Nov. 27, 1945. J. E. BORAH 2,389,890

CONTAINER

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FIG. 1.

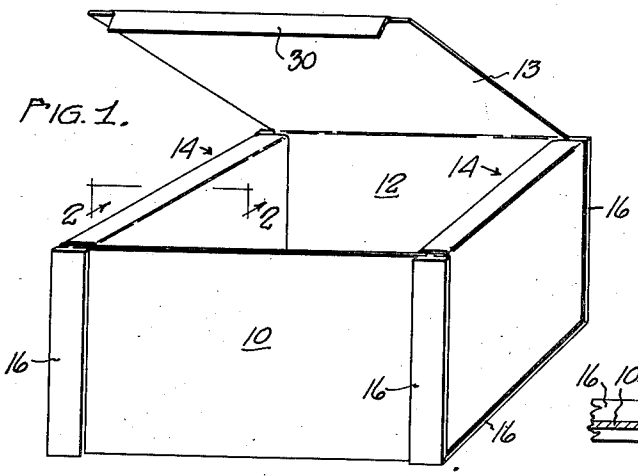


FIG. 8.

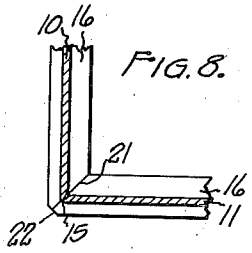


FIG. 9.

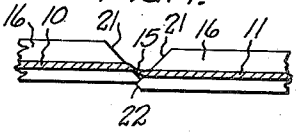


FIG. 2.

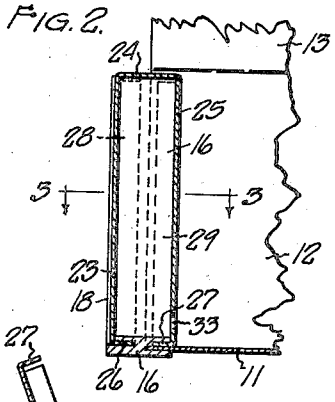
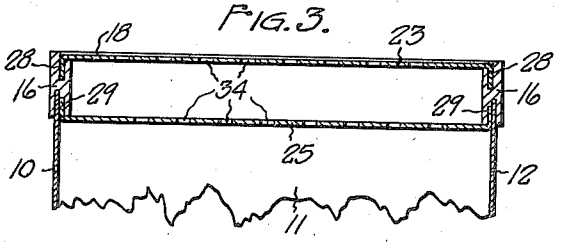


FIG. 3.



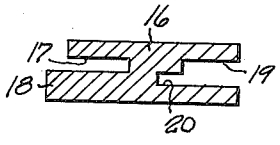
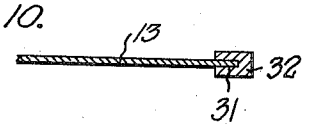


FIG. 4.

FIG. 10.



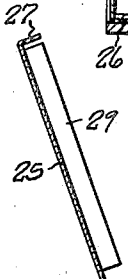


FIG. 6.

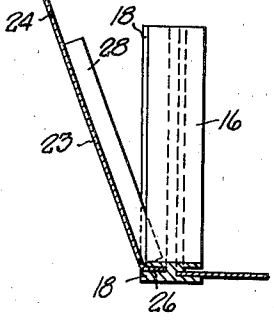
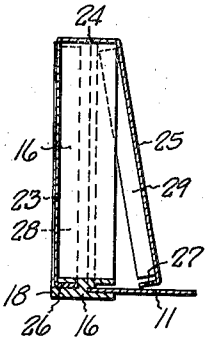


FIG. 7.



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FIG. 5.

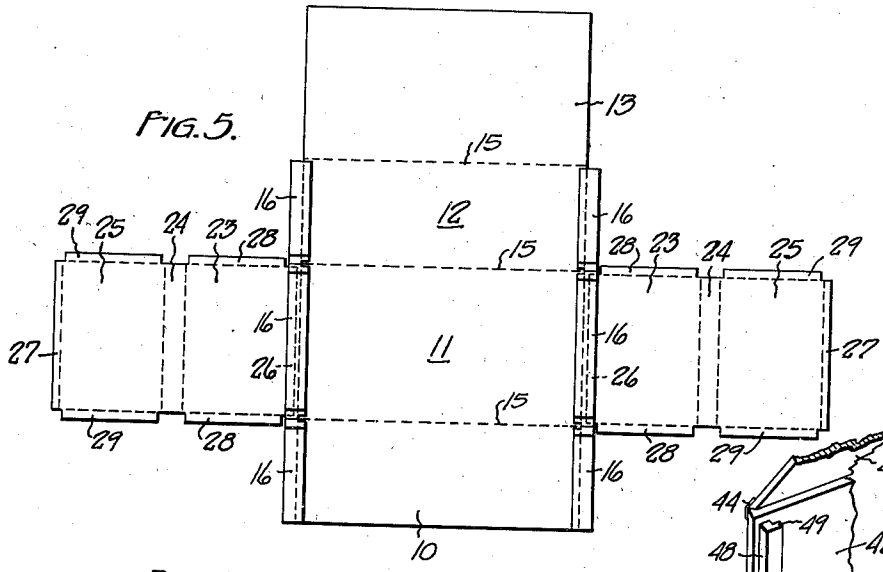


FIG. 11.

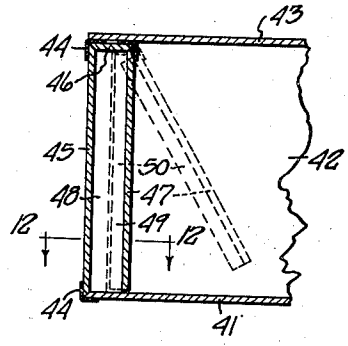


FIG. 13.

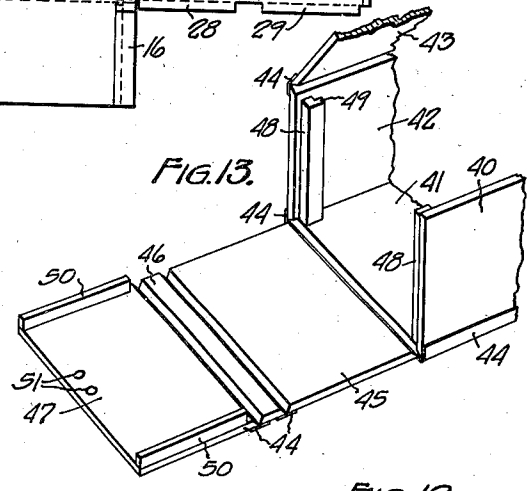


FIG. 12.

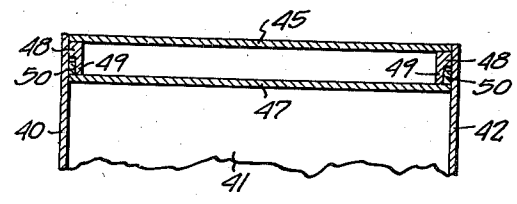
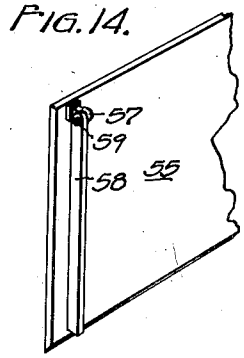


FIG. 14.



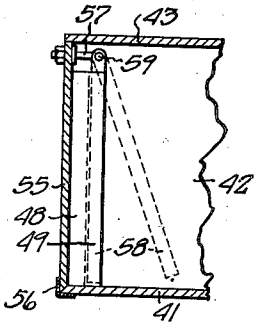


FIG. 15.

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UNITED STATES PATENT OFFICE

2,389,890

CONTAINER

John E. Borah, Penn Township, St. Joseph County, Ind.

Application March 1, 1943, Serial No. 477,525

14 Claims. (Cl. 229—23)

This invention relates to containers, and more particularly to shipping containers, storage containers and the like.

The primary object of the invention is to provide a container which can be shipped and stored in flat knockdown form, and which can be set up or erected quickly, easily and without the use of securing means.

A further object is to provide a collapsible container whose parts are so interlocked or interengaged when erected as to provide a strong rigid container.

A further object is to provide a container of the set-up type whose parts cooperate in interengaging relation to positively interlock and to sustain all stresses applied thereto in use in a manner to enhance and continuously effectuate said interlock.

Other objects will be apparent from the description, drawings and appended claims.

In the drawings:

Fig. 1 is a perspective view of one embodiment of the invention.

Fig. 2 is a fragmentary vertical sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a fragmentary horizontal sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is an enlarged transverse sectional view of a frame member used in the Fig. 1 embodiment.

Fig. 5 is a plan view of the container in knockdown or flat condition.

Fig. 6 is a fragmentary vertical sectional view taken on line 2—2 of Fig. 1 and illustrating one step in the erection of the container.

Fig. 7 is a vertical sectional view similar to Fig. 6 and illustrating another step in the erection of the container.

Fig. 8 is a fragmentary detail sectional view illustrating the relation of frame members when the container is erected.

Fig. 9 is a fragmentary detail sectional view similar to Fig. 8 illustrating the position of the frame members when the container is in flat collapsed condition.

Fig. 10 is a fragmentary sectional detail view.

Fig. 11 is a fragmentary vertical sectional view, similar to Fig. 2, of another embodiment of the invention.

Fig. 12 is a fragmentary horizontal sectional view taken on line 12—12 of Fig. 11.

Fig. 13 is a fragmentary perspective view of the Fig. 11 embodiment illustrating the container in partially erected condition.

Fig. 14 is a fragmentary perspective view of the end panel construction of another embodiment of the invention.

Fig. 15 is a fragmentary vertical sectional view, similar to Fig. 2, of the Fig. 14 embodiment of the invention.

Referring to the embodiment of the invention illustrated in Figs. 1 to 10, inclusive, the container comprises a front wall 10, bottom 11, back wall 12, folding top 13, and ends 14. The container is preferably formed from corrugated paper board, solid fiber board, or any other strong, rigid material adapted to be scored and bent. The front, bottom, back and top are preferably formed from a single rectangular blank of material which is bent along scored lines 15 (Fig. 5) to form said parts.

Rigid frame members 16 of the construction best illustrated in Fig. 4, are secured to the edges of each of the front, bottom and back panels. Frame members 16 are of generally H-form in cross section. A longitudinal slot or channel 17 is formed in one edge of each frame member, of a width to snugly slidably receive a single thickness of the paper board or other material of which the container walls are formed. One portion 18 of said member defined by said slot 17 preferably projects beyond the end of the other portion a distance preferably greater than the thickness of said paper board. A longitudinal slot 19 is formed in the opposite edge of each frame member, and is of a width substantially twice the width of slot 17. Slot 19 has a reduced width inner portion 20. Frames 16 are mounted on the main blank at the front, bottom and back panels with said panels, fitting in slot 19 and inner reduced portion 20 thereof and fixedly secured thereto by means of glue or of nails or staples driven therethrough at inner reduced width portion 20. The frame members are so positioned that the open or unfilled portion of slot 19 is inwardly positioned relative to the position of the container panels when erected.

The lower ends of the frame members at the vertical panels and both ends of the frame member at the bottom panel are preferably mitered at 21 as illustrated in Figs. 8 and 9. The mitered ends permit the solid abutment of said ends when the container is erected to insure effective sustaining by said frame members of stresses applied to the container. The corner formed by adjacent ends of abutting frame members is beveled or cut away at 22, to an extent permitting the full opening of the main blank to flat form. As best illustrated in Fig. 9, the ends of adjacent frame members are adapted to slide upon each other

when the main blank is opened. In this connection, the folding of fiber board along a score 15 entails a certain degree of doubling of the material at the score, so that subsequent flattening of the material spaces the panels or portions on opposite sides of the score apart a distance equal to the width of the score. Consequently a small amount of play is provided which permits the frame ends to shift relative to each other as illustrated.

Each of the ends 14 of the container is formed from a single blank of fiber board of generally rectangular shape, which is scored transversely to define an outer panel 23, an intermediate portion 24, an inner panel 25, outer end flange 26 and inner end flange 27. The end blank also has lateral flanges 28 projecting from opposite sides of outer panel 23 and lateral flanges 29 projecting from opposite sides of inner panel 25. The inner end flanges are secured in the slot 17 of the frame members 16 mounted on bottom panel 11 by any suitable means, such as glue, nails or staples, whereby the completed container blank assumes the shape of a cross when flat.

The container is assembled in the manner best illustrated in Figs. 6 and 7. The front and back walls are held perpendicular to the bottom, and the end-forming blanks are then raised toward vertical position with perpendicularly bent flanges 28 thereof being directed and inserted into grooves 17 of the front and back frame members. When the outer panel reaches vertical position, its side margins will bear against portions of the outer edges of frame members 16, and flanges 28 will fit snugly in grooves 17 to hold the front and back walls in parallel vertical position. The end-forming blank is then bent to position intermediate portion 24 horizontally, with its margins bearing upon the upper edges of frame members 16. Inner panel 25 is then bent downwardly, with the flanges 29 bent perpendicularly therefrom seating in the open portions of grooves 19 of the vertical frame parts. As the inner panel approaches vertical position, inner end flange 27 enters the open portion of the groove 19 in the bottom frame. As above mentioned, the grooves in the frames receive the various flanges snugly, though permitting sliding of the flanges therein to facilitate insertion and removal. Since the flanges are folded from the end-forming blank, there is a certain tendency thereof to return to flat condition, and this serves as a spring action to hold the flanges in place within the frame grooves if the grooves are slightly wider than the thickness of the fiber board. All exposed surfaces of ends 14 are smooth, which eliminates the possibility of accidental release of the parts from operative interlocked relation. Also, in use, the application of pressure at any exposed face tends to press the flanges more firmly into their receiving grooves. Consequently, when the container is set up, its parts are interlocked or self-locked, and no securing means are required to maintain or hold it erect. Note also that each of the front and back walls is held erect by the interlock of two flanges with its frame at each end.

The top panel may have a flange 30 at its free edge, for sealing purposes. Sealing may be accomplished by means of latches having cooperating or interengaging parts carried by the top and by the upper portions of vertical container walls; or by means of staples, wire or strap bindings, or any other conventional or desirable sealing means.

The container is very strong, by virtue of the U-shaped reinforcing frame formed by members 16 at each end, and also by virtue of the double thickness end construction. Note, also, that the corners and edges of the container, which are the critical points at which breakage or failure occurs in a large percentage of all cases of failure of fiber board containers, are all reinforced by the wood frames or by multiple thicknesses of the fiber board. In the case of the framed edges, the portions 18 of frame elements 16 may project beyond the plane of the outer face of outer end panels 23 to enhance the protective function of said frame elements. In the event a positive reinforcement at all top edges of the container is desired, the margins of the top panel 13 may be secured in grooves 31 in reinforcing bars 32 of U-shaped cross section, as illustrated in Fig. 10.

Where the container is to be re-used, so that collapse thereof to facilitate return shipment in compact flat form is desirable, suitable means may be provided to facilitate the collapsing operation. As illustrated in Fig. 2, one or more small holes 33 may be formed in the inner end panel 25 adjacent the lower end thereof, into which the user may insert his fingers to obtain a purchase sufficient to effect the outward pull required to withdraw flanges 27 and 28 from the frame grooves. The container can thus be folded to flat form easily and quickly without breakage thereof or damage thereto, which would interfere with or prevent re-erection of the container or re-use thereof.

It will be noted that a chamber is formed at each end of the container. This can be used in a number of different ways. Thus it can be used as a receptacle for a refrigerant or for an agent for treating, preserving or protecting the container contents. In some instances where the product to be shipped or stored includes a part which may be separated from other parts, such part to be separated may be placed in the end compartment by forming access or filling openings in end portions 24 or 25. The end chambers may also form ventilating means by having openings 34 formed in staggered relation in inner end wall 25 and outer end wall 23, thus avoiding danger of exposure of the contents, such as fruit, to direct impact from the exterior of the container.

Another feature of the container is its simplicity. Thus by using three fiber board blanks, and forming multiple panels or walls from each blank, the number of parts is held at a minimum. Also, the construction and arrangement of the frame elements holds the required number thereof and the number of permanent connections between between blanks and frame elements at a minimum. The frame members are well adapted to be formed from wood, although they can also be formed from plastic material, metal or other material, if desired. It will also be noted that the container can be formed from a single blank by cutting the same in the outline illustrated in Fig. 5. In this case, frame members are required only at the edges of the front and back panels, and the same self-locking arrangement of parts described above is achieved thereby.

An embodiment of the invention in a container formed of wood, metal or other non-bendable material is illustrated in Figs. 11 to 13. The container has a front panel or wall 40, bottom 41, back panel 42, top 43, each preferably with beveled edges and pivotally connected. As here illustrated flexible fabric strips 44 are secured to the margins of hinged panels at the outer faces

thereof to interconnect the same, though any desired hinge means may be employed. The end structure is formed by outer end wall panels **45** hingedly connected to the opposite ends of the bottom **41**, intermediate cleat **46**, and inner end wall panels **47**. The adjacent edges of the parts of the end wall structure are preferably hinged exteriorly, and are of beveled or mitered formation. The parts **45**, **46**, **47** are of a length to fit between the front and back panels **40** and **42**, when the container is erected. The front and back panels **40**, **42**, fixedly mount vertical cleats **48** of L-shape in cross section adjacent each end at the inner face thereof. Cleats **48** are preferably spaced from the vertical edges a distance equal to the thickness of end panel **45**, and are so positioned that one leg **49** thereof extends in spaced parallel relation to the panel mounting the same and in an inwardly extending direction. The inner end panels **47** mount cleats **50** of a thickness substantially equal to the spacing between the adjacent faces of legs **49** of cleats **48** and the panel which mounts the same. Cleats **50** are positioned at the outer ends of panels **47** at the face thereof which is positioned outwardly when the container is erected. Inner end panel **50** also has finger holes **51** therein.

This embodiment of the invention possesses the same primary advantages as outlined above. Thus the container can be erected without the use of securing means, being held erect by the insertion of the cleats **50** between the legs **49** of cleats **48** and the walls which mount the latter as illustrated in Fig. 11. All applied stresses in normal use of the container act to maintain the parts in their interlocked relation. The container is collapsed by swinging inner end walls inwardly to disengage cleats **48** and **50**, as accommodated by finger holes **51**.

Another modified embodiment of the invention is illustrated in Figs. 14 and 15, wherein the construction and interconnection of front panel **40**, bottom **41**, back panel **42** and top **43** is the same as in the embodiment shown in Figs. 11 to 13. Also cleats **48**, **49** are secured to the front and back panels in the same manner and position described above. The end structure comprises a single panel **55** hinged at **56** to an end of bottom **41**. An eyelet **57** or other rigid member is fixedly mounted at the two upper corners of panel **55** to project inwardly therefrom, and a bar **58** is pivoted to the inner end of the eyelet at **59**. In the embodiment, when panels **40**, **42** and **55** are erected to operative vertical position and relation, bars **58** can be pivoted to vertical depending position within the receiving grooves formed by cleats **48**, **49** to effect interlock of said vertical panels.

I claim:

1. A container comprising at least three panels interconnected in a unit and shiftable about parallel axes between operative and flat positions, cleats secured to the ends of two normally opposed panels and defining inwardly facing grooves, and end structures closing the ends of said container and each comprising an end panel pivotally connected to the panel intermediate said cleated panels and bearing against the outer edges of said cleats and locking means pivoted to the upper end of said end panel and including an elongated member depending at each side thereof to fit within said grooves to lock said first named panels in operative relatively perpendicular position.

2. A container comprising front, bottom and back walls interconnected in a unit and shiftable between operative and flat positions, end walls, one end wall being pivotally connected to said bottom, locking means pivoted to the upper end of said end panel and including elongated parts depending at opposite sides thereof, rigid retainer members secured to the margins of said front and back walls for engagement at their outer edges by said end panel and each defining an inwardly facing groove adapted to receive an elongated part of said locking means, and means for connecting the other end wall to said front, bottom and back walls.

3. A container comprising at least three walls interconnected in a unit and shiftable about parallel axes between operative and flat positions, end walls, at least one end wall comprising inner and outer panels interconnected in a unit and shiftable about parallel axes between operative and flat positions, said outer panel being pivotally connected to one end of an intermediate wall of said first unit, frame members secured to the walls of said first unit on opposite sides of said last named wall, said frame members being interposed between said inner and outer panels and each defining at least one longitudinal groove, and locking members projecting perpendicularly from the opposite edges of one panel and normally seating in said grooves.

4. A container comprising front, bottom and back walls interconnected in a unit and shiftable between operative and flat positions, end walls, at least one end wall comprising inner, intermediate and outer panels interconnected in a unit and shiftable between operative and flat positions, said outer panel being pivotally connected to one end of said bottom wall, vertical frame members secured to the front and back walls and interposed between said inner and outer panels of said end wall unit and each defining a longitudinal groove, and locking projections carried by the vertical margin portions of one end panel and seating in said grooves.

5. A container comprising at least three panels formed from a single blank and foldable along parallel scores to and from operative and flat positions, end walls, at least one of said end walls comprising a blank having parallel scores defining outer, intermediate and inner panels, said outer end panel being pivotally connected with an intermediate panel of said first blank, rigid frame members secured to the margins of panels of said first blank on opposite sides of said intermediate panel and each having a longitudinal groove, said end blank being normally folded around said frame members with the margins thereof bearing against the edges of said frame members, and flanges bent from opposite edges of one panel and seating snugly in said grooves.

6. A container comprising at least three panels formed from a single blank and foldable along parallel scores to and from operative and flat positions, end walls, at least one of said end walls comprising a blank having parallel scores defining outer, intermediate and inner panels, said outer end panel being pivotally connected with an intermediate panel of said first blank, rigid grooved frame members embracing the margins of the panels of said first blank on opposite sides of said intermediate panel, said end blank being normally folded around said frame members and bearing against the edges thereof at its margins, and flanges bent from opposite sides of said inner end panel and seating snugly in said frame grooves.

7. In a container having front, bottom and back walls and an end wall foldable to and from operative and flat positions, frame members carried by the end of each of the front and back walls adjacent said end wall, each frame member having a vertical groove, said end wall including inner and outer panels and being foldable around said frame members with the margins of said panels bearing against the inner and outer edges of said frame members, and vertical flanges projecting from one end panel and seating snugly in said grooves.

8. In a container having a plurality of walls foldable to and from flat and relatively perpendicular relation, a pair of opposite walls each mounting adjacent one end thereof a frame member having a longitudinal groove, an intermediate wall including a plurality of panel portions and being foldable around said frame members, and flanges projecting from the edges of one panel portion and fitting snugly in said grooves.

9. In a container, a fiber board blank having spaced parallel scores defining at least three container walls, a frame member secured to the margin of each wall at one side of said blank, a second fiber board blank having spaced parallel scores and carried by the intermediate frame member, each frame member having an inwardly facing groove, said last named blank being foldable around said frames, and flanges projecting from the sides and free end of said last named blank and seating snugly in said frame grooves.

10. In a container, a fiberboard blank having spaced parallel scores defining at least three container walls, a rigid frame member secured to the margin of each wall at one side of said blank, each frame member defining an inwardly and an outwardly facing longitudinal groove, a second fiber board blank scored to define three panels, and flanges projecting from the ends and sides of the panels at opposite ends of said second blank, one end flange being secured in the outer groove of the intermediate frame member, said second blank being foldable around said outer frame members with said side flanges fitting snugly in the grooves thereof and the flange at the free end of said blank fitting snugly in the inner groove of said intermediate frame member.

11. In a container, a fiberboard blank having spaced parallel scores defining at least three container walls, a rigid frame member secured to the margin of each wall at one side of said blank, each frame member defining an inwardly and an outwardly facing longitudinal groove, a second fiber board blank scored to define three panels, and flanges projecting from the ends and sides of the panels at opposite ends of said second blank, one end flange being secured in the outer groove of the intermediate frame member, said second blank being foldable around said outer frame members with said side flanges fitting snugly in the grooves thereof and the flange at the free end of said blank fitting snugly in the inner groove of said intermediate frame member, said frame member being of generally H-shape in cross section with the inner groove of a width for at least a portion of its depth sufficient to receive an edge of said first blank and a flange of said second blank.

12. In a container, a fiberboard blank having spaced parallel scores defining at least three container walls, a rigid frame member secured to the margin of each wall at one side of said blank, each frame member defining an inwardly and an outwardly facing longitudinal groove, a second fiber board blank scored to define three panels, and flanges projecting from the ends and sides of the panels at opposite ends of said second blank, one end flange being secured in the outer groove of the intermediate frame member, said second blank being foldable around said outer frame members with said side flanges fitting snugly in the grooves thereof and the flange at the free end of said blank fitting snugly in the inner groove of said intermediate frame member, said frame members having beveled edges adapted to abut when said container is erected, the outer tapered end portions of the ends of said frame members being cut away to accommodate collapse of said first blank to flat form.

13. In a container formed of fiberboard of predetermined thickness, an edge reinforcing and interconnecting grooved rigid frame member of H-section, one of said grooves being of a narrow width to snugly receive a single thickness of said fiberboard and the other being of a width to receive a double thickness of said fiberboard, the legs of said frame which define said narrow groove being of different widths.

14. In a container formed of fiberboard of given thickness, a rigid reinforcing frame member of H-shape in cross section, one groove being of a width for a portion of its depth to receive a double thickness of said fiberboard the inner portion of said first named groove and the other groove being of a width to receive a single thickness of said fiberboard.

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