Nov. 11, 1952

R. B. MELLER

2,617,580

SELF-LOCKING FOLDING BOX

Filed Nov. 10, 1948

3 Sheets-Sheet 1

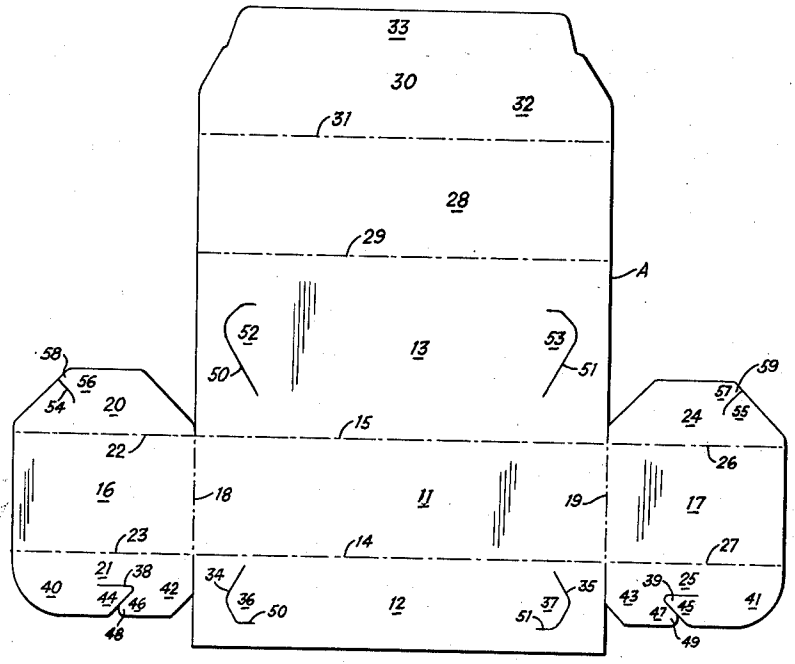


Fig. 1

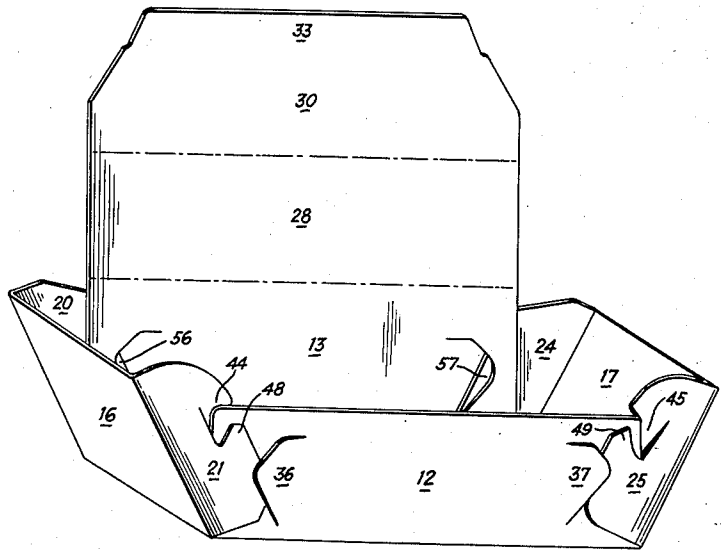


Fig. 2

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SELF-LOCKING FOLDING BOX

Filed Nov. 10, 1948 3 Sheets-Sheet 2

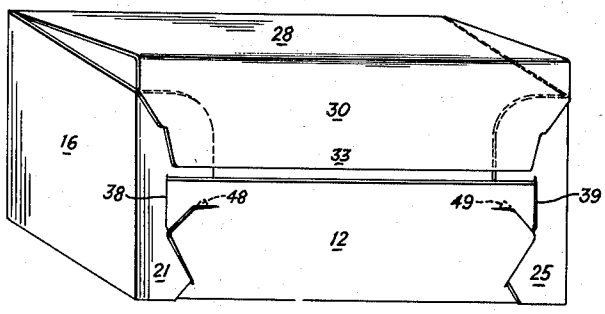


Fig. 3

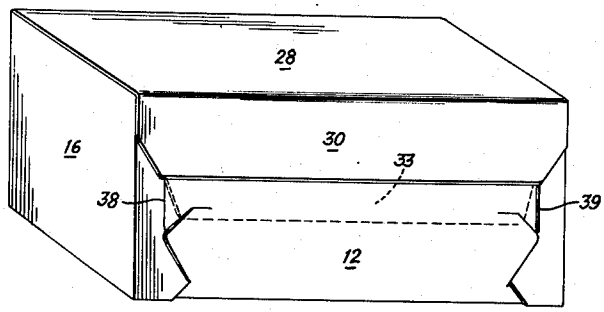


Fig 4

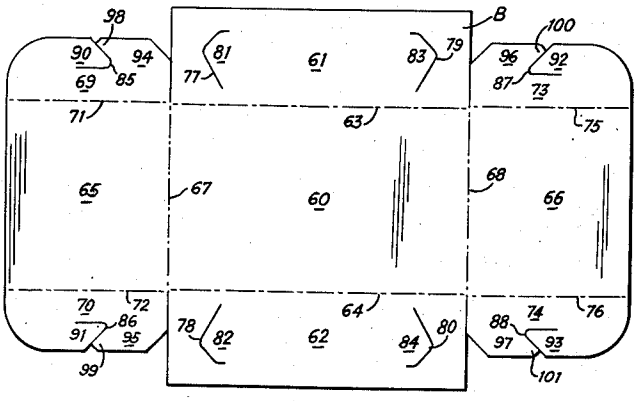


Fig. 5

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Nov. 11, 1952 R. B. MELLER 2,617,580

SELF-LOCKING FOLDING BOX

Filed Nov. 10, 1948 3 Sheets-Sheet 3

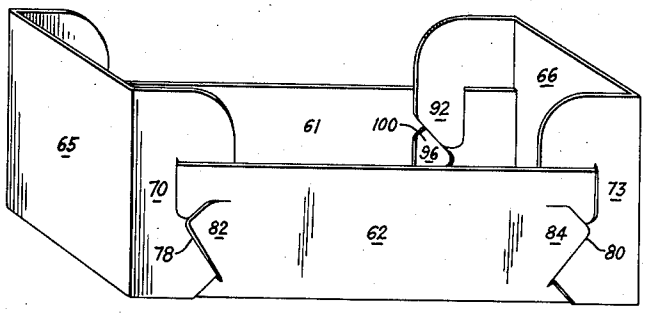


Fig. 6

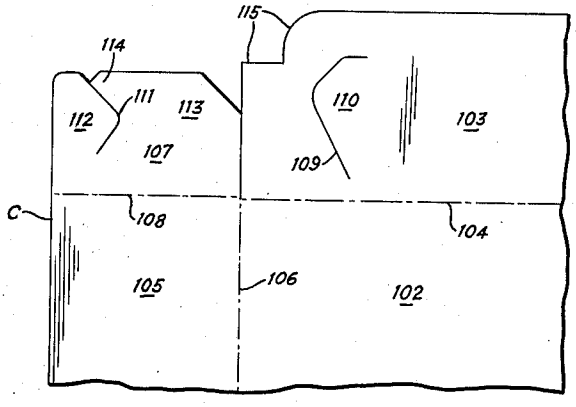


Fig. 7

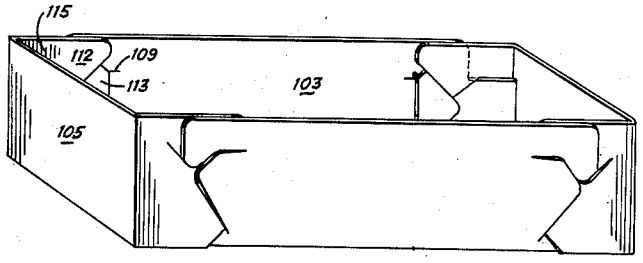


Fig. 8

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UNITED STATES PATENT OFFICE

2,617,580

SELF-LOCKING FOLDING BOX

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Application November 10, 1948, Serial No. 59,328

13 Claims. (Cl. 229—36)

1

This invention relates to improvements in cartons, boxes, trays, and other structures made from blanks of cardboard, paperboard, or other suitable foldable sheet material, hereinafter collectively referred to as "boxes" or "folding boxes."

The invention has particular application to folding boxes of the type commonly, although not quite accurately, called self locking boxes, that is, boxes which are maintained in assembly condition by glueless interengagement of certain box elements.

Most conventional folding boxes of the so-called self locking type have certain disadvantages or structural limitations which cause the assembled box to be weaker or less rigid than a comparable box of glued construction. For example, conventional glueless interlocks are usually sensitive to certain forces acting on the box walls from the outside. An outer wrapping of cellulose acetate sheet material, for instance, employed for over-wrapping merchandise-containing trays exerts pressure on the side walls of the box which pushes the walls inwardly, thereby tending to disengage the glueless interlock at the box corner.

Another limitation of conventional self locking boxes rests in the difficulty to use covers, particularly hinged covers in boxes of this type. Whereas hinged covers of the tuck type are in wide use on glued boxes because of the simplicity of construction and the ease with which the cover can be opened and reclosed, hinged covers of the tuck type have been found difficult to use on self locking boxes because of the peculiar corner construction of such boxes.

The invention provides, among other features, an improved interlock for the formation, without the use of adhesives, of a rigid and smooth box corner free from projections. The box corner being so constructed that it resists, in a heretofore unattained degree, forces which would tend to disengage the interlocking portions of the flaps or panels. More particularly, the invention provides an interlock which is extremely resistant to forces acting against the walls of the box from the inside and from the outside. The invention further provides an interlock which is practically free from play or lost motion so commonly found in construction of the self locking type.

These features make boxes embodying the present invention admirably suitable for tight overwrapping with a sheet of wrapping material, particularly materials which have a tendency to shrink after application.

The invention also provides an improved box corner construction of the gluelessly interlocked

2

type permitting convenient insertion for flaps or other portions of a cover or lid between interlocked panels or flaps without danger of prying the interengaging portions of the box apart.

While the invention is particularly applicable to the interlocking of panels at a box corner, it is not limited to such application but may advantageously be employed wherever it is desired to interlock two panels, or a panel and a flap of a folding box in a rigid manner to produce a connection therebetween comparable in strength and rigidity to a glued connection, but more convenient, quicker, and less expensive to assemble than a glued box.

The interlock provided by the present invention owes its strength, in no small measure, to a peculiarity of design which results in the board being subjected to compression, rather than tearing, compression being the type of load which the board is able to sustain most successfully, whereas tear stress is a far less favorable form of load.

The invention further provides a form of construction for a hinge cover box which is assembled entirely without adhesive and may be turned out on a small, compact, and relatively inexpensive machine at a rate approximately three times that of a conventional gluing machine occupying approximately five to ten times the amount of floor space and costing considerably more than an automatic machine for setting up boxes embodying the present invention.

The various objects, features, and advantages of the invention will appear more fully from a consideration of the detailed description which follows, accompanied by drawings showing, for the purpose of illustration, preferred embodiments and applications of this invention.

The invention also consists in certain new and improved details of the construction as hereinafter set forth and claimed.

Although the characteristic features of the invention which are believed to be novel will be particularly pointed out in the claims appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part of it in which:

Figure 1 is a plan view of a flat box blank for forming a hinge cover box with tuck flap closure;

Figure 2 is a perspective view of the blank of Figure 1 in the process of assembly;

Figure 3 is a perspective view of a box set up from the blank of Figure 1, the cover of the box being nearly closed;

Figure 4 is a perspective view of the box with its tuck flap fully inserted to maintain the cover in closed position;

Figure 5 is a plan view of a blank embodying the invention, the blank being designed to form an open tray or boat having elevated end walls;

Figure 6 is a perspective view of a tray formed from the blank of Figure 5;

Figure 7 is a plan view of a corner portion of a modified blank particularly suited for shallow boxes; and

Figure 8 is a perspective view of a tray formed from the blank of Figure 7.

In the following description and in the claims various structural details will be identified by specific names for convenience. The names, however, are intended to be as generic in their application as the art will permit. Corresponding reference characters refer to corresponding parts in the several figures of the drawings.

In the drawings accompanying, and forming part of the specification, certain specific disclosure of the invention is made for the purpose of explanation of broader aspects of the invention, but it is understood that the details may be modified in various respects without departure from the principles of the invention and that the invention may be applied to other structures than the ones shown.

The blank A shown in Figure 1 may be cut and scored in multiple from large sheets or rolls of suitable foldable sheet material, such as paperboard. The blank A is subdivided by several scored fold lines to provide a bottom panel 11 to which front and back wall panels 12 and 13 are hinged along front and back fold lines 14 and 15. End panels 16 and 17 are hingedly connected to the bottom panel 11 along end fold lines 18 and 19, respectively. Flaps 20 and 21 are hingedly connected to the end panel 16 along side fold lines 22 and 23. The fold lines 22 and 23 are either in line with, or parallel slightly offset with respect to, the side fold lines 15 and 14 to compensate for the thickness of the board in the succeeding folding operations, as is customary in the art. Flaps 24 and 25 are hingedly connected to the end panel 17 along fold lines 26 and 27 in a similar manner as just described.

A top panel 28 is hingedly connected to the back panel 13 along a top fold line 29, and a tuck flap 30 is hingedly connected to the top panel along a fold line 31. The tuck flap 30 has a main portion 32 of a width substantially equal to the width of the top panel 28, and has a tab portion 33 of reduced width, sufficiently narrow to fit between certain elements of the glueless interlock as will hereinafter be described in greater detail.

The means for interlocking the several panels and flaps of the box comprise internal cuts 34 and 35 in the front wall panel. These internal cuts are preferably of bent outline and form internal tongues 36 and 37 in the front wall panel pointing towards the box corners when the box is considered in set up condition. The internal tongues 36 and 37 may be flexed with respect to the remainder of the front wall panel, and, if so flexed, form wedge-shaped apertures in the front wall panel 12 into which portions of the associated lock flaps 21 and 25 may be moved in the manner which will presently be described.

The means of interlocking further comprise

external cuts 38 and 39 extending into the lock flaps 21 and 25 and separating upper flap portions 40 and 41 from lower flap portions 42 and 43. The upper flap portions will also be referred to as being far or remote with respect to the bottom panel 11 in the set up box, and the lower flap portions 42 and 43 will be referred to as being near or close with respect to bottom panel 11. The external cuts 38 and 39 are preferably of bent outline and form tongue shaped flap portions 44 and 45 pointing towards the bottom panel when the box is set up. The external cuts 38 and 39 further form external tongues 46 and 47 on the flaps whose cut edge portions are adapted to engage and interlock with cut edges formed by internal cuts 34 and 35 in the front wall panel. Preferably the interengaging edge portions are in substantial coincidence when the box is set up so as to produce an edge-to-edge engagement possessing far greater strength then a point-to-point engagement of cut edges extending at an angle. This will be described in greater detail in connection with the setting up operation of the box further below.

The external tongues 46 and 47 are preferably so shaped with respect to the outline of the internal cuts 34 and 35 as to extend beyond the outline of the internal tongues 36 and 37 when the lock flaps and the front wall panel are in the position which they assume in the finished box. As will later be seen more clearly, tip portions 48 and 49 extend beyond the confines of the internal tongues 36 and 37 particularly portions 50 and 51 of the internal cuts 34 and 35, when the box panels and flaps are in corner forming position.

The interlock between the back wall panel 13 and the lock flaps 20 and 24 may be somewhat simpler. In the illustrated form of blank it comprises internal cuts 50 and 51 preferably of bent outline, forming internal tongues 52 and 53 in the back wall panel. External cuts 54 and 55 in the lock flaps 20 and 24 form external tongues 56 and 57, therein, the tongues being preferably so shaped as to comprise tip portions 58 and 59 extending beyond the confines of the internal tongues 52 and 53.

The assembly of the blank A into box form may proceed as follows:

The blank A is first folded along the front and back fold lines 14 and 15 to bring the front and the back wall panels into substantially upright position with respect to the bottom panel 11. In this position, the stock of the front and the back wall panels is flexed adjacent the internal cuts 34, 35, 50, and 51 to deflect the internal tongues 36, 37, 52, and 53 outwardly, thereby opening apertures in the front and back walls into which the lock flaps 21, 25, 20, and 24 may thereafter be inserted.

The end panels 16 and 17 are then folded with respect to the bottom panel 11 about the end fold lines 18 and 19, and substantially simultaneously the flaps 21, 20, 25, and 24 are folded with respect to the end panels 16 and 17 about their respective fold lines 23, 22, 27, and 26. The lock flaps are brought into parallel position with the upright front and back wall panels 12 and 13 before the end panels 16 and 17 are fully folded into upright position with respect to the bottom panel. Simultaneously the tongue shaped flap portions 44 and 45 of the lock flaps 21 and 25 are flexed towards the inside of the box structure to pass behind the front wall panel 12 as is clearly shown in Figure 2.

The erection of the end panels 16 and 17 is continued while simultaneously the external tongues 46, 56 and 47, 57 of the flaps are being guided into the open apertures formed by the deflection of the internal tongues 36, 52 and 37, 53 in the front and back wall. This operation brings portions of the external cuts 38, 54, 39, and 55 into substantial coincidence with portions of the internal cuts 34, 50, and 35, 51. In this position, the tip portions 48, 58 and 49, 59 of the external tongues still rest on the outside of the front and back wall panel due to the fact that the external tongues with their tip portions extend beyond the contour of the respective internal tongues. The assembly is completed by pulling the tip portions to the inside of the box so that they overlie the inside surface of the front and back panels, respectively.

The box corners are now securely interlocked against disengagement. Edge portions of the lock flaps formed by the external cuts engage edge portions formed in the front and back wall panels by the internal cuts in edge-to-edge position. Forces acting against the end panels 16 and 17 from the inside of the box, for example pressure exerted by the box contents, are resisted by the interlocks which sustain compressive stress along the interlocked cut edges. Compressive stress is safely sustained by the board since the forces act in the plane of the panels, in which direction the board offers its greatest resistance to deformation. It will be noted that the tip portions 48, 58, and 49, 59 do not sustain any part of the load exerted on the interlock, but merely serve as safety locks, so to speak, for maintaining the interengaging cut edges in engaging position. In this respect the interlock formed according to the invention is distinct from, and superior to, glueless interlocks of the so-called hook type in which hook-shaped flaps are subjected to tearing, the hook-shaped flaps generally engaging cut edges in point-to-point relationship.

Pressure exerted against the end walls 16 and 17 from the outside are sustained by the end panels which rest against the side edges of the front and back panels.

Pressure exerted against the front and back walls 12 and 13 from the inside of the box is safely sustained by the box corner construction by reason of the reinforcement afforded by the lock flaps 20, 21, 24, and 25 which overlie the front and the back walls.

Forces acting on the front wall from the outside of the box are resisted primarily by the tongue shaped flap portions 44 and 45 which lie on the inside of the front wall panel 12 and prevent caving in of the front wall panel which, as is easily seen, would tend to disengage the interlocking cut edges at the corners of the front wall. The back wall is sufficiently secure against such caving in by the presence of the hinged cover comprising the top panel 28 and the tuck flap 30.

The cover of the box may now be folded into carton closing position as shown in successive stages in Figures 3 and 4. The tab portion 33 of the tuck flap is sufficiently narrow to fit between the front wall 12 and the tongue shaped flap portions 44 and 45 lying in back of it. In other words, the width of the tab portion 33 is less than the space between the upright portions of the external cuts 38 and 39. The tuck flap is held in carton closing position by frictional engagement making it easy to open and reclose the box.

The improved interlock provided by the invention is particularly suited for open trays which after filling with merchandise are overwrapped, generally with a sheet of transparent material such as cellulose acetate.

A typical blank for such a tray is shown in Figure 5.

The blank B comprises a bottom panel 60 having side wall panels 61 and 62 connected to it along bottom fold lines 63 and 64. End wall panels 65 and 66 are hingedly connected to the bottom panel 60 along end fold lines 67 and 68, respectively. Lock flaps 69 and 70 are hingedly connected to the end panel 65 along side fold lines 71 and 72. Similar box flaps 73 and 74 are hingedly connected to the end panel 66 along side fold lines 75 and 76. The side fold lines 71, 75 and the side fold lines 72, 76 may lie in line with the bottom fold lines 63 and 64 or, as shown in Figure 5, may be offset slightly to compensate for the thickness of the board.

Internal cuts 77, 78, 79, and 80 form internal tongues 81, 82, 83, and 84 in the side wall panels which upon flexing with respect to the remainder of the side wall panels open apertures into which portions of the lock flaps 69, 70, 73, and 74 may be inserted.

The lock flaps are partially severed by external cuts 85, 86, 87, and 88 and are divided into far portions 90, 91, 92, and 93 remote with respect to the bottom panel, and near portions 94, 95, 96 and 97 close to the bottom panel. The near flap portions 94, 95, 96, and 97 constitute external tongues and are provided, similar to blank A, with tip portions 98, 99, 100, and 101 extending beyond the confines of the respective internal tongues when the flaps 69, 70, 73, and 74 are folded into box forming position.

The far portions 90, 91, 92, and 93 constitute tongues pointing towards the bottom panel. These tongues are adapted to overlie the inside surface of the side wall panels when the box is set up.

The blank B is assembled into hollow tray form by forming and locking the four corners in the same manner as hereinbefore described in connection with the assembly of the box illustrated in Figures 1 to 4. Briefly, the side wall panels 61 and 62 are folded into upright position with respect to the bottom panel 60. The end panels 65 and 66 are then folded about their respective fold lines and the flaps 69, 70, 73, and 74 are folded with respect to the end panels to assume a position parallel to the erected side walls 61 and 62. The external tongues 94, 95, 96, and 97 are inserted into the apertures formed in the side walls 61 and 62 by outward flexing of the internal tongues 81, 82, 83, and 84. Simultaneously the downwardly extending flap portions 90, 91, 92, and 93 are flexed inwardly to move behind the side wall panels 61 and 62. After the end walls and the four corner or lock flaps have reached their final position, portions of the edges formed by the external cuts in the flaps engage portions of the edges formed by the internal cuts in the side walls in edge-to-edge postion as in the case of blank A.

As a final operation the tip portions 98, 99, 100, and 101 are pulled towards the inside of the box to maintain the interlocking edges in engaging position. However, it should be noted, that even without such tip portions the stiffness of the board tends to maintain the edges engaged due to a further peculiarity of the present interlock. As is apparent from the drawing, the internal and the external tongue at each

corner are oppositely directed, so that the root portion of one tongue where the tongue offers great resistance to flexing lies adjacent the tip portion of the other tongue where the latter offers little resistance to deflection; similarly the root portion of the other tongue lies adjacent the tip portion of the one tongue where the latter offers the least resistance to flexing and is thereby flexed into engaging position. In other words, the stiffness of the board is taken advantage of and the construction is such that each tongue tends to maintain the other in engaging position, rather than tending to push it out of engagement.

The set up box or tray is shown in Figure 6 and is ready for filling, and overwrapping, if desired.

A box which may either be considered an open tray, a box body, or a telescoping cover for a separate box body is shown in Figure 8. It is set up from a blank C of which, for the reason of simplification, only a corner portion is shown in Figure 7.

The blank C comprises a main panel **102** which may either be the bottom or the top of the resulting box structure, depending on whether it is to be used as the body or the cover of the box. A side wall panel **103** is hingedly connected to the main panel along a side fold line **104**. An end panel **105** of equal height as the side wall panel **103** is hingedly connected to the main panel along an end fold line **106**. A flap **107** is hingedly connected to the end panel **105** along a fold line **108** which may be parallel and slightly offset with respect to the side fold line **104** to compensate for the thickness of the board as set forth in connection with the previously described blanks A and B.

An internal cut **109** forms a resiliently deflectable internal tongue **110** in the side wall panel **103** which, upon deflection with respect to the remainder of the side wall panel, permits insertion of a portion of a flap **107** into the resulting slit or aperture.

The lock flap **107** is severed by an external cut **111** of bent outline into a far portion **112** and a near portion **113**. The near flap portion constitutes an external tongue and is provided, similar to blank B, with a tip portion **114** extending beyond the confines of the internal tongue **110** when the flap **107** is folded into corner forming position with respect to the side wall panel **103**.

The far portion **112** constitutes a tongue pointing towards the main panel. This tongue is designed to overlie the inside surface of the side wall panel **103** when the box is set up. The corner of the side wall panel **103** is cut away at **115** to permit passage of the tongue **112** behind the side wall panel **103**. This cut away portion is necessary because of the equal height of the side and end wall which necessitates location of the external cut **111** at a distance from the main panel **102** less then the height of the side wall panel **103**, considering the box in set up condition.

The assembly of the blank C into box form proceeds in the same manner as the assembly of the tray shown in Figure 6. A detailed description of the assembly procedure may for this reason be dispensed with.

A comparison of the form of the external cuts in the flaps of blanks A, B, and C shows that the contour of this cut may be varied considerably. In blanks A and B the inner branch of the external cut is nearly vertical and the outer branch extends at an angle thereto, considering the assembled box. In the blank C the V-shape of the external cut is nearly symmetrical and the inner arm of the cut extends at an angle less than 45 degrees with respect to the horizontal. The angle of the inner arm of the external cut is, therefore, a matter of choice and may be selected for each particular box according to the specific requirements.

The invention thus provides an improved form of glueless interlock which produces an extremely rigid box corner resistant to deformation by forces acting on the box walls from the inside as well as from the outside. In addition to lending a high degree of rigidity to the glueless interlock the portions of the blank hereinbefore referred to as tongue shaped flap portions **44, 45; 90, 91, 92, 92;** and **112** protect the external locking tongues against damage or accidental disengagement during filling of the box. This feature is particularly well apparent from Figures 6 and 8. Referring to Figures 6, it will be seen that the tongue **92** prevents box contents inserted into the box from catching, damaging, or deflecting the tip portion **100**. Similarly, in Figure 8 the far flap portion **112** protects the locking portion **113** by forming a substantially smooth inner box surface therewith at the corner.

The novel interlock has the advantage that it can be handled on automatic high speed machines of small size and relatively simple construction.

As the illustrated forms of boxes show, the invention is equally adaptable to boxes with and without covers.

Obviously the present invention is not restricted to the specific embodiments herein shown and described, but may be applied with equal benefit to other forms of boxes. Numerous additions, omissions, substitutions and other changes may therefore be made in adapting the invention to specific needs without departure from the spirit and the essence of the invention.

What is claimed is:

1. An improved glueless corner construction for folding boxes for assembling in corner forming relationship, a main panel, two wall panels hinged to the main panel along fold lines forming an angle, and a flap hinged to one of the wall panels along the side of said one wall panel, the flap being adapted to lie face-to-face with said other wall panel when the panels are in corner forming position, the corner construction being characterized by an interlock comprising, an internal cut of bent outline in said other wall panel forming an internal tongue in said other wall panel pointing towards the box corner when the panels are in corner forming position, the internal tongue, upon flexing with respect to the remainder of said other wall panel, forming a wedge shaped opening in said other wall panel into which a portion of said flap may be swung, said flap having an external cut of bent outline extending into it from an outer edge, said external cut separating an upper flap portion from a lower flap portion, each of said flap portions being bordered by said external cut and at least one outer edge of said flap, said lower flap portion being insertable, at least in part, into said wedge shaped opening through said internal cut, thus underlying said internal tongue but overlying said other wall panel beyond the confines of said internal tongue, said upper flap portion being movable to lie face-to-face with the inside

of said other wall panel as the lower portion is being swung into said opening, the internal cut and the external cut providing cut edges in said other wall panel and on the lower flap portion, respectively, which, in the position in which said other panel and flap are to be interlocked are in substantial line-to-line coincidence permitting an edge portion of one cut to engage an edge portion of the other cut in edge-to-edge position, the internal tongue and said lower flap portion pointing in opposite directions and deflecting each other into edge-to-edge engagement of said cuts, whereby the inherent stiffness of the stock is utilized in assisting the respective edges automatically to move into engagement and remain in engaged position, said upper flap portion reinforcing the interlock against disengagement by forces acting on said other wall panel from the inside or outside.

2. An improved glueless corner construction for folding boxes for assembling, in corner forming relationship, a main panel, two wall panels hinged to the main panel along fold lines forming an angle, and a flap hinged to one of the wall panels along the side of said one wall panel, the flap being adapted to lie face-to-face with said other wall panel when the panels are in corner forming position, the corner construction being characterized by an interlock comprising, an internal cut of bent outline in said other wall panel forming an internal tongue in said other wall panel pointing towards the box corner when the panels are in corner forming position, the internal tongue, upon flexing with respect to the remainder of said other wall panel, forming a wedge shaped opening in said other wall panel into which a portion of said flap may be swung, said flap having an external cut of bent outline extending into it from an outer edge, said external cut separating an upper tongue shaped flap portion from a lower flap portion, said upper tongue shaped flap portion pointing towards the main panel when the panels and flap are in corner forming position, each of said flap portions being bordered by said external cut and at least one outer edge of said flap, said lower flap portion being insertable, at least in part, into said wedge-shaped opening through said internal cut, thus underlying said internal tongue but overlying said other wall panel beyond the confines of said internal tongue, said upper flap portion being movable to lie face-to-face with the inside of said other wall panel as the lower portion is being swung into said opening, the internal cut and the external cut providing cut edges in said other wall panel and on the lower flap portion respectively, which, in the portion in which said other panel and flap are to be interlocked are in a position to engage each other, the internal tongue and said lower flap portion pointing in opposite directions and deflecting each other into engaging position, whereby the inherent stiffness of the stock is utilized in assisting the respective edges automatically to move into engagement and remain in engaged position, said upper flap portion reinforcing the interlock against disengagement by forces acting on said other wall panel from the inside or outside.

3. An improved glueless corner construction for folding boxes for assembling in corner forming relationship, a main panel, two wall panels hinged to the main panel along fold lines forming an angle, and a flap hinged to one of the wall panels along the side of said one wall panel, the flap being adapted to lie face-to-face with said other wall panel when the panels are in corner forming position, the corner construction being characterized by an interlock comprising, an internal cut of bent outline in said other wall panel forming an internal tongue in said other wall panel pointing towards the box corner when the panels are in corner forming position, the internal tongue upon flexing with respect to the remainder of said other wall panel, forming a wedge shaped opening in said other wall panel into which a portion of said flap may be swung, said flap having an external cut of bent outline extending into it from an outer edge, said external cut separating an upper flap portion from a lower flap portion, each of said flap portions being bordered by said external cut and at least one outer edge of said flap, said lower flap portion being insertable, at least in part, into said wedge shaped opening through said internal cut, thus underlying said internal tongue but overlying said other wall panel beyond said internal tongue, said lower flap portion having a tip thereon extending beyond the confines of the internal tongue when the panels are in corner forming position, the tip being forceable, against the resistance of the stock from which the box blank is formed, from an overlying position with respect to said other wall panel through said internal cut into a position underlying said other wall panel, said upper flap portion being movable to lie face-to-face with the inside of said other wall panel as the lower portion is being swung into said opening, the internal cut and the external cut providing cut edges in said other wall panel and on said lower flap portion, respectively, which, in the position in which said other panel and flap are to be interlocked are, except for said tip, in substantial line-to-line coincidence permitting an edge portion of one cut to engage an edge portion of the other cut in edge-to-edge position, the internal tongue and said lower flap portion pointing in opposite directions and deflecting each other into edge-to-edge engagement of said cuts, said tip, when forced into a position underlying said other wall panel, locking said other panel and said flap in engaging position, and said upper flap portion reinforcing the interlock against disengagement by forces acting on said other wall panel from the inside or outside.

4. An improved glueless corner construction for folding boxes for assembling, in corner forming relationship, a main panel, two wall panels hinged to the main panel along fold lines forming an angle, and a flap hinged to one of the wall panels along the side of said one wall panel, the flap being adapted to lie face-to-face with said other wall panel when the panels are in corner forming position, the corner construction being characterized by an interlock comprising, an internal cut of bent outline in said other wall panel forming an internal tongue in said other wall panel pointing towards the box corner when the panels are in corner forming position, the internal tongue, upon flexing with respect to the remainder of said other wall panel, forming a wedge shaped opening in said other wall panel into which a portion of said flap may be swung, said flap having an external cut of bent outline extending into it from an outer edge, said external cut separating an upper tongue shaped flap portion from a lower flap portion, said upper tongue shaped flap portion pointing towards the main panel when the panels and flap are in corner forming position, each of said flap portions being bordered by said external cut and at least one outer edge of said flap, said lower flap portion

being insertable, at least in part, into said wedge shaped opening through said internal cut, thus underlying said internal tongue, but overlying said other wall panel beyond said internal tongue, said lower flap portion having a tip thereon extending beyond the confines of the internal tongue when the panels are in corner forming position, the tip being forceable, against the resistance of the stock from which the box blank is formed, from an overlying position with respect to said other wall panel through said internal cut into a position underlying said other wall panel, said upper flap portion being movable into a position face-to-face with the inside of said wall panel as the lower portion is being moved into said opening, the internal cut and the external cut providing cut edges in said other wall panel and on said lower flap portion, respectively, which, in the position in which the said other panel and said flaps are to be interlocked are, except for said tip, in a position to engage each other, the internal tongue and said lower flap portion pointing in opposite directions and deflecting each other into engaging position, said tip, when forced into a position underlying said other wall panel, locking said other panel and said flap in engaging position, and said upper flap portion reinforcing the interlock against disengagement by forces acting on said other wall panel from the inside or outside.

5. A folding box made from a sheet of foldable stock and comprising a main panel; a first wall panel hingedly connected to the main panel along a first fold line; a second wall panel hingedly connected to said main panel along a second fold line extending at an angle with respect to said first fold line, said panels being foldable about said fold lines with respect to one another into a position in which they form a box corner; and a lock flap hingedly connected to one of said wall panels and foldable with respect thereto into a position overlying the outside surface of the other wall panel when the panels are in corner forming position, the said other wall panel having an internal cut therein, said lock flap being divided by a cut into a portion far with respect to the main panel, and a portion near with respect to the main panel, the far portion underlying the inside surface of said other wall panel, the near portion extending through said internal cut in said other wall panel, at least a portion of said internal cut being in substantial line-to-line coincidence with a portion of an edge formed by said external cut on said near portion of the flap to interlock with said last named edge portion when said panels are in corner forming position, said far portion being free from edge-to-edge engagement with said internal cut, but having an edge aligning with said portion of line-to-line engagement in box forming position, thereby exerting outward pressure on said wall panel at said portion of engagement tending to flex the wall panel into the plane of the engaging near portion.

6. A folding box made from a sheet of foldable stock and comprising a main panel; a first wall panel hingedly connected to the main panel along a first fold line; a second wall panel hingedly connected to said main panel along a second fold line extending at an angle with respect to said first fold line, said panels being foldable about said fold lines with respect to one another into a position in which they form a box corner; and a lock flap hingedly connected to one of said wall panels and foldable with respect thereto into a position overlying the outside surface of the other wall panel when the panels are in corner forming position, the said other wall panel having an internal cut of bent outline therein forming an internal tongue in said other wall panel pointing towards said one wall panel, said lock flap being divided by a cut into a portion far with respect to the main panel and a portion near with respect to the main panel, the far portion underlying the inside surface of said other wall panel, the near portion extending through said internal cut in said other wall panel, at least a portion of said internal cut being in substantial line-to-line coincidence with a portion of an edge formed by said external cut on said near portion of the flap to engage in edge-to-edge relationship the said edge of the near flap portion when the panels and flap are in corner forming position, the engaging edge portions extending transverse with respect to an imaginary circle crossing the said engaging edge portions and having the fold line of said one wall panel as a center, if the corner is viewed in side view, in which case the last named fold line appears as a point.

7. The structure as set forth in claim 6 in which the near flap portion is so shaped with respect to the said internal cut as to extend with a tip portion beyond the confines of said internal tongue, the tip being forceable, against the resistance of the stock from which it is formed from an overlying position with respect to said other wall panel through said internal cut into a position underlying said other wall panel to secure said flap and said other panel against separation of their engaging edges.

8. A folding box made from a sheet of foldable stock and comprising a main panel; a first wall panel hingedly connected to the main panel along a first fold line; a second wall panel hingedly connected to said main panel along a second fold line extending at an angle with respect to said first fold line, said panels being foldable about said fold lines with respect to one another into a position in which they form a box corner; and a lock flap hingedly connected to one of said wall panels and foldable with respect thereto into a position overlying the outside surface of the other wall panel when the panels are in corner forming position, the said other wall panel having an internal cut of bent outline therein forming an internal tongue in said other wall panel pointing towards said one wall panel, said lock flap being divided by an external cut of bent outline extending into it, into a portion far with respect to the main panel and a portion near with respect to the main panel, the far portion forming a tongue pointing towards the main panel and underlying the inside surface of the said other wall panel, the near portion forming an external tongue oppositely directed with respect to said internal tongue, said external tongue extending through said internal cut in the other wall panel to underlie, at least partially, said internal tongue, an edge portion formed on said external tongue by said external cut being in substantial line-to-line coincidence with an edge portion formed in said other wall panel by said internal cut in the position in which the panels and flap are in corner forming position, the internal tongue bearing down upon said external tongue and flexing it into edge-to-edge engagement of said coinciding edges.

9. The structure as set forth in claim 8 in which the near flap portion is so shaped with respect to the said internal cut as to extend with a tip portion beyond the confines of said internal

tongue, the tip being forceable, against the resistance of the stock from which it is formed from an overlying position with respect to said other wall panel through said internal cut into a position underlying said other wall panel to secure said flap and said other wall panel against separation of their engaging edges.

10. The structure as set forth in claim 8 in which the corner of said other wall panel is cut away adjacent said one wall panel, and in which the inner end of the external cut in the said flap rests in the cut away portion of said other wall panel.

11. A folding box made from a sheet of foldable stock and comprising a bottom panel; front and back wall panels hingedly connected to the bottom panel along front and back fold lines; side wall panels hingedly connected to the bottom panel along side fold lines; a top panel hingedly connected to the back panel along a top fold line; a tuck flap hingedly connected to the top panel along a fold line and lock flaps hingedly connected to the side wall panels and foldable with respect thereto into a position overlying the outside surface of the front wall panel when the box is set up, said lock flaps being interlocked with said front wall panel, each of the interlocks including an internal cut of bent outline in said front wall panel forming an internal tongue in said front wall panel pointing towards the respective side wall, said lock flap being divided by a cut into a portion far with respect to the bottom panel, the far portion underlying the inside surface of the front wall, the near portion extending through the respective internal cut in the front wall panel, at least a portion of said internal cut being in substantial line-to-line coincidence with a portion of an edge formed on said near portion of the respective flap by said external cut to engage in edge-to-edge relationship the said edge of the near flap portion when the box is set up, the end of the tuck flap being reduced in width sufficiently to fit behind the front panel and frictionally seat between the back surface of the front panel and the front surface of the far flap portions lying in back of the front panel.

12. The structure as set forth in claim 11 in which the near flap portions are so shaped with respect to the internal cuts as to extend with a tip beyond the confines of the respective internal tongues, the tip being forceable against the resistance of the stock from an overlying position with respect to the front wall panel through the internal cut into a position underlying the front wall panel.

13. A folding box made from a sheet of foldable stock and comprising a bottom panel; front and back wall panels hingedly connected to the

bottom panel along front and back fold lines; side wall panels hingedly connected to the bottom panel along side fold lines; a top panel hingedly connected to the back panel along a top fold line; a tuck flap hingedly connected to the top panel along a fold line; and lock flaps hingedly connected to the side wall panels and foldable with respect thereto into a position overlying the outside surface of the front wall panel when the box is set up, said lock flaps being interlocked with said front wall panel, each of the interlocks including an internal cut of bent outline in said front wall panel forming an internal tongue in said front wall panel pointing towards the respective side wall, said lock flap being divided by an external cut of bent outline extending into it into a portion far with respect to the bottom panel, and a portion near with respect to the bottom panel, the far portion forming a tongue pointing towards the bottom panel and underlying the inside surface of the front wall, the near portion forming an external tongue, the external tongue extending through said internal cut in the front wall panel to underlie, at least partially, said internal tongue, an edge portion formed on the said external tongue by said external cut being in substantial line-to-line coincidence with a portion of said internal cut to engage in edge-to-edge relationship the front wall panel at said internal cut portion when the box is set up, said external tongue having a tip extending beyond the confines of the internal tongue, the tip being forceable against the resistance of the stock from an overlying position with respect to the front wall panel through the internal cut into a position underlying the internal cut in the front wall panel to maintain said edge portions in edge-to-edge interengaging position, the end of the tuck flap being reduced in width sufficiently to fit behind the front panel and frictionally seat between the back surface of the front panel and the front surface of the far flap portions lying in back of the front panel.

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