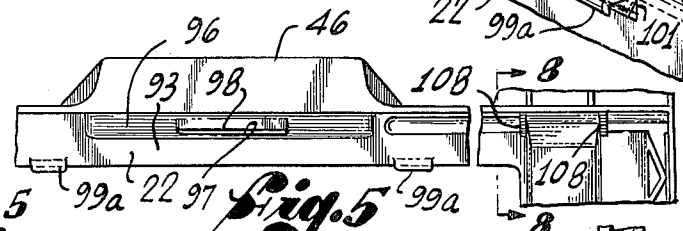


Fig. 5

Fig. 6

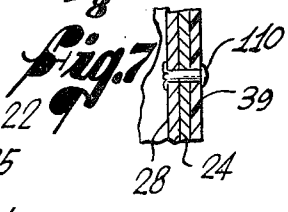


Fig. 7

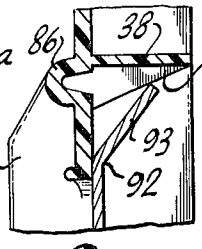


Fig. 8

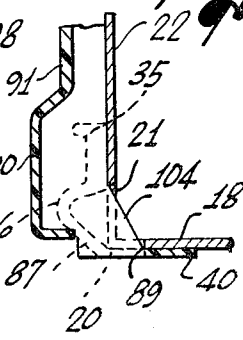


Fig. 4

STABILIZING MEANS FOR PLASTIC REINFORCED PAPERBOARD LUG BOX

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to containers of the "lug box" type, and particularly to those made of paper board or any other suitable semi-flexible container board, reinforced by plastic or sheet metal end frames which fit onto the container board forms like rectangular end caps.

2. Description of the Prior Art

A lug box container representative of the prior art is disclosed in my copending application Ser. No. **307,962,** filed Nov. **20, 1972,** now U.S. Pat. No. **3,878,980.** It is comprised of a rectangular container board box or container, made preferably from a single blank, and comprising a bottom, side walls turned up from the longitudinal edges of the bottom, lids hinged to the upper edges of the side walls, and end walls turned up from the end edges of the bottom wall. The vertical edges of the end walls have hinged thereto side flaps which overlap and are glued face-to-face to the side walls for connection and reinforcement.

The material of the container board may be, preferably, well known semi-rigid corrugated paperboard, or any suitable equivalent stock which may be bent along scored bend or hinge lines.

Applied over the ends of the container are stiff or rigid reinforcing frames of open rectangular configuration which are preferably unitary molded plastic shapes, or can be fabricated from sheet metal. These frames have coplanar flanges which seat against the outer surfaces of the end walls, and flanges perpendicular to the coplanar flanges which fit snugly, like caps, over narrow end portions of the container. The hinged lids remain outside these caps. The upper and lower perpendicular frame flanges provide, or have thereon means providing, interengageable substantially horizontal stacking surfaces such that a number of the containers may be stacked, frame against frame, in vertical columns. The flanged construction of the plastic end frames provides the latter with sufficient strength and rigidity in their vertical edgewise directions to withstand, without buckling or collapsing, the maximum stacking loads normally encountered when the containers are stacked in their filled condition.

The upper and lower perpendicular frame flanges are relatively thin, and have, respectively, substantially horizontal upwardly and downwardly facing exterior side surfaces thereon. Extending vertically outward from the exterior side of one of these upper and lower perpendicular flanges, preferably the upper flange, is a spacer means, which has thereon one of said substantially horizontal stacking surfaces, (which may be in one or more coplanar sections) which is thus spaced outwardly from the correspondingly facing exterior side surface of the flange. The oppositely facing stacking surface is then the aforementioned substantially horizontal exterior surface on the other of these upper and lower perpendicular flanges.

SUMMARY OF THE PRESENT INVENTION

The present invention provides improvements in the prior paperboard lug box described in the preceding paragraphs in strength, stiffness, and security, and especially in the support of the paperboard box ends in

fixed vertical planes, without warpage to which the boxes of the prior art were sometimes subject. To maintain the box ends in a good coplanar condition, I provide a fold or score line horizontally thereacross, near one of its horizontal edges, and then support the long narrow flap so provided at an obtuse angle to the plane of the end wall, so that any bending stress thereacross is resisted or prevented. I then lock the end walls of the paperboard box flush and flat against the upper and lower coplanar flanges of the end frames by locking elements projecting from said flanges through locking notches in the end walls. Finally, I secure the extremities of the side walls of the container to the overlapping vertical perpendicular flanges of the end frames, preferably by metal rivets or staples, giving the box maximum security in this region.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a complete lug box in accordance with the invention;

FIG. **2** is an exploded view thereof showing the components of the box prior to assembly;

FIG. **3** is a vertical section taken on the broken line **3—3** of FIG. **1**;

FIG. **4** is a vertical detail section taken on line **4—4** of FIG. **1**;

FIG. **5** is a fragmentary side elevational view, enlarged, looking in the direction indicated by the arrow **5** in FIG. **3**;

FIG. **6** is an enlarged perspective view of a detail seen in FIG. **1**;

FIG. **7** is a detail section taken on line **7—7** of FIG. **1**; and

FIG. **8** is a detail section taken on line **8—8** of FIG. **5.**

DESCRIPTION OF AN ILLUSTRATIVE EMBODIMENT

The reinforced paperboard container **10** has a body **12,** and rigid reinforcing end frames **14** made of a molded thermoplastics material. Body **12** can be of any suitable container board. Without limitation thereto, the invention will be described where the container is constructed from a blank **16** of corrugated paperboard or other suitable paperboard material. The blank **16** is folded in the manner illustrated in FIG. **2** to its final shape of FIG. **1.** Plastic end frames **14** are then applied over and secured to the ends of the body, but with the presently mentioned hinged lids of the container outside the end frame.

Referring to FIG. **2,** the container blank **16** has a rectangular bottom wall **18** with end and side edges. Joined to these edges of the bottom wall along scored or creased fold lines **20** are end walls **22** and side walls **24.** Joined to the ends of the end walls **22** along fold lines **26** are flaps **28.** A pair of slots **21** intersect each fold line **20.** Lids **30** are hinged to the upper edges of the side walls **24** along hinge lines **32.** The end edges **33** of these lids are offset from the vertical end edges of the side walls **24** by a distance which is substantially equal to or slightly greater than the widths of the end frames **14.** Thus there are shoulders at **33***c*, which are substantially extensions of hinge line **32,** though preferably with a slight downward slope, along which the lids **30** are unconnected with the side walls **24.** At the swinging corners of the hinged lids are locking tabs **33***a* which may project substantially to the plane of the end

walls of the container, forming locking shoulders 33*b*.

The container blank **16** is erected by folding the end walls **22** upwardly and folding the end wall flaps **28** inwardly normal to the end walls. The side walls **24** are then folded upwardly against and adhesively bonded to the inwardly folded flaps **28.** The lids **30** are foldable on their hinge lines **32** to closed positions over the open top of the container body.

Each end frame **14** comprises a rectangular integral structure embodying four coplanar flanges, an upper flange **34,** a lower flange **35,** and side flanges **36,** which overlie marginal portions of the end walls of the container, and engage flat thereagainst. In addition, the frames **14** include four flanges **38, 39** and **40** extending perpendicularly from the outer edges of the flanges **34,** 35, and **36,** the flange **38** being an upper flange, flanges **39** being side flanges, and flange **40** being a lower flange. These snugly fit on over limited end portions of the bottom and side walls of the container, and go on over the end walls **22,** forming end caps. The lids **30** remain outside. Means in accordance with the present invention for securing the end frames on the container, and for supporting the end walls in good planar positions, will be described hereinafter.

Centrally located on and extending vertically upward from a substantially horizontal upwardly facing exterior surface on the upper side of the upper perpendicular flange **38** of each end frame **14** is a spacer means **46** whose top forms a substantially horizontal, elevated stacking surface, and which is cored out to form a horizontally disposed recess **44.** The recess opens outwardly and serves as a handle, giving proper room for the fingers. The spacer structure **46** is of the same width as the upper frame flange **38.** Its top surface constitutes a support for the bottom perpendicular flange **40** of the end frame **14** of the container just above in a vertical stack of such containers.

The aforementioned spacer **46** occupies a central position on top of the flange **38,** extending for a distance as shown along the flange **38.** Occupying opposite end portions of the flange **38,** and spaced from opposite ends of the spacer **46,** are elevated spacers **50,** with flat horizontal tops forming substantially horizontal stacking surfaces coplanar with that at the top of spacer **46,** and cored out, as seen in FIG. **2.**

Thus, a given container, when stacked on a container below, will have the substantially horizontal lower exterior surface on the lower side of its lower flange **40** in engagement with and resting upon the three spacers **46** and **50.** It thus comprises the lower stacking surface of the end frame.

The weight of a stack of containers is thus transferred through the plastic end frames of the containers rather than through any paperboard portions of the latter.

The ends of the spacers **50** confronting the handle **44** have hook-forming projections **60,** forming therebelow tapered throats **61,** which are adapted to engage over and receive the opposed shoulders 33*b* formed on locking tabs 33*a*, projecting laterally from the end edges **33** of cover panels **30.** The end edges **33** extend alongside the spacers **50** to meet shoulders 33*c* which are approximately aligned with hinge line **32** and are formed along the top edge of each side wall **24** outwardly of the lids **30.**

Now, when the lids or top panels are to be folded in and over a filled carton, the tab 33*a* of a corner portion **70** of the lid engages the tapered tip of the projection **60,** and by pressing downwardly on the corner portion of the lid just outwardly thereof, the tab slides down the incline and into the throat **61.**

On each end frame, running entirely around the end flanges **34, 35** and **36,** excepting at the location of the handle, is a rounded bead **86,** which serves as a buffer against containers of an adjacent stack. The underside of the bead on the lowermost flange leads to a bevelled surface **87,** which facilitates penetration by the blades of a conventional clamp truck by which a carton can be conveniently lifted from the floor, or from a conventional pallet as shown in FIG. **1.**

Projecting upwardly from each of the spacers **50** is a tapering positioning prong **88,** adapted for reception, with small clearance, in an aperture **89** formed in the lower flange **40** of an end frame immediately above. The paperboard box structure is apertured at **21** suitably to permit entrance of these prong structures.

In the particular design of the end frame here shown for illustrative purposes, the inner edge of each vertical coplanar flange **36** merges with or is completed by an integral vertical column portion **90,** displaced outwardly from the flange **36,** and also outwardly beyond the aforementioned bead **86.** This column portion **90** preferably has a transverse indentation **91,** to the depth of a plane tangent to the bead **86,** for a purpose to be mentioned hereinafter.

Returning now to consideration of the end walls **22** of the container, it has been found in practice that when these are constructed of conventional paperboard or the equivalent, such as conventional corrugated board, there is a tendency for undue warpage under certain conditions, and for the fastenings to the end frames to pull loose. The present invention affords means acting to hold the end walls in improved planar condition, in secure connection to the end frames, as will now be described.

First, to hold the end walls **22** in a planar condition, I form them, in parallelism with, and spaced a short distance from one horizontal edge (preferably the top edge) with a horizontal score line **92.** In the embodiment here shown, this score line is a short distance down from the upper edge, and the score line is on the inner face of the wall, so that the horizontal edge flange or flap **93** so formed tends to hinge or bend inward, as seen best in FIG. **3,** to a substantial angle relative to the vertical plane occupied by the rest of the end wall. Held in this position, the end wall is stabilized by the hinge line against any harmful warpage.

It will of course have been noted that the main vertical panel of the end wall **22** abuts the inside surfaces of the coplanar flanges **34, 35** and **36** of the end frames. Just below the central spacer and handle structure **46,** the end frame member is formed with an angular wall **96,** longitudinally coextensive with the structure **46,** and longitudinally apertured as at **97.** This wall **96** is formed with a depending lip **98** serving as an abutment or catch for the upper edge of the end wall flap **93,** holding it in the angular position of FIGS. **1** and **3.** The upper edge engages snugly under the lip **98,** the flap **93** bridging across the aperture **97,** when the end wall **22** has been seated against the upper and lower coplanar flanges **34** and **35** and over the perpendicular flange **40,** as seen in FIGS. **1, 3** and **4.** The flap **93** also engages angular webs **108** which also deflect them angularly on the hinge line **92.**

Each upper end frame coplanar flange **34** is formed adjacent its lower edge with a pair of horizontally spaced, short, perpendicularly projecting locking elements or flanges **98***a*, recessed and shouldered on their undersides to form downwardly facing hooks **99***a*, and the lower end frame coplanar flanges **35** are formed adjacent their upper edges with a similar pair of recessed and shouldered flanges **98***b* formed to provide similar but upwardly projecting hooks **99***b*.

The end walls **22** of the container are severed, and scored on their inside surfaces, to provide inwardly folding flaps **100***a* and **100***b* opposite the hooks **99***a* and **99***b*. The three-edged apertures **101** resulting from the making of these flaps nicely receive said hooks, and permit them to engage over the horizontal aperture edges **102.** As will appear, the hooks **99***a* and **99***b* face downwardly and upwardly, respectively, and the flaps **100***a* and **100***b* are hinged at their upper and lower edges, respectively, in the illustrative embodiment. Preferably, the hinge line of the upper flaps coincides with the score line **92.**

In the assembly of the container, the upper flap **93** is engaged upwardly against the frame lip **98,** and the end wall **22** pressed into the frame, the upper edge flange or flap **93** of the end wall bending on the hinge line **92** by reason of engagement of the flap **93** against angular wall **96** and webs **108.** The locking elements **98***a* and **98***b* simultaneously force the flaps **100***a* and **100***b* back, until their hook ends engage over the end wall edges **102** afforded by the cutting of said flaps. Thus, marginal portions of the end walls **22** overlap, engage and are locked to marginal portions of the frame flanges **34** and **35.**

The aforementioned slots **21** along the container end score line **20** are centered with the columns **90,** and aligned therewith are vertical apertures **89** in the bottoms of the end frames, positioned to receive and laterally locate projections **88** on the end frame of a container immediately below. These apertures are between bracing webs **104.**

The overlapping side perpendicular flanges **39** of the end frames are then riveted to the underlying end edge portions of the side walls **24** by suitable heavy rivets **110,** as shown particularly in FIGS. **1** and **7.** The rivets can be either plastic or metal, but metal is preferred; and heavy staples can also be used.

The combined achievement is stability and bracing against warpage of the end walls, and added overall strength to the container. The hinge line and flap keep the end walls of the paperboard container against undue warpage, since the end wall cannot bend materially transverely of the hinge. At the same time, the end walls below the hinge line are secured flush against the horizontal, upper and lower coplanar flanges of the plastic end frame, while the riveting or stapling of the side or end perpendicular flanges of the end frames to the underlying end portions of the side walls of the container place the rivets or staples in shear, and thus maximize the strength of the fastening.

Various changes within the scope of the invention may of course be made without departing from the scope of the appended claims.

What is claimed is:

1. In a generally rectangular container with rigid rectangular, reinforcing end frames at opposite ends thereof, the container having rectangular bottom, side and end walls, and lids which are hinged to the upper edges of said side walls, said rectangular end frames comprising integral, coplanar, upper, lower and side flanges parallel with the end walls of the container and lying thereadjacent, and rectangular integral upper, lower and side flanges, integral with and projecting perpendicularly from said coplanar flanges from the outer margins thereof, whereby to provide reinforcing caps receiving therein the corresponding end walls of the container and end portions of said bottom walls, with the perpendicular side flanges thereof lying closely adjacent said side walls of said container;

each of said end walls having a horizontal score line near one horizontal edge thereof and the flap so formed being bent through an acute angle on said score line, whereby to resist warpage of said end wall transversely of said score line.

2. The subject matter of claim **1,** wherein said score line is near the upper edge of each end wall, and the flap formed thereby is bent inwardly relative to the container through an acute angle relative to the plane of the end wall.

3. The container of claim **1,** including means on the end frames engaging said flaps to force them into and to hold them in said bent positions.

4. The container of claim **2,** including means on the end frames engaging said flaps to force them into and to hold them in said bent positions.

5. The container of claim **1,** wherein:

portions of the perpendicular side flanges of the end frames overlap adjacent portions of the side walls of the container; and including

fastener elements penetrating said overlapping portions of said side flanges of said end frames and side walls of said container.

6. The subject matter of claim **3,** including also:

headed prongs on and projecting from said upper and lower coplanar frame flanges and cooperating apertures in said end walls of said container which receive and engage behind the heads of said prongs to releasably hold said end walls snugly against said frame flanges.

7. The subject matter of claim **3,** in which said flap engaging means comprise walls of angular profile on said end frames engaging the upper edges of said flaps to support them in said bent positions.

* * * * *