

Feb. 6, 1940.

G. D. DENNY

2,189,602

FOLDABLE BOX

Filed Oct. 8, 1936

2 Sheets-Sheet 1

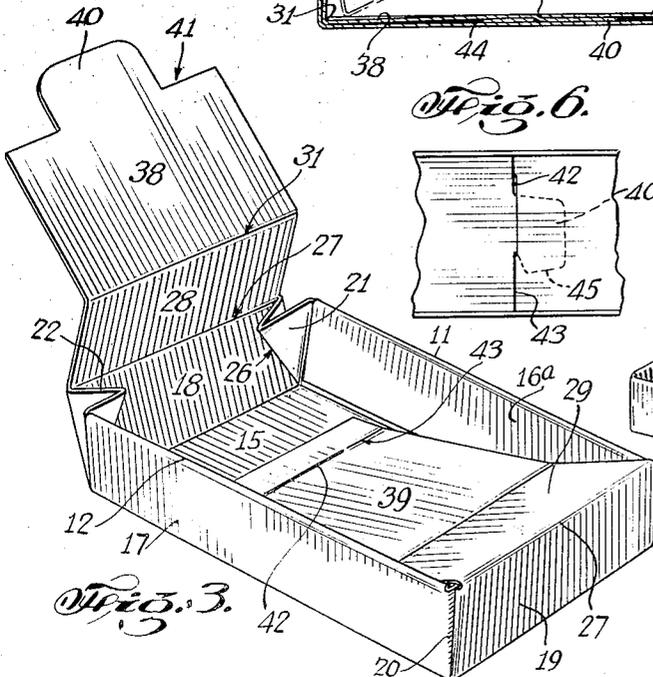
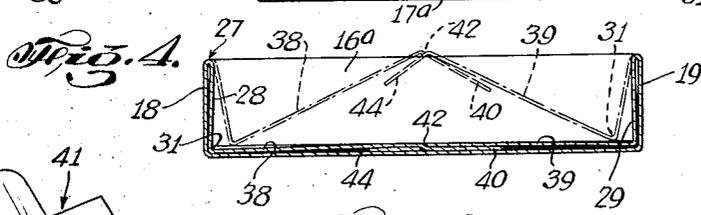
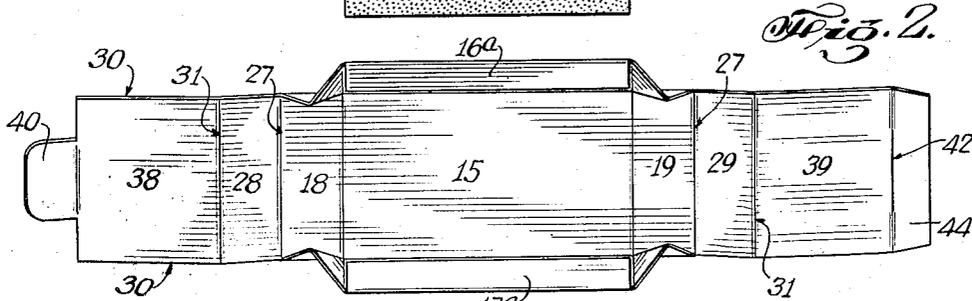
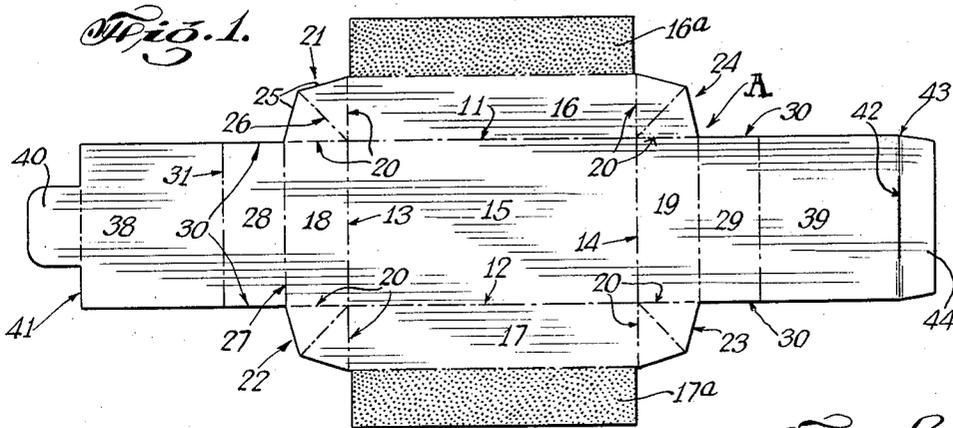


Fig. 6.

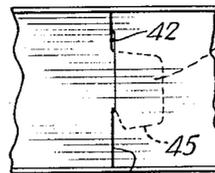
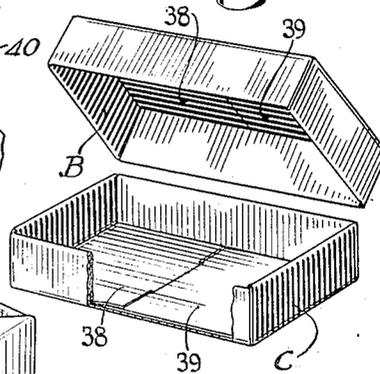


Fig. 5.



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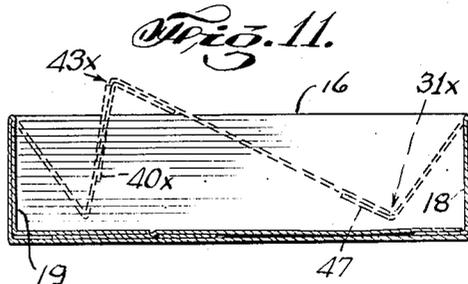
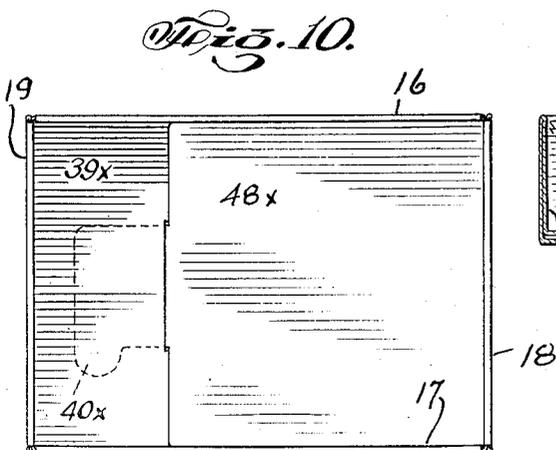
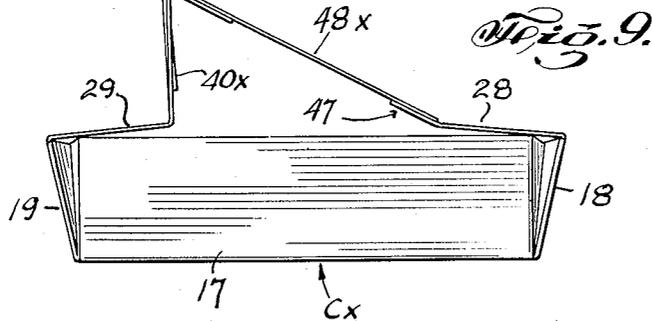
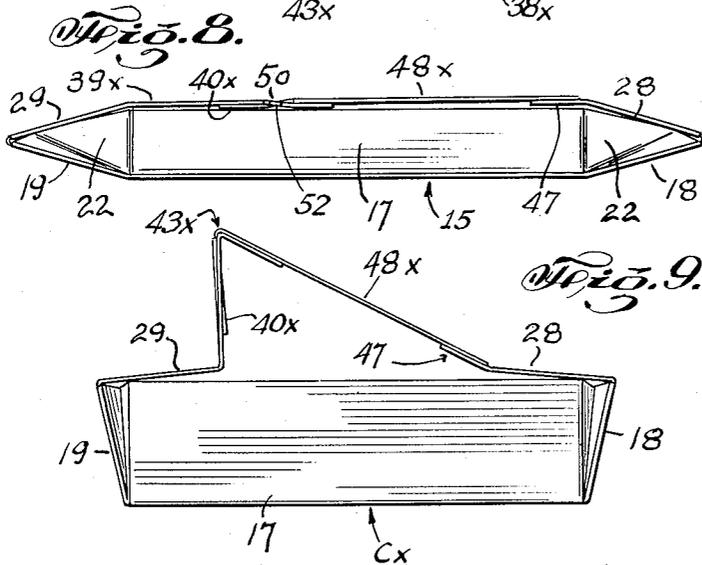
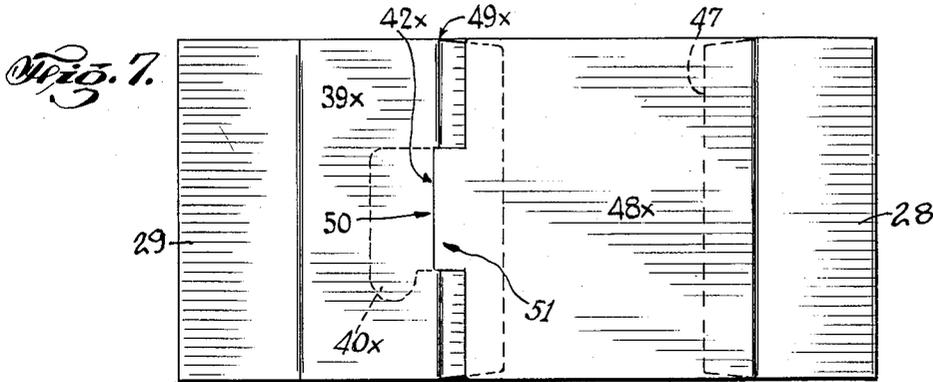
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2,189,602

FOLDABLE BOX

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2 Sheets-Sheet 2



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2,189,602

FOLDABLE BOX

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Application October 8, 1936, Serial No. 104,572

8 Claims. (Cl. 229—34)

This invention relates to cardboard boxes, especially to boxes of the collapsible type, and more particularly to boxes formed of a one-piece blank and adapted to be kept in stock in collapsed, flat form, ready to be erected individually, as required.

An object of the present invention is to provide a single-piece foldable box of this type which is completely free from added parts, and in the fabrication of which no unusual pasting operations are required.

Another object is to provide such a box with improved structural features which impart unusual strength to the box when it is loaded or filled, and which lend themselves to fabrication of a box in which all of the walls may be of double-ply construction, or some of which may selectively be of single-ply construction.

Another object is to provide a foldable box in which interlocking parts are so disposed at the bottom of the boxes to be readily manipulated in the operation of erecting the box, and will also form an inconspicuous joint, entirely concealed by the contents of the box when the latter is opened by the consumer.

Another object is to provide a foldable box with a foldable cover of identical structure, so that the box and cover are erectable by identical operations, thus facilitating rapid erection by a salesperson, and not requiring special training or attention.

Still another object is to provide such a box the fabrication of which can be accomplished with desirably few and inexpensive operations, and which will present in its erected form the appearance of a well finished and attractive article.

Other objects and advantages will hereinafter appear.

In the accompanying drawings, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings, in which:

Fig. 1 is a view in plan of a typical one-piece blank having panels adapted to be erected to form the component shown in other figures;

Fig. 2 is a view of a like component, shown in partially erected condition;

Fig. 3 is a view in perspective on a larger scale of a partially erected box component in the construction of which the present invention has been embodied;

Fig. 4 is a view in vertical longitudinal section of a fully erected box component, showing also

in dotted lines the interlocking bottom members in an intermediate position;

Fig. 5 is a view in perspective, on a somewhat smaller scale, of two complementary components, a container and its cover, in fully erected condition, ready for assembly, a side of the container being broken away to reveal inner structure;

Fig. 6 is a fragmentary detail view illustrative of a modification of an interlocking part;

Fig. 7 is a plan view of a component like those described, illustrating a partly folded condition in which all of the components are adapted to be stored; this figure shows also a modification of structure to be described;

Fig. 8 is a side elevation of the modification as shown in Fig. 7;

Fig. 9 shows the same component in a partly erected condition;

Fig. 10 shows it in plan, completely erected;

Fig. 11 is a medial longitudinal section, illustrating in dash lines an intermediate stage in the compression of the interior floor panels.

In the now preferred embodiment of the invention selected for illustration and description, and referring first to Fig. 1, the reference character A designates generally a typical blank which is preferably made of a single piece of sheet material (as shown in Figs. 1 to 6) in order to make it completely free from added parts, although certain of the improvements herein disclosed may be embodied in a structure where a preponderant portion of the blank is made of a single piece and a part of the inside floor or bottom-forming panel of the box may be made of a separate piece, as shown in Figs. 7 to 11.

Any suitable material may be utilized, as for example any of the sheet materials known respectively as coated, uncoated or lined board.

In pursuance of the invention, from the blank A may be erected a box component embodying my improvements, the same form of blank serving for a container component or a cover component with slight dimensional changes familiar to those skilled in the art, to permit telescoping assembly of the components.

Where a conventional oblong box of quadrilateral shape is to be made, such as a candy box, the blank is desirably scored in usual fashion to facilitate the formation of crease lines in the operation of erection, as indicated at 11, 12 and 13 and 14 where the scorings define collectively an oblong body panel 15, two adjoining side panels 16 and 17 and two adjoining end panels 18 and 19.

The dimensions of the side panels in the blank

may be varied, as is well understood, to provide either single-ply side walls, constituted by the panels 16 and 17 respectively, or double-ply walls, in which case the added panel areas 16a and 17a are provided, as in the instance of the container portion of the box, shown in Fig. 1, the added panel areas being glued, as indicated, folded over and adhered in broadside relation to the panels 16 and 17, as indicated in Fig. 5.

It is customary, but not essential, for a box having a container part with double side walls to be provided with a cover component also having double side walls, but it is to be understood that the showing in this respect herein is merely illustrative, and not limitative.

Intermediate and connecting the end portion of each side wall, as 16, 17 and with the adjacent margin of each end wall, as 18, 19, being united thereto at each end by preferably integral creased joints respectively designated by the reference character 20 throughout the several figures, are provided a series of corner-forming gores or filling pieces 21, 22, 23, 24, which may advantageously be of the trapezoidal form illustrated, two of the sides coinciding with, and defined by the crease lines 20, and the other two free sides 25 being shorter and rendered easily infoldable upon each other by the provision of a crease line 26 extending diagonally from the inner intersection of crease lines 20, and 11 to 14 respectively, outwardly to the intersection of the short sides 25.

Each of these gores 21-24 is intended to be tucked in between the outer ply of one of the end walls as 18 and 19 and the inner ply thereof, as 28, 29 each of which designates a panel defined by side lines 30, in extension of the crease lines 20; also by a transverse crease line 27 which defines the rim at each end of the box in the erected structure; and a crease line 31 which defines an edge of the panel or ply 28 or 29, as the case may be, which coincides with the inner bottom corner edge between the body panel 15 and the end panel 18 or 19.

Fig. 3 illustrates the manner in which the infolding and tucking in of the corner gores 21 to 24 are effected, the gore 21 being shown as folded flat upon itself along the diagonal 26, and then back against the erected end ply 18, while the gore 22 is partially infolded preliminary to being tucked in. The gores 23 and 24 are concealed by the folded-down inner ply 29 at the other end of the box, and the side walls are thus tied by the gores into their proper erected positions.

In pursuance of the invention, the retention of the side and end walls in this combinative erected relation is effected by means of two complementary false bottom panels or flaps, designated 38 and 39 respectively, the former of which, 38, is constituted by an integral extension of the inner end ply 28, beyond the crease line 31, while the latter flap or false bottom panel, 39, is constituted by a similar extension of the inner end panel or ply 29.

Preferably these false bottom flaps or panels are of suitable length respectively to meet at or about the mid-transverse axis of the box, and in further pursuance of the invention they have interlocking fastening means consisting of a tongue-and-slit connection, the tongue 40 being so formed as to project beyond the edge 41 of one extension, as 38, and the slit 42 being formed along the crease line 43 which defines the meeting line of the panels 38 and 39, it being understood that a short integral flap or extension 44 is provided to form a margin in which the slit 42 is

cut. If desired, the tongue 40 may be provided with a locking lug 45, as illustrated in Fig. 6.

From the foregoing description, taken in connection with the drawings, it will be seen that the box of the present invention can be, and preferably is, composed of container and cover components of identical structure, as B and C respectively, with suitable difference in dimensions to permit telescoping assembly of the components; also that each component is fabricated from a one-piece blank which includes all of the structure-defining elements required to provide for easy erection of the component without special training and without the use of separately formed locking means or unusual pasting operations; also that the side and end panels of each box component are formed integrally with the body panel and are locked firmly in erected position by means which afford an attractive finish at the interior bottom wall of the container component and a like, symmetrical finish at the interior top wall of the cover component, the only visible evidence of the existence of any joint being the single transverse axial meeting line of the panels 38 and 39.

In Fig. 4, is shown, in dotted lines, an intermediate position to which the extension panels 38 and 39 are bent in the course of erection, the tongue 40 having been already inserted in slit 42 (see Fig. 4). It is clearly apparent from this figure that when these interlocking parts are pressed down into their bottomed (full-line) position as shown, they co-act to exert a thrust lengthwise in each direction toward the ends of the box, at the lower end edges 31, serving to create and maintain a smooth assembly of the elements which make up the end walls, including the panels 18 and 28 at one end, and the panels 19 and 29 at the other end, with the gores 21, 22, 23, and 24 infolded and compressed between the end panels as already described.

It is of further interest to note that the complete material of each component is fabricated from sheet material which need be finished with enamel or like paper only on one surface, inasmuch as the novel mode of fabrication results in the presentation of the finished paper throughout all surfaces, both exterior and interior of each component.

In Figs. 7 to 11 inclusive, the several views illustrate the several relative positions in which the cooperating parts may be most rapidly and conveniently disposed successively in the operation of erecting the blank from its knocked-down condition, as furnished by the maker to its fully erected condition for use, the erection being usually accomplished by salespersons who need only have average skill and experience in carrying such manual operations into effect.

The container element illustrated in these figures embodies several modifications of the structure already disclosed, the modifications affording advantages in manufacture and in the snug conformity of the interfitting parts, while not altering the sequence of the setting-up operations, and these structural modifications will now be pointed out briefly before describing the preferred mode of erection, which applies alike to all forms illustrated.

As distinguished from the blank shown in Figs. 1 to 6 inclusive, which blank is a one-piece article, the blank used in the modification shown in Figs. 7 to 11 has one of its bottom panels, as 38^x, formed with a piece 48^x constituting a preponderant member in the bottom structure of the

container. It is shown as joined to the main blank structure by an overlapping pasted seam, as at 47, so disposed that when the erection of the box has been completed the edge 31^x of the added piece will be held at the transverse meeting edge between it and the upright end piece 18. The ends as 18, 19, sides, as 16, 17, and in general all of the parts of the container component C^x are identical in structure and combinative detail with parts similarly designated in Figures 1 to 6, and will not be again described in detail.

The only further difference in structure is found at the joint line 43^x between the piece 48^x and its mating part 39^x in which is formed the slit 42^x for receiving the tongue 40^x, the latter being integral with the piece 48^x in the instance illustrated, although it is to be understood that the modification now in course of description may be utilized with a blank formed entirely of one piece of material.

The slit 42^x is formed in a position parallel with but slightly offset from, the crease lines 43^x and 49^x which define the temporary folds assumed by the bottom members 39^x and 48^x respectively as they pass through the intermediate stage of erection best understood from Fig. 9, these folds persisting, but to a lesser degree, when the joined parts 39^x and 48^x are straightened out, as indicated in Fig. 8 and also in Fig. 10.

The primary purpose of thus offsetting the slit 42^x is to cause the margin 50 of the part 39^x to exert a certain leverage upon the shank 51 of the tongue 40^x which underlies the said margin 50 and overlies the margin 52 at the opposite side of the slit (see Fig. 8). It is found in practice that the action of the tongue in causing even the slight divergence in level between the margins 50 and 52 tends to bring about a reactive pressure which holds the tongue flat against the contiguous under face of the part 50 both during the operation of erection, and after the box component is ready for use. This is of special advantage in the fabrication and use of the cover component of a box, as the cover does not have the assistance of the contents in maintaining its shape.

Proceeding now to describe the sequence of setting-up steps involved in the erection of a box component, and referring first to Fig. 7, this illustrates the appearance of a component ready to be erected, by the user, who receives a supply of such flat components in pairs including container components and cover components of complementary sizes adapted for telescopic assembly.

The sides of each component as so received by the user occupy a tucked-in position relatively to the real bottom 15 and false bottom 39^x—48^x, as indicated in Figs. 7 and 8, which however, illustrate the first stage in setting up the box component, accomplished by grasping the parts 15 and 39^x—48^x, at their side edges, each in one hand, and separating them so that they are brought to substantially the position shown in Fig. 9.

Here the fold 43^x is elevated considerably above the top edges of the component and the sides 16, 17 and ends 18, 19 are thus drawn in toward the central part of the box component in the manner shown, without requiring special skill or effort on the part of the salesperson.

The next step is accomplished by simply pressing down on the fold 43^x to push it and the associated bottom parts 39^x, and 48^x to, and past, the position shown in Fig. 11 in dotted lines,

and finally to the position shown in Fig. 10, which completes the erection of the box.

Reverting to the pasted-on part 48^x, it will be understood by those skilled in the art that under certain conditions it is an advantage to have a part of this character formed separately, both for the sake of economy of material and ease of finish and assembly, the single pasting operation at 47 not being one that involves special difficulty.

Forming the part 48^x separately also has a utility advantage; that is, heavier, stronger board and a cheaper finish and furnish can be used for the part 48^x to strengthen this portion of the box. There is also an economy in manufacturing; that is, as a result of 48^x being a separate piece, it is possible to lithograph or print more boxes on a sheet than could be done if the box was made throughout of one piece.

I have described what I believe to be the best embodiments of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. A foldable-box component of the class described, comprising a one-piece element of sheet material having scored crease lines defining panels including a body panel and including also four panels bent upwardly from the body panel to constitute upright sides enclosing a container space, said element being characterized also by integral corner gore pieces joining adjacent upright edges of said side panels and scored to facilitate infolding of each gore piece upon itself and against an upright wall of said box, and an extension ply integral with each of two opposite upright wall panels of said component, each of said extension plies including a panel portion extending downward in broadside relation with one of the first-named upright side panels and confining therewith two of said infolded gore pieces tucked in therebetween, each of said extension plies including also a second extended panel portion disposed in broadside relation over the body panel to a meeting with the symmetrically disposed second panel from the opposite side, said last-named extension ply panels being joined in an interlocking union.

2. A foldable-box component of the class described, comprising a one-piece element of sheet material having scored crease lines defining panels including a body panel and including also four panels bent upwardly from the body panel to constitute upright sides enclosing a container space, said element being characterized also by integral corner gore pieces joining adjacent upright edges of said side panels and scored to facilitate infolding of each gore piece upon itself and against an upright wall of said box, and an extension ply integral with each of two opposite upright wall panels of said component, each of said extension plies including a panel portion extending downward in broadside relation with one of the first-named upright side panels and confining therewith two of said infolded gore pieces tucked in therebetween, each of said extension plies including also a second extended panel portion disposed in broadside relation over the body panel to a meeting with the symmetrically disposed second panel from the opposite side, and an interlocking union for said last-mentioned extension ply panels, said union comprising a tongue on one of said plies transfixing a slit formed in the other ply.

3. A foldable-box component of the class described, comprising a one-piece element of sheet material having scored crease lines defining panels including a body panel and including also
 5 four panels bent upwardly from the body panel to constitute upright sides enclosing a container space, said element being characterized also by
 10 integral corner gore pieces joining adjacent upright edges of said side panels and scored to facilitate infolding of each gore piece upon itself
 and against an upright wall of said box, and an
 extension ply integral with each of two opposite
 upright wall panels of said component, each of
 15 said extension plies including a panel portion extending downward in broadside relation with one
 of the first-named upright side panels and confining therewith two of said infolded gore pieces
 tucked in therebetween, each of said extension
 plies including also a second extended panel portion
 20 disposed in broadside relation over the body panel to a meeting with the symmetrically disposed
 second panel from the opposite side, and said last-named extension ply panels being
 joined in an interlocking union comprising a
 tongue on one of said plies transfixing a slit
 25 formed in the other ply along a line defining a minor axis of said element.

4. A foldable-box component of the class described, comprising a one-piece element of sheet
 30 material having scored crease lines defining panels including a body panel and including also
 four panels bent upwardly from the body panel to constitute upright sides enclosing a container
 space, said element being characterized also by
 35 integral corner gore pieces joining adjacent upright edges of said side panels and scored to
 facilitate infolding of each gore piece upon itself and against an upright wall of said box, and
 an extension ply integral with each of two opposite
 upright wall panels of said component, each of
 40 said extension plies including a panel portion extending downward in broadside relation
 with one of the first-named upright side panels and confining therewith two of said infolded
 gore pieces tucked in therebetween, each
 45 of said extension plies including also a second extended panel portion disposed in broadside
 relation over the body panel to a meeting with the symmetrically disposed second panel from the
 opposite side, and said last-named extension ply
 50 panels being joined in an interlocking union comprising a tongue on one of said plies transfixing
 a slit formed in the other ply, said tongue being
 substantially concealed beneath said slitted panel
 when in use and provided with a locking projection
 55 to prevent unintended displacement of the tongue from operative position.

5. A foldable box component of the class described, comprising a blank formed in general of
 60 a single piece of sheet material creased to permit
 easy infolding of the blank to box form, comprising a central body panel, side panels, end

panels, gore pieces forming side and end panel
 junctions and adapted to be infolded; and a pair
 of auxiliary complementary bottom-forming and
 gore pieces confining members; at least one of
 said last-named members being provided with
 5 an added piece of sheet material pasted thereto
 with a seam so disposed that its edge defines an
 inner bottom edge of said component.

6. A foldable box component of the class described, comprising the panels and members combined
 and cooperating as set forth in claim 5, and
 further characterized by having said pasted-on
 piece of the bottom-forming member formed
 with a tongue, and said complementary bottom-
 forming member formed with a slot, the tongue
 15 and slot cooperating to form a bottom-joint-seam.

7. A foldable box component of the class described, comprising a sheet of thin material having
 scored crease lines defining a main body panel
 and four panels bent upwardly from the main
 body panel to constitute upright sides enclosing a
 container space, said sheet also having integral
 corner gore pieces joining adjacent upright edges
 of said side panels and scored to facilitate
 25 infolding of each gore piece upon itself and against
 an upright wall of said box, and an extension
 connected to each of two opposite upright wall
 panels of said component, each of said extensions
 including a panel portion extending downward
 30 in broadside relation with one of said first-named
 upright side panels and confining therewith two
 of said infolded gore pieces, each of said extensions
 being provided with a second extended panel
 portion disposed in broadside relation over the
 main body panel, one of said extensions being
 provided near its end with a transversely extending
 slit and the other extension being provided
 with an extended tongue portion passing through
 and extending beyond said slit and adapted to
 40 engage the upper surface of the main body panel.

8. A foldable box component of the class described, comprising a central bottom-forming
 panel, side panels, end panels and integral auxiliary
 lining members, each divided from an associated
 end panel by a crease line and subdivided
 45 into an end lining portion and a bottom lining
 portion by a second crease line parallel to the
 first, said bottom lining portions being formed
 with complementary tongue-and-slot connecting
 parts and being provided with crease lines parallel
 to said first and second crease lines, and
 further characterized by having the slit disposed
 in a position sensibly removed from the last-
 named crease lines, to permit the root of the
 tongue to overlie the crease while the end of the
 tongue underlies the portion of the auxiliary bottom
 panel in which the slot is formed, both during
 the erection of the component and when it is
 55 fully erected.

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