July 4, 1967 F. E. HELMICK 3,329,330

EGG CARTON

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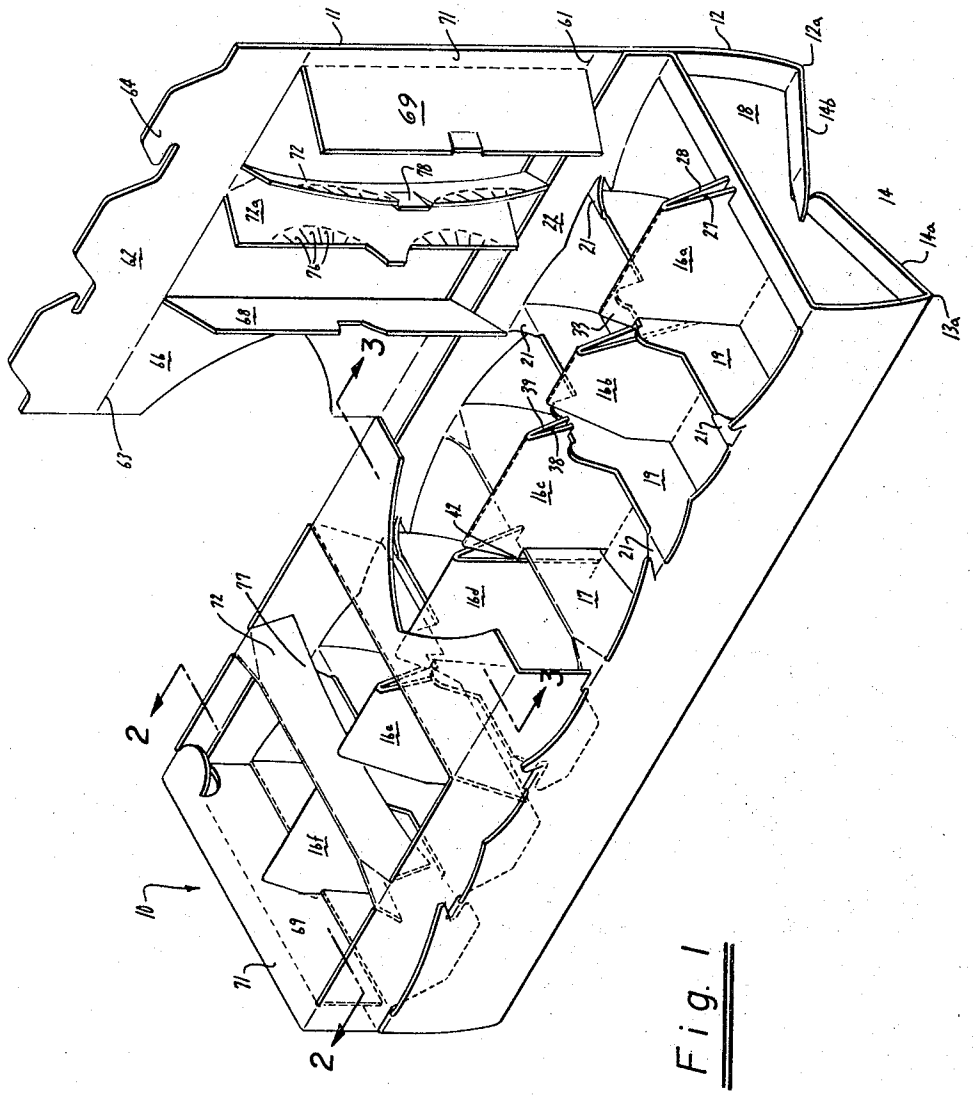


Fig. 1

INVENTOR.
Fred E. Helmick
BY
Flehr and Swain
Attorneys

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EGG CARTON

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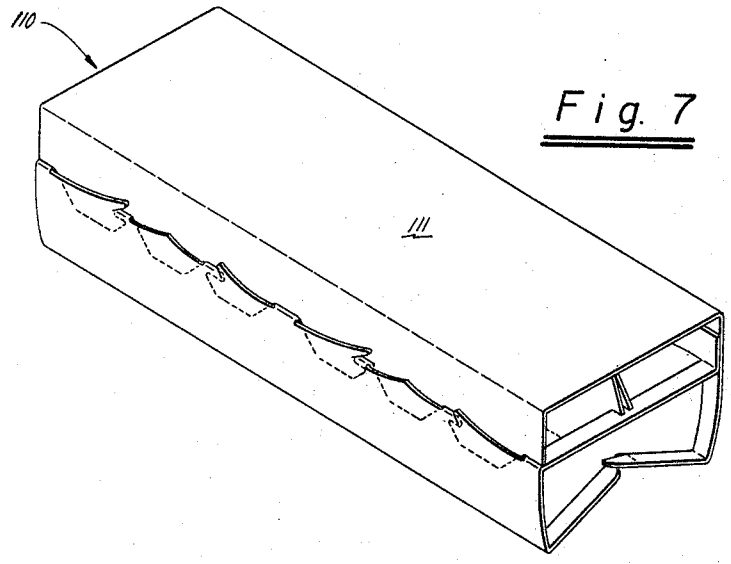


Fig. 7

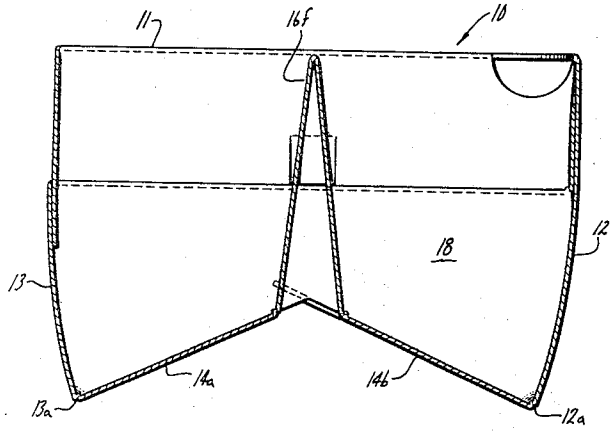


Fig. 2

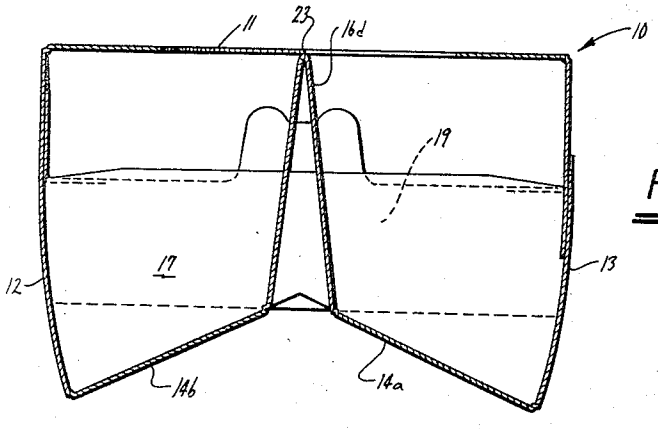


Fig. 3

INVENTOR.
Fred E. Helmick
BY Flehr Hohbach Test Albritton & Herbert
Attorneys

July 4, 1967 F. E. HELMICK 3,329,330

EGG CARTON

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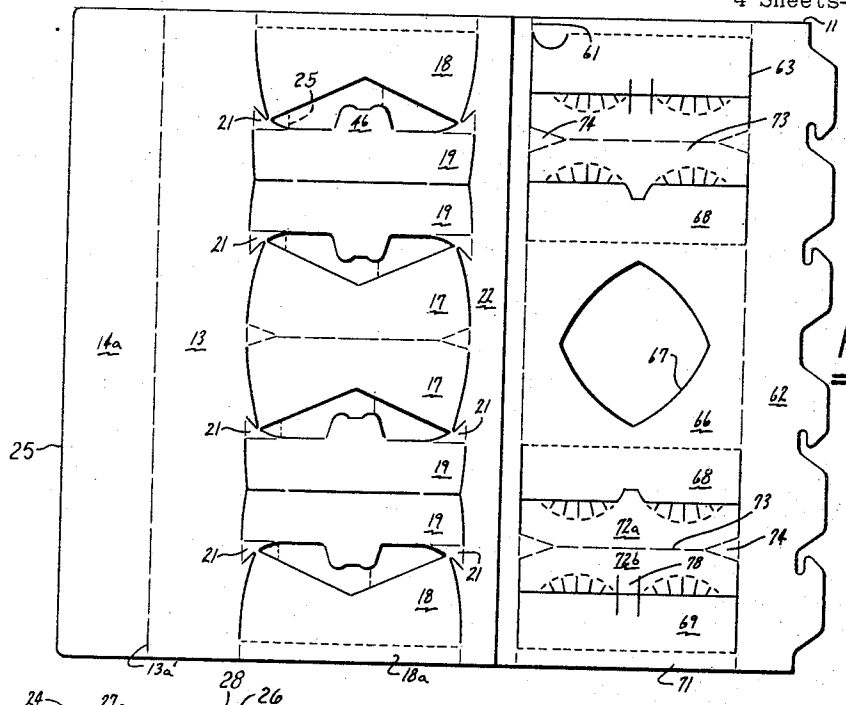


Fig. 4

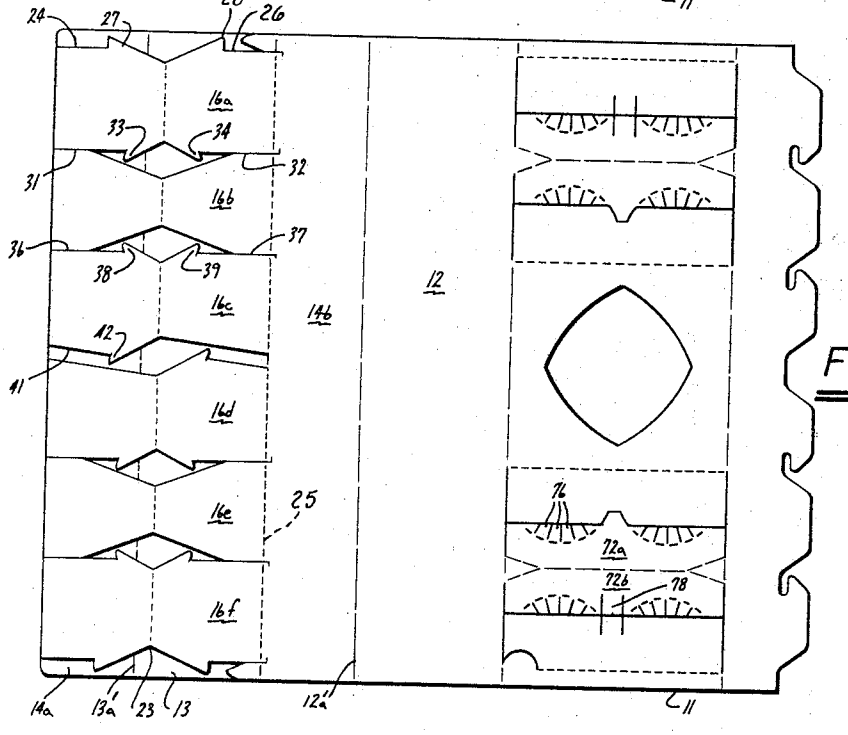


Fig. 4a

INVENTOR.
Fred E. Helmick
BY
Flehr & Swain
Attorneys

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EGG CARTON

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Fig. 5

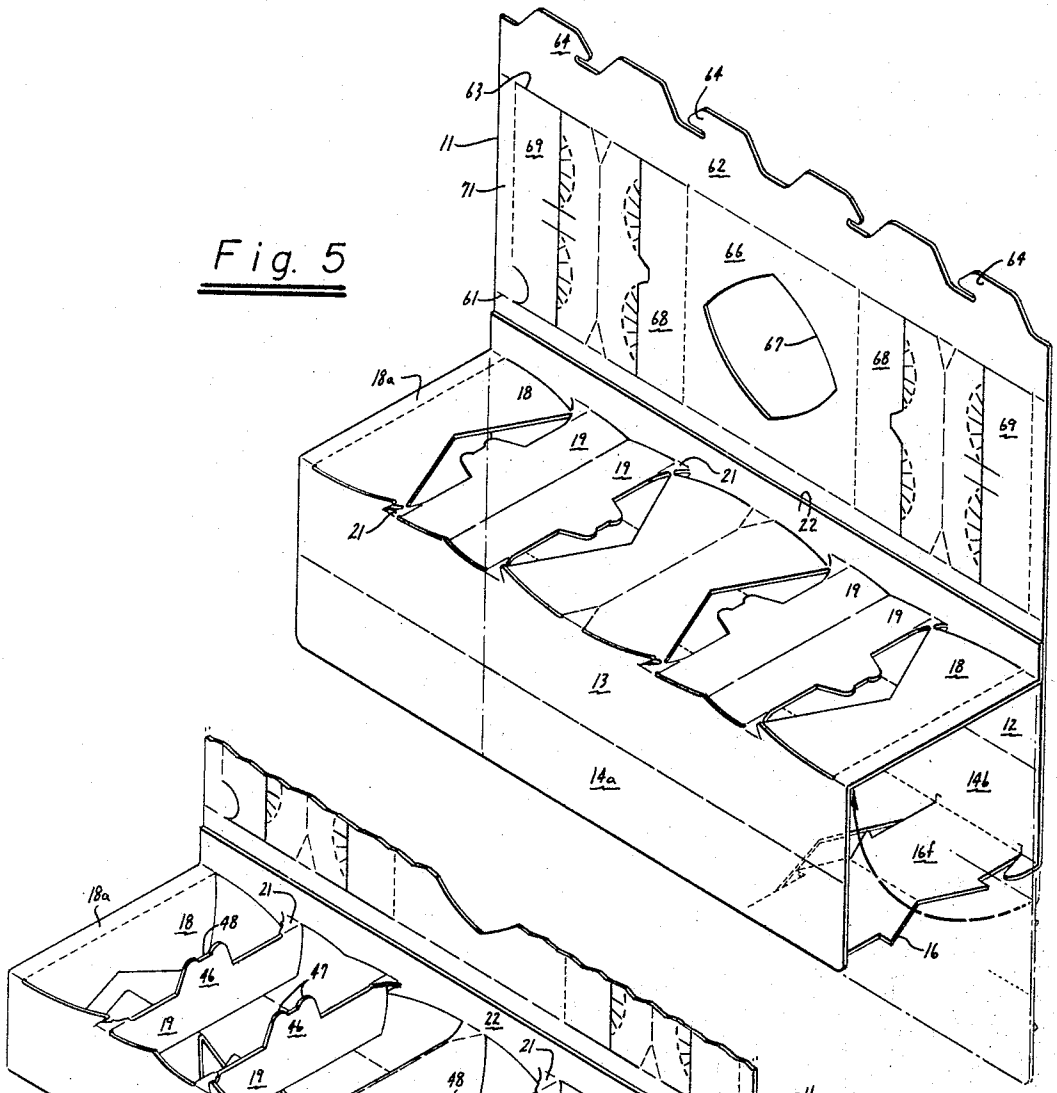


Fig. 6

INVENTOR.
Fred E. Helmick
BY Fleh & Swain
Attorneys

United States Patent Office

3,329,330

Patented July 4, 1967

3,329,330

EGG CARTON

Fred E. Helmick, 381 Felton Drive,
Menlo Park, Calif. 94025

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7 Claims. (Cl. 229—29)

ABSTRACT OF THE DISCLOSURE

An egg carton having depending cross members on the cover, the free edges of which restrain movement of the contents and also furnish a window in the cover. On the bottom portion, a segmented, gabled central spine projects from a leakproof bottom, certain segments of the spine have shoulders which engage between spaced abutments on the upper edge of adjacent cross partitions, and straight edges on such segments beneath the shoulders, engage and stiffen the cross partitions against lateral buckling.

This invention relates to a collapsible cellular carton, and particularly concerns an improved carton for packaging eggs and comparably shaped fragile articles.

An object of the invention is to provide an egg carton having improved leak resisting characteristics.

Another object of the invention is to provide an egg carton which is stackable in a manner wherein the load of a stack of cartons is applied principally to the side walls of the cartons thereby to minimize substantially the load applied to the contents of the several cartons in the stack and tending to reduce the likelihood of breakage of the contents.

Still another object of the invention is to provide a one-piece cellular carton erectable from a blank of fiberboard material which makes maximum utilization of the fiberboard material.

Yet another object of the invention is to provide a carton of the type described which is economical to make and is susceptible of quick erection by automatic machinery.

Still another object of the invention is to provide an egg carton in which the cover is supported on its opposite sides and along its longitudinal center line and is so constructed that a load applied to the cover along such longitudinal center line is distributed to the side walls of the carton.

Yet another object of the invention is to provide an egg carton in which the cover is so constructed to provide in the closed position a view of the carton's contents.

Still another object of the invention is to provide an egg carton in which the cover is provided with a plurality of openings for viewing the contents, the carton being constructed so that in the closed condition eggs in adjacent cells are resiliently cushioned so as to provide maximum protection against breakage.

A further object of the invention is to provide a generally improved egg carton in which the fluid from an egg, if broken, is largely, if not entirely, confined to the carton and therefore does not flow downwardly so as to damage the subjacent cartons.

With this and other objects in view, the invention consists of certain novel features of construction and arrangements of elements as will fully appear as this description proceeds, the novel features thereof being pointed out in the appended claims. The invention will be best understood by reference to the following specification taken in connection with the drawings wherein like reference numerals designate like parts throughout in which:

FIGURE 1 is a perspective view of a cellular carton made in accordance with and embodying the principles of the present invention, a portion of the carton's cover being shown in the closed position, another portion of the cover being shown in an open condition;

FIGURE 2 is an enlarged transverse sectional view taken in the direction of the arrows along the line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged transverse sectional view taken in the direction of the arrows along the line 3—3 of FIG. 1;

FIGURES 4 and 4*a* are plan views of the partially folded blank from which the carton of FIGURE 1 is constructed;

FIGURES 5 and 6 are each perspective views illustrating further steps employed to erect the carton of FIGURE 1; and

FIGURE 7 is a perspective view of a second embodiment of a cellular egg carton made in accordance with and embodying the principles of the present invention.

Referring now to the drawings, and particularly to FIGURES 1–3, there is shown there a carton in the erected condition designated generally by the numeral **10** which is made in accordance with and embodies the principles of the present invention. The general configuration of the carton **10** is that of a 2 x 6 egg carton adapted to accommodate a dozen eggs in two aligned rows of six each. The carton **10** is formed from a blank comprising a single sheet of fiberboard material and includes a cover **11** hingeably connected to a tall rear wall **12**, a somewhat shorter front wall **13** and a substantially imperforate bottom **14** established by the planar front bottom panel **14***a* and the planar rear bottom bottom panel **14***b*.

The carton **10** is divided longitudinally by a gabled, central spine **16** which includes the individual spine segments **16***a*, **16***b*, **16***c*, **16***d*, **16***e* and **16***f*. An upstanding medial partition **17** extends between the confronting edges of the spine segments **16***c* and **16***d* and separates the carton **10** into symmetrical halves about its lateral axis. Each end of the carton **10** is closed by an end wall **18**. Between each end wall **18** and the medial partition **17** there are arranged two spaced apart cross-partitions **19**, each extending between the confronting edges of adjacent spine segments. Each cross-partition **19** is united by a connector **21** to the front panel **13** and by a similar connector **21** to a securing strip **22** attached as by gluing to the rear wall **12**.

The arrangement of the rear **12** and front **13** walls with the bottom **14**, spine **16**, partitions **17** and **19**, and the end walls **18** provides the carton **10** with a dozen cells or compartments, each adapted to receive an egg or the like object. By reason of the close fit between the end walls **18** and the imperforate bottom **14** the carton **10** possesses superior leak resisting characteristics. By reason of the arched bottom **14** the cartons **10** may be stacked one upon another so that the vertical forces in the stack are distributed principally through the side walls **12** and **13** of the carton **10** and not through the cover. This reduces the likelihood of crushing oversize eggs in subjacent cartons.

Considering now in detail the cellular or compartmented portion of the container **10** and leaving for a later portion of this specification a detailed description of the cover **11** it will be seen from FIGURES 1–3 that the tall rear wall **12** and the shorter front wall **13** each merge respectively with the bottom panels **14***a* and **14***b* at the carton supporting corners **12***a* and **13***a* respectively. When erected and filled the weight of the carton **10** and those which may be stacked above it is supported solely along the lines defined by the corner portions **12***a* and **13***a*. It is to be understood, of course, that the blank from which the carton **10** is formed is suitably scored to facilitate

folding along the corner portions **12***a* and **13***a*, the lines of scoring being identified in FIGURES 4*a* and 4 as **12***a'* and **13***a'* respectively.

The interlocked arrangement, to be described fully below, of the cross-partitions **19** and walls **18** and medial partition **17** with respect to the segmented spine **16** is such that loads placed upon the cover of the carton **10** and then distributed to the spine are transferred through the truss-like relation of the aforementioned members to the side walls **12** and **13**. Even though the members **17–19** are formed from relatively thin fiberboard materials the truss-like arrangement best utilizes and combines the strength of these members in a manner permitting stacking of the cartons **10** to a substantial height but minimizes the danger of the breakage to the contents.

The segmented spine **16** is of double fold construction formed integrally with the bottom panels **14***a* and **14***b*. Each fold of the spine **16** merges along a continuous crease **25** with the inner edge of one of the bottom panels **14***a* and **14***b*. The member **16** extends from the bottom **14** in a gable-like fold to an apex **23** which is disposed in a plane substantially level with the top margin of the rear wall **12**, as shown best in FIGURES 2 and 3.

Referring to FIGURE 4*a*, the six segments of the gabled spine **16** are symmetrically arranged about an imaginary line extending between the medial segments **16***c* and **16***d*. More specifically, the following segments are related in form and function; the end segments **16***a* and **16***f*; the intermediate segments **16***b* and **16***e*; and the medial segments **16***c* and **16***d*. For this reason, only one of each type of segment will be described more fully.

The end segment, as may be seen in FIGURE 4*a*, is cut from the blank to have substantially straight edges **24** and **26** which terminate respectively in notch-like shoulders **27** and **28** disposed in an overhanging relationship at right angles with respect to the edges **24** and **26**. Parallel to the edges **24** and **26** are the straight edges **31** and **32** which terminate respectively in overhanging latch-like projections or shoulders **33** and **34**. The projections **33** and **34** describe with respect to the associated edges **31** and **32** an acute angle. It will be appreciated that when the carton **10** is erected the edges **24**, **26**, **31** and **32** extend upwardly from the bottom panels **14***a* and **14***b* in a converging relationship.

The medial segment **16***c* and its counterpart **16***d*, is provided with straight edges **36** and **37** disposed perpendicular to the crease **25** and terminating in the latch-like shoulder protrusions **38** and **39** respectively. The arrangement of the edges **36** and **37** and shoulders **38** and **39** is similar to that of the edges **31** and **32** and associated shoulders **33** and **34** of the end segments **16***a*.

The medial segment **16***c* opposite from the edge **36** is provided with a diverging edge **41** inclined with respect to the crease **25** and terminates in a notch-like shoulder **42**, the shoulder **42** being aligned with the shoulder **27** of the end segment **16***a*.

The intermediate segment **16***b* is disposed between the end segments **16***a* and the medial segment **16***c*. Opposite from the edges of **31**, **32**, **36** and **37** the respective confronting side edges of the intermediate section **16***b* are straight for a distance and perpendicular to the crease **25**. Opposite from the shoulders **33**, **34**, **38** and **39** the side edges are cut inwardly to provide clearance for the shoulders.

Referring now particularly to FIGURES 4 and 5, it will be seen that there are joined between the securing strip **22** and front wall **13** the cross-members **17–19**, each of which is provided with curved side edges which in the erected condition of the carton **10** supply to the rear **12** and front **13** walls a slight outward bow as clearly appears in FIGURES 1–3. The medial partition **17** is formed from two flaps hinged at an apex to fold downwardly, each presenting to the bottom panels **14***a* and **14***b* a lower edge shaped like a wide V. The V-like lower edges of the medial partition is somewhat like the lower edges of the end walls **18** and serves to fix the angular disposition of the bottom panels in the erected condition of the carton **10**.

Each end wall **18** includes an upper marginal connector strip **18***a* extending between the securing strip **22** and the front wall **13** and a panel foldable downwardly at a right angle to the strip **18***a*.

Each cross-partition **19** is attached by a connector **21** to the securing strip **22** and by a like connector **21** to the front wall **13**. A tab **46** is centrally arranged along the top edge of the cross-partition **19** and extends upwardly therefrom, terminating in spaced apart abutments **47** having a substantially straight land **48** disposed therebetween, best shown in FIGURE 6. The bottom edge of the cross-partition **19** is straight and is disposed above the bottom panels **14***a* and **14***b* to provide a channel between compartments so that fluid from a broken egg may flow from one compartment to another. Upon encountering an end wall **18** or the medial partition **17**, however, additional endwise flow is halted.

When erected, the outer shoulders **27** and **28** of the end segment **16***a* frictionally interlock with the horizontally disposed connector strip **18***a* and the end wall **18** is held vertically against the straight edges **24** and **26**. The spacing of the shoulders **27** and **28** from the crease connection **25** of the spine **16** is such that the bottom panels **14***a* and **14***b* are urged into snug engagement with the V-shaped free lower edges of the end panel **18** and are then disposed in a negative dihedral relationship to each other.

The inner shoulders **33** and **34** of the end segment **16***a* interlock with the tab **46** of the adjacent cross-partition **19**, the shoulders **33** and **34** being restrained laterally by the abutments **47**. Similarly, the shoulders **38** and **39** of the medial segment **16***c* interlock with the associated tab **46** of the adjacent cross-partition **19**, the shoulders **38** and **39** being restrained by the abutments **47** from outward movement.

The cross-partitions **19** are maintained in a substantially upstanding or vertical attitude by reason of the straight edges **33**, **34**, **36** and **37** underlying the associated shoulders. The adjacent confronting straight edges of the intermediate partition **16***b* serve to hold the cross-partition **19** in locking relation to the shoulders. This arrangement also serves to stiffen the cross-partition **19** thereby to prevent buckling. When the aforementioned parts are arranged as described the bottom panels **14***a* and **14***b* define a negative dihedral relationship with respect to each other.

The shoulder **42** of the medial segment **16***c* engages frictionally the top edge portion of the medial partition **17**.

The carton as described above may be provided with a cover having a plurality of opennigs permitting a view of the contents within the several cells or compartments, as shown in FIGURES 1–6. On the other hand, a carton may be formed in accordance with the principles of the present invention which includes a cover of imperforate character such as that shown in FIGURE 7 wherein there appears a carton designated generally **110** embodying a second form of the invention. It will be understood that the carton **110** in the cellular or compartmented portion thereof may include each of the features previously described and may be assembled from a blank similar, except for the cover portion, to that shown in FIGURES 4 and 4*a*. One feature of the carton **110** is that the cover **111** thereof provides a field for receiving a substantial expanse of advertising material serving to identify the source and features of the contents. Where it is felt desirable to permit a customer to view the contents of a carton in the closed condition thereof a carton may be equipped with a cover such as that shown in FIGURES 1–6.

Referring now to FIGURES 1, 4 and 5, it will be seen

that the cover **11** is hinged along a score line **61** to the rear wall **12** and includes a locking flap **62** foldable about a score line **63** to present the free edge of the flap **62** equipped with the hook portion **64** to the gusset shaped connectors **21** along the front wall **13** to interlock therewith when the cover **11** is closed, as shown in FIGURE 1.

A central panel **66** having a large diamond shaped opening **67** extends between the hinged connection **61** and locking flap **62** and is so arranged that when the cover is closed the opening **67** provides a view to the four cells or compartments adjacent to the medial partition **17**.

A flap is foldable inwardly from each lateral edge of the panel **66**. The rectangularly shaped flaps **68** and the panel **66** are so arranged that when the cover **11** is closed, the flaps **68** are disposed outwardly of the cross-partitions **19** next adjacent to the medial partition **17** whereby the flaps **68** serve as an extension of the cross-partitions, thus, arranging the four cells or compartments as a subcontainer within the carton **10**.

An end flap **69** is arranged at each end of the cover **11**, the end flap **69** being folded inwardly from an end strip **71** which extends from the hinge **61** to the locking flap **62**. When the cover **11** is closed the end flap **69** presents its lower edge to the connector strip **18***a* to form a continuation of the end wall **18**, thus lending a more solid appearance to the carton **10**.

A retaining member **72** is provided on the cover **11** intermediate each panel flap **68** and end flap **69**, the retaining member **72** comprising a pair of inwardly directed flaps or folds **72***a* and **72***b* folded about a hinge **73** extending between two triangular shaped gusset members **74**, best shown in FIGURE 4. The inner or free edge of the flaps **72***a* and **72***b* may be provided with means for engaging the surface of the contents of the carton **10**, such as eggs or the like objects. Such means may take the form of a fan-like array of tabs **76** defined by radially oriented perforations extending from the free edge of the respective folds **72***a* and **72***b*, best shown in FIGURE 4*a*. Alternatively, the contents engaging means may take the form of an arcuate edge or recess **77**, as shown in the left portion of FIGURE 1.

When the cover **11** is in the closed position, the retaining member **72** extends between the V-shaped notch defined by the upper confronting edge portions of the intermediate segment **16***e* and end segment **16***f* and their respective counterparts, end segment **16***a* and intermediate segment **16***b*.

A bendable tab **78** is formed in each flap **72***b* and the end flap **69** so that when the cover is in a closed position clearance is afforded to the adjacent shoulders.

It will be observed in FIGURE 1 that the retaining member **72** is spaced from the end flap **69** and from the medial flap **68** a distance so that the four contiguous cells or compartments adjacent the member **72** are exposed to the viewer when the cover **11** is in the closed position. Thus, each of the cells or compartments of the carton **19** may be viewed from the exterior when the cover **11** is in a lower or closed position.

The carton **10**, or the carton **110** as the case may be, is assembled from a blank, shown in FIGURES 4 and 4*a*. In the case of the carton **110** the cover portion is imperforate. Considered as a blank, the carton **10** comprises a double thickness of fiberboard material being that a first portion of the blank containing the panels **14***a* and the cross members **17–19** are folded upon a second portion of the blank comprising the segmented spine **16** and rear bottom panel **14***b*. The first portion is secured to the second portion at the securing strip **22**, shown in FIGURE 5.

The first stage in erecting the carton **10** is to spread the overlying first and second portions to form an open box-like configuration as shown in FIGURE 5. Thereafter, the segmented spine **16** and the cross members **17–19** are rotated into position in the direction of the arrows shown in FIGURE 6. Thereafter, the spines are moved up into interlocking relationship with the cross members **17–19** and locked therein in the manner shown in FIGURE 1. This operation may be performed by high speed machinery of the kind shown and described, for example, in Patent No. 3,200,718, issued Aug. 17, 1965, for a Carton Forming Machine.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

I claim:

1. An egg carton comprising a single sheet of fiberboard material erectable to have spaced apart front and rear walls, first and second imperforate bottom panels merging respectively with said front and rear walls along front and rear carton supporting corners, a gabled segmented spine projecting upwardly from each bottom panel along a continuous crease, a plurality of spaced apart cross-partitions extending between said front and rear walls and passing between adjacent segments of said gabled spine to define a plurality of egg receiving compartments, ones of said cross-partitions being each equipped on the upper edge thereof with a laterally spaced pair of abutments, ones of said gabled segments each presenting to the adjacent cross-partition a pair of straight edges disposed in a plane perpendicular to said front and rear walls for stiffening said partitions from lateral buckling and for maintaining the same in an upstanding attitude, said ones of said segments being equipped with shoulders overhanging said straight edges and latchingly engaging said upper edge of the adjacent cross-partition mediate said abutments.

2. The egg carton of claim **1** wherein said shoulders and said upper edge mediate set abutments are spaced from said crease a distance so that in the erected condition of said carton said crease is disposed above said supporting corners, said bottom panels being then disposed in a negative dihedral relationship.

3. The egg carton of claim **1** wherein said carton at each end is provided with an imperforate end wall connected to and shaped to fit snugly against said front and rear walls, the lower edge of said end wall presenting to said bottom panels a concave obtuse profile, the segment of said spine adjacent said end wall presenting thereto a pair of straight edges disposed in a plane perpendicular to said front and rear walls, said segment being equipped with shoulders overhanging said straight edges and frictionally engaging the upper portion of said end wall serving to maintain said wall against said straight edges in a substantially upstanding attitude and serving to maintain said bottom panels in a snug relationship with said lower edge.

4. The egg carton of claim **1** wherein said carton is provided with a cover formed to permit in the closed position thereof a view of the contents, said cover being joined in a hinge connection to the upper margin of said rear wall and including a closure flap alignable in said closed position with said front wall, at least one retaining member extending between said hinged connection and said closure flap and arranged to afford a view into a contiguous group of egg receiving compartments, said retaining member being folded downwardly from the plane of said cover to protrude into said group of egg receiving compartments, the lower portions of said member presenting to the contents of said compartments retaining means positioned to occlude removal of such contents.

5. The egg carton of claim **4** wherein said cover includes, spaced from said retaining member, a panel overlying a group of egg receiving compartments, said panel being provided with a window affording a view into such compartments.

6. An egg carton erectable from a blank of fiberboard material to have integral rear, bottom and front panels

and being closed by end panels integrally joined to said front and rear panels, said carton being equipped with internal partitions defining a multiplicity of egg receiving compartments, a cover formed to permit in the closed position thereof a view of the contents of said compartments, said cover being hingeably joined to the upper margin of said rear panel and including a closure flap alignable in said closed position with said front panel, a central panel on said cover overlying in said closed condition a contiguous group of said egg receiving compartments, said panel having a window therein affording a view into said group of compartments, at least one retaining member on said cover spaced from said central panel a distance permitting a view into another contiguous group of compartments, said retaining member projecting downwardly from the plane of said cover to protrude into said last mentioned group of compartments, the lower marginal portions of said member presenting to the contents of said compartments retaining means positioned partially to occlude removal of such contents.

7. Egg carton set forth in claim 6 wherein said retaining member of said cover is hingeably joined to said upper margin of said rear panel and extends perpendicular to and connects with said closure flap, said member being formed from a pair of retainer flaps folded downwardly from the plane of said cover, the lower margin of each retainer flap being slit on opposite sides of said spine to define a fan-like array of tabs yieldably conformable to the surface of an egg.

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JOSEPH R. LECLAIR, *Primary Examiner.*

DAVIS T. MOORHEAD, *Examiner.*