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3,014,413

REINFORCED CARTON AND METHOD OF MAKING SAME

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Fig. 1.

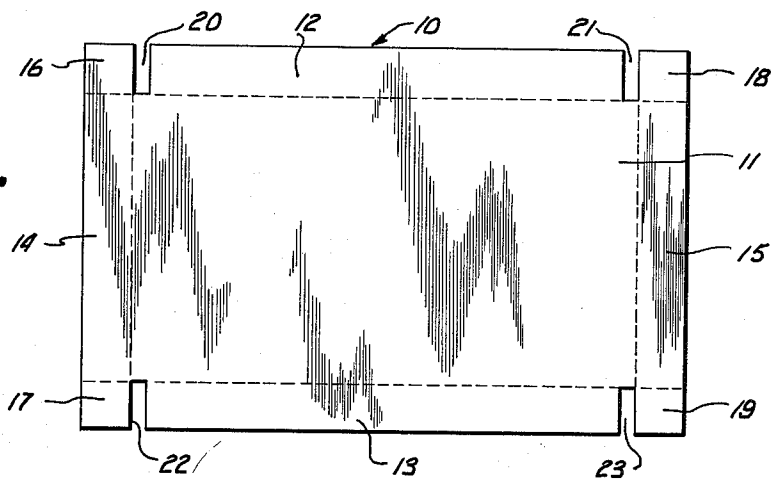


Fig. 2.

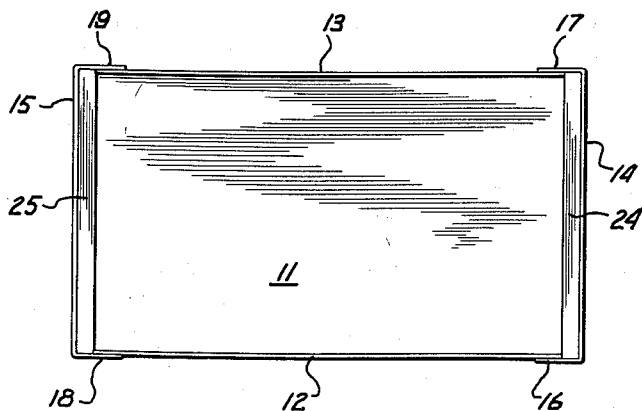
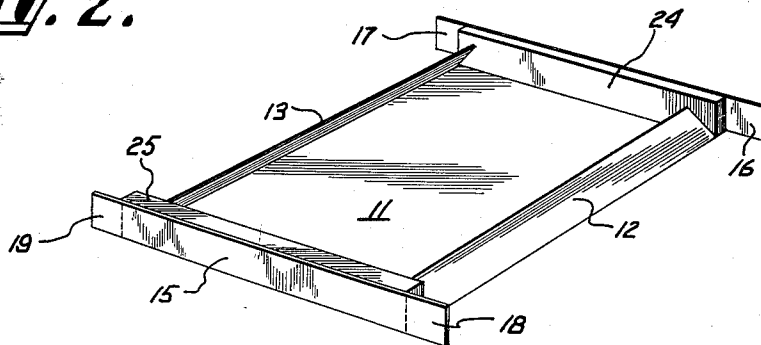


Fig. 3.

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1

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REINFORCED CARTON AND METHOD OF MAKING SAME

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This invention relates to cartons from sheet material having reinforced end members and a process for making the same.

Conventional cardboard cartons have several advantages which make such cartons particularly useful in the packaging of numerous commodities and materials. Cartons of cardboard and other paper materials provide savings in shipping costs because of low weight and in construction costs because of relative cheapness of material and amenability to machine handling methods. However, certain disadvantages limit the applicability of such cartons. The intrinsically low structural strength of the cartons results in low stacking strength so that unless the material within the carton is itself capable of providing support, cardboard cartons cannot be safely stacked. The problem of stacking cardboard cartons becomes particularly aggravated where filled cartons are stacked in an atmosphere of high humidity since the water-absorbent characteristic of paper materials results in a further reduction of the structural strength of the cartons.

The present invention provides a carton retaining the basic advantages of cardboard cartons while eliminating the disadvantages heretofore found in their use. The present invention is a reinforced carton comprising a substantially rectangular bottom, a pair of upright end members joined to one pair of opposite bottom edges, and a pair of upright sides joined to the other pair of opposite bottom edges. Each side is shorter than the edge of the bottom adjoining it so that a space is defined between each end of each side and each end member. A reinforcing member is held between the upright end edges of each side and each end member. Means are provided for joining the sides and the end members.

The invention also encompasses a method for forming a reinforced carton. The method according to the invention comprises the steps of forming an integral carton sheet including a substantially rectangular bottom, a pair of opposed end members each having an integral lapping tab at both ends, and a pair of opposed sides, each shorter than the edges of the bottom adjoining it so as to define a space between each end of each side and each respectively adjacent lapping tab. The end members are then bent up from the bottom to an upright position. The sides are bent up from the bottom and inwardly toward each other. A reinforcing member is inserted adjacent each end member in the defined space so that the reinforcing member is supported between the end member and the end edges of each inwardly bent side. The sides are then swept inwardly to an upright position and the lapping tabs are bent inwardly. The lapping tabs are then fastened to the upright sides to form a carton.

In the preferred form of the invention the carton sheet is made from cardboard or other paper product and each reinforcing member is a wooden slat having dimensions substantially equal to those of the adjoining end member. While not limited to such use, the carton according to the invention has particular utility in the marketing of produce. The wooden reinforcing members provides the structural strength necessary to permit stacking of such boxes. This structural strength is in no way affected by the environments of high humidity associated with produce or by the dampness of the produce itself. Furthermore, the horizontal upper surfaces of the wooden

2

reinforcing members provide a surface to which longitudinal wooden strips, furnishing additional rigidity, may be readily nailed.

Since the major portion of the carton according to the invention is formed from cardboard or other paper material and the more expensive reinforcing material is used only in the ends, considerable saving in material costs and weight is achieved concurrent with greatly improved structural strength. Furthermore, the carton with the reinforcing members in place can be formed by packaging machinery in which the several operations are performed automatically and in proper sequence.

The carton according to the invention and the method of forming it will be better understood from the following description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a plan view of the carton sheet prior to any folding;

FIG. 2 is a perspective view after the carton is partially folded and the reinforcing members are inserted; and FIG. 3 is a plan view of the assembled carton.

With reference to FIG. 1, a rectangular carton sheet 10 consists of nine rectangular elements defined by prearranged fold lines (shown dotted). One of these elements, a bottom 11, is joined at one pair of parallel fold lines to sides 12, 13. The bottom is joined at another pair of parallel fold lines to end members 14, 15 which are transverse to the sides. End member 14 has lapping tabs 16, 17 joined at fold lines to both its ends. End member 15 has lapping tabs 18, 19 joined at fold lines to both its ends. In the preferred embodiment, the combined length of each end member and its integral lapping tabs is equal to the combined width of the bottom and the two sides. The sides are equal in length and are shorter in length than the bottom. In this manner, spaces 20, 21, 22, 23 are formed between each end of each side and the respectively adjacent lapping tab.

The flat carton sheet is formed into the reinforced carton according to the invention by first bending end members 14 and 15 to an upright position. Thereupon, sides 12 and 13 are bent up from the bottom and inwardly toward each other. It has been found that bending the sides through an arc of approximately 150° effectively kills the fold and enables the sides to retain an inwardly bent position during the remaining steps of forming the carton. Wooden slats 24, 25 are inserted in the space formed at the ends of the sides. As particularly shown in FIG. 2, the wooden slats are supported at this stage between the upright end members and the edges of the inwardly bent sides.

The wooden slats provide a reinforcing element and the thickness of the slat is controlled by the width of spaces 20, 21, 22, 23. It is apparent that slats of varying thickness, dependent upon the structural strength required, may be inserted by making a corresponding change in the width of the spaces. The length and width of the slats are substantially equal to the corresponding dimensions of the end members. While not essential, the face of the slat adjacent the end member may be coated with a mucilage to aid in maintaining the slat in proper position during assembly of the carton.

When the slats are positioned as previously described, the sides are swept outwardly to an upright position. Each slat is then retained between the surface of the adjacent end member and the end edges of the sides with which it is in contact. The lapping tabs are bent inwardly and fastened as by cementing or stapling to the portion of each side in juxtaposition with each lapping tab. When the lapping tabs are fastened to the sides, a complete reinforced carton, as shown in plan view in FIG. 3, is formed.

3

It is readily apparent that modifications of the carton according to the invention and the method for making it may be made without departing from the scope of the invention. For example, materials other than wood may be used for the reinforcing members. Similarly, modifications may be made in certain dimensions of the rectangular elements formed in the carton sheet. In addition, the method of forming the carton may be modified by providing external means for supporting both surfaces of each side as the sides are swept to the upright position. In this manner, continued support for the slats is insured until the fastening of the lapping tabs completes formation of the carton. Modifications, such as these however, remain within the scope of the invention which provides a method for forming a relatively inexpensive carton having unusual properties of structural strength and stability.

I claim:

1. A method for forming a reinforced carton comprising the steps of forming an integral carton sheet including a substantially rectangular bottom, a pair of opposed end members each having an integral lapping tab at both ends and a pair of opposed sides each shorter than the edge of the bottom adjoining it so as to define a space

4

between each end of each side and each respectively adjacent lapping tab; bending the end members up from the bottom to an upright position; bending the sides up from the bottom and inwardly toward each other; inserting in each defined space a reinforcing member adjacent each end member so that the reinforcing member is supported between the end member and the end edges of each inwardly bent side; sweeping the inwardly bent sides to an upright position; bending the lapping tabs inwardly; and fastening the lapping tabs to the upright sides.

2. Method in accordance with claim 1 wherein both surfaces of each side are continually supported by external means when swept from the inwardly bent position to the upright position.

3. Method in accordance with claim 1 wherein the carton sheet is constructed for forming the bottom, the opposed end members, the lapping tabs and the sides by folding along prearranged lines.

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