June 6, 1961 P. C. STRINE 2,987,236

CORRUGATED CONTAINER

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FIG. 1

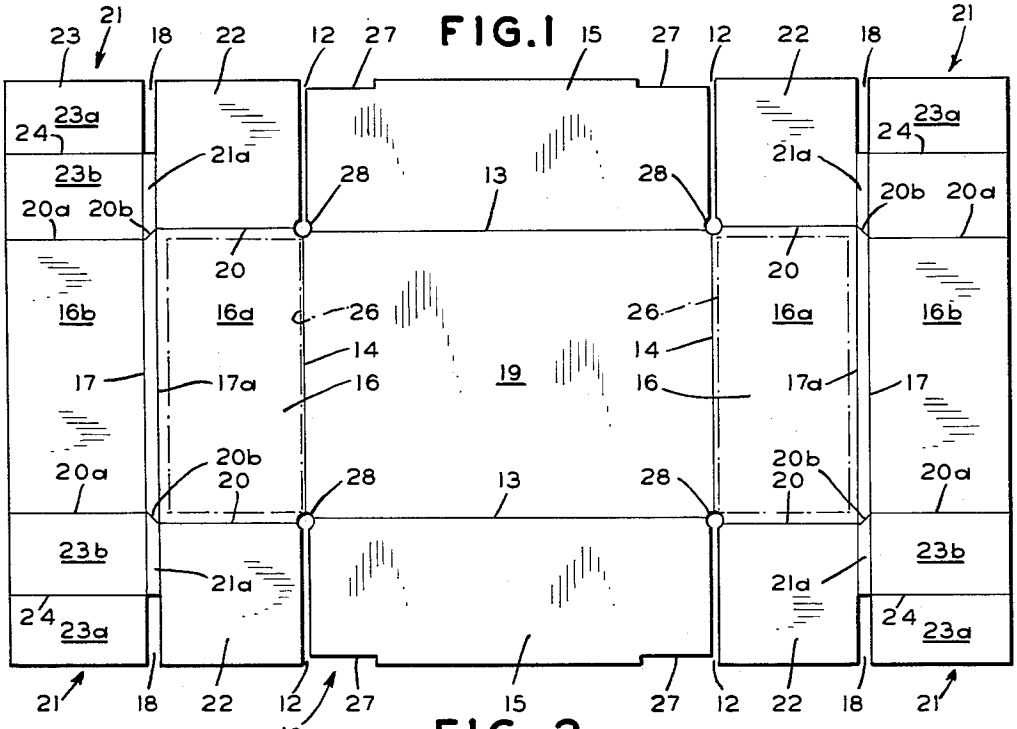
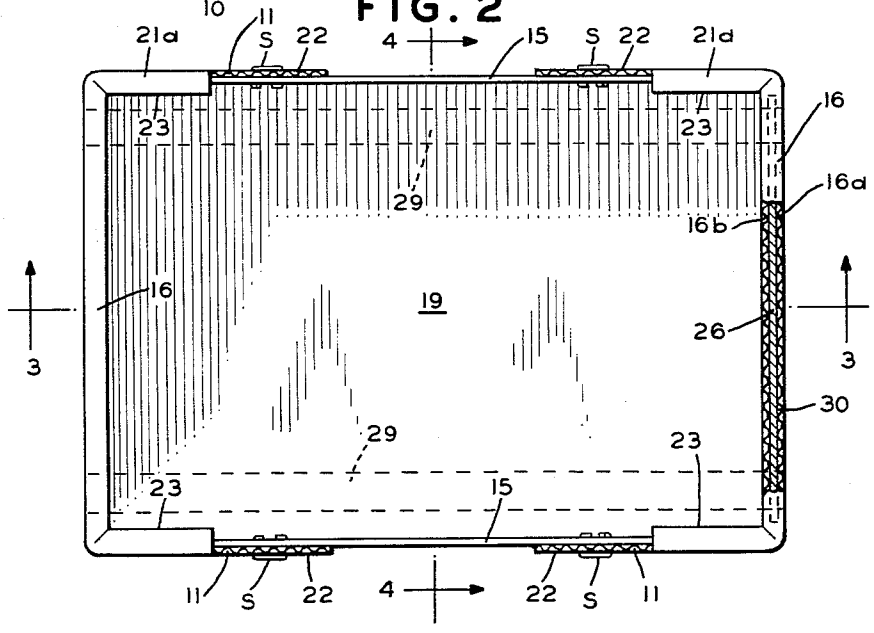


FIG. 2



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FIG. 3

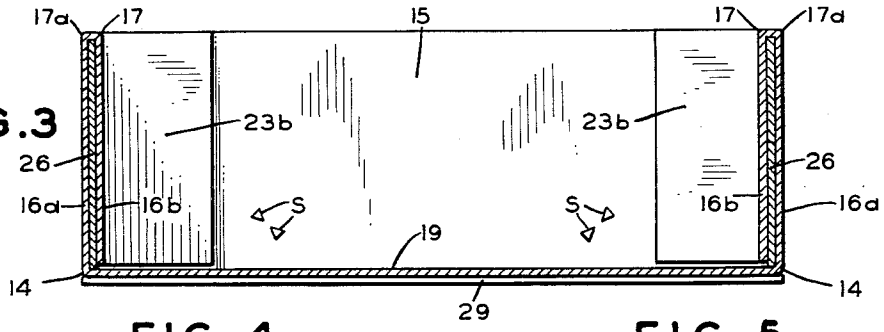


FIG. 4

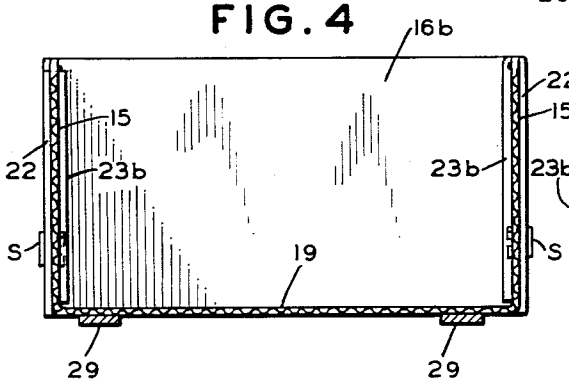


FIG. 5

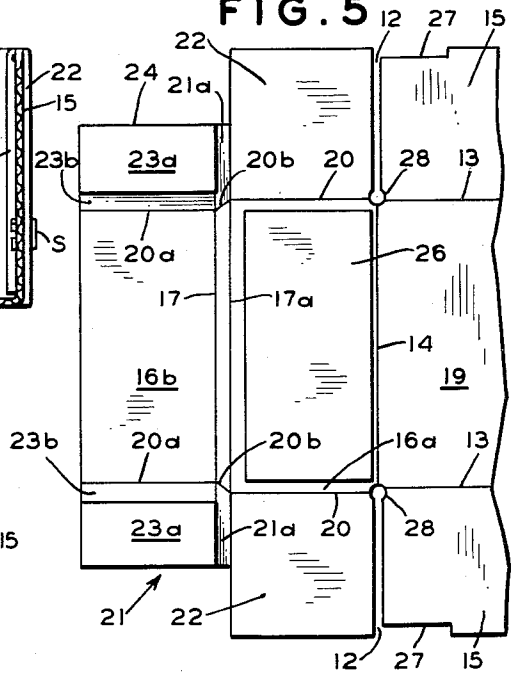


FIG. 6

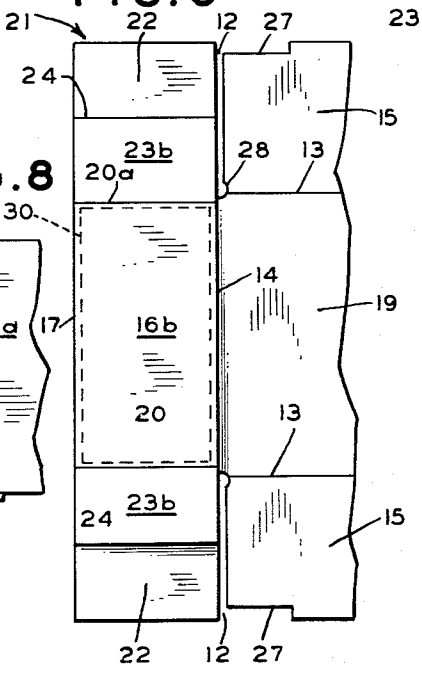
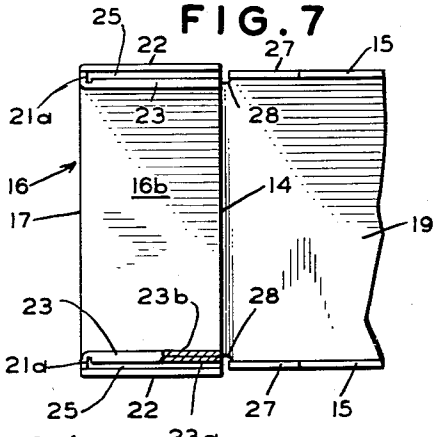


FIG. 8

FIG. 7



Philip C. Strine Inventor by Robert B. Lamb, atty

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2,987,236

CORRUGATED CONTAINER

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8 Claims. (Cl. 229—34)

This invention relates to boxes and more particularly to a paperboard box construction especially well suited for packaging such articles as perishable foods requiring refrigeration.

Considerable difficulty has hitherto been encountered in providing a container susceptible of high speed, manufacture and handling and which is suitable for use in packaging such articles as perishable foods together with a refrigerant such as ice. While wood boxes embody to a desired degree the ability to withstand wetting and are characterized by a high degree of wet-strength, they are relatively costly to produce and handle because of, among other reasons, the difficulty of providing high speed machinery for automatically forming and erecting them. Paperboard boxes are highly desirable when the required blanks may be readily formed by high speed machinery and may be shipped flat to conserve space. These blanks are readily erected at the point of use either manually or by means of high speed box machinery. However, boxes hitherto made from paper stock with which I am familiar have not proven to be entirely satisfactory. One drawback has resided in the failure of such paperboard boxes to have a sufficiently strong corner construction so as to be able to resist tearing when wet to the degree required by many uses. Another drawback of conventional paperboard boxes resides in the inability of the side and end walls to support any substantial load when wet.

In accordance with an important feature of the present invention a box is fabricated from paper stock in such a way as to be readily adapted for production and erection by high speed mass production machinery while at the same time incorporating a substantially reinforced corner construction as well as substantially improved strength to support loads. Important advantages are achieved in accordance with the present invention by forming the end panels and flaps of the box blank so that when the box is erected therefrom the end wall and flap construction is such as to provide at least two thicknesses of the paperboard around the corner formed so as to join with and reinforce the adjacent end portion of the side wall of the boxes. The arrangement is such as to provide substantially improved strength to resist tearing and to support greater loads even when wet. In accordance with a further important feature of the invention, the end wall is formed so as to provide a pocket for the insertion of a rigidifying member substantially coextensive with the end wall for providing such strength in the end walls of the box that it is capable of supporting substantially the same vertical load as a box made entirely of such rigid material as wood.

It is, therefore, a principal object of this invention to provide an improved box fabricated from paper stock which may incorporate wood rigidifying members, which lends itself to manufacture by high speed, mass production methods and which is especially well suited for packing such articles as perishable foods together with ice.

Further features, objects and advantages of the present invention will be apparent from the following detailed description and the accompanying drawings in which

FIGURE 1 is a plan view of a blank fabricated in accordance with the present invention;

FIGURE 2 is a top plan view of a box erected from the blank shown in FIGURE 1 and constructed in accordance with the present invention;

FIGURES 3 and 4 are sectional views taken respectively through the lines 3—3 and 4—4 of FIGURE 2;

FIGURES 5, 6 and 7 are plan views showing successive intermediate steps in the erection of the box; and

FIGURE 8 is a fragmentary elevational view showing one bottom corner of the erected box.

Referring now to the drawings in detail, a blank **10** is formed by conventional methods from paper stock which preferably is well known corrugated paperboard having a corrugated medium **11** sandwiched between inner and outer sheets of paperboard. The blank **10** is formed with four slots **12** and fold lines **13**, **14** which define side panels **15** and end panels **16**. If desired, the paper from which the blank **10** is formed may be pretreated in a well known manner by impregnating or otherwise applying waterproofing, wet-strengthening or moisture-resistant compositions as is well known in the art.

Each of the end panels **16** is formed with two closely spaced fold lines **17**, **17***a* extending across the blank **10** and terminating at slots **18**. The fold lines **17**, **17***a* divide each of the end panels **16** into what, in the erected box, become outer and inner end wall portions **16***a*, **16***b*. Fold lines **20**, **20***a*, **20***b* are formed transversely to fold lines **17**, **17***a* across each of the end panels **16**, lengthwise to the blank **10** and define flaps **21** connected to the ends of the end panels **16**. As shown in FIGURE 1, the fold lines **20** and **20***a* are somewhat offset from each other and from the fold lines **13** to facilitate formation of the box. The diagonal fold lines **20***b* connect them together. The flaps **21** are each divided by a slot **18** and a bridging portion **21***a* between the fold lines **17**, **17***a* into what, in the erected box, become an outer flap **22** and an inner flap **23**. Each of the inner flaps **23** is divided into flap portions **23***a* and **23***b* by a fold line **24** which extends from the inner end of the slot **18** and substantialy normal to the fold lines **17**, **17***a*.

In erecting the box **10**, the inner flaps **23** are folded along the lines **24** with the portions **23***a* over the portions **23***b* as shown in FIGURE 5. A rigidifying member **26** such as a wood board or other suitable material which has been precut to fit between the fold lines **14**, **17***a* and **20** is positioned on each of the end wall portions **16***a*. Then the parts are folded along the fold lines **17**, **17***a* so that the inner end wall portion **16***b* overlies the outer end wall portion **16***a* forming a pocket **30** in which the member **26** is enclosed between them and with the folded portions **23***a*, **23***b* of the inner flaps **23** overlying the outer flaps **22** as shown in FIGURE 6.

Then the superimposed inner and outer flaps **23**, **22** are folded up substantially perpendicular to the end walls **16** as shown in FIGURE 7, and at the same time, the side walls **15** are folded up along the fold lines **13** perpendicular to the bottom **19**. Now, the two end walls **16** are folded up along the fold lines **14** and at the same time the ends of the side walls **15** are guided into a space **25** between the inner flap portions **23***a* and the outer flaps **22** so that the box is now substantially erected as seen in FIGURES 2, 3 and 4. The box is conveniently secured in erected condition by fastening the outer flaps **22** to the side walls **15** with stitching staples S seen in FIGURE 2 and from inside the box in FIGURE 3.

As shown most clearly in FIGURE 1, the erection of the box **10** may be facilitated by the formation of small diameter holes **28** at each of the corners of the box formed at the convergence of fold lines **13** and **14** with each of the slots **12**. These may also act as drain holes for melted ice water. The upper end edge portions of the side walls **15** may be cut away as indicated at **27** in FIGURES 1 and 6 to provide clearance for the bridging por-

tions 21*a*. Any suitable cover may be utilized when one is required.

In order to take advantage of the directional strength of corrugated paperboard, the blank is formed so that the corrugations extend lengthwise of the blank as viewed in FIGURE 1. Thus, when the side walls **15** are erected and the box is viewed as in FIGURES 3 and 4, the corrugations in the side walls and bottom extend horizontally so as to provide a maximum degree of lateral strength and resistance to lateral bending, while the corrugations in the end wall and end reinforcing portions **16, 21** extend vertically to withstand the weight of filled and stacked boxes. If desired the bottom of the box may be reinforced by means of wood slats **29** which extend along the outer surface of the bottom **19**. These wood slats may be readily affixed by means of glue which is preferably waterproof.

The unique flap and double end wall construction of box **10** insures a unique degree of strength in the box to resist rupture at the corners and to support a vertical load. When such boxes are packed with perishable food together with ice and then are stacked one on top of another to form a relatively high tier in a warehouse or a delivery van, a substantial weight is placed upon the vertical walls of the lower boxes. Even in the absence of wood board rigidifying members **26** in the end wall pockets, the construction of box **10** is such that it has a greatly enhanced degree of strength even when subjected to the adverse effect of the moisture formed when the ice melts. When the wood board members **26** are in place in the end wall pockets, as is preferred, the strength of the box to support vertical loads compares well with that of wood boxes while at the same time the drawbacks which normally attend the use of wood boxes are avoided.

The box is economical to produce because, as seen in FIGURE 1, the blank is substantially rectilinear in shape so that full use is made of the paperboard stock with very little trimming and waste.

The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. A paperboard box, comprising a bottom member, a pair of side wall members joined with said bottom member along fold lines on opposite sides of said bottom member, a pair of end walls joined with said bottom member along fold lines extending along the opposite ends of said bottom member, each of said end walls being doubled over upon itself along a fold line extending therealong substantially parallel with the end of said bottom thereby forming inner and outer end wall portions, said inner and outer end wall portions respectively merging at each end thereof into mutually juxtaposed inner and outer flaps extending substantially normal to said end wall portions, a bridging portion uniting the inner and outer flaps formed at each end of each of said end walls, the juxtaposed inner and outer flaps extending in substantially parallel spaced relation with an end portion of one of said side walls extending therebetween and with said bridging portion extending across the edge of said side wall remote from said bottom member.

2. A paperboard box, comprising a bottom member, a pair of side wall members joined with said bottom member along fold lines on opposite sides of said bottom member, a pair of end walls joined with said bottom member along fold lines extending along the opposite ends of said bottom member, each of said end walls being doubled over upon itself along a fold line extending therealong substantially parallel with the end of said bottom thereby forming inner and outer end wall portions, said inner and outer end wall portions respectively merging at each end thereof into mutually juxtaposed inner and outer flaps extending substantially normal to said end wall portions, bridging portions extending substantially normal to said end wall portions and each integrally uniting the juxtaposed inner and outer flaps, said inner flaps each being folded back along itself so that the juxtaposed outer flap extends therebeyond, and the inner and outer flaps formed at each end of each of said end walls extending in substantially parallel spaced relation with an end portion of one of said side walls extending therebetween and with the associated bridging portion extending across the edge of the side wall remote from said bottom member.

3. A paperboard box, comprising a bottom member, a pair of side wall members joined with said bottom member along fold lines on opposite sides of said bottom member, a pair of end walls joined with said bottom member along fold lines extending along the opposite ends of said bottom member, each of said end walls being doubled over upon itself along a fold line extending therealong substantially parallel with the end of said bottom thereby forming inner and outer end wall portions, said inner and outer end wall portions respectively merging at each end thereof into mutually juxtaposed inner and outer flaps extending substantially normal to said end wall portions, bridging portions extending substantially normal to said end wall portions and each integrally uniting the juxtaposed inner and outer flaps, said inner flaps each being folded back along itself so that the juxtaposed outer flap extends therebeyond, the inner and outer flaps formed at each end of each of said end walls extending in substantially parallel spaced relation with an end portion of one of said side walls extending therebetween and with the associated bridging portion extending across the edge of the side wall remote from said bottom member, and fastening means securing each of said outer flaps with the end portion of the side wall juxtaposed thereto.

4. A paperboard box, comprising a one-piece paper member forming integrally united bottom, side and end wall members with the side and end wall members extending substantially normal to each other and to said bottom member, each of said end wall members having spaced parallel fold lines around which it is folded inwardly back upon itself thereby forming substantially coextensive inner and outer end wall portions extending in substantially parallel spaced relation and forming a pocket therebetween, a rigidifying member extending in said pocket, said inner and outer end wall portions respectively merging at each end thereof into mutually juxtaposed inner and outer flaps extending substantially normal to said end wall portions, said inner flaps each being folded back along itself so that the juxtaposed outer flap extends therebeyond, and the inner and outer flaps formed at each end of each of said end walls extending in substantially parallel spaced relation with an end portion of one of said side walls extending therebetween.

5. A paperboard box, comprising a one-piece paper member forming integrally united bottom, side and end wall members with the side and end wall members extending substantially normal to each other and to said bottom member, each of said end wall members having spaced parallel fold lines around which it is folded inwardly back upon itself thereby forming substantially coextensive inner and outer end wall portions, extending in substantially parallel spaced relation and forming a pocket therebetween, a rigidifying member extending in said pocket, said inner and outer end wall portions respectively merging at each end thereof into mutually juxtaposed inner and outer flaps extending substantially normal to said end wall portions, said inner flaps each being folded back along itself so that the juxtaposed outer flap extends therebeyond, the inner and outer flaps formed at each end of each of said end walls extending in substantially parallel spaced relation with an end portion of

one of said side walls extending therebetween, and fastening means extending through each of said outer flaps and the end portion of the side wall juxtaposed thereto.

6. A paperboard box, comprising a one-piece paper member forming integrally united rectilinear bottom, side and end wall members with the side and end wall members extending substantially normal to each other and to said bottom member, each of said end wall members having spaced parallel fold lines around which it is folded inwardly back upon itself thereby forming substantially coextensive inner and outer end wall portions extending in substantially parallel spaced relation and forming a pocket therebetween, a rigidifying member extending in said pocket, said inner and outer end wall portions respectively merging at each end thereof into mutually juxtaposed inner and outer flaps extending substantially normal to said end wall portions, said inner flaps each being folded back along itself so that the juxtaposed outer flap extends therebeyond, the inner and outer flaps formed at each end of each of said end walls extending in substantially parallel spaced relation with an end portion of one of said side walls extending therebetween, mutually adjacent corners of said bottom, side and end wall members and said outer flaps being cut away to form an opening through each of the bottom corners of said box, and fastening means extending through each of said outer flaps and the end portion of the side wall juxtaposed thereto.

7. A blank for a paperboard box comprising a bottom, sides, and ends, the sides being defined by fold lines lengthwise of the blank, the ends being defined by fold lines and slots crosswise of the blank, the ends being divided into inner and outer end portions by additional fold lines crosswise of the blank, the inner and outer end portions having corresponding inner and outer flaps defined essentially by extensions of said lengthwise fold lines, corresponding inner and outer flaps being united by a bridging portion defined by the end portions of said additional fold lines, the flaps being foldable into engagement with portions of the sides with said side portions positioned between said flaps and with said bridging portions extending about the edges of said side portions.

8. A blank for a paperboard box, said blank being substantially rectilinear in shape and comprising a bottom, sides and ends, the sides being defined by fold lines lengthwise of the blank, the ends being defined by fold lines and slots across the blank, the ends being divided into inner and outer end portions by additional fold lines crosswise of the blank, said additional crosswise fold lines being in pairs, the fold lines of each pair being spaced to provide a pocket for accommodating a rigid member between the folded inner and outer end portions, the inner and outer end portions having inner and outer flaps defined essentially by extensions of said lengthwise fold lines, corresponding inner and outer flaps being united by a bridging portion defined by the end portions of said additional fold lines, the flaps being foldable into engagement with portions of the sides with said side portions extending between said flaps and with said bridging portions extending about the edges of said side portions.

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