

March 6, 1956

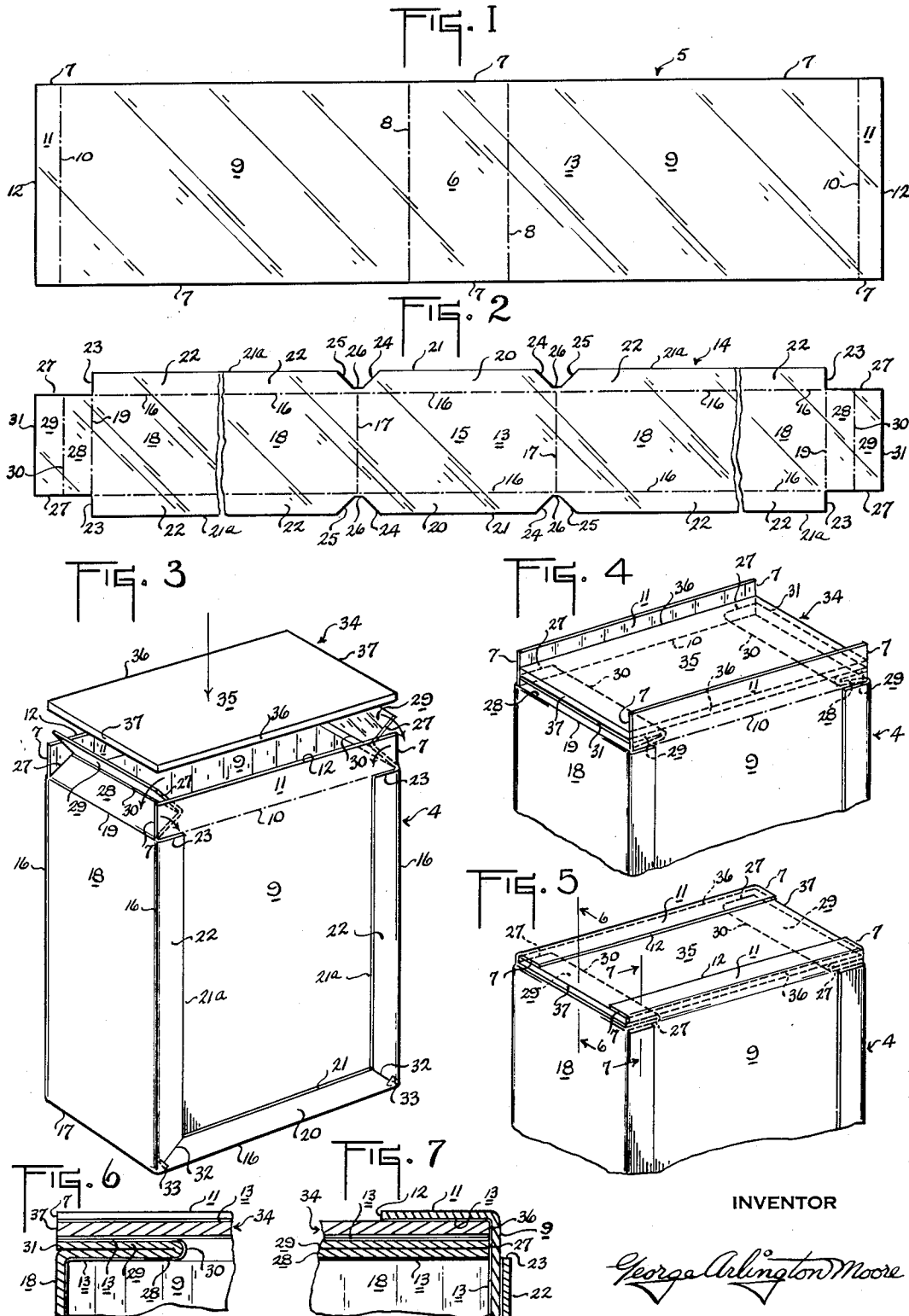
G. A. MOORE

2,737,336

CONTAINER WITH HERMETIC CLOSURES

Filed Aug. 6, 1952

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 8

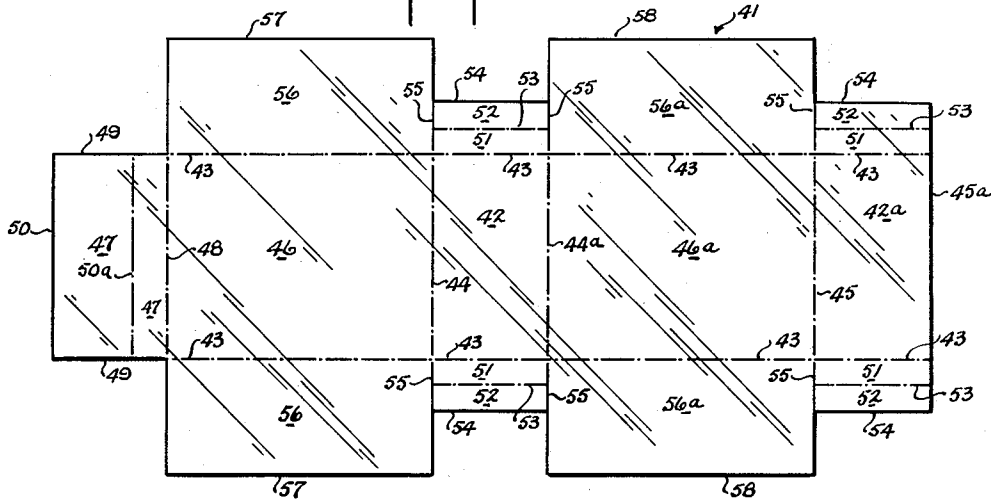


FIG. 9

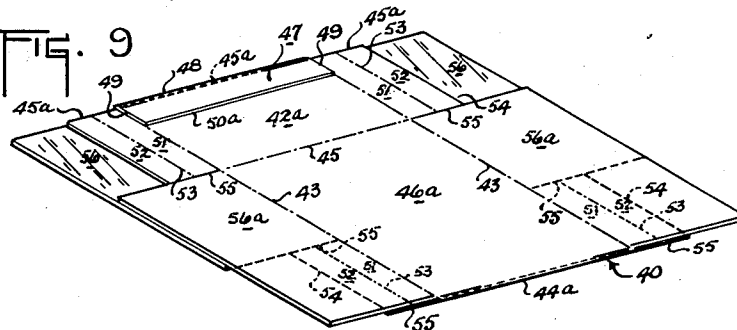


FIG. 10

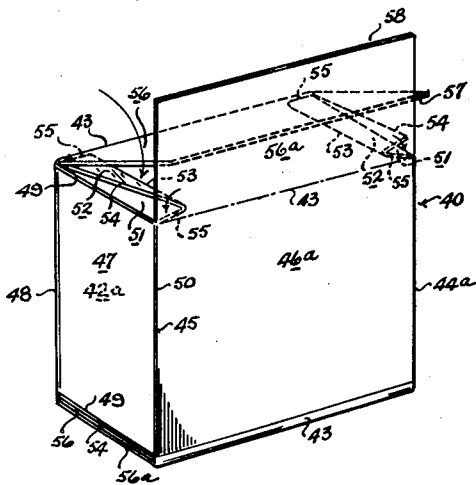
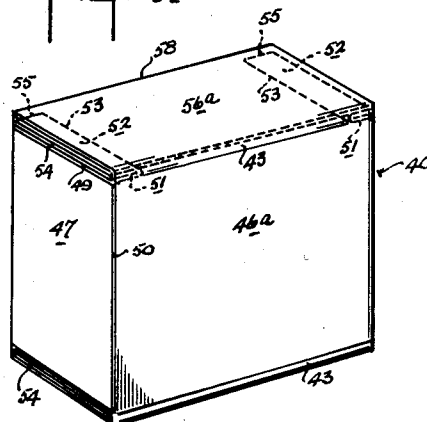


FIG. 11



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CONTAINER WITH HERMETIC CLOSURES

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10 Claims. (Cl. 229—43)

This invention relates to containers, more particularly to hermetic closures being adapted thereto. The containers are fabricated of any suitable sheet material, preferably, paper-board, one side of the material being provided with plastic film having thermoplastic properties.

Conventional paper-board containers such as carton types rely upon interior liners or bags for protection of the container contents. The inner bags are sealed before closing the outer container or, the liner or bag is folded intermediately of the folded flaps thereof. The outer container closure flaps are folded in overlapping relationship and usually employ paste or glue adhesive to fasten the folds together. The interior exposure of raw edges of material within the container together with the well known inherent weaknesses of the said closure, necessitates the use of the said liners or bags in conjunction therewith.

A principal object of the instant invention is to provide containers having hermetic closures, the interior walls of the containers being substantially impervious and devoid of exposed raw edges of material.

Another object of this invention is to provide strongly reinforced closures that may be adapted to carton type containers.

A further object of the invention is to provide containers that are rectangular in shape with closures having strength greater than the capacity of the material used in forming the side walls of the container.

A still further object of the instant invention is to provide containers made of sheet material wherein the said material supplies both the wall protection and the sealing medium with which to fabricate both the container and the closure thereof.

Another object of this invention is to provide containers with side wall end segments of material adapted to form double wing-back sealing ledges with which to efficiently heat-seal the closure of the container.

These and other objects of the invention will be apparent upon reading the following descriptive disclosure read in conjunction with the illustrative accompanying drawings, wherein:

Fig. 1 is a plan view of a first container blank,

Fig. 2 is a broken plan view of a second container blank,

Fig. 3 is a perspective view of the assembled container and a closure cap in a preliminary stage of assembly,

Fig. 4 is a fragmentary view in perspective of another stage in the assembly of the closure,

Fig. 5 is a fragmentary view in perspective of the completed closure,

Fig. 6 is a fragmentary view in cross-section of the closure taken on line 6—6 in Fig. 5,

Fig. 7 is a fragmentary view in cross-section of the closure taken on line 7—7 in Fig. 5,

Fig. 8 is a plan view of another type of container blank adapted for providing the closure of the invention,

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Fig. 9 is a perspective view of the blank folded flat and secured with a longitudinal seam,

Fig. 10 is a perspective view of the container with one end closure completed, the opposite end closure being in a stage of folding, and

Fig. 11 is a perspective view of the completed container.

One embodiment of the present invention is illustrated by the assembled container 4 in Fig. 3, the container being assembled of two blanks illustrated in Figs. 1 and 2. A first blank 5 (Fig. 1) is provided with a central panel 6 constituting an inner bottom wall for the container. The blank and said panel is defined with parallel sides 7 and a pair of parallel folding lines 8 disposed in transverse relation to the said sides 7. Panels 9 constituting two opposed side walls of the container are disposed outwardly from each folding line 8 and extend to folding lines 10 which are parallel therewith. The blank is provided with opposite end segments 11 defined with parallel opposing edges 12 disposed outwardly of the folding lines 10 and parallel therewith and having transversely disposed sides 7.

The said first blank 5 is preferably made of paper-board of suitable grade and thickness and having one side thereof coated or extruded with suitable thermoplastic film 13 thereupon. The plastic film may be polyethylene or vinyl compositions, such films having the desirable characteristics necessary to carry out the illustrative disclosure of the present invention.

A second blank 14 is provided with a central panel 15 constituting an outer bottom wall for the container. The panel 15 is defined with parallel folding lines 16 and transversely disposed parallel folding lines 17. Panels 18 constitute two opposing side walls of the container which extend laterally and in opposing directions from each of the folding lines 17 of the central panel 15. Parallel folding lines 16 define the side borders of panels 18 which end at the opposing folding lines 19 disposed in parallel relationship with the folding lines 17. Marginal projections extending outwardly of the parallel folding lines 16 constitute pairs of opposing flanges 20 and 22, the flanges 20 disposed outwardly of each side of the central panel 15 and having outer parallel edges 21, the flanges 22 having outer parallel edges 21a and disposed outwardly of the panels 18 and terminating adjacent each end of the blank with edges 23 disposed at substantially right angles to the edges 21a. The flanges 20 and 22 are partially separated with V-shaped notches having inwardly sloping opposed edges 24 and 25, the theoretical apices being disposed at the junctions of the folding lines 16 and 17 defining the four corners of the central panel 15. The actual apices of the said V-shaped notches are flattened with edges 26 disposed outwardly of the said corners and parallel with the folding lines 16.

The blank 14 is provided with substantially identical end segments having opposing sides 27 disposed substantially in line with the parallel folding lines 16 and outwardly of the edges 23 of the flanges 22. The segments are divided into areas 28 and 29 defined with folding lines 30 disposed outwardly of the folding lines 19 and parallel thereto, and inwardly of the end edges 31 of the areas 29.

The blank 14 may be made of the same coated sheet material as hereinbefore described for the blank 5, the grain of the material should run across the blank 5 whereas, the grain of the blank 14 should run with the length thereof. The cross-grain relationship of the said blanks adds efficiency in the assembly of the container.

The container 4 (Fig. 3) is assembled by superimposing the blank 5 upon the blank 14 in crossed relationship with respect to the central panels 6 and 15 thereof. The lateral panels 9 and 18 extending therefrom are folded to

form the side walls of the container. The flanges 20 and 22 of the folded side walls 18 are folded to superimpose marginal wall areas of the folded blank 5. The V-shaped notches 24, 25 and 26 of the blank 14 close when folding the blank, the edges 24 and 25 form mitre-like abutted seams 32 adjacent each of the four corners at the bottom end walls of the container. The flattened apices 26 of the said V-shaped notches gathers material 33 with which to close and seal the corners of the bottom and side wall junctions of the container.

Heat and pressure applied to the exterior surfaces of the bottom wall 15 and marginal overlapping flanges 20 and 22, activate the intermediately disposed layers of thermoplastic film 13 on the interior surfaces of the assembled folded blanks, uniting the engaging surfaces together in seam forming relationship. The gathered material 33 at the corners of the bottom walls of the container is compressed with heat forcing the said material inwardly, sealing and reinforcing the said corners.

The end segments of the assembled blank 14 are adapted to be folded in wing-back formation at the top of two opposed side walls 18 of the container (Fig. 3). The folding lines 30 form a bending hinge to provide a lower area 28 adapted to be folded inwardly on the folding line 19 disposed across the wall 18, and an upper area 29 to be folded outwardly on the hinging line 30. The sides 27 of the wing-back folds wipe the inner surfaces of the opposing end segments 11 extending from the opposing side walls 9 of the assembled container.

A separate substantially flat wall panel 34 constituting a bridging cap for the open mouth of the container is provided, having a wall area 35 with parallel sides 36, and at substantially right angles thereto, the parallel sides 37. The cap 34 may be made of any suitable rigid material and of any desired thickness. The material may consist of ground wood paper-board having one surface coated with plastic film compatible with the film used for the container blanks. Various laminates may be used with the paper-board such as aluminum foil or other substantially impervious sheet materials including plastics.

The cap 34 is located centrally over the mouth of the container to engage the surfaces of the previously folded areas 29 of the wing-back folds of superimposing areas 28 and 29. The thermoplastic film 13 faces upwardly on the folded areas 29 to face marginal areas of the inner wall surface of the cap 34 having thermoplastic film thereon. The wing-back folds constitute efficient sealing ledges for the cap, the power spring resistance generated by the action in collapsing the area 29 over the area 28 of the said folds resisting the cap 34 when pressed downwardly thereupon (Fig. 4).

The cap 34 may be pre-heated just prior to the engagement of the cap with the sealing ledges. The cap is home when the wing-back folds are completely compressed. Heat from the cap or alternatively, heat imposed upon the exterior surface 35 thereof, activates the thermoplastic film on the intermediate surfaces of contact thereby uniting the cap to the surfaces of the upper wing areas 29 of the sealing ledges. At this stage in forming the closure should the downward pressure be released from the cap, the resilient spring power of the sealing ledges would expand upwardly and raise the thermally attached cap out of proper position therefor, the downward pressure on the cap 34 is maintained while the end segments 11 of the opposing side walls 9 are folded or plowed inwardly from the folding lines 10 and over the parallel sides 36 of the cap, and downwardly to overlap opposing marginal areas of the exterior wall of the said thermally attached cap. The parallel overlapping segments 11 are sealed by the heat of the cap 34, the thermoplastic film 13 on the interior and intermediate engaging surfaces being activated thereby. The said sealed overlapping segments hold the cap in clamping engagement with the sealed ledges (Figs. 5 and 6). The side edges 27 of the collapsed areas 28 and 29 are

sealed in edge to face abutments with the interior thermoplastically coated side walls 9 of the container (Fig. 7). The turned corner edges 30 of the sealing ledges disposed within the interior of the container are plastically covered thereby rendering the interior walls of the container devoid of efficiency destroying raw wicking edges (Fig. 6). All other edges of material within the interior of the container are in edge to plastic face engagements in sealed relationship (Fig. 7). The edges 7 of the assembled first blank 5 are in abutment (edge to plastic face engagements) with the interior walls of the second assembled blank 14.

The completed container having hermetic closures (Fig. 5) is suitable for distribution of a wide variety of commodities. The plastically covered interior walls of the container including the closures (top and bottom) and the sealed interior edges of structural material, renders the container substantially impervious. The bottom closure is reinforced with double walls sealed together, the corners thereof are reinforced and sealed. The top closure comprises adaptations of container side wall segments that provide efficient means with which to seal the closure and have reinforcements to withstand shock and other disturbances in handling and shipping the containers. The sealed closure maintains desirable resiliency without impairment of the sealed areas thereof. The wing-back sealing ledges co-act with the cap to have cushioning effects inwardly of the opposed overlapping sealed segments 11.

The container hereinbefore described may be made with tapering side walls to facilitate nesting of empty containers into each other and thereby simplify shipping problems of economy.

The principles of the closure hereinbefore described may be adapted to containers of the folding carton type as illustrated in Figs. 8 to 11 of the drawings. A blank 41 (Fig. 8) provides side wall panels and end segments thereof with which the end closures of the container are formed. The blank 41 is provided with side wall panels 42 and 42a defined with creased folding lines 44, 44a and 45 and side edge 45a disposed in parallel relationship and parallel longitudinal transversely disposed creased folding lines 43 extending across the blank. Side wall panels 46 and 46a extend laterally and outwardly of each of the creased lines 44 and 44a, the right panel 46a being disposed between the panels 42, the left panel 46 being disposed between the panel 42 and end panel 47 defined with a creased folding line 48, parallel side edges 49 and end edge 50. The parallel longitudinal creased lines 43 are linear with the parallel side edges 49.

Side wall panels 42 have like-end segments disposed outwardly of the longitudinal creased lines 43, the said segments defined with divided areas 51 and 52 separated by creased folding lines 53. The areas 51 are disposed outwardly of the creased lines 43 and inwardly of the creased line 53. The areas 52 are disposed outwardly of the creased lines 53 and inwardly of the longitudinal edges 54. The areas have cut sides 55 terminating at the longitudinal parallel creased lines 43. Side wall panels 46 have like-end segment panels 56 and 56a disposed outwardly of the longitudinal creased lines 43. The panels 56 and 56a are separated from the end segments of the panels 42 and 42a by the cut lines 55. The panels 56 have longitudinally disposed edges 57 and the panels 56a have longitudinally disposed edges 58.

The blank 41 is provided with a coating of suitable thermoplastic film on one side thereof as described for the blanks 5 and 14. The blank 41 is folded on the creased line 44a to constitute a collapsed container 40 (Fig. 9). The plastic film surface of the blank is disposed intermediate of the overlapping areas. The panel 47 of the blank 41 may be varied in width as desired, the said panel constituting the container body seam (Fig. 9). The panel 47 may extend over the entire area of the side wall panel 42a or short thereof as defined by the

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line 50a (Fig. 8) and edge 50a (Fig. 9). The panel 47 is pre-heated prior to being folded over the edge 45a and downwardly over a marginal area of the side wall panel 42a. Pre-heating the panel 47 softens the thermoplastic film thereon to activating temperature, thereby sealing the panel when folded and pressed to the said opposing area of the panel 42a. The pre-heating of the panel avoids blocking the adjacent areas of thermoplastic film on the inner surfaces of the folded blank 40.

The flat folded blank may be opened and a bottom closure formed to the body walls in the same manner as described for the folding and sealing of the top end closure (Figs. 10 and 11) as follows. The end segments on the opposing side walls 42 and 42a are folded to bend on the creased lines 53 and form wing-back sealing ledges as hereinbefore described for the container 4 in Fig. 4. One end of the wing-back folds 51 and 52 are collapsed to fold the end panel 56 inwardly and downwardly, the wing-back folds are then compressed flatly. The thermoplastic film on the up-turned faces 52 of the wing-back folds contact the thermoplastic film on the inner face of the overlapped panel 56. The edge 57 of the said panel engages the thermoplastic film face of the interior side wall 46a in edge to face abutment. The panel 56a is then folded inwardly and downwardly over the exterior wall of the folded panel 56, the thermoplastic film on the inner face of the folded panel 56a engages the exterior face of the folded panel 56. Heat and pressure applied to the exterior surface of the folded panel 56a activates the intermediate layers of thermoplastic film uniting the engaging folded segments in seam forming relationship (Fig. 11).

The wing-back sealing ledges exert force in an upward direction to oppose downward direction of sealing pressure, this coaction of opposing forces provides an efficiently sealed closure for the container. The exterior overlapping panel 56a locks the wing-back sealing ledges under substantially permanent compression. The edges 55 of the sealing ledges are maintained in tight abutments with marginal surfaces of the interior opposing walls of the container by the sealed overlapping panels 56 and 56a. The panel 56 having a hinge 43 disposed oppositely to the hinge of the panel 56a, the said panels being drawn tightly from the said opposing hinges in a plane parallel to their engaged surfaces.

When the container 40 is made of relatively heavy gauge material, heat and pressure may be applied to the exterior surface of the first folded panel 56 prior to the folding of the panel 56a, the heat of the first panel elevating the temperature of the thermoplastic film of the overlapping panel 56a when folded, to effect a seal thereof to the panel 56. Production efficiency and capacity may be increased when packing and closing the containers in such manner.

Paper-board such as used in making conventional types of folding cartons, have tendencies to crack or minutely fracture when being creased and folded. Such inherent characteristics of the material may weaken or injure the protective coating of plastic film. Pre-heating the folding junctions of material to temperatures below the plastic blocking heat prior to folding, will render the plastic film flexible enough to take the fold without injury.

The containers and methods constituting the invention disclosed herein has many attendant advantages that will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention, the form hereinbefore described representing a preferred embodiment thereof.

I claim:

1. In a container structure of the character described having four side walls provided with surface adhesive and being arranged in opposing alternate pairs defining an open end, each wall of one pair of said side walls

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having an upper marginal portion folded inwardly along its corner edge at right angles to the corresponding side wall then upwardly and outwardly in substantial face contacting relation with its outer edge in substantially the plane of said corresponding wall, the transverse end side edges of said folded margins being in flat edge abutment to upper interior surface portions of the other alternate pair of said side walls, each wall of said other pair being provided with an upper wall margin being folded inwardly and downwardly upon exterior marginal surface portions of a closure wall seated upon the upper margins of said first folded wall portions which closes the open end of the container, said closure wall having two opposed longitudinal edges in coplanar relation included with said end side edges that are in abutment, said closure wall and alternate side walls marginally engaged in surface relation being sealed together in seam forming relationship by action of said adhesive.

2. In a container structure having side walls arranged in opposing pairs to provide a body portion of rectangular horizontal cross section and a closed end, said closure comprising a flat end closing wall being seated upon upper surfaces of two opposed folded margins of each wall of one pair of said opposing side walls, said margins being folded inwardly at right angles to its dependent side wall then upwardly and outwardly in face contacting relation with its outer edge in the plane of wall to which it is attached, two opposed side edges of said closure wall being in coplanar relation with opposed side edges of said folded wall margins, both sets of edges being disposed in abutment with upper interior flat surface margins of the other pair of said side walls, each wall of the other pair being provided with an upper in-folded margin which overlaps exterior surface margins of the closure wall transverse of the plane of said edges disposed in abutment, the opposed transverse end edges of said in-folded margins which overlaps two sides of the closure wall being in substantial coplanar relation with outer exterior edges of the closure wall and said outer edge of the first folded margins, the marginally engaged surfaces of said folded wall portions having a thermoplastic film thereon activated to secure said engagements in seam forming relationship.

3. A container comprising four side walls provided with thermoplastic adhesive and which are arranged in opposing pairs to provide a body portion of rectangular cross section and defining the container mouth, a mouth closing separate bridging wall of flat rectangular shape having two opposed side edges in abutment with interior surface margins of one pair of said opposed side walls, the transversely opposed side edges being in plane with the exterior of the other pair of said side walls, which other walls each have upper wall margins folded inwardly then upwardly and outwardly in face contacting relation with the outer edge in plane with the wall to which it is attached, said folded margins being resiliently active in supporting said bridging wall upon two opposing marginal sides transverse of said edges in abutment, each wall of said one pair of side walls having an upper margin folded inwardly and downwardly upon two marginal exterior surfaces of the bridging wall to compress and flatten said resilient supporting folded margins while other of said face contacted surface portions are adhesively secured together by activation of said thermoplastic upon the interior of said wall engaging surfaces in seam forming relationship.

4. A container in accordance with claim 3 wherein, said pair of supporting folded margins resiliently opposes said bridging wall upon marginal surfaces inwardly of the exterior end edges thereof, the folded margins of said one pair of side walls providing means which firmly resists said resiliency to maintain a constant compression and thereby secure interior abutment sealing engagements of said two opposed side edges of the bridging wall with

two side walls, and which side edges are transverse of said exterior edges thereof.

5. A container having thermally sealed end closures comprising a first blank provided with thermoplastic surface adhesive and folded to provide an inner closed bottom wall and two opposed side walls of the container, said side walls having substantially identical double foldable end marginal wall portions constituting two closure forming supporting ledges; a second blank provided with thermoplastic surface adhesive and folded to provide an outer closed bottom wall being adhesively bonded upon said inner bottom wall of the first blank to constitute a bottom closure of the container, said second blank providing two opposed adjacent side walls of the container and having substantially identical single foldable end marginal wall portions to co-act with said ledges of the first folded blank when forming the top end closure of the container, said second blank having longitudinal flanges disposed to overlap marginal surfaces of the side walls of the first folded blank and being adhesively secured together along their vertical side edges, the top end closure comprising an end closing separate wall being seated upon said ledges, which ledges are formed by being folded inwardly at right angles to the dependent side wall, then folded upwardly and outwardly in substantial face contacting relation with the outer edge in the plane of said dependent side wall, two opposed transverse edges of said seated closure wall including transverse edges of said ledges being in abutment with interior flat surface portions of the side walls of said second folded blank, said end margins of the second blank being folded inwardly and downwardly upon two exterior opposing marginal face sides of said closure wall, said folded marginal wall engagements including said seating contacting margins being thermally sealed together by application of heat and pressure.

6. In a container structure having four side walls arranged in opposing pairs to provide a body portion of rectangular cross section and a closed end, said closed end comprising a separate end closing wall seated upon two opposed interiorly disposed folded marginal portions of one pair of said side walls, said marginal portions being folded inwardly from the plane of wall to which it is attached and disposed at right angles thereto and being further folded upon an inner junction of said folded portion upwardly and outwardly in substantial face contacting relation with its outer edge in the plane of said wall to which it is attached including two opposed end edges of said seated closure wall, two opposed transverse side edges of said closure wall and opposed end side edges of said first folded margins being disposed in interior abutment with upper flat surface portions of the other pair of side walls, which other walls each having an upper wall margin folded inwardly from the plane of its dependent wall to overlap a marginal portion of the exterior surface of said closure wall which locks said abutment edges to said other side walls to complete the structure of the closure.

7. In a container structure according to claim 6, wherein said folded wall margins engaged with said end closing wall is provided with interior surfaces of thermoplastic adhesive which may be utilized to seal said closure upon application of heat and pressure, said seal of the closure being effected by the combination of two opposed interior lateral surface engagements of said closure wall with side wall folded portions combined with engagements of two opposed transverse end edges of the closure wall with interior flat surface portions of two alternate side walls.

8. In a rectangular shaped container made of paper-board sheet material being folded to provide four side walls arranged in opposing pairs defining an open end, and said walls being provided with surface dry plastic

adhesive, each wall of one pair of said side walls having an upper marginal portion being folded inwardly along its corner edge at substantially right angles to the corresponding side wall then upwardly and outwardly in substantial face contacting relation with its outer edge in substantially the plane of said corresponding wall, the transverse end side edges of said folded margins being in flat edge abutment to upper interior surface portions of the other alternate pair of side walls, each wall of said other pair being provided with an upper wall portion being folded inwardly and downwardly upon the exterior surface of a closure wall seated upon the upper margins of said first folded wall portions which closes the open end of the container, said closure wall having two opposed longitudinal edges in coplanar relation included with said end side edges that are in abutment, said closure wall and alternate side wall upper folded portions engaged in surface relation including said edges in abutted coplanar relation being sealed in seam forming relationship by activation of said plastic adhesive.

9. In a container according to claim 8 wherein said closure wall seated upon upper margins is provided with surface dry plastic adhesive to augment said adhesive upon the walls of the container in contact therewith when sealing the closure in said seam forming relationship.

10. In a container having a plurality of side walls arranged in alternate opposing pairs defining an open end, each wall of one pair of said side walls having an upper marginal portion folded inwardly along its corner edge at right angles to the corresponding side wall then upwardly and outwardly in substantial face contacting relation with its outer edge in substantially the plane of said corresponding wall, the transverse end side edges of said folded margins being engaged in flat edge abutment contact upon upper interior surface portions of the other alternate pair of said side walls, each wall of said other pair being provided with an upper wall portion being folded inwardly and downwardly upon the exterior surface of a closure wall seated upon the upper margins of said first folded wall portions which closes said open end of the container, the interior surface of said seated closure wall being provided with thermoplastic film material thereupon that is compatible for sealing purpose with thermoplastic film material that is provided upon interior surface of said walls of the container, said closure wall having two opposed side edges disposed in coplanar surface relationship with the end side edges that are disposed in said flat edge abutment contact, the thermoplastic film upon said closure wall providing means to seal said seated engagement upon the thermoplastic film of upper margins of said first folded wall portions, and the thermoplastic film upon interior surface of said alternate side wall folded margins providing means to seal opposite marginal surface sides of the closure wall transverse of said seated engagement when activating said thermoplastic film material with heat, and upon an application of pressure being imposed downwardly upon exterior surface of said margins and closure wall, thereby closing and sealing said open end of the container in seam formed relationship.

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