

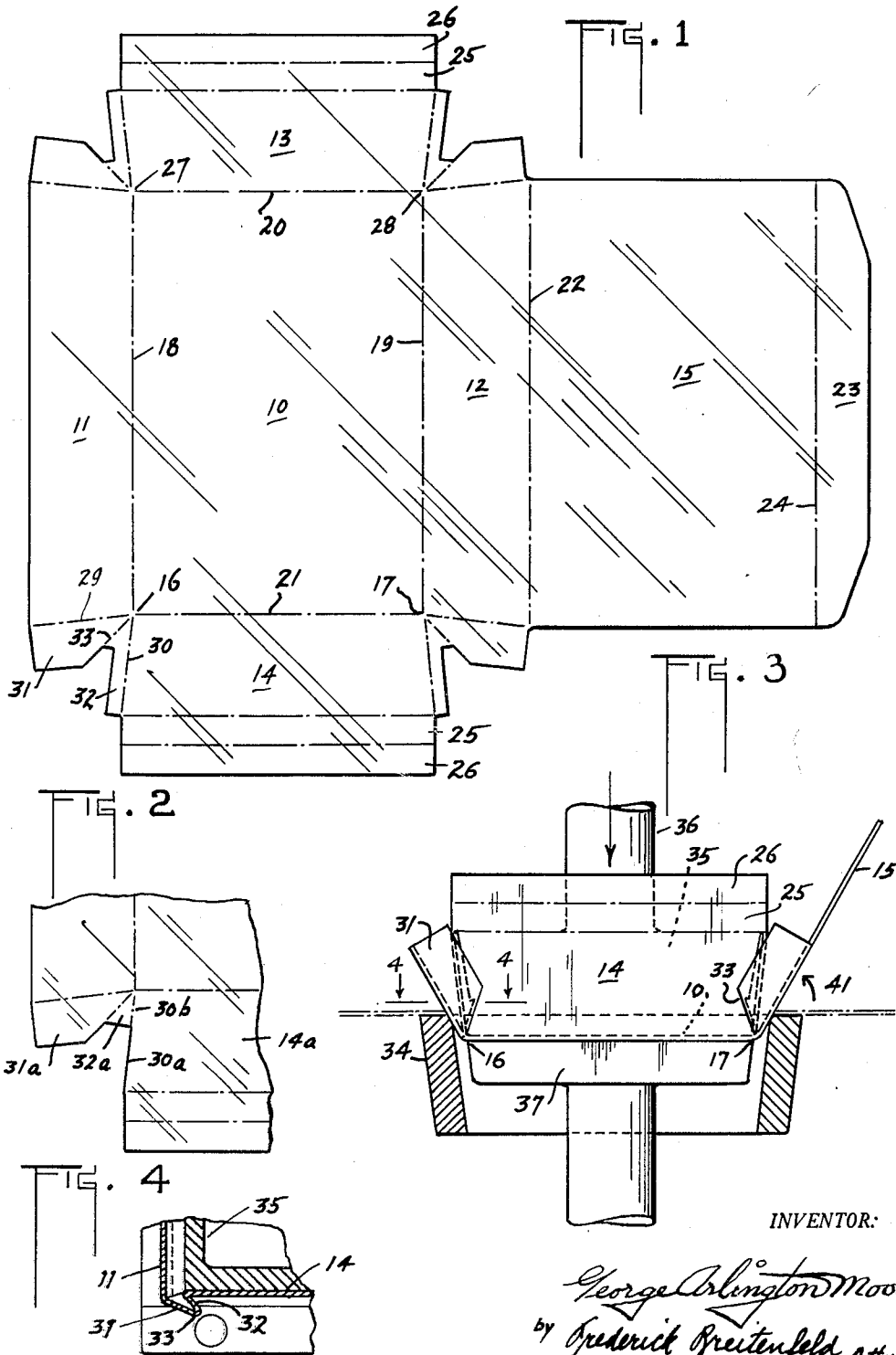
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G. A. MOORE
CONTAINER CONSTRUCTION

3,146,933

Filed Nov. 25, 1960

2 Sheets-Sheet 1



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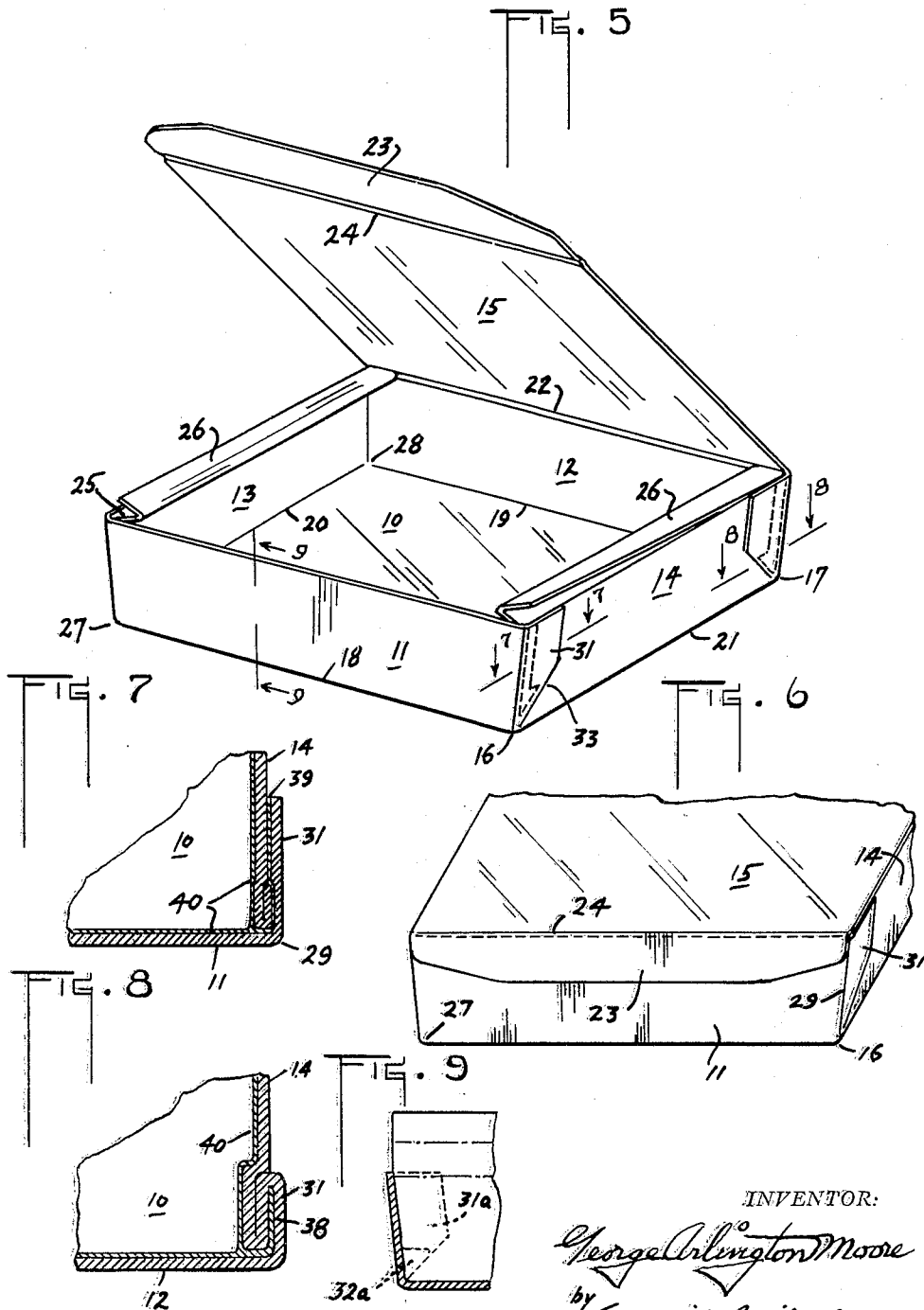
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CONTAINER CONSTRUCTION

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6 Claims. (Cl. 229—31)

This invention relates generally to containers, and has particular reference to containers of the character which are commonly employed as containers for foods of various kinds, such as prepared foodstuffs, frozen items and other semi-liquid or solid products.

Containers of the type referred to are customarily made of relatively thin paperboard stock. However, other sheet materials may be used, such as aluminum or other foils, plastic, laminations of aluminum and paper or paper and plastic, paperboard, and sheet material having thermoplastic properties. An initially flat blank or blanks are suitably shaped, cut and folded to define the walls of the container, and in the assembling and filling procedures the sections of the blank or blanks are folded and brought together in predetermined fashion, and adhesively bonded, to define the desired contours. Where the container is of polyhedral shape it is important that the corners be adequately reinforced to guard against leakage. It is an objective of this invention to provide an improved reinforced corner construction for a container of the character described.

Usually the sheet stock of which the container is made is coated or otherwise furnished on one side with a thermoplastic protective layer which seals the pores of the material and insures against leakage due to capillary seepage or "wicking." Such coating also serves as an adhesive to hold the parts of the container in desired relationship, to seal the container after it has been filled, and to safeguard the contents against contamination. Another object of this invention is to enhance the protective effect of such a coating at the corners of the container structure, and to utilize the adhesive and sealing capabilities of a thermoplastic layer to advantage in producing a reinforced corner construction.

In brief terms, it may be stated that, regardless of the specific shape or size of the container, and independent of other structural features that may be included in the structure, the invention is directed to an improved reinforcement of polyhedral corners formed by a single blank that is shaped and folded to define a main panel and a pair of wing panels hinged thereto. For example, such a corner might be formed by a main panel which constitutes, say, the bottom wall of a rectangular container, and a pair of adjacent side wall panels extending upwardly from the bottom wall with their adjacent edges in registry to define one of the upright edges of the container. In any case, regardless of the roles which such panels might play in the finished article, the corner reinforcement involves the provision of a special pleat formed as an integral part of the blank and interposed between the two wing panels. The pleat is formed of a pair of flanges which are hinged, respectively, to the registering wing panel edges, and are hinged to each other along a fold line emanating from the corner itself. The pleat in the finished container lies flatwise against one of the wing panels and is adhesively held in position. Preferably the pleat lies on the exterior of the container.

In the preferred embodiment of the invention, one of the pleat flanges, i.e., the outer one, is of such size and shape that it provides an extension which projects beyond the free edges of the inner flange. This extension is adhesively connected directly to the underlying wing panel. An unusually efficient and economical result can be achieved by coating the blank on the inside surface, and folding the parts in such a way that the pleat lies on the

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outside of the underlying wing panel. In this way, the thermoplastic coating, when subjected to the required heat and pressure during the creation of the container, will serve not only to seal the pleat and its associated wing panels together but also to retain the two flanges of the pleat itself in firmly bonded superposed relation.

A general objective of the invention is to accomplish the desired reinforcement by a means which is simple and inexpensive, involving no extraneous material or elements, and thoroughly practical for use on containers manufactured on a commercial scale.

The preferred mode of achieving these objects and advantages, and such other objects and benefits as may hereinafter be pointed out, is exemplified in the accompanying drawings, in which—

FIG. 1 is a plan view of an illustrative blank which may be formed into a container provided with a reinforced corner construction of the kind to which this invention relates;

FIG. 2 is a fragmentary view similar to the lower left corner of FIG. 1, illustrating a modification;

FIG. 3 is a fragmentary view, partly in section, of apparatus that may be employed in converting the blank of FIG. 1 into the desired container;

FIG. 4 is an enlarged fragmentary cross-sectional view along the line 4—4 of FIG. 3;

FIG. 5 is a perspective view of the assembled container, ready for filling;

FIG. 6 is a fragmentary perspective view of the container after filling and sealing;

FIG. 7 is an enlarged partial cross-sectional view along the line 7—7 of FIG. 5;

FIG. 8 is a similar view along the line 8—8 of FIG. 5 but showing the various layers in uncompressed condition; and

FIG. 9 is a fragmentary cross-sectional view, in the direction indicated at 9—9 of FIG. 5, of a container similar to that of FIG. 5 but made of a blank modified as indicated in FIG. 2.

The container herein chosen for illustration is of relatively shallow rectangular kind, as best seen in FIG. 5, involving a bottom wall 10, upstanding front and rear walls 11 and 12, upstanding side or end walls 13 and 14, and a cover 15 hinged to the back wall 12. The lower corners 16 and 17 have been chosen to represent the type of polyhedral (in this case, trihedral) corners whose reinforcement has been attained by the improved corner construction of this invention. It is to be understood that the invention, as it relates to such polyhedral corners, is not restricted to a container of the specific type, shape, or proportions shown, but is applicable to any container structure in which a polyhedral corner, formed of an integral blank of material, is present.

The initial blank of which the container of FIG. 5 is formed is shaped and cut as shown in FIG. 1, and to avoid confusion the same reference numerals will be applied to the various parts of this blank as are employed in the other figures to designate corresponding parts of the set-up box or container.

Fold lines and properly contoured edges divide the blank of FIG. 1 into a bottom-wall panel 10 of rectangular shape, wing panels 11 and 12 hinged along opposite parallel fold lines 18 and 19, and wing panels 13 and 14 hinged along opposite parallel fold lines 20 and 21. The cover panel 15 is hinged to panel 12 along the line 22, and a closure flap 23 is hinged to the free edge 24 of the cover panel 15.

In the container shown, there are resilient two-layer ledges at the upper ends of the opposite end walls 13 and 14. These ledges are of the type, and have the general purpose, of the ledges shown in my earlier Patent No.

2,737,337. Each ledge consists of a lower intumed layer 25 and an upper outwardly turned layer 26.

To illustrate the improved corner construction, reference is made to the corner 16 of FIG. 1, the description of which will serve as a description of all four corners 16, 17, 27 and 28 since they are all similar. The same reference numerals will be applied to corresponding parts at all corners.

With respect to the formation of the trihedral corner 16, the panel 10 may be considered the main bottom panel of the container, and the panels 11 and 14 the wing side wall panels of the container. The convergent adjacent edges 18 and 21 of the panel 10 intersect at the corner 16 and define, in the container, two of the three edges of the trihedral structure. The third edge is defined by the opposed edges 29 and 30 of the wing panels 11 and 14, respectively, which are brought together when the carton is formed, and lie in registry. The reinforcement of this corner structure is achieved by a special pleat formed as an integral part of the blank and interposed between the wing panels 11 and 14. The pleat consists of two flanges 31 and 32. The flange 31 is hinged to the panel 11 along the edge 29, the flange 32 is hinged to the panel 14 along the edge 30, and the two flanges are hinged to each other along the fold line 33 which extends obliquely from the corner 16 itself.

Although the flanges 31 and 32 may assume various shapes, it is preferred that at least the outer flange (in this case, flange 31) be coextensive in length with the edge (29) to which it is connected. In FIG. 1 both flanges are of this nature, and it will be observed that the flange 32 is coextensive in length with the edge 30 to which it is attached. In FIG. 2, on the other hand, the flange 31a is the same as the flange 31 of FIG. 1, but the flange 32a has been considerably shortened and is hinged to the edge 30a of the wing panel 14a only along the relatively short region depicted in dot-dash lines 30b. The structure of FIG. 2 is intended to be, in all other respects, the same as that of FIG. 1.

It is to be noted that the pleat flange 32 of FIG. 1 is the one which will lie underneath the flange 31 when the container is set up, and that the flange 32 is considerably narrower than the flange 31. (The same is true with respect to flanges 31a and 32a of FIG. 2.) As a result, the outer flange 31 provides an extension, when the container is set up, which projects beyond the free edge of the inner flange 32 and is adhesively secured directly to the underlying wing panel 14, as best indicated in FIG. 7.

Any suitable apparatus may be employed for converting the initial blank into carton shape. By way of example, FIG. 3 depicts a female die 34 which cooperates with a forming head 35 mounted on a rod 36 movable into the die 34 as indicated by the arrow. The lower face of the head 35 is shaped and sized to bear down upon the panel 10 of the blank. A supporting element 37, movable with the head 35, lies beneath the panel 10. As the head 35 moves the blank downwardly, the walls 11, 12, 13 and 14 are angled upwardly as indicated by arrow 41 and as the adjacent edges 29 and 30 at each corner are brought into registry the pleats at the corners are folded along their respective medial fold lines 33 and moved into overlying relation to the walls 13 and 14. To facilitate the desired folding action the fold lines in the blank are initially created in such a way that the parts move in the contemplated directions.

The blank is coated on at least one surface, i.e., the surface ultimately to lie on the interior of the container, with a thermoplastic protective material such as polyethylene, vinyl or other suitable plastic. This coating is depicted on an exaggerated scale at 40 in FIGS. 7 and 8. Either or both of the cooperating forming dies 34, 35 are heated, by any suitable means (not shown), so that as the container panels are brought together under the pressing action imposed by the dies the coating material

softens and exerts an adhesive bonding effect which serves not only to hold the pleat flanges together (as shown at 38 in FIG. 8) but to bind the pleat as a whole to the container wall (as shown at 39 in FIG. 7). Also, the three layers of material consisting of the two pleat flanges and the underlying panel are squeezed together by the dies so that while these layers are initially arranged as shown in FIG. 8 they become compacted to the two-ply thickness shown in FIG. 7 as the container formation progresses to completion. In addition, as may be seen clearly in FIGS. 7 and 8, the turned corner end edge of the wall 14 is butt-welded, by means of the thermoplastic material 40 against the inner face of the wall 11 for the full height of both walls. In the resultant structure the corner is thoroughly leakproof, strongly reinforced, and lined in all critical areas with a continuous film of the protective coating 40. There are no raw cut edges of the paperboard material exposed on the interior surfaces of the container, through which capillary seepage or "wick-ing" can take place.

It will be recognized, particularly in FIG. 5, that since the pleat members extend along the full height of the wall 14, the pleat acts as a vertical strengthening member to reinforce the corner of the erected container. As a result, the filled containers may be stacked upon one another without danger of the walls buckling.

The sealing of the cover elements 15 and 23 to the underlying ledge areas 26 and the front wall 11, after the container has been filled, may be carried out in any desired manner and has no relevance to the corner reinforcement hereinbefore described.

It will be understood that in this respect, as well as in others, many of the details described and illustrated may be modified by those skilled in the art without necessarily departing from the spirit and scope of the invention as expressed in the appended claims.

What is claimed is:

1. In a container formed of foldable sheet material having thermoplastic properties and having four opposing side walls formed and connected from an integral bottom base wall, three of the side walls having top end closure forming foldable elements, comprising said opposing side walls each being connected with the other at substantially a right angular formed corner junction wherein one pair of the opposing side walls being overlapped in part by articulated end free projected flanges of wall material and further articulated from the projected flanges of the other pair of adjacent side walls whereby, a short lower corner end pleat is formed at each of the corner ends of said bottom base wall and side walls, the short pleat being secured by the articulated upper elongated projected flanges from said other pair of adjacent side walls and in heat compressed seam forming relationship.

2. A container for foodstuffs formed of a cut and creased blank of sheet material treated with thermoplastic material and having four side walls arranged in opposing pairs with integral top end closure forming elements including an integral flat bottom end wall, which comprises each of said side walls being articulated upwardly from the boundary corner edges of said bottom end wall, each pair of the side walls being provided longitudinally at each end with a cut outlined end flange forming a pair at each corner, one flange of each pair being longer than the other, said flanges of each pair being joined together at the corner along a diagonal fold line, said flanges of each pair being folded along said fold line and secured to the exterior surface of an adjacent wall with the longer flange overlying the shorter flange, each of said flanges being coextensive with the height of the adjacent wall, whereby the secured flanges form an impermeable seam at each corner of the container for the full height of the container.

3. In a paperboard carton in which a polyhedral corner is formed by a single blank shaped and folded to define a main panel and a pair of wing panels hinged

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connected thereto, said main panel having a pair of adjacent edges converging to said corner and said wing panels having opposed free edges emanating from said corner and lying in registry, the inner face of said blank bearing a thermoplastic protective coating: a corner reinforcement comprising a pleat formed as an integral part of said single blank and interposed between said wing panels, said pleat having a pair of flanges hinged to said registering wing panel edges respectively and hinged to each other along a diagonal fold line emanating from said corner, the entire inner faces of said flanges bearing said thermoplastic protective coating, said pleat overlying and being adhesively secured to one of said wing panels, the outer flange of said pleat being adhesively connected to said one wing panel, and the inner disposed pleat flange overlapped by the outer pleat flange being hinged at a turned corner edge of said one wing panel and extending along said turned corner edge the entire height of said one wing panel, whereby raw cut edges of the paperboard material are removed from exposure within the interior confines of the container.

4. In a container as set forth in claim 3 wherein said lower corner end pleat is provided with a relatively narrow articulated marginal flange extension disposed upwardly of the pleat section and being overlapped by a longitudinal freely extended wall flange articulated from the other adjacent side wall, the pleat marginal extension and its cut end edge being secured in between the exterior surface of its parent side wall and the interior surface of said longitudinally extended wall flange thereby securing the lower formed corner end pleat in seam forming relationship.

5. In a container according to claim 3 wherein said corner end pleat is formed in the base of a pair of cut outlined marginal flanges projected from the defined corner junctions of the connected side walls whereby upon articulating said flanges the pleat is provided with an extended outwardly turned corner edge, the turned marginal flange adjacent said edge being overlapped by

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an adjacent margin extended longitudinally from the adjacent other side wall and extending beyond the underlying turned flange thereby securing the pleat and its extended flange in impermeable seam forming relationship and flatly upon the corresponding exterior surface of the side wall from which said corner turned edge is formed, thereby avoiding exposure of any cut edges of wall material within the interior confines of the container.

6. A container forming blank of sheet material cut and creased to define a bottom forming panel and extended therefrom four side wall forming panels arranged in opposing pairs, one of said pairs each having a further projected foldable closure forming element and one panel of the other pair of side wall forming panels having a projected full size foldable closure forming element, comprising each panel of the first mentioned pair of side wall forming panels being provided longitudinally at each end with a cut outlined end flange of relatively narrow width and each said flange being co-joined in part along a diagonal creased line with another cut outlined end flange of wider width provided at each end of said other pair of side wall forming panels, whereby upon folding said blank into container body formation each pair of said co-joined flanges being articulated along their defining creased lines at each corner end of said side wall panels into overlapping relationship, the folded portion along said diagonal creased line being adapted to form a lower corner end pleat at each of the junctive corner ends of said bottom and side wall panels.

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