

Jan. 12, 1954

R. M. BERGSTEIN
LINED BOX STRUCTURE

2,665,835

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2 Sheets-Sheet 1

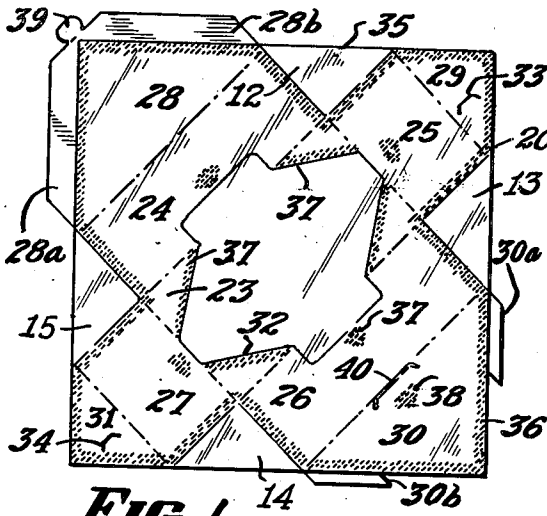


FIG. 1.

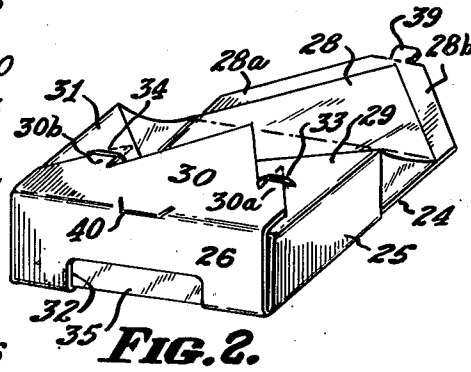


FIG. 2.

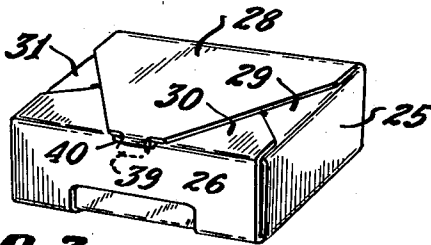


FIG. 3.

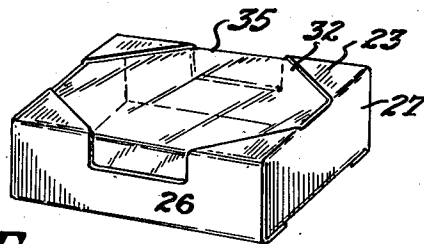


FIG. 4.

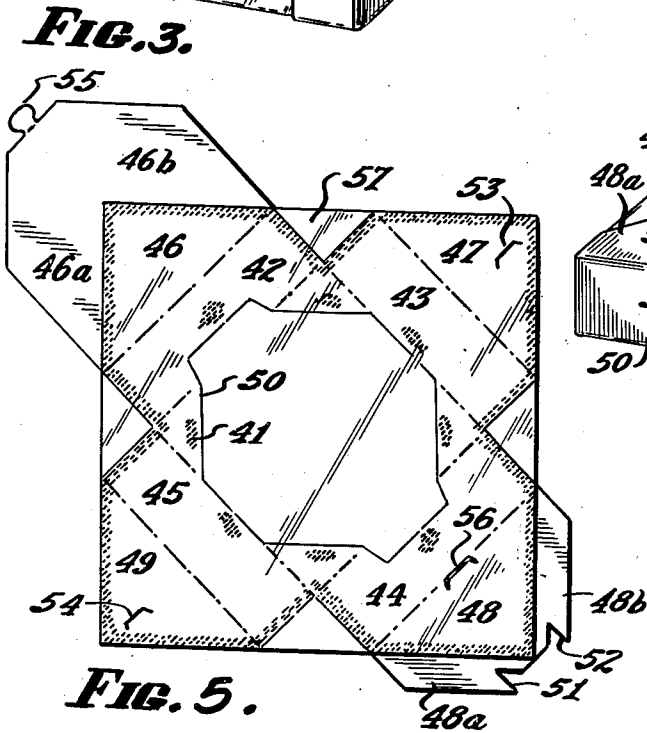


FIG. 5.

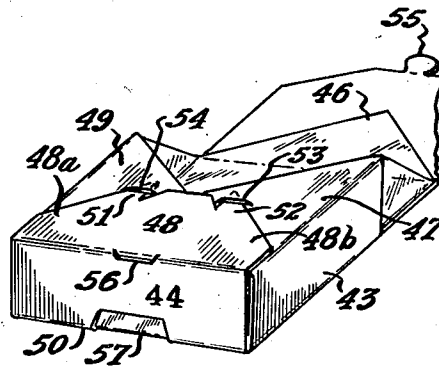


FIG. 6.

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2 Sheets-Sheet 2

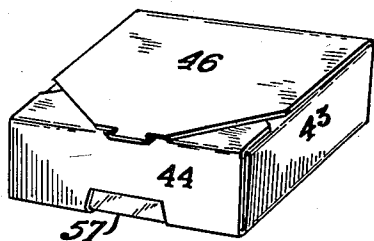


FIG. 7.

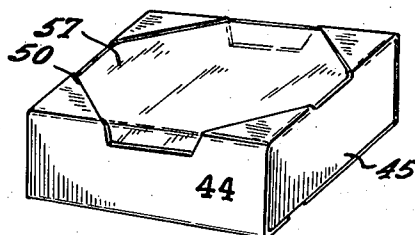


FIG. 8.

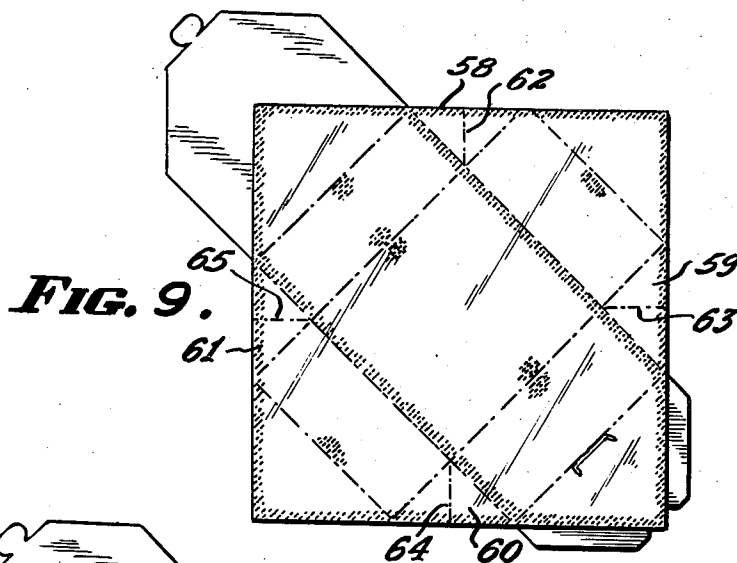


FIG. 9.

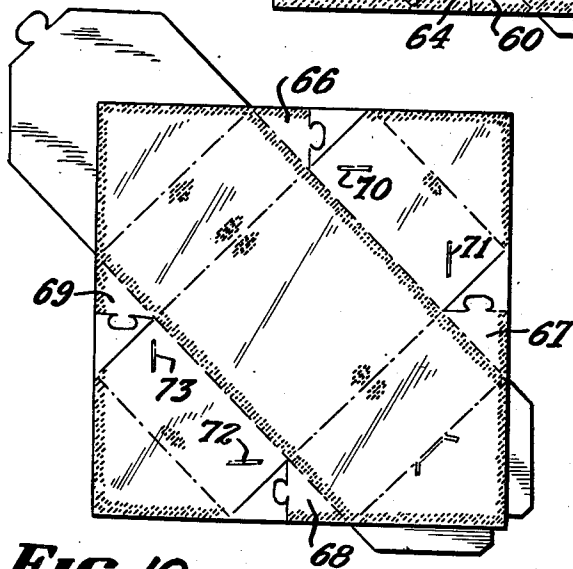


FIG. 10.

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LINED BOX STRUCTURE

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Application November 27, 1948, Serial No. 62,257

4 Claims. (Cl. 229-14)

1

My invention relates to the provision of lined paperboard box structures of knock-down form, i. e. capable of being shipped flat and set up by the user, in which the liner and the paperboard blank are integrally joined in the process of manufacture, and need not be handled as separate pieces by the user.

Various structures of this class have hitherto been suggested. The familiar window carton is one in which an opening is formed in one or more panels and covered on the inside surface of the carton with a sheet of transparent material such as cellophane, adhered to the carton walls about the edges of the opening. The usual window carton is not a lined carton in the sense here used, for the sheet of cellophane has an area not greatly larger than that of the opening in the wall or walls, so that substantial areas of the paperboard from which the carton is made are exposed to the contents of it. Windows have, however, been formed in lined cartons.

In the manufacture of lined cartons it has been proposed, for example, to ply a liner to one or both sides of a supply of boxboard, and then form cartons therefrom by the usual operations of cutting, scoring and (where required) folding and gluing. This is an expensive procedure requiring combining equipment, and involving a wastage of liner substance equivalent to the scrap loss of the paperboard incident to the manufacture of the carton. In modern merchandising visibility of the contents along with all-over inner protection is of great importance. In the type of structure just mentioned the problem of providing windows is a serious one. Openings can be provided in the bulk supply of boxboard prior to laminating, but this often results in the liner being covered with adhesive over the window area, which is disadvantageous, and entails the further difficulty that the correlation of preformed openings in a bulk supply with box blanks to be formed in a separate operation from sheets cut from the supply is commercially impracticable. Even if a slow sheet lining method is used, it will be evident that there will be an initial operation to cut out the window openings and a subsequent operation to form the cartons as such, these operations being separated by a laminating step; all of which results in a complicated and expensive procedure.

Again it has been proposed to form carton blanks and associate liner sheets with them. In some forms of box blank, sheets of liner material larger in area than the blank are employed, and the resultant structures involve either in their

2

formation or in their erection a folding of the liner as well as the blank. In other forms, as where closure flaps or the like are employed, and since it is impracticable to configure the liner sheet as the blank is configured, it has been necessary in some instances to use liner sheets substantially smaller than the paperboard blanks with the result that the boxes are incompletely lined. In other instances larger liner sheets have been employed, but must be left free from certain portions of the box blanks, which gives rise to a handling problem. Wherever in a composite structure of box blank and liner, any substantial edge length of the liner is left free of the blank, the structures tend to catch on each other with possible tearing of the liner, thus destroying its utility. Wherever the liner extends substantially beyond the confines of the blank, the liner tends to be rumped and creased in handling and in many instances to separate from the blank. Also the liner must be separately folded and manipulated in closing the composite structures after the contents have been placed in them.

It is a fundamental object of my invention to provide lined structures in which the above mentioned disadvantages are avoided.

It is an object of the invention to provide a structure combining a boxboard blank and a liner sheet, in which the blank and sheet are of the same or substantially the same size and shape and may be readily and economically associated together through the employment of the ordinary "cellophane window machines" in current use in the box making art.

It is an object of my invention to provide a simple and inexpensive box or folder structure in which a rectangular sheet of lining material is associated with a rectangular or substantially rectangular blank so as to line all parts of it, which are exposed to the contents, in which the folding of the box walls results in a folding of the liner in erecting the structure so that extra manipulations are not required, and in which locking means may be provided and employed to hold the structure in erected condition without configuration or cutting of the liner sheet, and without exposing to the contents of the package any part of the paperboard blank.

It is an object of my invention to provide structures of the class set forth at substantial savings over any of the hitherto known types of lined box structures. It is an object of my invention to provide a completely lined blank for a box, in which the liner sheet does not extend beyond the general confines of the blank, and is bound to the

blank for substantially the entire length of its peripheral edges.

It is an object of my invention to provide a composite structure in which an absolute minimum area of liner material is employed to achieve the completely lined box. The importance of this will be evident when it is realized that in many instances the liner is the more expensive material involved. In my structures the exact minimum amount of liner material is used which will provide dependably a complete inner lining when the package is assembled. There is no wastage or scrapping of liner stock. The boxboard blanks moreover are so designed as to involve a minimum scrap loss, as will be pointed out hereinafter. In this way savings up to and exceeding 10% of the cost of the structures are effected as compared with lined boxes of the same capacity otherwise produced.

It is also an object of my invention to provide box structures which are unique in that they involve a 6-panel enclosure for the contents, that is to say, a top, a bottom and four sides, five of the six panels being protected by an integral and unbroken sheet of liner material, whereas the sixth panel is protected by fully lined parts which are abutted or mitered in relation to each other.

It is an object of my invention to provide lined structures in which no unlined portion of the boxboard is presented to the contents, yet in which no manipulation of a liner sheet is required apart from the manipulation of the composite structure as a whole.

It is an object of my invention to provide a type of structure in which the boxboard blank is rectangular, and in many instances square, irrespective of widely varied ratios of length, width and thickness in the completed box, and in which a blank is run through the lining operation with the main fold lines substantially diagonal to the direction of travel of the blank.

It is an object of my invention to provide a lined box of the type set forth in which the bottom panel and the various side panels together with the liner may form a water-tight structure in which, for example, materials of high liquid content may be introduced for subsequent freezing.

It is an object of my invention to provide structures in which the liner sheet is either square or rectangular so that it may be cut conveniently and without waste from a continuous supply.

It is an object of my invention to provide structures in which while the ultimate box will be fully lined as set forth, the sheet of liner material does not project beyond the main outlines of the blank and may be secured continuously throughout its periphery to all contiguous portions of the blank, thus leaving no portions of the liner sheet projecting beyond the main outlines of the blank and only exceedingly minor portions of the periphery of the liner unsecured to the blank.

My invention is not limited by the nature of the liner sheet, which will be a flexible sheet material the substance of which may be chosen in the light of the particular qualities desired. By way of non-limiting examples, a glassine paper may be employed where its particular qualities of grease-proofness are desired; various plied materials inclusive of papers, foils and films may be employed where their qualities of proofness, appearance and the like are of importance; and where transparency and gloss as well as proofness contribute to the utility of the

box, or where windows are desired, various ones of the transparent films of commerce are available. I shall hereinafter describe exemplary structures in which cellophane is used as a liner, it being understood that the substance of the liner does not affect the structure claimed, excepting as set forth above. I shall describe typical structures in which the liner is associated with the inside surface of the paperboard blank.

The objects of the invention which have been set forth above and others which will be discussed hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that procedure and in that structure and arrangement of parts of which I shall now describe certain exemplary embodiments. Reference is made to the accompanying drawings wherein:

Figure 1 is a plan view of a blank and liner sheet associated in accordance with my invention.

Figure 2 is a perspective view showing the structure of Figure 1 in a partially erected condition.

Figure 3 is a perspective view of the completely erected and closed box from the under side.

Figure 4 is a perspective view of the completely erected and closed box from the upper side.

Figure 5 is a plan view of a paperboard blank and an associated liner sheet forming a modification of my invention.

Figure 6 is a perspective view of the partially erected box.

Figure 7 is a perspective view of the completely erected and closed box from the under side.

Figure 8 is a perspective view of the completely erected and closed box from the upper side.

Figure 9 is a plan view of a blank and associated liner sheet generally similar to that of Figure 5 but showing a variation of the construction at the corner forming portions.

Figure 10 is a plan view of a blank and associated liner sheet, also generally similar to that of Figure 5, but showing yet another form of corner construction.

In the various figures solid lines indicate lines of cut, and dash-dot lines indicate lines of scoring. Referring to Figure 1, I have shown at 20, a rectangular paperboard blank which will be understood to have been printed as desired. It is cut and scored to provide a main panel 23 which will form the top of the box when erected, side walls 24 and 26 articulated to the side edges of the main panel 23, and end panels 25 and 27 articulated to its end edges. These elements are arranged diagonally or aslant on the blank as shown; and there are left at each corner of the blank triangular tabs or flaps 28, 29, 30 and 31 which, in the erected structure, will coact to form the bottom panel. The blank may be notched out at the ends of the side and end walls as shown at 12, 13, 14 and 15. A window opening 32 is shown as formed in the main panel 23 and the side walls 24 and 26, and is exemplary only. Window openings of a size and shape other than that shown in Figure 1 may be employed.

In order to assure positive overlapping of the flaps, it will be noted in Figure 1 that I have carried outwardly the edges of the flap 28 as at 28a and 28b beyond the rectangular main outline of the blank. Also at 30a and 30b I have provided lateral projections on the side edges of the flap 30. These projections have pointed outer ends as shown, forming tongues. Slits 33 and

34 are formed as shown in the triangular flaps 29 and 31.

While the paperboard blank of Figure 6 is not truly rectangular in absolute outline, it is generally of that shape, and its edges remain such as to provide adequate coaction with the guides in a cellophane window machine and in the hopper thereof. It will be understood that this blank, and all blanks herein illustrated, are sent through a cellophane window machine in the direction of one of their rectangular sides. A sheet of cellophane or other lining material is applied to the blank by the window machine, and is indicated in Figure 1 at 35. It will be adhered to the blank in the shaded area 36 about the rectangular periphery of the blank; but it may be adhered elsewhere also if desired as at areas 37 adjacent the window 32, and areas in the interior of the flaps as at 38. The projections 28a, 28b, 30a and 30b extend beyond the rectangular periphery of the liner sheet, as shown. At the apex of the flap 28 I may provide a locking tongue 39 adapted to enter a slit 40 formed in the flap 30.

In erecting the box, the end walls 25 and 27 are first erected, and their flaps 29 and 31 folded over into the rear plane of the box, whereupon the side wall 26 may then be erected, the flap 30 folded over and the tongue-like pointed ends of the extensions 30a and 30b may then be engaged in the slits 33 and 34 in flaps 29 and 31. This will hold the erected parts in erected condition, giving a structure which may then be filled with contents like an envelope (if the contents have not already been inserted in the package). Then the side wall 24 may be erected, the flap 28 folded over and the locking tongue 39 thrust downwardly into the slit 40. The box then will be securely closed, and there will be an adequate overlap of flaps to provide an adequate protective closure on the bottom of the box. The extension of the cellophane or other liner sheet beyond the knocked-out portions of the blank in the areas 12, 13, 14 and 15 leaves small bellows-folding portions of the liner sheet at the ends of the side and end walls. These may either be folded inwardly or cut off in the completed structure.

In any event it will be observed that I have provided in this structure a paperboard blank lined on the inside throughout with a liner sheet; that one or more of the flaps involved are cut or slitted as to the paperboard portion but not as to the liner sheet; and that when the ends of the locking tongues are thrust through these cuts or slits they engage between the paperboard portion of the flap and a continuous uncut portion of the liner sheet therebeneath so that these paperboard portions are prevented from coming into contact with the contents of the package. Figures 3 and 4 illustrate respectively the bottom and top sides of the completed package.

The boxes of my invention are formed from blanks which are generally rectangular or square in outline, with the main panel and side and end walls disposed in directions parallel to the diagonals of the rectangle or square. This does not, however, circumscribe the general size and shape of the boxes produced. Figure 1 illustrates a structure for a box having relatively deep side and end walls and being of elongated, rectangular (non-square) form. In Figure 5 I have shown a box of square form, but with relatively narrower side and end walls. Since the blanks are generally rectangular they can be cut without

substantial waste from rectangular sheets of paperboard, even when extensions are provided as taught in Figures 1, 5, 9 and 10 hereof. The reason for this is that when the blanks are reversed they nest, and the extent of the projections may readily be controlled to permit nesting. In Figure 5, I have shown a blank for a square box having a main panel 41, side and end walls 42, 43, 44 and 45 articulated respectively to the sides and ends of the main panel, and flaps 46, 47, 48 and 49 on the outer edges of the side and end walls. A window 50 common to the side walls and the main panel may be provided as shown. Relatively wide lateral extensions 48a and 48b are formed on the edges of the flap 48, and the approaching ends of these extensions are configurated to provide tongues 51 and 52 which, in the erected structure will engage in slots 53 and 54 in the triangular flaps 47 and 49, in a way already explained. Much wider extensions indicated at 46a and 46b are provided on the flap 46, and a locking tongue 55 is provided at its apex which will engage in a slot 56 in the flap 48 substantially coinciding with its score line, in a way also already explained. The parts are so proportioned that the distance between the line of articulation of the flap 46 to the side wall 42 and the base of the locking tongue 55 is substantially equal to the width of the main panel 41.

Paperboard blanks of the kind shown in Figure 5 are sent as before through a cellophane window machine and receive liner sheets substantially congruent to the general rectangular outline of the blank, and adhered to the blank about the peripheries of the liner sheets, and elsewhere if desired. The liner sheet in Figure 5 is indicated at 57. The manner of erecting and closing this box will be understood from the description above. Figure 6 illustrates the box in partially erected condition with flap 48 locked to flaps 47 and 49 and the box in condition to be filled like an envelope. Figure 7 illustrates the completely closed box from the reverse or bottom side, while Figure 8 shows it from the top side.

My boxes may, as above indicated, be erected about solid contents, or styles of boxes such as those illustrated in Figures 1 and 5 may be partially erected before the introduction of the contents and the contents thereafter introduced through the area to be occupied by the as yet unfolded side. Such a method of erection and filling is suitable for use with contents which can not act as a form for the erection of the box. There are, however, instances in which it is undesirable to fill the box in the partially erected condition illustrated in Figure 6. Where these conditions are encountered, it is within the scope of my invention to provide a form or jig into which a partially erected box may be placed. The partially erected condition of the box would be one in which side and end walls 42, 43, 44 and 45 were erected at right angles to the main panel 41, but in which the flaps 46, 47, 48 and 49 remain unfolded until after the filling. While the box is still in the form or jig, the contents of whatever nature are introduced, and thereafter the flaps are folded and interengaged. It will be noted not only that my blanks are fully lined throughout with the liner sheet, but at the corners the liner sheet is formed into bellows folds so that the boxes are suitable for use with contents which are filled into them in such soft condition as to be likely to exude

at the corners of boxes not provided with bellows folds.

Especially where the side and end walls of the box are relatively deep, instead of notching out the paperboard blank between the ends of the side and end walls, I may permit the paperboard to remain in these positions and diagonally score it to provide paperboard bellows folds which will assist in the bellows-folding of the liner sheet, and also assist in maintaining the positions of the ends of the side and end walls, thereby greatly strengthening the box. This is illustrated in Figure 9 where the paperboard webs connecting the ends of the side and end walls have been allowed to remain in the blank at 58, 59, 60 and 61 and have been diagonally scored as at 62, 63, 64 and 65.

Yet again, as illustrated in Figure 10, it is within the scope of my invention to provide a structure in which the side and end walls will maintain themselves in erected form without the use of a jig as described above. In this figure, in which like parts are designated by like index numerals, the portions of board in the paperboard blank lying between the ends of the side and end wall elements, are configured to form locking tongues 66, 67, 68 and 69, which in the erected structure will engage in slots 70, 71, 72 and 73 in the two end walls. In setting up this structure the engagement of the locking tongues in the slots is effected immediately upon erecting the side and end walls with respect to the main panel, after which the box will retain its shape during filling. The liner sheet will of course not be adhered to the locking tongues, and in the portions lying between the ends of the side and end walls will be bellows-folded, with the folds extending inwardly of the box. After the box has been filled with its contents, the various triangular flaps may be folded over onto the contents and interengaged as hereinabove described.

Modifications may be made in my invention without departing from the spirit thereof. Having thus described my invention in certain exemplary embodiments, what I claim as new and desire to secure by Letters Patent is:

1. In a machine lined paperboard box structure having enclosing body walls and incorporating a liner having the minimum rectangular area for completely internally lining the enclosing walls of said box structure, said box structure being formed from a paperboard blank cut and scored to provide a main panel, side and end wall panels articulated to said main panel, and flap members articulated to said side and end wall panels for forming the remaining wall of said box structure, a rectangular liner sheet overlying said bottom panel and said side and end wall panels, said rectangular liner sheet being diagonally disposed with respect to said main panel and having its edges coinciding with the outermost corners of said side and end wall panels, thereby providing triangular liner portions extending outwardly beyond said side and end wall panels and overlying said flap members, three of said flap members being triangular in outline and having their edges coinciding with the edges of the overlying corner portions of said liner sheet, the fourth of said closure flaps being larger than the overlying corner portion of said liner sheet and extending beyond the edges thereof, said triangular portions being marginally secured to said flap members, said first named three flap members being adapted to be folded into edge

abutting relation in the erected box, whereby to bring edge portions of the corresponding liner corners into abutting relation, said fourth flap being foldable to overlie edge portions of said first named three flap members with the corner portion of the liner secured to said fourth flap member in edge abutting relation with adjacent edge portions of the liner corners secured to the opposed pair of said first named three flap members.

2. In a machine lined paperboard box structure having enclosing body walls and incorporating a liner having the minimum rectangular area for completely internally lining the enclosing walls of said box structure, said box structure being formed from a paperboard blank cut and scored to provide a main panel, side and end wall panels articulated to said main panel, and flap members articulated to said side and end wall panels for forming the remaining wall of said box structure, a rectangular liner sheet overlying said bottom panel and said side and end wall panels, said rectangular liner sheet being diagonally disposed with respect to said main panel and having its edges coinciding with the outermost corners of said side and end wall panels, thereby providing triangular liner portions extending outwardly beyond said side and end wall panels and overlying said flap members, three of said flap members being triangular in outline and having their edges coinciding with the edges of the overlying corner portions of said liner sheet, the fourth of said closure flaps being larger than the overlying corner portion of said liner sheet and extending beyond the edges thereof, said triangular portions being marginally secured to said flap members, said first named three flap members being adapted to be folded into edge abutting relation in the erected box, whereby to bring edge portions of the corresponding liner corners into abutting relation, said fourth flap being foldable to overlie edge portions of said first named three flap members with the corner portion of the liner secured to said fourth flap member in edge abutting relation with adjacent edge portions of the liner corners secured to the opposed pair of said first named three flap members, interlocks for fastening together said first named three flap members to provide a structure which may be filled envelope-wise, said interlocks comprising minor projections extending outwardly beyond the triangular outline of at least one of said first named three flap members and adapted to overlie an adjacent flap member in the erected structure, the fourth of said flap members including locking means for securing it in folded condition overlying the said first named three flap members.

3. In a machine lined paperboard box structure having enclosing body walls and incorporating a liner having the minimum rectangular area for completely internally lining the enclosing walls of said box structure, said box structure being formed from a paperboard blank cut and scored to provide a main panel, side and end wall panels articulated to said main panel, and flap members articulated to said side and end wall panels for forming the remaining wall of said box structure, a rectangular liner sheet overlying said bottom panel and said side and end wall panels, said rectangular liner sheet being diagonally disposed with respect to said main panel and having its edges coinciding with the outermost corners of said side and end wall

panels, thereby providing triangular liner portions extending outwardly beyond said side and end wall panels and overlying said flap members, three of said flap members being triangular in outline and having their edges coinciding with the edges of the overlying corner portions of said liner sheet, the fourth of said closure flaps being larger than the overlying corner portion of said liner sheet and extending beyond the edges thereof, said triangular portions being marginally secured to said flap members, said first named three flap members being adapted to be folded into edge abutting relation in the erected box, whereby to bring edge portions of the corresponding liner corners into abutting relation, said fourth flap being foldable to overlie edge portions of said first named three flap members with the corner portion of the liner secured to said fourth flap member in edge abutting relation with adjacent edge portions of the liner corners secured to the opposed pair of said first named three flap members, interlocks for interconnecting said first named three flap members to provide a structure which may be filled envelope-wise, said interlocks comprising locking tongues extending beyond the triangular outline of the intermediate one of said first named three flap members and adapted to overlie the opposed pair of said flap members, the said opposed pair of flap members having slits therein for engagement by said locking tongues, said fourth closure flap including locking means for securing it in folded condition overlying said first named three flap members.

4. In a machine lined paperboard box structure having enclosing body walls and incorporating a liner having the minimum rectangular area for completely internally lining the enclosing walls of said box structure, said box structure being formed from a paperboard blank cut and scored to provide a main panel, side and end wall panels articulated to said main panel, and flap members articulated to said side and end wall panels for forming the remaining wall of said box structure, a rectangular liner sheet overlying said bottom panel and said side and end wall panels, said rectangular liner sheet being diagonally disposed with respect to said main panel and having its edges coinciding with the

outermost corners of said side and end wall panels, thereby providing triangular liner portions extending outwardly beyond said side and end wall panels and overlying said flap members, three of said flap members being triangular in outline and having their edges coinciding with the edges of the overlying corner portions of said liner sheet, the fourth of said closure flaps being larger than the overlying corner portion of said liner sheet and extending beyond the edges thereof, said triangular portions being marginally secured to said flap members, said first named three flap members being adapted to be folded into edge abutting relation in the erected box, whereby to bring edge portions of the corresponding liner corners into abutting relation, said fourth flap being foldable to overlie edge portions of said first named three flap members with the corner portion of the liner secured to said fourth flap member in edge abutting relation with adjacent edge portions of the liner corners secured to the opposed pair of said first named three flap members, portions of said blank lying between the ends of said side and end wall panels being severed from one pair of said wall panels and remaining in articulation with the other pair of said wall panels and being further configured to provide locking tongues engageable in slits in the last named pair of said wall panels, whereby the side and end wall panels of said box structure may be erected with respect to said main panel and held in erected condition during filling of said box structure prior to the infolding of said flap members.

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