United States Patent [19]

Gorham

[11] **3,921,891**

[45] **Nov. 25, 1975**

[54] **ONE PIECE PARTITION**

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[73] Assignee: **Hoerner-Waldorf Corporation**, St. Paul, Minn.

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[52] **U.S. Cl.** **229/15**; 229/28

[51] **Int. Cl.²** **B65D 5/48**; B65D 85/00

[58] **Field of Search** 229/15, 28, 42

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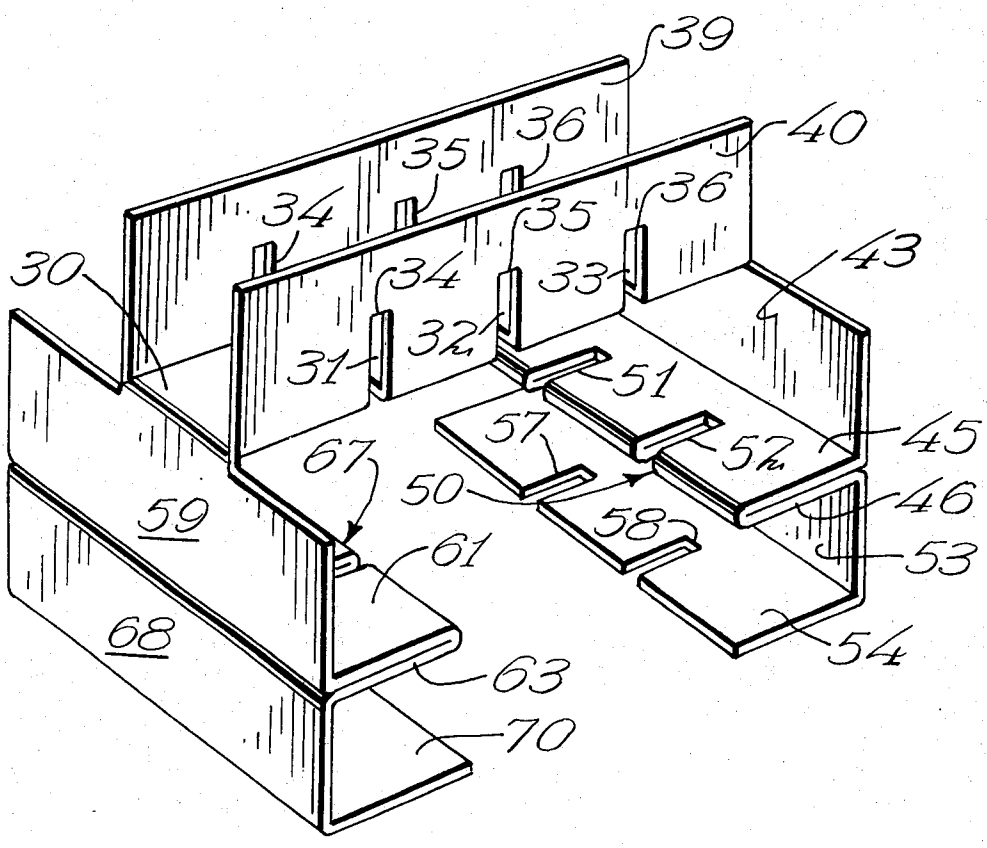
Primary Examiner—Davis T. Moorehead

Attorney, Agent, or Firm—Jerry F. Best

[57] **ABSTRACT**

A one piece partition foldable from a blank die cut from paperboard or like material which features a center section having an upright rib panel and multiples of lateral panels hinged to the sides thereof which are foldable downwardly and then up into slots formed in the rib panels in a single or double thickness orientation.

5 Claims, 17 Drawing Figures



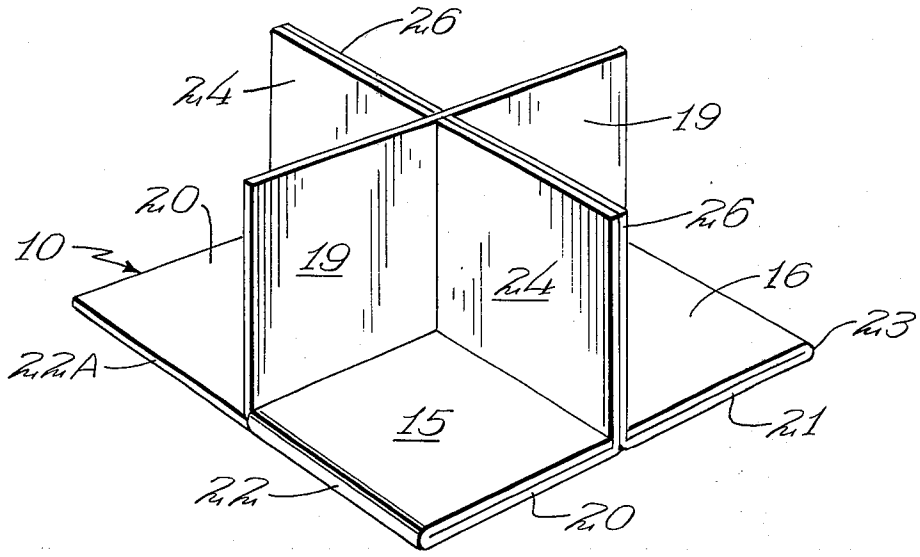


FIG. 1

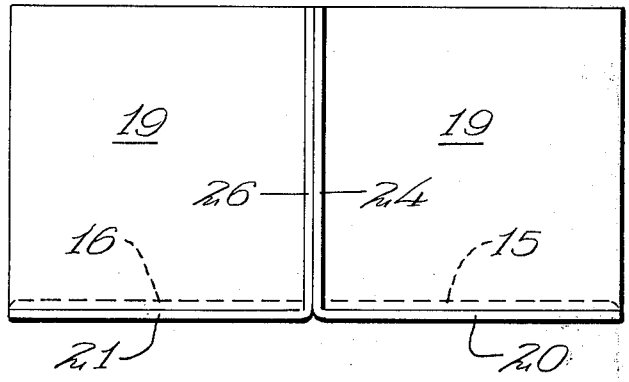


FIG. 2

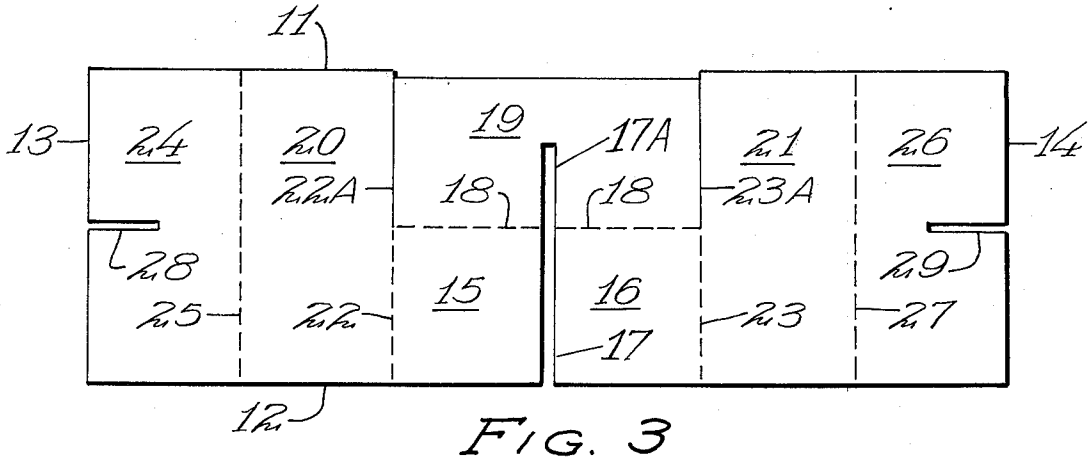


FIG. 3

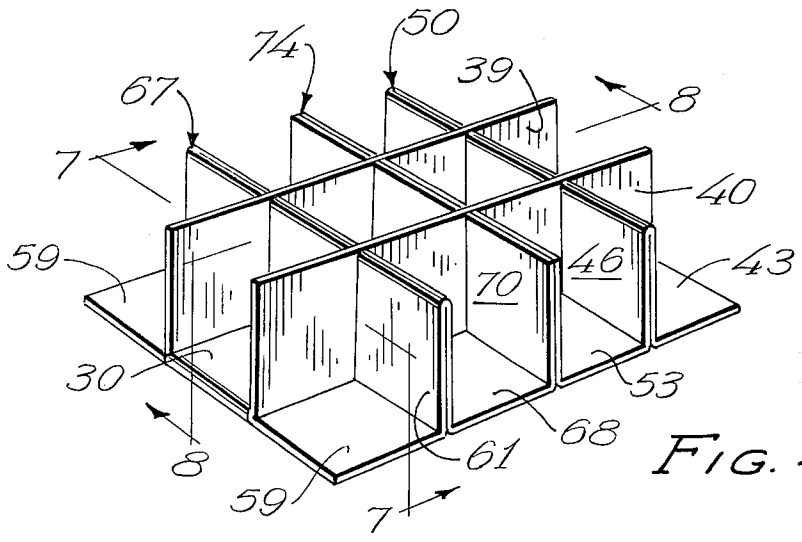


FIG. 4

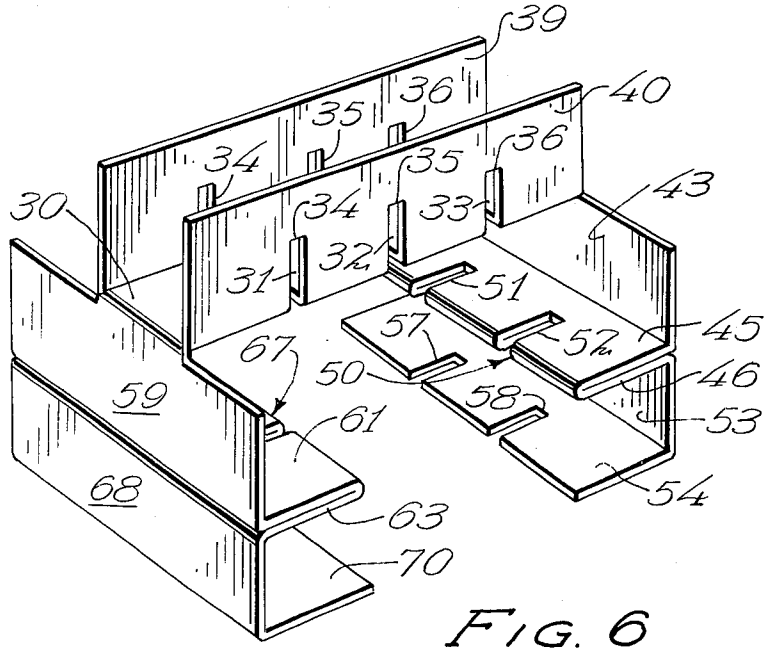


FIG. 6

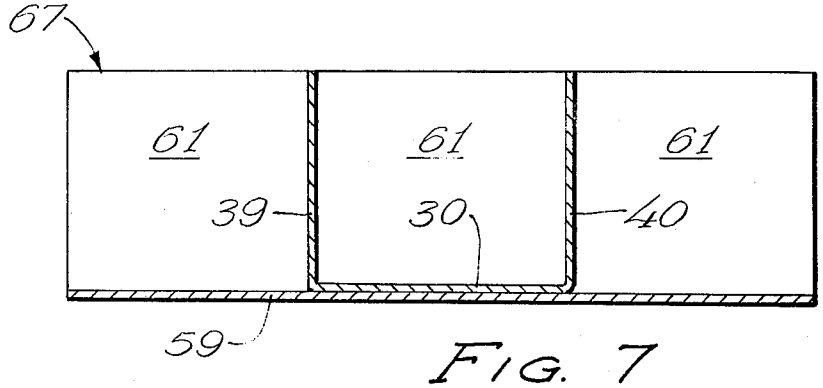


FIG. 7

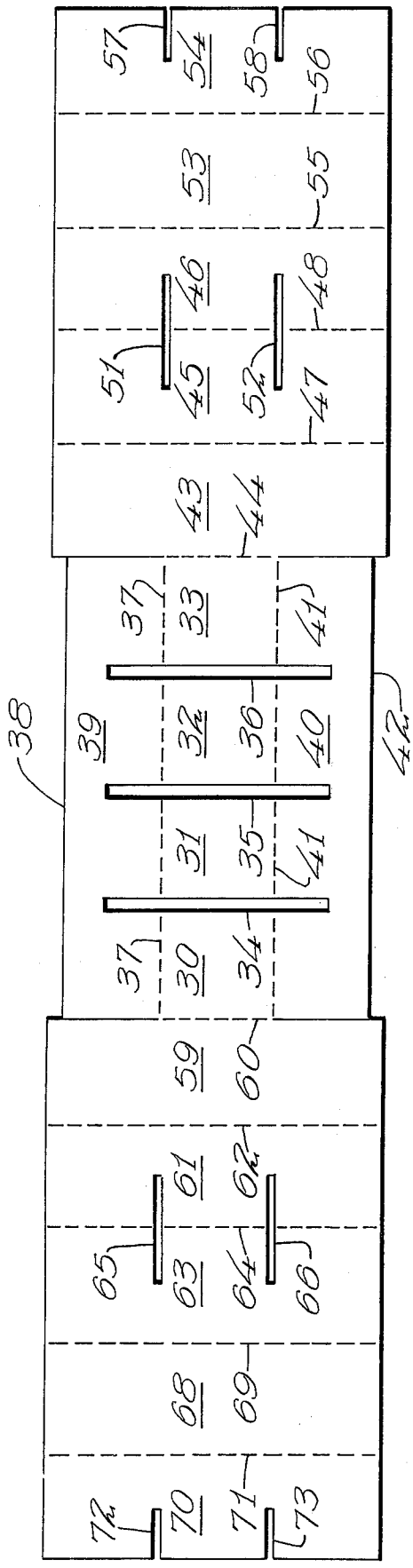

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FIG. 5

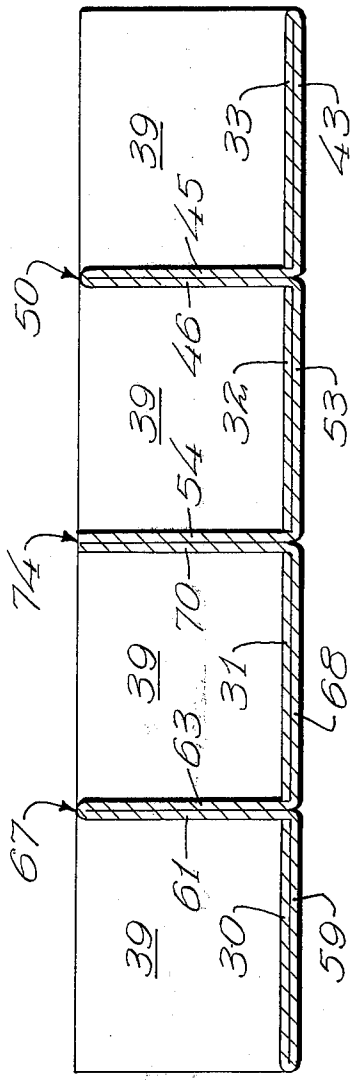

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FIG. 8

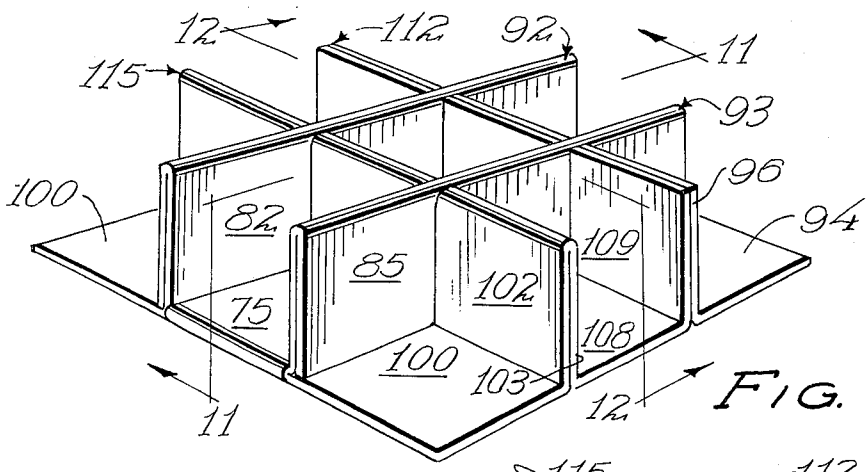


FIG. 9

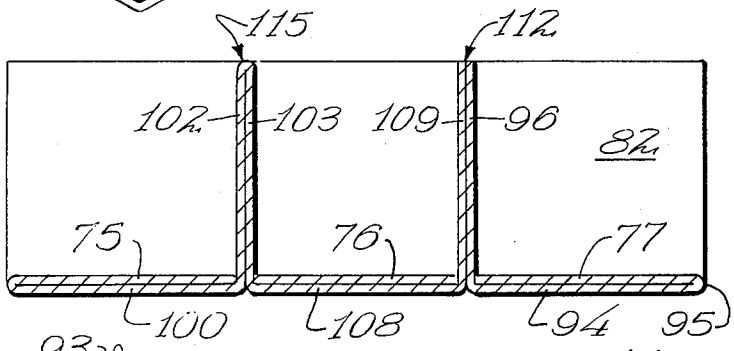


FIG. 11

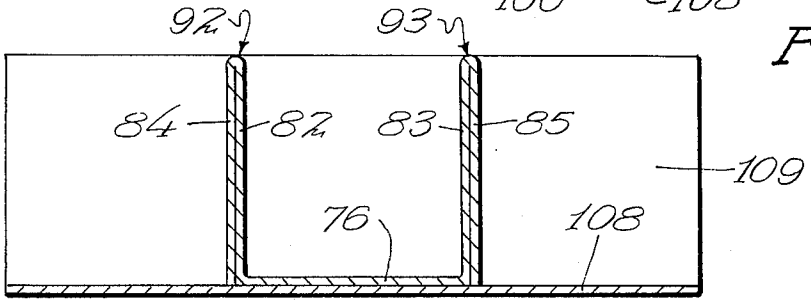


FIG. 12

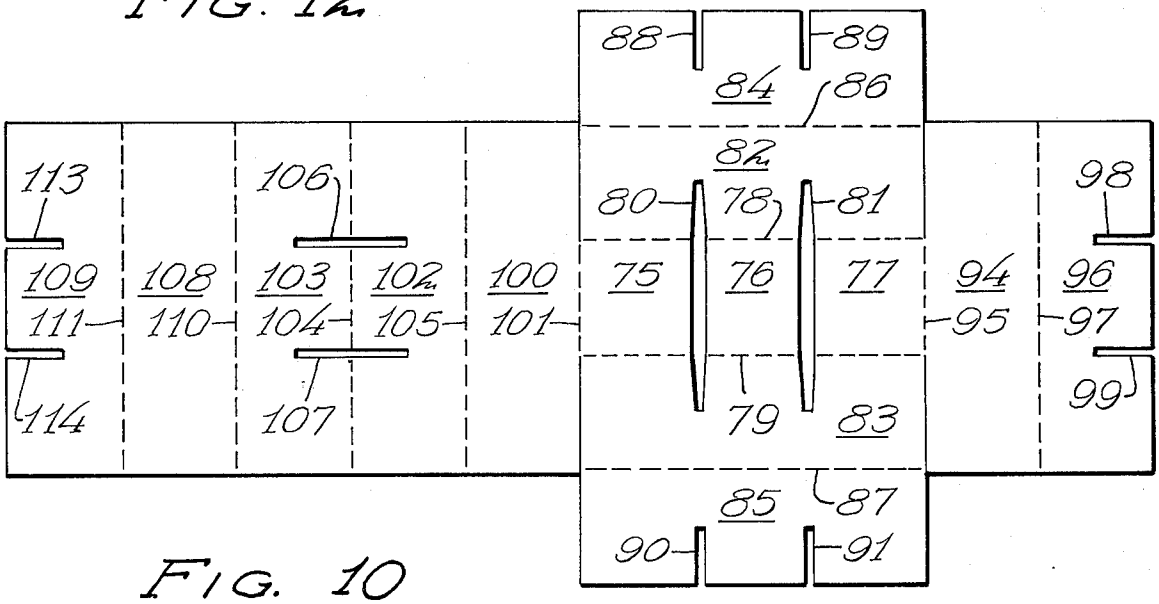


FIG. 10

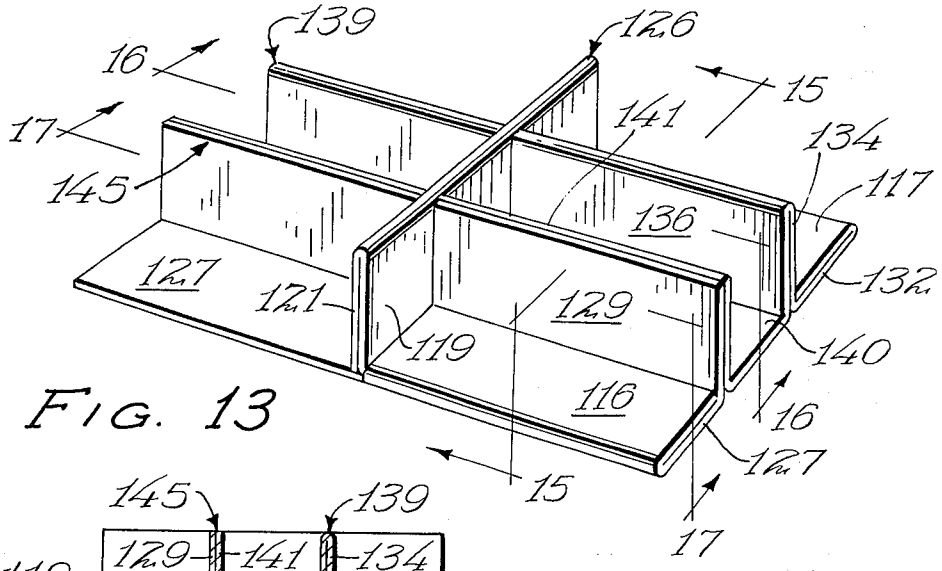


FIG. 13

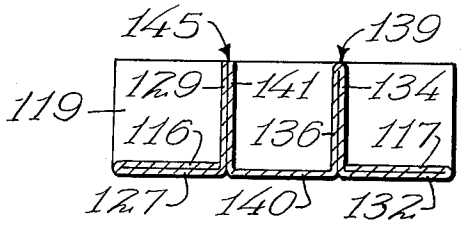


FIG. 15

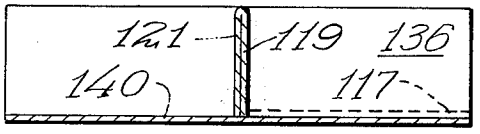


FIG. 16

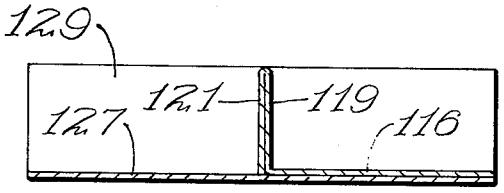


FIG. 17

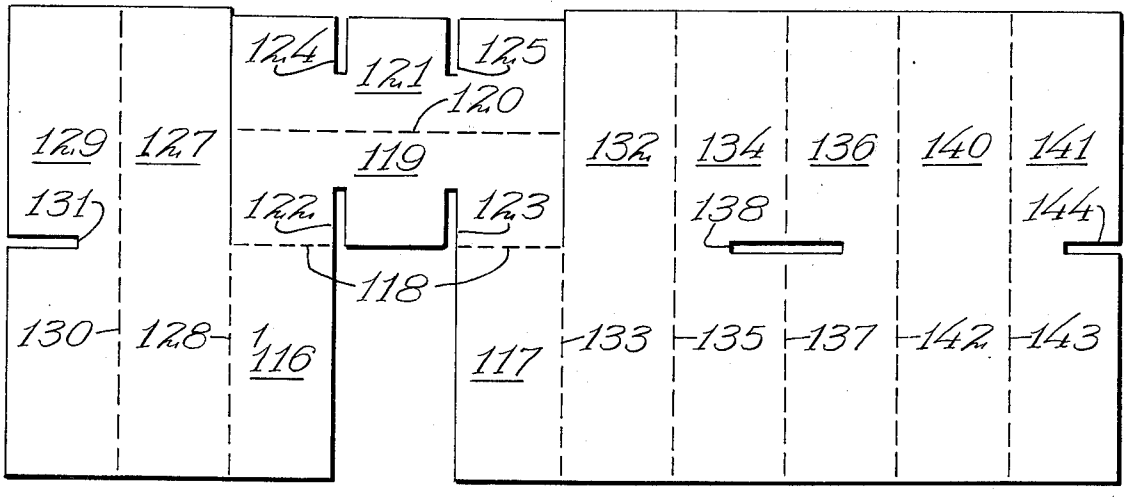


FIG. 14

ONE PIECE PARTITION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to partitions for containers and more particularly to those partitions which are foldable from a single sheet of foldable material and are of the multiple cell type.

2. Description of the Prior Art

In corrugated shipping containers which are used to hold items that must be kept separate from one another, it is commonplace to use partitions or dividers which create cells or sections which keep the articles or groups of articles to be contained therein from touching one another. The traditional manufacture of these partitions involve the use of multiple ribs with matching slots which are formed in the ribs and allow them to be pushed together at 90° angles thereby creating a web of crossing members. This style does not lend itself to double wall protection nor is there any additional protection on the bottom of the cells for the articles to be contained therein.

SUMMARY OF THE INVENTION

A one piece container partition and blank for making same foldable from paperboard or similar sheet-like material and employing upwardly insertable lateral rib members into a transversely oriented upstanding rib member having slots and which provide a bottom surface to the cells and may employ double thicknesses in the ribs to provide additional protection to the articles to be separated by the partition.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a four cell partition embodying the present invention;

FIG. **2** is a side elevational view of the partition shown in FIG. **1** shown from the rear of the view of FIG. **1**;

FIG. **3** is a plan view of a blank adapted to be folded into a partition similar to that shown in FIG. **1**;

FIG. **4** is a perspective view of a partition featuring an alternative embodiment of the present invention having twelve cells, with single thickness transverse ribs;

FIG. **5** is a plan view of a blank adapted to be folded into the partition shown in FIG. **4**;

FIG. **6** is a perspective view of the blank shown in FIG. **5** partially erected into the partition of FIG. **4**, illustrating the relationship of the upstanding transverse ribs and the downwardly folded lateral panels which are insertable into the slots in the transverse ribs;

FIG. **7** is a side elevational section view taken along the section line **7—7** in FIG. **4**;

FIG. **8** is a side elevational section view taken along section lines **8—8** in FIG. **4**;

FIG. **9** is a perspective view of a partition embodying the present invention which has nine cells, and double thickness in both the transverse ribs and lateral panel members;

FIG. **10** is a plan view of a blank adapted to be folded into the partition shown in FIG. **9**;

FIG. **11** is a side elevational section view of a portion of the partition shown in FIG. **9**, taken along section lines **11—11** in FIG. **9**;

FIG. **12** is a side elevational section view of a portion of the partition shown in FIG. **9** taken along section line **12—12** in FIG. **9**;

FIG. **13** is a perspective view embodying the present invention having six sections, with double thickness transverse ribs and lateral panels, illustrating how the dimensions of the cells may be varied;

FIG. **14** is a plan view of the blank adapted to be folded into a partition such as that shown in FIG. **13**;

FIG. **15** is a side elevational section view of the partition shown in FIG. **13** taken along section line **15—15** in FIG. **13**;

FIG. **16** is a side elevation section view of the partition shown in FIG. **13** taken along section line **16—16** in FIG. **13**;

FIG. **17** is a side elevation section view of the partition shown in FIG. **13** taken along section line **17—17** in FIG. **13**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The concepts disclosed in this invention may be employed in basic form, and for purposes of this disclosure additional modifications and embodiments have been included to illustrate how many variations of this partition design may be achieved within the scope of the invention. In FIG. **1** the basic structure is disclosed which is for a partition **10** which is in the fourcell configuration. As can be seen in FIG. **3**, the partition blank is made up of a substantially rectangular sheet of foldable paperboard or similar sheet-like material, and has a top edge **11**, a bottom edge **12** and opposed perpendicular lateral edges **13** and **14**.

In the center of the blank is a center section which is adapted to be folded to form the base of the partition and which includes two center section support panels **15** and **16**. These two center section support panels **15** and **16** are separated by a slot **17** which extends perpendicular to the top edge **11**. The edges of the support panels **15** and **16** which extend along the longitudinal center line are defined by a fold line **18** along which is connected a center rib panel **19** which as can be seen in FIG. **1**, is foldable into a vertically oriented center rib panel which has a slot **17A** formed partially therethrough opening on to the bottom edge **18** of the center rib panel **19** which is an extension of the slot **17** separating the two center support panels **15** and **16**. The exact dimension of this slot **17** is dictated by the thicknesses of the panels which are inserted into the slot and normally would extend into the center rib panel **19** approximately on half of its width. The center rib panel **19** extends transversely across the width of the center section of the blank and is attached only to the center section support panels **15** and **16**. The rib panel **19** is not connected to the lateral panels to be described later.

Along each of the lateral sides of the center section are attached lateral panels. These lateral panels are designated as **20** and **21** and are attached to the center section support panel **15** along a fold line **22** and to center support section **16** along the fold line **23**. These fold lines **22** and **23** are perpendicular to the top edge **11** of the blank and these lateral panels are separated from the center rib panel **19** by line cut extensions of the hinge lines which are shown as **22A** and **23A** respectively.

These lateral panels **20** and **21** can be seen in FIGS. **1** and **2** to fold downwardly and lie in flush relationship with the bottom of the center support panels **15** and **16** to form a double thickness at those locations, and also provide for a base structure in the two cells which in

FIG. 1 appear at the back of the drawing. There are additional lateral panels located at the outer lateral sides of the blank and are shown as **24** attached to lateral panel **20** along hinge line **25** and lateral panel **26** attached to lateral panel **21** along hinge line **27.** These third and fourth lateral panels have slots formed approximately halfway therethrough which open to the outside edges **13** and **14** of the blank. These slots are shown as **28** and **29** and they are oriented on a line aligned with the fold line **18** which connects the center rib panel **19** to the center support sections **15** and **16.** The reason for this orientation is so that the slots **28** and **29** will align and fit into the extension of the slot **17A** which is formed in the center rib panel **19** thereby creating a double thickness cell divider wall which extends in a direction perpendicular to the transversely oriented center rib panel **19.** That portion of the slot **17** which divides the center support panels **15** and **16** is required so that the outer lateral panels **24** and **26** may be folded together and upwardly into the position shown in FIG. **1.** The width of the slot **17** should be approximately twice the thickness of the board used for the blank and the thickness of the slots **28** and **29** need only be approximately the same thickness so that center rib panel **19** may be accomodated therein.

The basic four cell structure which just has been described and is illustrated in FIGS. **1, 2** and **3** forms the basis for the other embodiments which are illustrated. For example, the twelve cell structure which is illustrated in FIGS. **4** through **8** is made from a blank which is shown in FIG. **5.** This blank has a center section which is similar to that shown in FIG. **3** but which has been expanded to include a larger number of cells, in this case four instead of two. There are center support sections **30, 31, 32** and **33** which are separated by slots **34, 35** and **36.** The top edge of these center support sections is defined by a fold line **37** which is parallel to the top edge **38** of the blank and along this fold line **37** is attached a first rib panel **39** which is oriented much like the rib panel **19** in FIG. **3,** only is formed with a greater length in the transverse direction. The slots **34, 35** and **36** extend into the rib panel **39** in a manner similar to the slot **17** extending into the rib panel **19** in FIG. **3.** In order to form a cell partition which is three cells in depth, a second rib panel **40** is added along a bottom fold line and is connected along a bottom fold line **41** which is parallel to the fold line **37** and to the bottom edge of the blank **42** and which is formed in a mirror image of the other rib panel **39.** As can be seen in FIG. **6** these two rib panels fold upwardly into vertical position along what can best be described as the top and bottom edges of the various center support panels along the hinge lines **37** and **41,** and extend the transverse length of this center area.

In the four cell embodiment of FIGS. **1, 2** and **3** there were only two lateral panels on each side of the center section which folded together to form a single center partition. In order to form a four cell lengthwie division, it is necessary to use five lateral panels on each side of the center section and as can be seen in FIG. **5** these include on the right hand side a first lateral panel **43** attached only to the center support section **33** along a fold line **44,** a pair of lateral panels **45** and **46** which are connected to panel **43** along fold line **47** and to each other by a common fold line **48.** These two pannels **45** and **46** have a pair of transversely extending slots formed partway therethrough aligned with each of the fold lines **37** and **41** and as can be seen in FIG. **6** these two panels fold together into face contact and are insertable into the slot **36** to form the outside double thickness partition wall which is designated generally as **50** in FIGS. **4** and **8.** The slots in the two lateral panels **45** and **46** are designated **51** and **52** respectively. Attached to the lateral panel **46** are a pair of panels **53** and **54** which are analagous structured to the outside panels **21** and **26** in FIG. **3** and which are connected to the panel **46** along fold line **55** as well as to each other along fold line **56.** The outermost lateral panel **54** has two slots **57** and **58** formed therein which are in alignment with the two fold lines **37** and **41** and allow the outermost lateral panel **54** as shown in FIG. **6** to fold downwardly and then up into the slots **35** in the center of the two vertical rib panels **39** and **40.**

The opposite lateral side of the blank shown in FIG. **5** has a similar lateral panel configuration including a first panel **59** connected along a hinge line **60** to the center support section **30,** a second lateral panel **61** connected to the panel **59** by a hinge line **62,** a third lateral panel **63** connected to the lateral panel **61** by a hinge line **64.** The two adjacent lateral panels **61** and **63** have transverse slots **65** and **66** formed therein which, when the two lateral panels **61** and **63** are folded into flush relationship to form the outer partition divider panel shown as **67** in FIG. **4** the slots allow that wall to be inserted into the slot **34** separating the two center support panels **30** and **31** and extending into the two rib panels **39** and **40.** A fourth lateral panel **68** is connected to the lateral panel **63** along the fold line **69,** and a final outermost lateral panel **70** is hingedly attached thereto along a fold line **71** and is formed with transverse slots **72** and **73** which correspond to the transverse slots **57** and **58** at the opposite end of the blank.

As can be seen in FIG. **6** these first lateral panels at either side of the center section **43** and **59** fold downwardly to form part of the partition bottom, and provide a double thickness bottom underneath the center support sections **33** and **30** respectively. The next two sections in each of the groupings on either side of the center section, **45** and **46** and **61** and **63** respectively, are then folded together in back-to-back relationship and inserted into the slots **36** and **34** to form double thickness partition walls already designated as **50** and **67.** The center partition is double thickness and is formed by folding the sections **53** and **68** into flush relationship beneath center support sections **32** and **31** respectively, and then inserting the outermost lateral panels **54** and **70** into the center slot **35** in side-by-side relationship to form the center double thickness panel, which is designated as **74.**

It should be understood that this twelve cell partition has double thickness dividers in one direction formed by the double folding of the lateral panels positioned on either side of the center section. This twelve cell partition could be made into a nine cell by simply deleting, for example, the first three lateral panels on either side of the center section, such as **43, 45** and **46** and deleting also the first adjacent center support panel **33** and slot **36.** This would result in the double thickness partition wall **50** being deleted so that there would only be a three by three cell arrangement. Likewise a longer partition with more cells could be produced by simply adding additional center support sections and additional slots with corresponding multiples of three lateral panels on that end to which the center support section was to be added. It can be seen in FIGS. **7** and **8**

that the row of center support sections **30** through **33** have a double thickness bottom in the final folded arrangement and the remainder of the partition bottom is made up of single thicknesses of the upper and lowermost portions of the lateral panels which also make up the bottom of the partition.

As previously mentioned, and as illustrated by the four cell partition of FIG. **1** and the twelve cell partition of FIG. **4**, a single thickness center rib design may be expanded in the transverse direction by any number of cell additions, and a second single thickness rib panel may be added as in FIG. **4** so that the partition is three cells in depth and again may be varied in the number of cells in the transverse direction. For those applications where additional strength or cushioning is desired in the cell walls between the articles a double thickness design may be used for all of the partition panels and is described in the FIGS. **9** through **17.** The partition shown in FIG. **9** is a nine cell style, and the one shown in FIG. **13** is a six cell style. The difference is that the partition in FIG. **9** has a double rib design whereas the partition in FIG. **13** has a single rib design.

The nine cell partition is formed from the blank shown in FIG. **10** and as can be seen this partition blank incorporates a center section similar to those previously described having a series of three center support panels **75, 76** and **77,** and which is variable to give the desired multiple of cells. These three center support panels have a first edge defined by fold line **78** which is parallel to the top edge of the blank and a second defined by fold line **79** similarly parallel. The three center support sections are spaced and separated by a pair of slots **80** and **81** which extend therethrough and into the adjacent rib panels which are hinged to the first and second edges of the center support sections. These rib panels are numbered **82** and **83,** respectively, and have attached along a fold line to the outer edges thereof rib stiffener panels **84** and **85** which are formed in size equal to the rib panels **82** and **83** and are connected thereto along hinge lines **86** and **87.** The slots **80** and **81** extend into these rib panels **82** and **83** and a corresponding slot is formed in the outermost portion of the rib stiffener panels **84** and **85,** these slots shown as **88** and **89** in the rib stiffener panel **84** and a slots **90** and **91** in the stiffener panel **85.** These pairs of rib panels and rib stiffener panels are folded together to form the double thickness transverse ribs which in FIG. **9** are shown as **92** and **93** respectively.

What is produced in effect and is a center section similar to that in the twelve cell partition of FIG. **4** but with three cells in length and an additional panel which folds up into flush relationship with the rib panels to give a double thickness and extra cushioning partition. The lateral panels which fold to double thickness are in a similar configuration to those previously described and in this case illustrate how a three wide partition may be formed which results in an uneven number of lateral panels on each ide of this center section.

On the right hand side in FIG. **10** can be seen a first lateral panel **94** connected to the center support section **77** by a fold line **95** which is perpendicular to the top and bottom edges of the center support sections, and connected to that lateral panel **94** is an outer most lateral panel **96** by a fold line **97.** This outermost panel has slots formed transversely partly therethrough and opening to the outside edge thereof along the line parallel to the top and bottom edges of the center support sections **78** and **79.** These slots are designated as **98** and **99.** On the opposite side is a series of lateral panels similar to those shown on each side of the blank of FIG. **5** and include a first lateral panel **100** connected to the center support panel **75** by a hinge line **101.** Further there is a pair of lateral panels **102** and **103** which are connected to each other by a fold line **104** and which are attached along the first lateral panel **100** by a hinge line **105** and have two slots formed therein similarly aligned with the top and bottom hinge lines **78** and **79** and designated **106** and **107.** The outermost two lateral panels are shown as **108** and **109** and are connected to the lateral panel **103** by a hinge line **110** and to each other by a hinge line **111.** The outermost panel **109** is foldable into the slot **81** and into flush relationship with the outermost opposite lateral panel **96** to form the double thickness partition wall **112** shown in FIG. **9.** The two slots formed in the outermost lateral panel **109** are labeled **113** and **114** and as previously mentioned align with the slot **81** and the matching slots **89** and **91** in the outermost rib stiffening panels **84** and **85.** The two panels on the left **102** and **103** fold together to form the double thickness lateral rib **115.**

The embodiment illustrated in FIG. **13** is analogous to that of FIG. **9** except that only a single double thickness rib section is employed and also the relative proportions of the cell dimensions have been changed to illustrate how that may be accomplished. In the blank shown in FIG. **14** the center section is changed somewhat and includes only two center support panels **116** and **117** which are defined along the longitudinal center line of the blank by a fold line **118** which is parallel to the top and bottom edges of the blank. There is room for a third center support section, but it has been omitted to illustrate how this may be accomplished. Along the fold line **118** is attached the primary rib panel **119** which has in turn attached to its top edge along the fold line **120** the rib stiffener panel **121.** Since the middle of the three potential center support sections has been omitted, the slots **122** and **123** do not extend the full breadth of the support sections **116** and **117,** but it should be understood that if that third support section were present, the slots would still extend to the bottom edge of the blank. Corresponding slots **124** and **125** are formed in the rib stiffener panel **121** so that when the two rib panels **119** and **121** are folded into vertical position to form a double thickness center rib, which is shown in FIG. **13** as **126,** the slots are in registry and extend to the center line of the cell structure along the fold line **118.**

The lateral panels on the left side of the center section in FIG. **14** are similar to those on the left side of the blank of FIG. **3** and include a first lateral panel **127** which is connected along a fold line **128** to the center support section **116,** and attached thereto is an outer lateral panel **129** which is connected to the first lateral panel **127** along a hinge line **130.** A single slot is formed in the outer lateral panel **129** and is shown as **131** and which extends along the longitudinal center line of the blank. The slotted panel **129** is insertable into the combined slots **122** and **124** in the manner previously described. The lateral panel **127** forms a double thickness bottom with the center support section **116** on one half of the partition. The opposite lateral panels are five in number to allow a double thickness partition and create the three cell length for the total of six cells in this particular embodiment. The first lateral panel is designated as **132** and is connected to panel **117** along a hinge line **133.** The next lateral panel is shown as **134**

and is connected along a hinge line **135** as well as an adjoining panel **136** which is connected to **134** by a fold line **137.** These two adjacent panels **134** and **136** have formed therein a slot **138** which is alinged with the fold line **118** and when these two panels are doubled together they are insertable into the slots **125** and **123** in the double thickness rib **126** to form the lateral double thickness rib **139.** The two outermost lateral panels are similar to the two panels on the opposite side of the center section and are numbered **140** and **141** which are connected to the transverse panel **136** by a hinge line **142** and to each other by a fold line **143.** An outside opening slot **144** is formed alinged with the slots **131** and **138** running in the transverse direction and when the folding is completed the panel **141** rests in flush relation with the opposed lateral panel **129** and the two slots **131** and **144** are inserted into the slots **122** and **124** to form the other double thickness lateral partition wall shown in FIG. **13** as **145.** As can be seen in FIG. **15** the center area between the double thickness partitions **145** and **139** has only a single thickness bottom which is formed by the panel **140** and is the result of the result of omitting the third center section support panel from the blank. The number of partitions may be expanded in the lateral direction as previously described.

In accordance with Patent Statutes, I have described the principles of construction and operation of my improvement in ONE PIECE PARTITION; and while I have endeavored to set forth the best embodiments thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A blank made from foldable paperboard or similar sheet-like material and adapted to be erected into a one-piece multi-cell container partition, said blank comprising:

a substantially rectangular sheet of said material;

said sheet having a top edge, a bottom edge, and opposed lateral sides;

a center section adapted to be folded to form the base of said partition in final erected form;

at least two center section support panels, said center section support panels separated by a first slot extending perpendicular to said top edge;

a first center rib panel hingedly connected along a fold line to the top edge of said center support panels and foldable normally to said center support panels into position to become the first center rib of said partition said first rib panel having formed therein a slot partially therethrough coaxial with and extending from said first slot separating said center support panels;

a first lateral panel located at the side of a first of said center section support panels opposite said first slot and hingedly connected thereto along a fold line perpendicular to the top edge of said blank;

a second lateral panel hingedly connected to said first lateral panel along a fold line parallel to said first fold line and having a first slot formed therein partially therethrough opening to the outside edge thereof and oriented on a line extending from said fold line connecting said center support panels and said first rib panel;

a third lateral panel hingedly connected along a third hinge line to a second of said center support panels and opposite said first slot, said third hinge line being parallel to said first hinge line; and

a fourth lateral panel hingedly connected to said third panel along a fourth hinge line parallel to said third hinge line, said fourth panel having a first slot formed partially therethrough opening the outside edge thereof and oriented along a line colinear with said first slot in said second panel.

2. The blank of claim **1,** including a second center rib panel hingedly connected along a fold line to the bottom edge of said center support panels and foldable as a second rib panel parallel to said first rib panel, said second rib panel having formed partially therethrough a slot coaxial with said slot separating said center support panels, and

second slots formed in each of said second and fourth lateral panels coaxial with an extension of said fold line connecting said second center rib panel to said bottom edge of said center support panels, said second slots in said second and fourth lateral panels opening to the outside lateral edge of said second and fourth lateral panels.

3. The blank of claim **1,** including a rib stiffening panel hingedly connected to the top edge of said rib panel and having a slot formed partially therethrough opening to the top edge of said rib stiffening panel and coaxial with an extension of said slot separating said center section support panels.

4. A one piece container partition made from foldable paperboard or similar sheet-like material, said partition comprising:

a vertically oriented center rib panel, said center rib panel having a slot formed partially therethrough and opening on to the bottom edge thereof;

said center rib panel having hingedly attached on the bottom edge thereof on each side of said slot a horizontal center support panel;

each of said center support panels having hingedly attached to the outside edge thereof a first lateral panel folded beneath said center support panel to form a double thickness on one side of said rib panel and extending beyond said rib panel to give said partition length beyond said rib panel;

said lateral panel extending in width up to said slot in said center rib panel;

each of said lateral panels having hingedly attached to the edge thereof juxtaposed with said slot a second lateral panel folded vertically and having a slot formed therein to create a lateral rib of double thickness perpendicular to center rib panel and creating said partition.

5. A multiple celled container partition made from foldable paperboard or similar sheet-like material, said partition comprising:

a horizontal center support panel having at least one slot formed transversely therethrough;

a pair of rib panels hingedly connected to said center support panel along the top and bottom sides thereof and oriented vertically;

first lateral support panels hingedly connected to said center support panel and located at either lateral side of said center support panel and folded downwardly to form a double thickness bottom underneath said center support panel, said first lateral panels extending inwardly to the nearest of said slots formed in said center support panels; and

second lateral panels hingedly connected to said each of said first lateral support panels, each of said sec-

ond lateral panels having slots formed therein positioned to accommodate said rib panels, said second support panels folded upwardly to lie in vertical side-by-side relationship and form a double thickness transverse rib panel perpendicular to said rib panels.

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