Feb. 16, 1960 H. D. WILLETT 2,925,020

METHOD FOR ERECTING BOXES

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FIG. 1

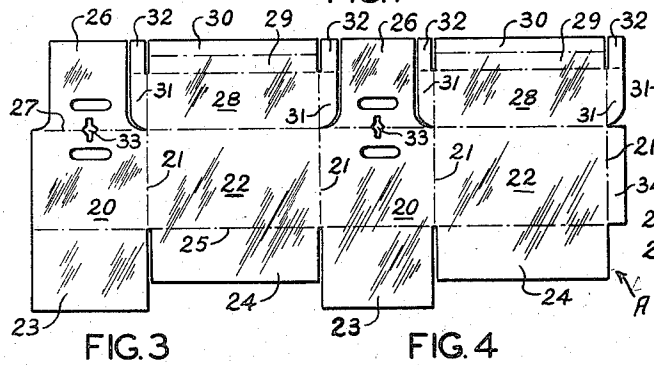


FIG. 2

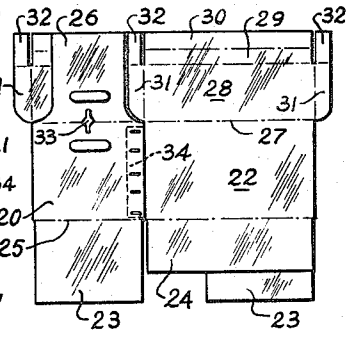


FIG. 3

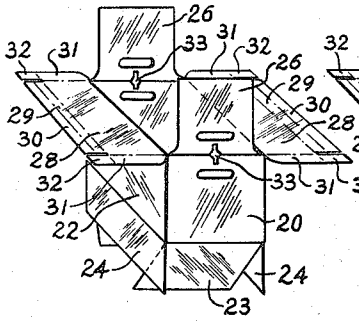


FIG. 4

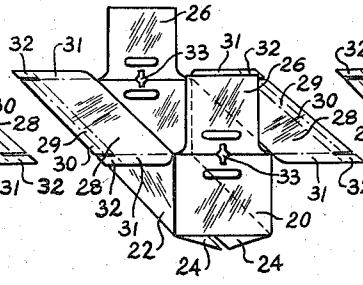


FIG. 5

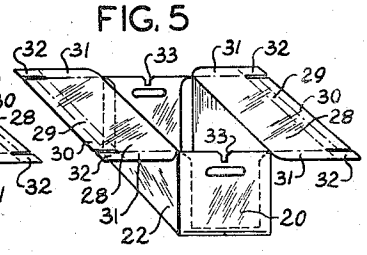


FIG. 6

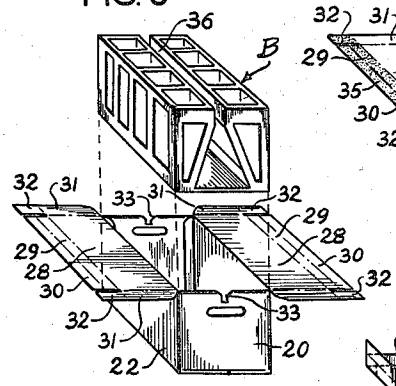


FIG. 7

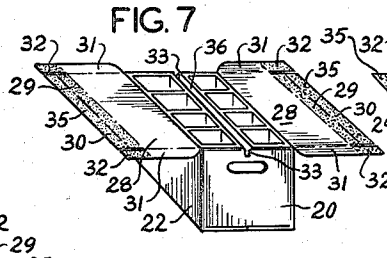


FIG. 8

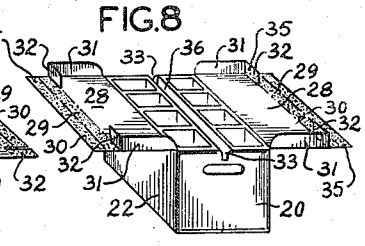


FIG. 9

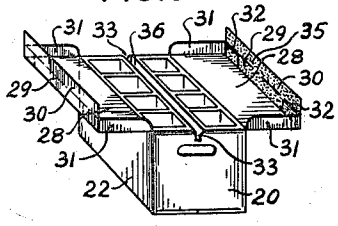


FIG. 10

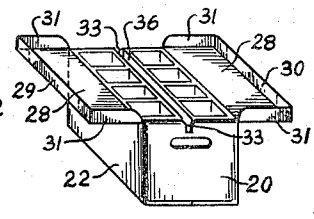
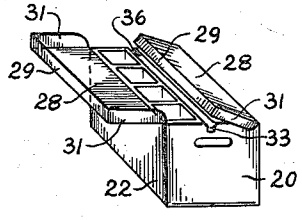


FIG. 11



INVENTOR:
HOWARD D. WILLETT
By William Angle
ATTORNEY.

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FIG. 12

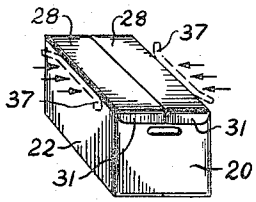


FIG. 13

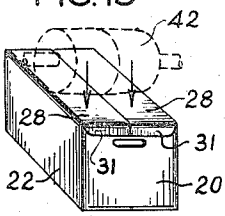


FIG. 14

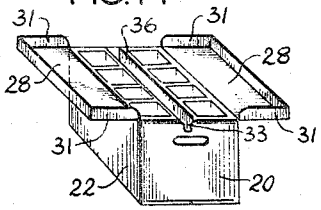


FIG. 15

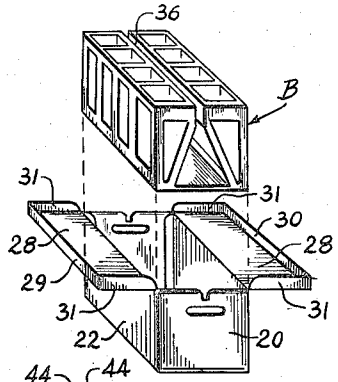


FIG. 16

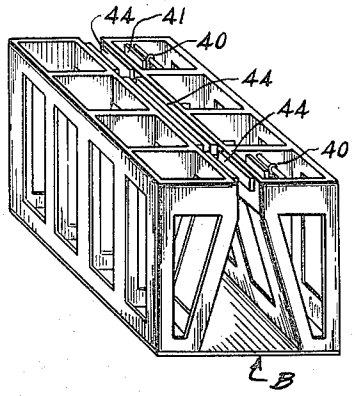


FIG. 17

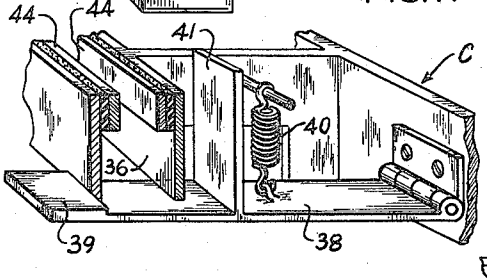


FIG. 18

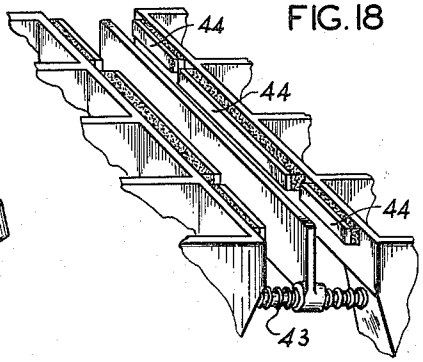
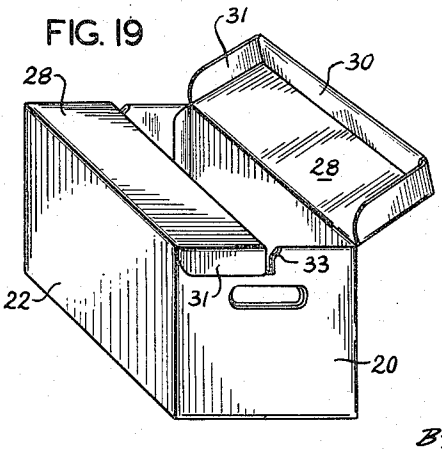


FIG. 19



INVENTOR:
HOWARD D. WILLETT
BY William Thye
ATTORNEY.

United States Patent Office 2,925,020 Patented Feb. 16, 1960

2,925,020

METHOD FOR ERECTING BOXES

Howard D. Willett, Alton, Ill., assignor to Crown Zellerbach Corporation, San Francisco, Calif., a corporation of Nevada

Application July 2, 1956, Serial No. 595,243

2 Claims. (Cl. 93—36)

The invention appertains to a process employing a mandrel to erect and fabricate boxes and containers having inwardly projecting parts constructed of a solid fibreboard, corrugated fibreboard or other similar, bendable materials.

Various methods are employed to erect fibreboard boxes and containers. One of the most common methods is to manually erect the container blanks and manually maintain the container parts in position as they are stitched, glued or otherwise secured in place. With the more complex boxes and containers, it is more difficult to manually position and maintain container parts for fabrication. A particular type of container which is in general use for the shipment of bottled beverages and the like, embodies split, half cover members, having longitudinal, inwardly disposed flanges or projections located on the outer edges of half cover members. In some embodiments of the multiple trip beverage containers, end cover flanges are also provided. An example of the class of containers referred to is illustrated in the disclosure of Patent No. 2,603,406, issued on July 15, 1952, to Walter C. George. In the various embodiments of the class of containers referred to, various configurations of inwardly disposed cover projections are provided.

It is readily apparent that it is not without some difficulty that inwardly disposed cover projections and flanges are maintained in proper position as they are glued or sealed together. It is, therefore, an object of this invention to provide a novel process for maintaining the inwardly projecting parts of containers of the type described in proper position and alignment while exerting internal forces against the inwardly projecting parts to permit them to be fixedly secured together.

Another object of this invention is to provide a process for erecting containers of the type described which employs an interior mandrel device, such as described in the copending application of Walter C. George, entitled Box Fabricating Mandrel, designated Serial No. 545,361, filed on November 7, 1955.

A further object of this invention is to provide a process which may be employed to erect various modified forms of containers of the class described having inwardly projecting parts which must be sealed or otherwise secured fixedly in position.

These and other objects and advantages of this invention will be apparent to those skilled in the art upon a full and complete understanding of the method and process described hereinafter.

This invention consists in the parts, arrangements, and combinations of parts hereinafter described and claimed. The accompanying drawings form a part of this specification and like numerals and symbols therein appearing refer to like parts wherever they occur.

Fig. 1 is a plan view of a container blank which may be fabricated by a process which embodies a preferred form of the invention;

Fig. 2 is a plan view of the blank shown in Fig. 1 wherein adjacent marginal portions thereof have been secured together;

Fig. 3 is a perspective view of the blank shown in Fig. 1 wherein adjacent marginal portions thereof have been secured together;

Fig. 4 is a perspective view of a partially erected container shown with the bottom flaps folded into bottom-forming position;

Fig. 5 is a perspective view of a partially erected container shown with the end wall reinforcing flaps folded downwardly into place;

Fig. 6 is a perspective view shown with a mandrel device in position to be inserted into the partially erected container;

Fig. 7 is a perspective view of a partially erected container shown with a mandrel disposed therein and with adhesive applied to cover parts;

Figs. 8, 9 and 10 show various stages of the erection of inwardly projecting container cover parts;

Fig. 11 is a perspective view of the container cover parts and inwardly projecting portions thereon being inserted into the mandrel device.

Fig. 12 is a perspective view of horizontal external pressure means being applied to the container;

Fig. 13 is a perspective view of external, vertically downward forces being applied to the container;

Fig. 14 is a perspective view of the completed container shown with the covers open and the mandrel in place;

Fig. 15 is a perspective view of the completed container shown with the mandrel removed;

Fig. 16 is an enlarged perspective view showing a form of the mandrel device which may be employed in the embodiment of the invention described;

Fig. 17 is an enlarged, fragmentary, perspective view showing the detail of the mandrel locking means;

Fig. 18 is an enlarged fragmentary, perspective view of a center portion of the mandrel device; and

Fig. 19 is an enlarged perspective view of a completely erected container formed by a preferred embodiment of the invention shown with one cover member open and one cover member closed.

For purposes of describing a preferred embodiment of the process employing the invention, a container blank A for a beer box is shown in Fig. 1. The container blank A is of a preferred, well-known embodiment, commonly used for multi-trip beverage containers, such as those designed to store and transport bottle beer, etc. The blank A is provided with opposing end walls **20** connected along corner defining scores **21** to side walls **22**. Each end wall **20** is provided with a bottom end flap **23** while each side wall **22** is provided with a side bottom flap **24**. The bottom flaps **24** are connected to their respective end and side walls along a bottom score **25**.

End wall reinforcing panels **26** are foldably connected to the end wall panels **20** along a top defining score **27**. Half cover flaps **28** are foldably connected along continuations of the top score **27** to upper margins of the side walls **22**. Each top half cover flap **28** is provided with a side flange **29** and a side flap **30**. End reinforcing flanges **31** are foldably connected to the end margins of the top half cover flaps **28**. Each end reinforcing flange **31** is provided with an end flap **32**. In the particular embodiment of the container shown in the drawings, a notch opening **33** is provided in the central portion of the upper margin of the end walls **20** and the adjacent portions of the end wall reinforcing panels **26**.

A preferred means of fabricating or erecting the container within the scope of the present invention will involve first stitching the container into position as shown

in Fig. 2. To accomplish this stitching operation, the side wall 22, to which is connected a stitch flap or glue flap 34, is folded upwardly about the corner defining score defining its connection to the adjacent end wall 20. At the same time, the opposing or opposite end wall 20 is folded upwardly and inwardly about its adjacent corner defining score 21 into flatwise contacting relation with the adjacent portions of the side wall 22. As the first side wall 22 and its connected stitch flap 34 are folded inwardly, the stitch flap will come into overlapping, contacting relation to the free side margin of the folded end wall 20 as shown in Fig. 2. In this position, the stitch flap 34 and the adjacent side marginal portions of the folded end wall 20 may be secured together as shown in Fig. 2.

It may be desired to secure the folded end wall 20 in flatwise relation against the outer face of the stitch flap 34 in the event stitch flap 34 is to be concealed.

The stitched container blank shown in Fig. 2 is folded into rectangular, tubular configuration as shown in Fig. 3 so that the side walls and end walls are in right angular relationship to each other. The bottom end flaps 23 are folded inwardly, horizontally and the side bottom flaps 24 are folded inwardly into horizontal flatwise contacting relationship with the previously positioned bottom end flaps 23 as shown in Fig. 4. In this position, the bottom end flaps 23 are secured to the side bottom flaps 24 by means of stitches, adhesives or other suitable means. The end wall reinforcing panels 26 are then folded inwardly, downwardly about their adjacent top score 27 into flatwise contacting relation with the inner face of the end walls 20 as shown in Fig. 5. In this position, the end wall reinforcing panels 26 are secured by glue, stitches or other suitable means to the inner faces of the end walls 20. An erecting mandrel B (such as disclosed in copending application Serial No. 545,361) is then inserted into the body of the partially formed container as shown in Figs. 6 and 7. Adhesive 35 is then applied to the exposed, inner faces of the cover side flanges 29 and the cover side flaps 30. As the adhesive is applied, it is preferable that the top half cover flaps 28 are positioned outwardly with respect to the adjacent side walls in substantially horizontal relation as best shown in Fig. 7. The end reinforcing flanges 31 are then folded upwardly into right angular relation with the top half cover flaps 28, and the end flaps 32 are then folded right angularly inwardly with respect to the end reinforcing flanges as shown in Fig. 8. The cover side flanges 29 and cover side flaps 30 are then folded simultaneously upward into substantial vertical relation as shown in Fig. 9. In this position, the glued inner faces of the cover side flanges 29 will be in flatwise contacting relationship with the previously positioned end flaps 32. The cover side flaps 30 are then folded inwardly to 180° into downward flatwise contacting relation with the previously positioned end flaps 32 and the side flanges 29 as shown in Fig. 10.

In order to maintain the cover side flaps and flanges 30 and 29 in proper contacting relation as the adhesive hardens, the top half cover flaps are folded inwardly into horizontal relationship so that the previously positioned cover side flanges 29 and side flaps 30 are received into a central mandrel void 36 as shown in Fig. 11. In order to facilitate the easy insertion of the cover parts into central mandrel void 36, it is preferred that the void be sufficiently wide to permit entry of the container cover parts without substantial frictional engagement.

With the cover parts inserted into the mandrel void 36, external horizontally disposed inwardly lateral forces are applied to the upper margins of the side walls as shown in Fig. 12. The exterior forces may be applied by force applying plates 37, vertically disposed pressure roller sections or any other suitable means. The force applying plates cause the mandrel parts defining the central mandrel void 36 to deflect inwardly into contacting engagement with the container cover parts 29, 30 and 32 which have been inserted into the void 36 thereby maintaining the cover parts in contacting secured relationship during the hardening or setting of the adhesive.

Certain forms of the mandrel B are provided with internal locking means C, such as shown in Fig. 17, which maintain the mandrel parts in the inwardly deflected position as described so as to maintain the frictional engagement between the mandrel and the inwardly disposed cover parts even after the exterior forces are released. The internal locking means, in one embodiment of the mandrel device, employs relatively long horizontal hinged plate member 38 having an upwardly projecting locking plate 39 at its free end. The hinged plate member 38 is provided with a vertical tension spring 40. A vertical release plate 41 which extends substantially above the top of the mandrel B in the locked position of the internal locking means, is provided. The particular locking means C engages as the mandrel parts defining the central mandrel void 36 are deflected horizontally inwardly. Certain of the mandrel parts engage the locking plate 39 and the spring tension means 40 maintains the locking plate 39 and the hinged plate member 38 in an upward position thereby maintaining the mandrel parts in the inwardly deflected position.

The locking means may be released by forcing the vertical release plate 41 downwardly thereby moving the hinge plate member 38 and the locking plate 39 free of the adjacent mandrel parts thereby permitting the mandrel parts defining the central mandrel void 36 to spring outwardly from engagement with the container cover parts. The release of the locking means C may be accomplished by providing a horizontal roller 42 positioned so as to force the vertical release plate 41 downwardly substantially flush with the top of the mandrel device.

After the locking means C has been released, the cover members 28 and their inwardly projecting integral parts are opened as shown in Fig. 14. As shown in the next figure, Fig. 15, the mandrel is removed from the erected container and the container is ready for use.

The method described and embodying a preferred process of the invention may be modified and still fall within the scope of the invention; for example, it may be desirable to insert the mandrel B into the partially erected container blank before the bottom end flaps 23 and the side bottom flaps 24 are swung into position.

It may also be desirable to omit the internal locking means and, in the alternative, rely solely upon exterior force applying plates 37 or other similar means which will maintain external forces until the adhesives are hardened or set.

The process of this invention is also not to be limited to the exact type of mandrel illustrated and described. For example, in certain embodiments of the invention, the central mandrel void 36 is provided with a central longitudinal dividing anvil 43 as shown in Fig. 18, which is resiliently mounted within the central mandrel void 36. The purpose of the central longitudinal anvil 43 is to provide a dividing space between adjacent inwardly projecting side flanges 29 which are disposed within the mandrel void 36.

Also, resilient pressure parts 44 may be applied to portions of the mandrel B adjacent the central mandrel void to provide for more controlled engagement and contact with the inwardly projecting container cover parts which are to be adhesively fixed and sealed together.

An enlarged perspective view of a completed container formed by a preferred method embodying the invention is shown in Fig. 19.

It is to be understood that the embodiments herein described are illustrative and not restrictive, and it is also to be understood that the invention may be susceptible of embodiment in other modified forms, and that all such modifications which are similar or equivalent hereto come equally within the scope of the claims next appearing.

What I claim is:

1. The method of erecting a container blank scored and slotted to define opposed pairs of side and end walls including a connecting flap hinged to a wall, half cover members hinged to the side walls, side and end flanges hinged to the half cover members and a connecting flap hinged to the end flanges of the cover members, the said method comprising connecting the opposed pairs of side and end walls together by attaching said connecting flap to the remote wall of the blank, opening the connected walls into tubular form and extending the cover members, flanges and connecting flange flaps outwardly, preferably in a substantially common plane, inserting into the partially assembled container, a mandrel conforming substantially to the interior of the container applying an adhesive to the extended cover member side flanges, folding the end flanges in substantially right angular relation to the inner face of the cover member, folding the connecting flange flap inwardly in substantially right angular relation to the folded end flanges, folding the side flanges in substantially right angular relation to the underface of the cover member and against said folded connecting flap, inserting the cover members side flanges and connecting flange flaps into a void in the mandrel, thereby enclosing the mandrel, the said void in the mandrel substantially conforming to the shape of the inwardly projecting cover member parts and defined by substantially equal resilient mandrel halves, applying external continuing compressive force to position the inwardly projecting cover member parts into continuing compressing engagement to each other and to the surfaces of the mandrel for a predetermined time to effect permanent connecting together of the cover member parts by setting said adhesive applied thereto.

2. The method set forth and claimed in claim 1 wherein the side flanges of the half cover members have reinforcing flaps hinged to their outer edges to which an adhesive is applied while in the outwardly extended position of the cover members, and the reinforcing flaps are folded flatwise over the cover member flanges, enclosing the end flange connecting flaps.

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