March 12, 1957 T. GEORGE 2,784,898

FOLDING PAPER BOX

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Fig. 1.

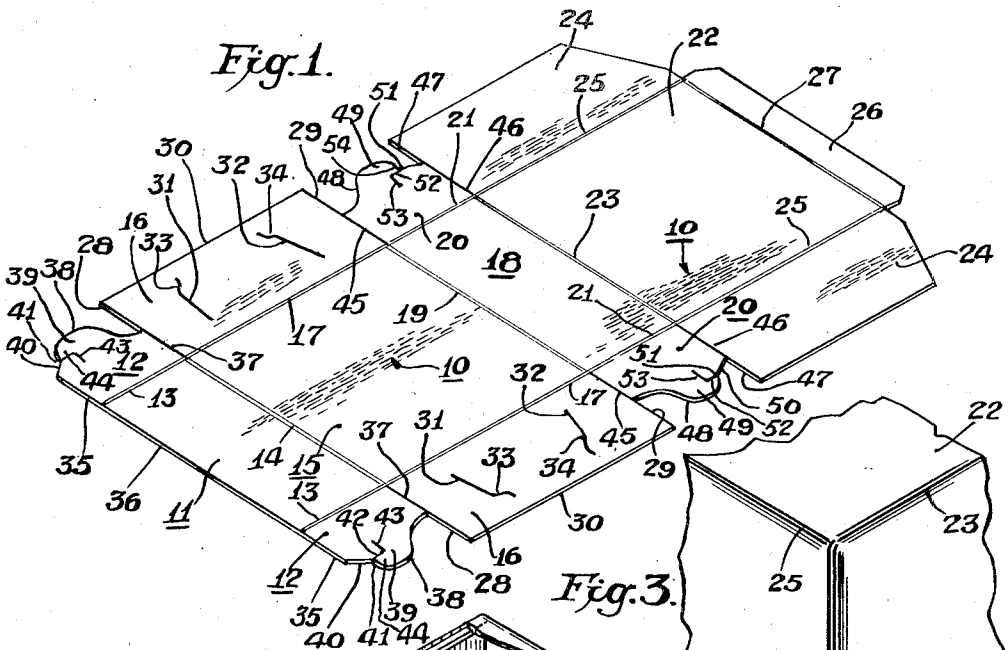


Fig. 3.

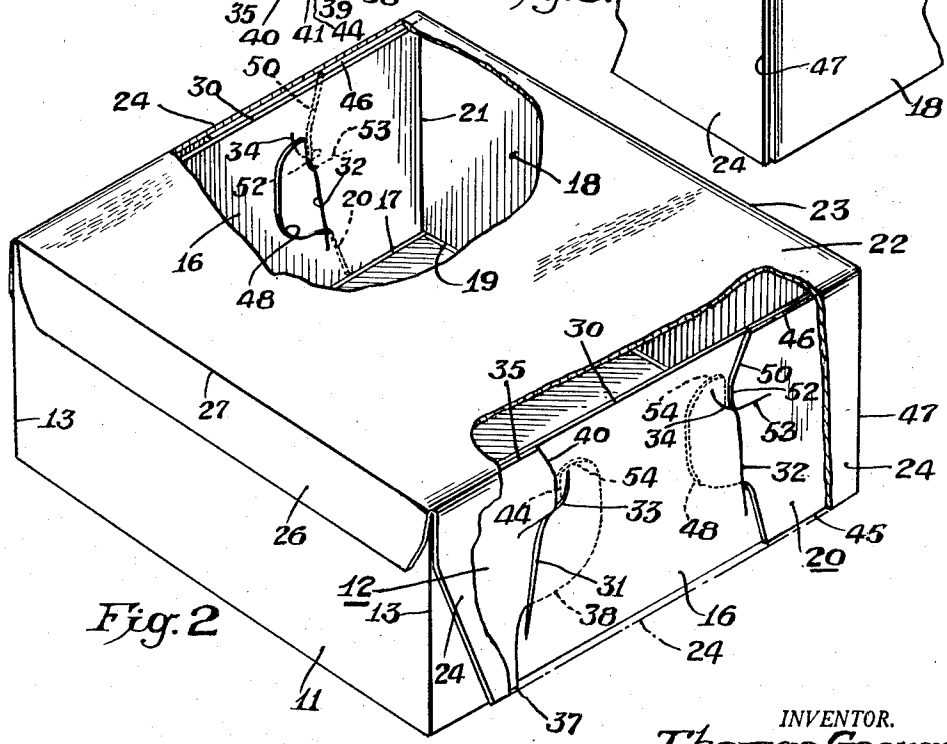


Fig. 2

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Fig. 4.

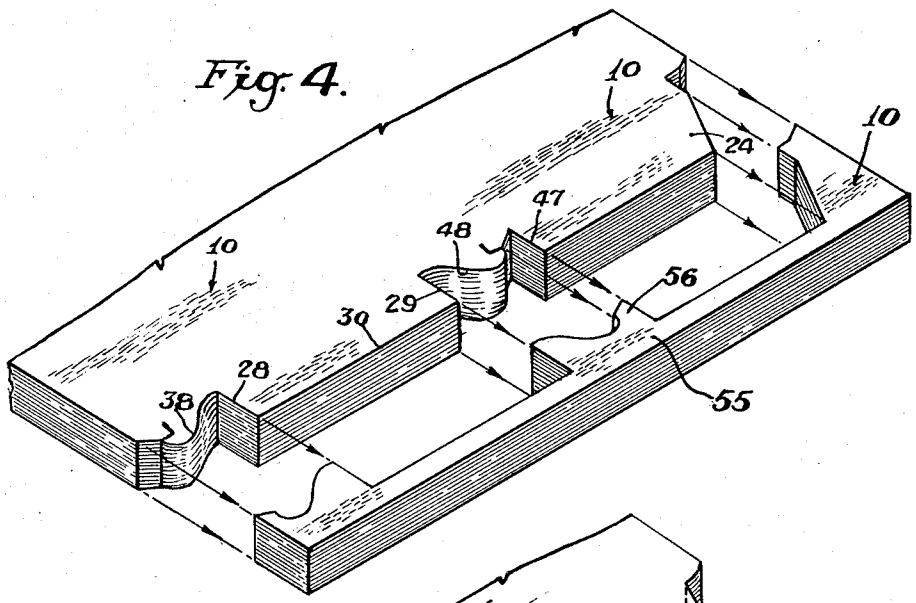


Fig. 5.

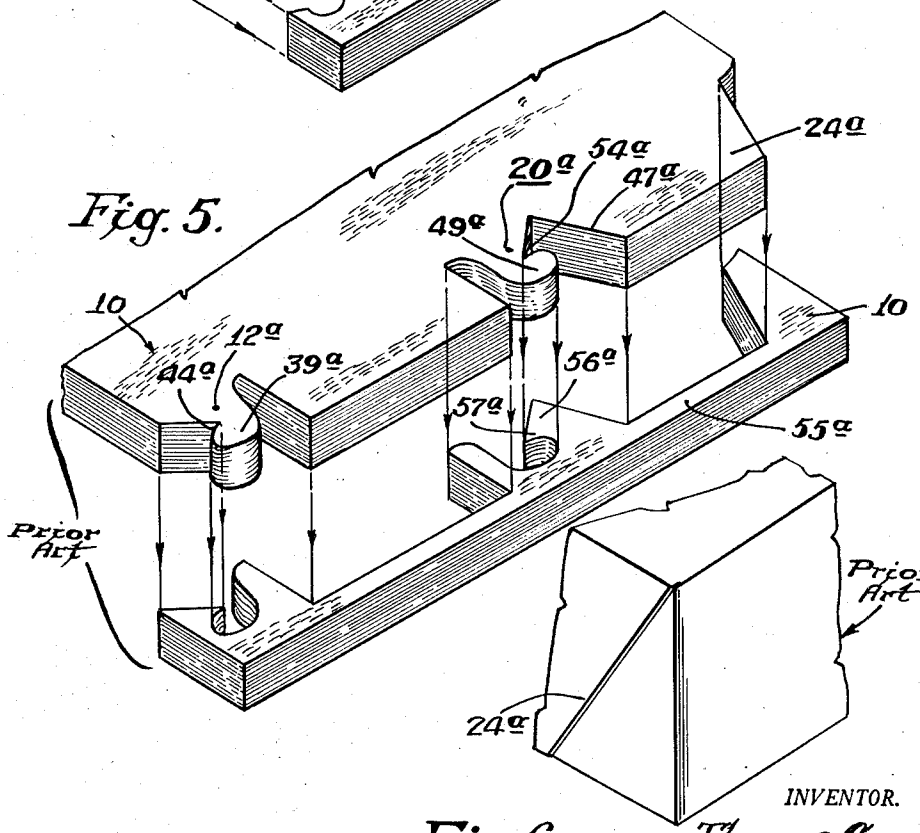


Fig. 6

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FOLDING PAPER BOX

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3 Claims. (Cl. 229—33)

The present invention relates generally to folding paper boxes and the like and more particularly to folded-blank boxes with integrally formed covers.

An object of the present invention is to provide a new and improved construction for a folding paper box. Another object of the present invention is to provide a novel construction for a paper box of the folded-blank, integral cover type, which can be more easily manufactured and which, when assembled, has considerably greater strength and resistance to crushing than are possible with conventional constructions heretofore employed.

Other objects and advantages of the present invention are apparent in the following detailed description, appended claims and accompanying drawings.

Bakery products and various other articles of merchandise are commonly packaged, by the retailer, in a box of cardboard or like material which is delivered to the user in the form of a pre-cut and pre-scored flat blank having an integrally formed cover extension and having corner flaps provided with locking tongues or ears, enabling the flat blank to be quickly and easily folded and locked into the form of an open-type tray with a hinged lid or cover. In this type of construction the flat blank is customarily cut out, by means of suitable dies, from a larger sheet of cardboard, so that the grain of the cardboard runs vertically along the front and back walls of the folded tray, thereby imparting a relatively high degree of stiffness and resistance to crushing.

However, the side walls of the folded tray are formed by flaps in which the grain of the cardboard runs horizontally, so that there is considerably less stiffness and resistance to crushing at the sides. In order to afford additional strength at the sides of the tray, the cover is customarily provided with side flaps which, when the box is closed, fit over the sides and extend to the bottom of the bottom of the box so as to give an extra ply or layer at the two sides.

In order to give maximum additional support to the sides of the closed box, it is desirable that these side flaps on the cover be substantially co-extensive with the sides of the box, and especially that the rear edge of each side flap be substantially vertical and in juxtaposed relationship to the corresponding vertical fold line of the tray.

However, in conventional constructions heretofore employed, it has been found necessary to form the rear edges of these side flaps at an angle to the vertical, so that they extend downwardly and frontwardly away from the corresponding vertical fold line of the tray itself, thereby providing a shorter bottom load supporting edge and giving correspondingly less reenforcement for the sides of the box. The formation of angular rear edges on the side flaps in conventional constructions has been required in order to permit relatively easy removal of the flat blank from the somewhat oversize sheet of cardboard from which it is stamped. Thus, as will be explained more fully hereinbelow, in conventional constructions, the locking tongues or ears on the rear corner flaps of the box are undercut and are directed toward the rear edges of the side flaps. If these rear edges were made vertical, instead of inclined, they would pass relatively closely adjacent to the undercut tongues, with the intervening waste or surplus material so nearly fully surrounded thereby as to make it difficult to remove. The use of angular rear edges on the side flaps, in conventional constructions, somewhat improves this condition but still renders the intervening waste material relatively difficult to remove and, frequently, attempted removal of this intervening waste material results in tearing of the tongue, thereby rendering the box worthless.

According to the present invention, there has been developed, for the first time, a novel corner flap construction which elminates undercut edges on the corner flap when in blank form, thereby permitting the rear edges of the side flaps to be cut along true vertical lines and, at the same time, enabling the waste material to be removed relatively quickly and easily and with minimum damage to the locking tongue.

As will be more apparent hereinbelow, the present invention contemplates a novel corner flap construction in which the undercut edge of the locking tongue, instead of being fully struck out from the adjoining flash material, is defined by a suitably curved slit, so as to present a continuous and non-undercut outer edge in the blank, while affording an undercut locking shoulder when the flap is bent and inserted into a corresponding slit in the side wall of the box during assembly.

For the purpose of illustrating the invention, there is shown in the accompanying drawings one form thereof which is presently preferred and which has been found, in practice, to give satisfactory results; it being understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown, and that the several parts and elements can be variously arranged and organized, without departing from the spirit or essential attributes of the invention.

Referring to the accompanying drawings in which like reference characters indicate like parts throughout:

Figure 1 is a perspective view of an integrally-formed cardboard blank, constructed according to the present invention, in flat, unfolded position.

Figure 2 is a perspective view, on an enlarged scale, showing the blank of Figure 1 as it appears when folded ino box form, with the lid closed; parts being broken away better to reveal the construction thereof.

Figure 3 is a fragmentary perspective view showing the appearance of one of the rear vertical edges of the box and the rear edge of the corresponding side flap of the cover.

Figure 4 is a schematic perspective view showing the manner in which the side waste material can be readily removed from a stack of blanks.

Figure 5 is a perspective view generally like that of Figure 4 but showing the prior-art construction, and indicating the greater difficulty involved in removing the waste material adjoining the undercut surfaces of the locking tongues.

Figure 6 is a fragmentary perspective view, like that of Figure 3, but showing the prior-art construction of Figure 5.

In Figure 1 there is shown a flat blank for a folding box, constituting one embodiment of the present invention. This blank is integrally formed of cardboard or like fibrous material, the grain 10 of which runs generally longitudinally thereof.

The blank includes a front wall portion 11 having left and right front corner flaps 12 formed at the ends

thereof and separated therefrom by longitudinal fold-lines 13.

Adjoining the front wall portion 11, and separated therefrom by a transverse fold-line 14, is a bottom portion 15 having left and right side wall portions 16 separated therefrom by longitudinal fold-lines 17.

A back wall portion 18 extends in continuation of the bottom portion 15 and is separated therefrom by a transverse fold-line 19; the back wall portion 18 having left and right back corner flaps 20 separated therefrom by longitudinal fold-lines 21.

A lid 22 extends in continuation of the back wall portion 18 and is separated therefrom by a transverse fold-line 23. The lid 22 is provided with left and right side flaps 24 separated therefrom by longitudinal fold-lines 25, and a relatively narrow front flap 26 separated therefrom by a transverse fold-line 27.

It is apparent, from Figures 1 and 2, that the portions 11, 15, 18 and 22 have the same transverse dimension; that the longitudinal fold-lines 13, 17, 21 and 25 are formed generally in continuation of each other; and that the side wall portions 16 and the side flaps 24 have the same transverse dimension.

Each of the side wall portions 16 includes a front edge 28, formed in continuation of the fold-line 14, a back edge 29 formed in continuation of the fold-line 19, and a longitudinal edge 30 extending intermediate the edges 28 and 29, at right angles thereto.

A pair of locking-slits 31 and 32 is formed in each of the side wall portions 16, the locking-slit 31 being disposed relatively adjacent the front edge 28 while the locking-slit 32 is disposed relatively adjacent the back edge 29. The locking-slits 31 and 32 are curved to provide shoulders 33 and 34 respectively, the function of which will be described hereinbelow.

The front corner flaps 12 are formed by transverse edges 35 which extend in continuation of the transverse free edge 36 of the front wall portion 11, and transverse edges 37 which extend in continuation of the fold-line 14; the edges 37 extending upwardly to and adjoining the front edges 28 of the side wall portions 16 but being only about half as long.

Extending generally longitudinally inward from the outer end of the edge 37 of each corner flap 12 is a reversely-curved edge 38 which defines a protruding locking-tongue 39.

Extending generally longitudinally inward from the outer end of the edge 35 of each front corner flap 12 is a curved edge 40 which meets the end of the reversely-curved edge 41 but continues generally longitudinally inward therebeyond as at 42 and then curves to extend generally transversely inward a short distance as at 43.

It is apparent that the portions 42 and 43 of the edge 40 constitute a bent slit in the locking-tongue 39 and define an undercut locking-shoulder 44 which co-acts with the shoulder 33 in the locking-slit 31 when the locking-tongue is inserted into the locking-slit and displaced slightly from the plane of the remainder of the corner flap 12, as indicated in Figure 2, so as to retain the side wall portions and the front wall portion in folded-up generally vertical position.

It can be seen, however, that, in the unfolded position of Figure 1 (wherein the locking-tongue is in the same plane as the remainder of the corner flap), the curved edges 38 and 40 form a generally continuous smoothly curved line, without any undercut portions or edges therein.

Each of the back corner flaps 20 has a straight edge 45 extending in continuation of the fold-line in juxtaposition to the edge 29 of the side wall 16, the edge 45 being only about half as long as the edge 29. Each of the back corner flaps 20 also includes a straight edge 46 formed in continuation of the fold-line 23 and disposed in juxtaposition to the rear straight edge 47 of the adjoining side flap 24; the edge 46 being only about half as long as the edge 47. Attention is called to the fact that, in contradistinction to the structure of the prior-art, to be referred to hereinbelow, the rear edge 47 of the side flap 24 extends in continuation of, and parallel to, the fold-line 23 so that, when the box is folded into its assembled, closed position, the rear edge 47 extends straight downward, in true vertical position, in juxtaposition to the fold-line 21, as shown in Figures 2 and 3, so as to provide maximum reenforcement and support for the side wall.

Extending generally longitudinally inward from the outer end of the straight edge 45 of each rear corner flap 20 is a reversely-curved edge 48, similar to the edge 38 described above, and defining a protruding locking-tongue 49.

Extending generally longitudinally inward from the end of the straight edge 46 is a curved edge 50, similar to the edge 40 described above, which meets the edge 48 as at 51 and continues generally longitudinally inward therebeyond as at 52 and then curves sharply to extend generally transversely inward as at 53. The portions 52 and 53 of the edge 50 thus constitute a slit in the locking-tongue forming an undercut locking-shoulder 54 which is similar to the locking-shoulder 44 described above and which co-acts with the shoulder 34 when the locking-tongue is inserted into the slit 32 and displaced slightly from the plane of the remainder of the flap, so as to maintain the rear corner flap and the side wall in generally upright vertical position as shown in Figures 2 and 3.

It can be seen however that, in the unfolded position of Figure 1 (wherein the locking-tongue is in the same plane as the remainder of the corner flap), the curved edges 48 and 50 form a generally continuous smoothly curved line, without undercut portions or edges therein.

As indicated in Figure 4, it is customary to stack a relatively large number of sheets of cardboard so that a single operation of the cutting or stamping dies forms a plurality of superimposed blanks, with a small strip 55 trimmed off. Due to the fact that the edges 48 and 50 form a generally continuous curved line, without any undercut portion, it is a relatively simple matter to remove the strip of waste material 55, despite the fact that the transverse rear edge 47 comes relatively closely adjacent thereto. Thus, the intervening portion 56 of the waste material 55 is roughly sector-shaped with no overhanging shoulder, so that it is free to move laterally away from the blank, as indicated by the arrows in Figure 4 (although, in actual practice, such removal is customarily effected by applying a succession of more or less vertical blows to the top of the stacked waste material 55, employing an air-hammer or the like).

By way of contrast, there is shown in Figure 5, a prior-art construction which generally resembles that of Figure 4 except that the corner flaps 12–*a* and 20–*a* are provided with conventional locking-tongues 39–*a* and 49–*a* respectively having undercut locking-shoulders 44–*a* and 54–*a* respectively. In this conventional construction, the rear edge 47–*a* of the side flap 24–*a* is cut at an angle, instead of extending transversely as in the present invention.

As can be seen from Figure 5, the portion 56–*a* of the waste material 55–*a* intervening the locking-tongue 49–*a* and the edge 47–*a* as an overhanging projection 57–*a* (corresponding to the undercut locking-shoulder 54–*a*) such as prevents the lateral removal of the strip 55–*a*. In other words, the overhanging projection 57–*a* and the undercut locking-shoulder 54–*a* co-act to lock the strip 55–*a* to the blank and thereby to prevent relative lateral movement thereof, in a manner similar to the interlocked relationship of the individual pieces of a jigsaw puzzle.

As a result, the only way in which the strip 55–*a* of waste material can be removed from the blank is by direct downward displacement as indicated by the arrows in Figure 5. However, even this direct vertical displacement is difficult because the intervening portion 56–*a* is so nearly fully surrounded by the locking-tongue and the edge 47–*a* as to result in considerable resistance to dis-

placement of one from the other. This not only requires appreciably greater time to effect the removal, but also results in a considerably higher percentage of torn or mutilated locking-tongues and defective box blanks, as compared to the novel construction of the present invention in which, as described above, there is no undercut outer edge on the corner flap and no corresponding overhang on the intervening portion of the side strip of waste material.

In Figure 6 there is shown the appearance of one of the back corners of a folded box made from the conventional blank of Figure 5. As is apparent from Figure 6, the rear edge 47–*a* of the side flap 24–*a* of the lid diverges downwardly and forwardly away from the vertical fold-line of the corner flap (instead of extending directly vertically downward in juxtaposition to the vertical fold-line as in the novel construction of the present invention). As a result, the side flap of the lid affords considerably less support and reenforcement for the side wall portions of the box and makes the box much less rigid and much more susceptible to crushing, as for example, when a number of filled boxes are stacked, one on top of the other.

Although considerably weakening the rigidity and strength of the box, this angular rear edge construction is essential in the conventional box of Figures 5 and 6 because, if the edge 47–*a* were to be made so as to extend vertically in the completed box, it would pass so close to the undercut locking-tongue, when in the blank form of Figure 5, as to render the intervening portion 56–*a* almost fully encased by the material of the blank and virtually impossible of removal. In other words, the construction of the prior-art is such that rigidity and strength of the final box must be sacrificed in order to permit reasonably effective removal of the waste material from the box blank.

From the foregoing, the important advantages of the present invention are readily apparent, in that the invention permits the use of side lid flaps having vertical rear edges to afford maximum support and reenforcement for the sides of the box, while, at the same time, rendering removal of the side waste material from the blank a considerably quicker, easier and more effective procedure than is possible even with the weakened construction of the prior-art.

The present invention may be embodied in other specific forms and, accordingly, the foregoing embodiments are to be considered in all respects merely as illustrative and not restrictive, reference being made to the appended claims, rather than to the foregoing description, as indicating the scope of the invention.

Having thus described my invention, I claim as new and desire to protect by Letters Patent:

1. A flat foldable blank of paper or the like for forming a one-piece box, said blank comprising a front wall portion, a bottom portion connected to the front wall portion by a transverse fold-line, a back wall portion connected to the bottom portion by a transverse fold-line, a lid connected to the back wall portion by a transverse fold-line, left and right side wall portions connected to the bottom portion by longitudinal fold-lines, left and right side flaps connected to the lid by longitudinal fold-lines, left and right corner flaps connected to the back wall portion by longitudinal fold-lines, each corner flap having a pair of parallel cut edges extending transversely from and generally at right angles to the longitudinal fold-line, each of the side wall portions and the flaps having a transverse cut edge disposed in parallel juxtaposition to the adjoining cut edge of the corner flap but extending laterally outward somewhat therebyond, the flaps having the same transverse dimension as the side wall portions so that in the box form they are vertically coextensive with and provide reenforcement for the side walls, each of the side wall portions having an internal locking slit generally adjacent the corresponding corner flap, each of said corner flaps being constructed and arranged to be folded so as to lie generally flat against the folded-up side wall portion and having a protruding locking-tongue formed at its outer free edge and constructed and arranged to be inserted within and to make locking engagement with the aforesaid internal locking-slit in the corresponding side wall portion, each locking-tongue being formed by two curved generally longitudinally extending intersecting cut edges which begin at the ends of the two transverse cut edges and meet to form a generally continuous outwardly bulged free edge, one of said curved cut edges extending beyond and generally longitudinally inwardly of its meeting point with the other curved cut edge and being bent to extend generally transversely inwardly so as to define an internal undercut locking-shoulder in the locking-tongue, said locking-shoulder being constructed and arranged to engage with the locking-slit when inserted therewithin and displaced slightly from the plane of the remainder of the corner flap.

2. A construction according to claim 1 wherein the transverse cut edge of each flap extends to the outermost longitudinal edge of the flap and forms a right angle therewith, the cut edge being disposed vertically and generally in juxtaposition to the fold-line of the corner flap when the lid is closed in the box form, so as to afford maximum reenforcement and support for the side wall portion.

3. A construction according to claim 1 wherein the front wall portion is also provided with left and right corner flaps each having a locking-tongue like those on the rear corner flaps and wherein each of the side wall portions has a second internal locking slit generally adjacent the corresponding front corner flap, the front corner locking-tongues being constructed and arranged to make locking engagement with the front locking slits.

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