Aug. 5, 1947. H. S. CANN 2,425,230

COMPARTMENTED COLLAPSIBLE FIBERBOARD CONTAINER

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FIG.1.

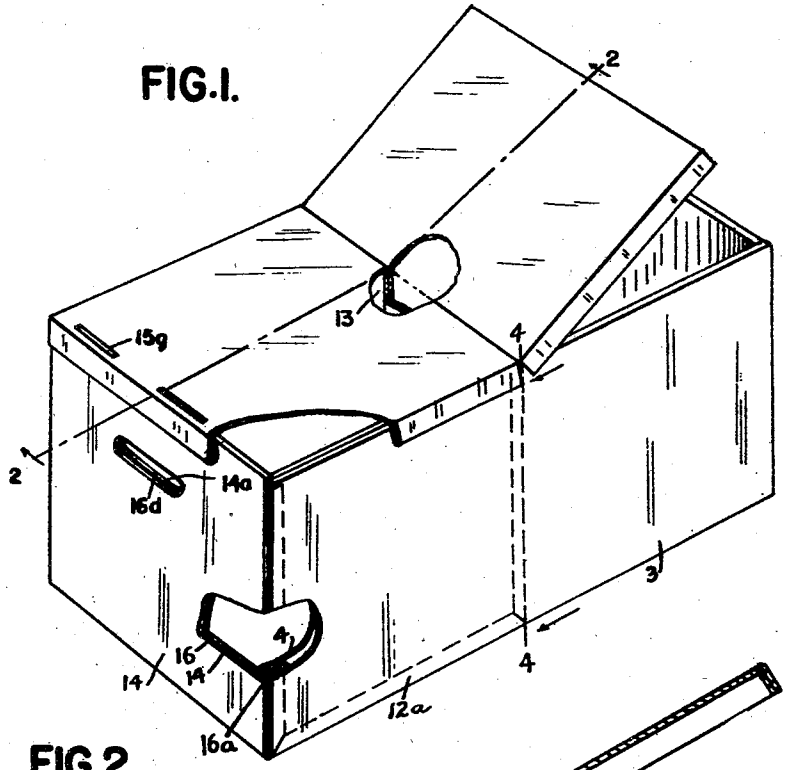

FIG.2.

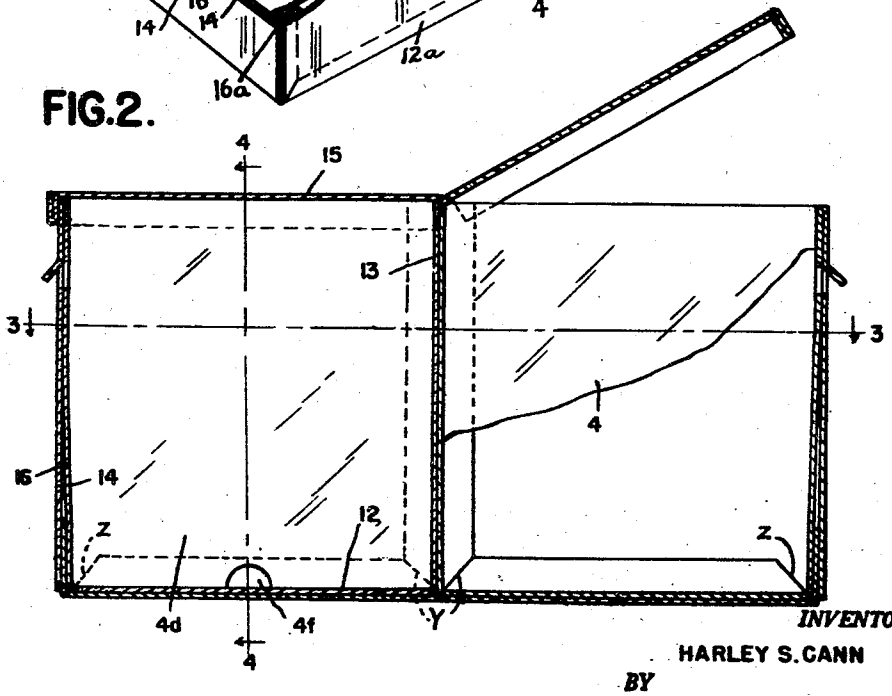

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FIG.8.

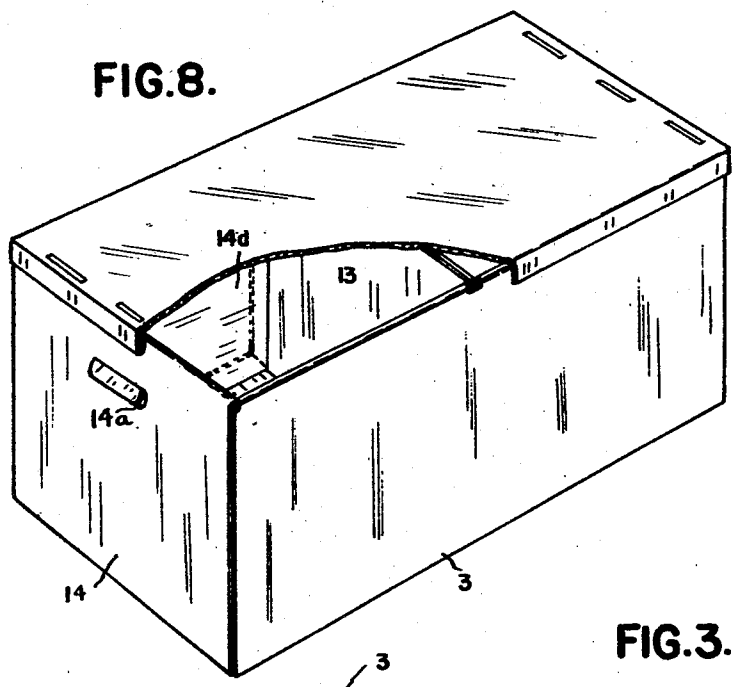


FIG.3.

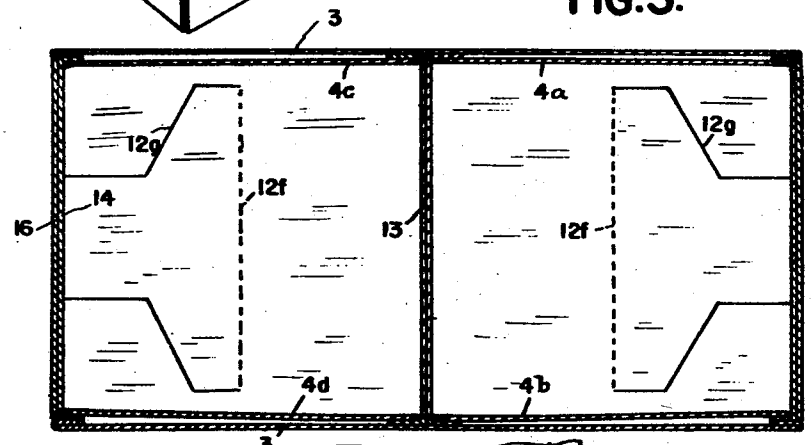
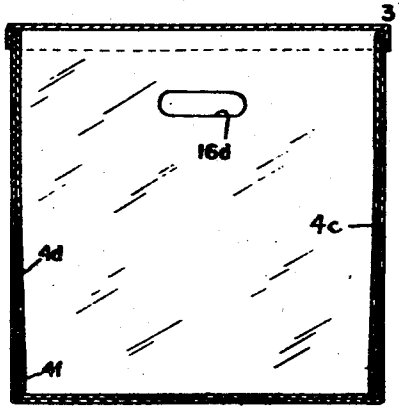


FIG.4.



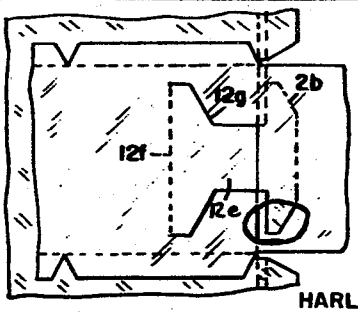


FIG.7.

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FIG.5.

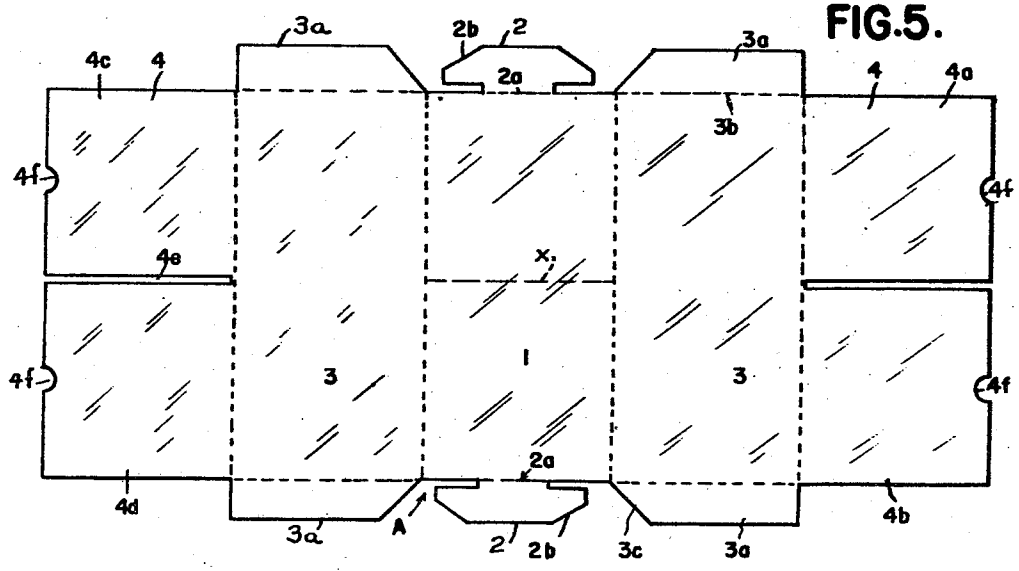


FIG.6.

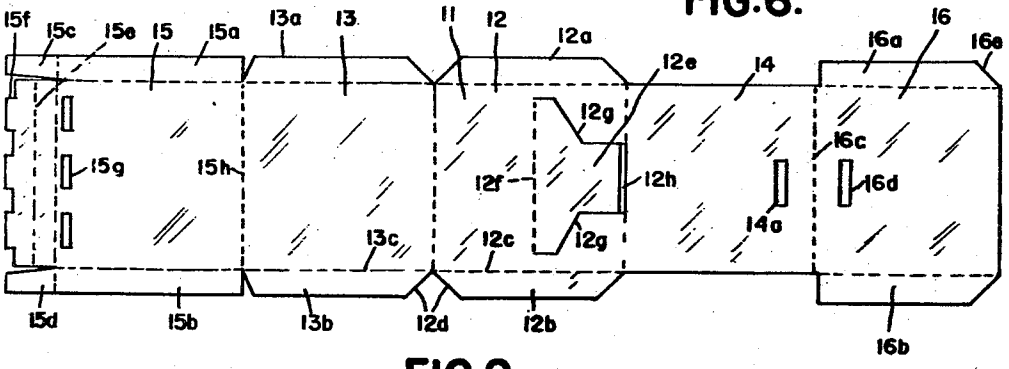
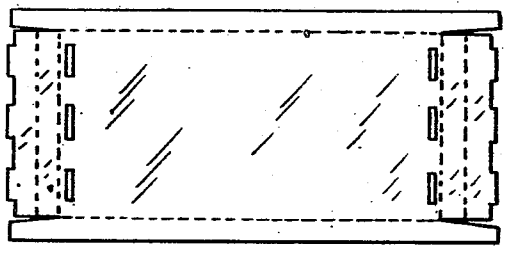


FIG.9.



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UNITED STATES PATENT OFFICE

2,425,230

COMPARTMENTED COLLAPSIBLE FIBERBOARD CONTAINER

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Application June 16, 1943, Serial No. 491,039

8 Claims. (Cl. 229—15)

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This invention relates to an improved container and shipping crate construction, and has for its object the production, from corrugated fiber board or the like, of a container of unusual strength as regards resistance to load and lifting strains, which may be furnished to the user in conveniently compact or knockdown form, to be assembled and integrated by him as needed, and which will then lend itself to storage or shipping use for such diversified purposes as, for example, the handling and shipping of crated eggs, packaged merchandise articles, comparatively heavy or light, or bulk quantities of vegetables, fruits, etc.

Many variantly constructed containers for such purposes are, and for a long time have been in common use. Some, with their walls formed of fiber board, rely upon securing the necessary rigidity by the use of corner or angular-edge wood or metal elements, others rely merely upon thickness of the selected fiber board, or upon the use of several layers thereof, for securing of the desired rigidity of the box or container, the character of its build-up requiring that it be furnished to the user in fully assembled form, which is of course very wasteful from the standpoint of storage space.

Still other types of container, which are primarily furnished the user in flat, knock-down form, require, for their assemblage into usable form, the stapling or sewing together of certain of the panels, generally by the use of a special manually-operable tool. This is objectionable not only from the standpoint of the user having to purchase a device and have it constantly available, but as well because of the fact that if an attempt is made, after the assembled container has once been used, to disassemble it back into flat form, as for shipment back to its consigning source for subsequent re-assembly and re-use, the fiber board is apt to be torn or mutilated by the attempted removal of the sewing or of the metal staples which may have been employed to correlate the several parts in the first place.

And, seemingly negligible in total weight though the wire or staple elements used may be, the securing of even that much metal for such use is, under present priority rulings, becoming increasingly difficult.

A further object of my invention is the interlocking and frictional engagement of certain of the component parts and panels of the fiber board blanks as selectively cut out and ultimately assembled, so that, without the presence of any metal or wooden reinforcing members, the container, when expanded into cubical form, is of such strength that it will sustain the weight of an adult of average weight or greater, and, when filled with vegetables, packaged metal articles, crated eggs, or the like, is of such rigidity that it and its contents can be lifted by the terminal hand-holds without buckling.

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And after a thus-filled container has been emptied of its contents, the several interlocking and mutually reinforcing panels and parts of the box structure may be easily disengaged and folded over upon one another, so that the package then composed of the constituent parts occupies, either for storage or for shipment back for refilling, only a very small total of cubic space as contrasted with the fully expanded container.

In the drawings:

Figure 1 is a partly broken-away perspective of the container with its constituent parts expanded into cubical form.

Figure 2 is a side sectional elevational view taken along the line 2—2 of Figure 1 and looking in the direction of the arrows there shown.

Figure 3 is a side elevational view of the interior of the expanded contour taken along the line 3—3 of Figure 2 and looking in the direction of the arrows there shown.

Figure 4 is a similar sectional elevational view of the inside face of one end of the container, taken along the line 4—4 of Figure 1 and looking in the direction of the arrows there shown.

Figure 5 is a plan view of one of the selectively contoured blanks of fiber board, the lines of folding of the various panels as regards one another being indicated in dotted lines.

Figure 6 is a similar plan view of one of the constituent and cooperating fiber board blanks.

Figure 7 is a detailed view on a somewhat larger scale than in Figures 5 and 6, of the interfitting and shouldered portions of those of the blanks whose interlocking constitutes the primary step of the building up of the container to cubical form.

Figure 8 is a partly broken away perspective view similar to Figure 1 as regards the box body parts, but illustrating its use in connection with a wholly detachable cover piece as contrasted with the integral panels forming the cover of the construction shown in Figure 1.

Figure 9 is a plan view of the blank from which the cover illustrated in Figure 8 is fabricated.

As hereinabove already stated, each fully assembled carton comprises three constituent and selectively contoured fiber board units, the base

unit being of the form illustrated in plan in Figure 5, and two similarly contoured units of the form illustrated in plan in Figure 6, which are thereafter organized in the manner to be later set forth in detail so as to form a structurally unitary two-chambered container.

For simplicity, this three-blank form will be first described, for the reason that certain of the constituent and bendably correlated fiber board blanks provide units for similarly bendably- connected cover panels with suitably reinforced and depending edge flanges. If, however, somewhat modified or abbreviated fiber board blanks are employed for the build-up of the body structure of the carton, the resultant article is an open-topped one, requiring, for purposes of complete enclosure of the carton's contents, a separate cover member, additional to the three-blank fiber board structure now to be described. In either form, however, the interengagement of the constituent cardboard parts forming the body of the container, and their interaction in the matter of lending rigidity to the assembled structure, is the same.

Referring first to Figures 5 and 6, which are respectively illustrative of the contouring and folding of the three fiber board units from which my container is built up, it will be noted that the base unit illustrated in plan contour in Figure 5 consists of a central panel 1, at each of whose edge portions is posiitoned a projection or tab of dwarfed-T-shape, 2, each of which is adapted to be bent up into angular relation with the central panel 1 along the dotted lines 2*a*. Next outside of these, on either side of the central panel 1, are panels 3, each of which has a marginal portion 3*a* which is similarly designed to be bent up to perpendicular position with respect to the plane of the panel along the dotted lines 3*b*; and it should further be noted that one end of each of these projecting portions 3*a* is beveled or angularly cut as at 3*c*.

Immediately beyond each of the panels 3 are, at either end, a pair of foldably connected panels 4, the individual ones on either side being designated as 4*a* and 4*b* and 4*c* and 4*d*. A relatively narrow kerf 4*e* separates each pair of panels and in the terminal or outer edge of each one of these panels of this series there is a cut-away or finger engagement portion 4*f*, the purpose of which will be later described.

Similarly, as to each of the cut-out blanks 11, illustrated in Figure 6, there are a pair of central portions or panels as 12 and 13, each provided with terminal flange portions as 12*a* and 12*b* and 13*a* and 13*b*, which are adapted to be bent along the dotted lines 12*c* and 13*c* respectively into perpendicularity with the plane of the panels 12 and 13. These edge projections 12*a*, 12*b*, and 13*a* and 13*b*, are similarly beveled or cut away at one of their ends as at 12*d*. Also in the panel 12 there is located a partly cut-away portion designated as 12*e*, whose base is integrated along the line 12*f* with the main portion of the fibre board panel 12, but whose marginal edges are fully cut away from the adjoining portion of the fibre board panel as at 12*g*, so that this piece 12*e* can be swung upwardly away from the plane of the panel 12 along the line 12*f* as a hinge or axis.

At either end of each of the blank units thus far described are positioned further panel units 14 and 15. The panel unit 14 is provided with a handle aperture 14*a*, but unlike the panel unit 15, does not have the marginal and hingedly integral flange sections 15*a*. Similarly foldably

connected along the edge 16*c* is a further panel unit 16, which is provided with overbendable edge pieces 16*b* and 16*a* and with a hand-hold aperture 16*d* which, when folding is effected along the dotted line 16*c*, registers with the already mentioned hand-hold aperture 14*a*.

The folded-over edge portions of the pieces 16*a* and 16*b* are terminally beveled or cut away as at 16*e* for a purpose later to be described.

The extreme left-hand panel 15, as viewed in Figure 6, has the extreme end portions of its marginal edge sections 15*a* and 15*b* independently enough kerfed, as at 15*c* and 15*d* respectively, so that the end (as viewed in said Figure 6) portion of the panel 15 may be bent over along the line 15*e*, so that its projections 15*f* may, when the folding over is accomplished, be lockingly passed through the slots 15*g* thus forming a plurally reinforced edging for that panel.

With one thus selectively contoured blank of one kind (Figure 5) and two blanks of another kind (Figure 6) as illustrated in plan view in Figures 5 and 6, selected from a stock pile, which permits their storage, until needed for use, with a maximum of compactness, the two blanks of the second type are placed in cruciform relation over one base blank (Figure 5), so that the central panel 12 of each of the former overengages one-half of the central panel 1. The beveled ends 2*b* of the truncated T sections 2 at either edge of the base panel 1 (Figure 5) are then passed through the lifted up and partly cut-away portions 12*e* of the panels 12 of the blanks of the form illustrated in plan view in Figure 6, in other words, until it reaches the median position thereon designated by the dotted lines 2*a* (Figure 5). Each of the blanks (of the form illustrated in Figure 6) is then moved toward the center of the base panel 1 (Figure 5) so that the truncated neck of the adjacent tab 2 in the base panel 1 (Figure 5) rides along the correspondingly cut-away portion 12*h* of each panel 12 until it reaches the far or terminal edge thereof to which the leading-in line from reference character 12*h* slightly overruns, the truncated tab 2 being then raised to a position of approximate perpendicularity to the plane of the rest of the base panel (Figure 5), and when this limit is reached the bendedly hinged panel is pressed down into a position of coincidence of its plane with that of the traversing blank 12 (Figure 6). The then exposed edge of the truncated tab 2 then comprises a central straight portion with its ends beveled as shown sloping away from the ends thereof, for a purpose later to be described. And in the then attained position of the parts, each panel 13 (Figure 6) is then swung to position of perpendicularity to the plane of its bendably connected panel 12 and of the panel 1 of the base section (Figure 5), that is to say at, roughly, the position of the median dotted line x on the panel 1. Thus a double-thickness wall is created by the panels 13 (Figure 6), which in the completely assembled carton, divides its interior into two separate compartments, as well as lending rigidity to the structure as a whole.

The panels 3 of the base section (Figure 5) are now swung upwardly, carrying with them the now over-engaging bendable and terminally bevelled sections 12*a*, 12*b*, 13*a* and 13*b* until they engage the similarly overbent and bendable sections 3*a* at the edge portions of the panel 3, thus forcing them into position of substantial parallelism with each of the panels 3. At this point the purpose of beveling the terminal portions of the bendable

projections 12a, 12b, 13a and 13b and the adjacent ends of the bendable projections 3a of the base blank 1 (Figure 5) now becomes apparent, for these edges fit against one another in the assembled carton at such points as are designated as Y and Z in Figure 2, so as to make a reinforcing fit almost equivalent in effect to the presence of another thickness of wall in that plane throughout each half side of the completed carton. In themselves, they would not readily stay in this position without gluing or stitching, but at this point the terminal panels 4 of the base blank (Figure 5) are bent through a travel distance of 180° into a position of spaced parallelism with the then attained plane of these several bendable edge pieces 12a, 12b, 13a and 13b (Figure 6) and of the similarly beveled (at one end only) bendedly connected marginal portions 3a on the panel 3 (Figure 5), thus serving to lock these adjacent bevelled edges in structurally engaging position with one another. This swing of the terminal panels 4 of the base blank (Figure 5) is made possible by the provision of the kerf 4e in each to provide for their passing on either side of the dividing second thickness wall constituted by the already bent-up parts 13 (Figure 6). The parts of the fiber board thus cut away leave the panels 4a and 4c of such size that as they are swung down to the clinching position already described they frictionally engage the terminally facing surfaces of the panels 13. This is as intended, for the overswung panels 4a and 4c are thus held against displacement from their then attained position firmly enough to not only hold the bevelled edge pieces 12a, 12b, 13a, 13b and 3a in their inner engaging positions, but when disassemblage of the carton structure is desired it is necessary to insert the tip of one's finger into the notched-out apertures 4f to lift them against the frictional anchorage described.

The ends of the carton as thus built up are of double thickness, comprising as they do, as regards the interior cardboard layers, the bendedly connected panels 13 and 14 on either side of the panel 12 (Figure 6), each one of which has been swung through an arc of 90° to a position of perpendicularity to the plane of the base panel 12. In the case of the panel 13, its next bendedly connected panel 15 bent along the dotted line 15h does not function as a structurally reinforcing part, since it is designed to function as a swingable cover piece over that half of the assembled carton, with its outer, overbent edge or skirting fitting, when lowered, over that half chamber of the container in its finally assembled form. The corresponding parts of the companion blanks (of the two of the type shown in Figure 6) superposed transversely of the one blank of the type and contouring shown in Figure 5, are bent up exactly similarly as already described, so that the panels 13 of the two blanks are positioned back to back relatively to one another, thus forming the double-thickness partition wall designated 13 in Figure 3. The extension portion 15 of the second (identical) blank functions, with its marginal appurtenances, as the liftable cover of the second half of the assembled container, with its skirted free terminal edge and lateral skirtings 15a and 15b engaging over the exposed top edges of that (second) partitioned-off half of the container.

So, in case it be desired that there be no covers for the top of the chambered container, the foldedly connected panels 15 and their marginally attached parts may merely be omitted when the initial outlining or contouring of the blanks of the type illustrated in Figure 6 is performed.

In either case, one double-thickness end wall of the fully assembled carton is made to consist of the panels 14 and 16, the latter folded through an 180° swing about the dotted line 16a to a position of parallelism with the plane of the panel 14, the hand-hold apertures 14a and 16d then registering with one another, as brought out perspectively in Figure 1, and as suggested in plan view Figure 6.

The terminal panel 13 (of each blank of the type shown in Figure 6) carries along its marginal edges beveled projections 13a and 13b, whose sloped end portions marginally engage against the then adjacent beveled edges of the bendedly connected extensions 3a of one or the other of the side panels 3, and consequently afford an edge-to-edge contacting reinforcement for the box structure being held in the same plane by the presence on either face of the double-thickness end wall formed by the panels 14 and 16.

Each of the integrated or attached cover panels is bendably connected along the line 15h with the just-mentioned middle transverse wall panels 13, with their freely swinging outer edges engaging either end of the assembled carton. Reinforcement or downward skirting of the end and side edges of these cover panels is afforded by the integral though bent-over 15a, 15b, 15c and 15d already described. And if desired the end edge may be reinforced by another thickness of the fibre board by the overbending of the further extension or margin piece 15c against the next interior piece 15e. In this case interlocking of these two last-mentioned parts is effected by tabs or short neck pieces 15f which lockingly fit into correspondingly positioned slots 15g.

It will be noted that the build-up thus far described in detail as to one complete blank unit of the form illustrated in Figure 6 accounts for its engagement with and over one-half only of the panel 1, that is from one end thereof to the medianly located dotted line x in Figure 5. The connection and build-up of a similar blank of the Figure 6 type over and based upon the remaining one-half of the panel 1 (Figure 5) is an exact duplicate thereof, and when the second such unit is organized and assembled the then vertical panels 13 of each Figure 6 unit lie against one another, transversely of the lengthwise extent of the carton, and form a valuable reinforcing double-wall therefor, as well as dividing the interior of the now built up carton into two parts.

For a carton with an integrated top or cover the structure thus far described is now complete, and upon assemblage is found to be of surprising rigidity. But if a separate cover or top is desired, this may be provided for by omitting the extension panels 15 of the blanks (Figure 6) already described.

The structure first described, it will be noted, constitutes a true three-blank organization of the fibre board parts as contrasted with the entirely separate and removable cover piece just mentioned which would make the assembled carton a four-unit product as regards its constituent blanks. But the principle underlying the building up of the carton structure as such and of effecting its mural reinforcement by the interengagement of the parts described is the same in each case.

In either form the walls of the thus built up carton are in all instances of two-ply thickness.

In the case of the bottom this consists of the center panel 1 of the blank illustrated in plan in Figure 5, one-half of it overengaged by the panels 12 and 13 of one of the blanks illustrated in plan in Figure 6 and the other half by a duplicate thereof, each interlocked therewith through the medium of the T-shaped projections 2 shown in Figure 5 and the correspondingly cut contouring 12h shown in Figure 6. Similarly, the side and end wall portions are of double wall thickness, interrelated as already described in a way to lend bulk-weight-resistant rigidity to the entire container assembly.

It will thus be obvious that a surprisingly sturdy carton is thus provided, without reliance upon any such correlating parts as sewing, or wire staples, or a layer of glue, to hold the correlated parts in desired relative position, and because of the interengagement of the several parts, including the terminally beveled and foldable projections with their securing and frictionally held supplemental panels, a cubical structure capable of carrying a considerable total weight of contents is offered. And a disassembly sequence of steps the reverse of what has been described enables the separation and subsequent salvaging of the parts for temporary storage and reassemblage when desired calls for only such a cubic space total as is represented by the size of the selectively contoured panels multiplied into their total thickness.

What I claim is:

1. A cubically chambered fiber board container assembled from three initially separate selectively contoured and kerfed blanks having marginal edge portions, one of said blanks forming the outer wall of the bottom and sides of the container and the other blanks cooperating with the first-named blank to form a partition member, inner bottom wall, and ends of the container, said first mentioned blank being transversely overlaid by the center portions of the other two blanks, which are substantially identical with one another in contour and kerfing and which are positioned in partition-contacting relation over the first mentioned blank, and portions adjacent the end forming panels of each of these latter blanks being interlocked with correspondingly located kerfs in said first mentioned blank, and the several panels of said blanks being held in their assembled position by frictional and interlocking engagement of the identical blanks with marginal end portions of the remaining blank.

2. A plural wall-thickness fiber board container built into cubical form from a plurality of selectively contoured and kerfed blanks, the intermediate panels of each of two of said blanks being of identical contour and being interlocked with correspondingly kerfed portions of the intermediate portion of a variantly contoured third blank in axially transverse position thereto to form a double thickness bottom wall, and one end portion of each of said first-named blanks being bent into parallel relation with the then foldedly adjacent panels to form a central partition and double-thickness end walls respectively for the container as cubically assembled, the then adjacently positioned panel portions of the constituent blanks respectively frictionally engaging as to their marginal edge portions and their surface portions respectively to effectively hold the thus assembled parts in their attained container-constituting relation.

3. A knockdown fiberboard container built into its attained cubical form from a plurality of initially separate and selectively contoured and kerfed blanks, having laterally positioned extension portions, the constituent panels of one of said blanks forming the bottom and side portions of the assembled container and the intermediate panel portions of the other two blanks being kerfedly interlocked therewith to form a supplemental bottom wall for the container, two of the five foldedly connected main panels of each of said last-named blanks being bent to positions of approximate perpendicularity to the plane of the next adjoining central panel thereof to serve as double-thickness end walls for the container and the other end portion of each being bent upwardly to form, with its companion panel of the other blank, a double-thickness central partition wall for the container as assembled, the several panels of the blanks as thus assembled and bent into position frictionally engaging the then adjacent portions of other panel units to firmly hold the container structure as a whole in its then attained cubical form.

4. A plurally chambered fiber board container built into its attained cubical form from a plurality of selectively contoured and kerfed blanks, the constituent panels of one of which constitute the bottom and side panel-portions of the container, the other two blanks being of substantially identical contour and having their intermediate panel portions kerfedly interlocked with the bottom panel portion of said first mentioned blank, their end panel portions serving respectively as the end wall panels and the central partition panel of the container as assembled, all of said constituent parts being held in their finally assembled relation by the frictional engagement of the edge portions of certain of them with the then adjacent surface portions of panels then positioned in propinquity to them.

5. A fibreboard container assembly consisting of a plurality of selectively contoured and kerfed blanks assembled into cubical form by the interengagement of certain of their kerfed parts and by the frictional engagement of the marginal portions of certain of their constituent panels with then adjacently positioned surface portions of certain other panels, the panels of one of said blanks forming the bottom and side wall portions of the assembled container, and each of the remaining two identically contoured blanks being kerfedly attached to the central panel of the first mentioned blank, one end portion of each of said last mentioned blanks serving to form a partition within the container as assembled, and the other end portion of each of said last-mentioned blanks serving as a plurally-layered end wall of the cubically assembled container.

6. A knockdown fiberboard container built up from and held to a cubical form by the kerfedly effected interlocking of a plurality of selectively contoured and kerfed blanks and by the frictional engagement with one another of certain then adjacently positioned parts, one of said blanks constituting the bottom and side wall portions of the container as assembled, and intermediate panels of the two other identically contoured and kerfed other blanks being kerfedly interlocked with the bottom panel portion of said first mentioned blank to form a second bottom wall panel of the container, one plurally paneled end of each of said last mentioned blanks serving as a double- thickness end wall for the container and the other end panel of each serving, cooperatively with its correspond-

ing panel of the other blank, to form a double-thickness central partition for the assembled container.

7. A plurally-chambered fiberboard container whose constituent parts are held in assembled cubical position wholly by the frictional and kerfedly effected inter-engagement of its constituent parts with one another, said container being formed of three initially separate and selectively contoured and kerfed blanks, the constituent panels of one of said blanks forming the bottom and side panels of the container as assembled, and an intermediately located panel of each of the other two blanks being kerfedly interlocked with the bottom panel of the first-named blank to form a second bottom wall for the container as assembled, one end panel of each of said last-named blanks forming an end wall of the container as assembled and the other end panel serving, cooperatively with its companion panel of the other of said blanks, to form a central partition wall of the container.

8. A fiberboard container built into cubical form from three selectively contoured and kerfed blanks the constituent parts of which are held in their finally assembled positions entirely by the interengagement of their respectively kerfed parts and by the frictional engagement of the marginal and adjacent surface portions of certain of their constituent panels as foldedly positioned in contact with one another, the constituent panel portions of one of said blanks forming the bottom and side wall portions of the container and each of the two other blanks having an intermediate panel portion kerfedly connected with the bottom panel portion of the first mentioned blank to form an additional bottom wall panel for the assembled container, and one of the plurally paneled end portions of each of said last-mentioned blanks constituting the double thickness end wall of the completed container, and the other end panel of each of said last-mentioned blanks serving, with its corresponding panel of the other blank, to form a double-thickness central partition within the assembled cubical structure.

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