Dec. 14, 1965 R. M. KUHLMAN 3,223,307

CARTON CONSTRUCTION

Filed July 25, 1963 2 Sheets-Sheet 1

Fig. 2

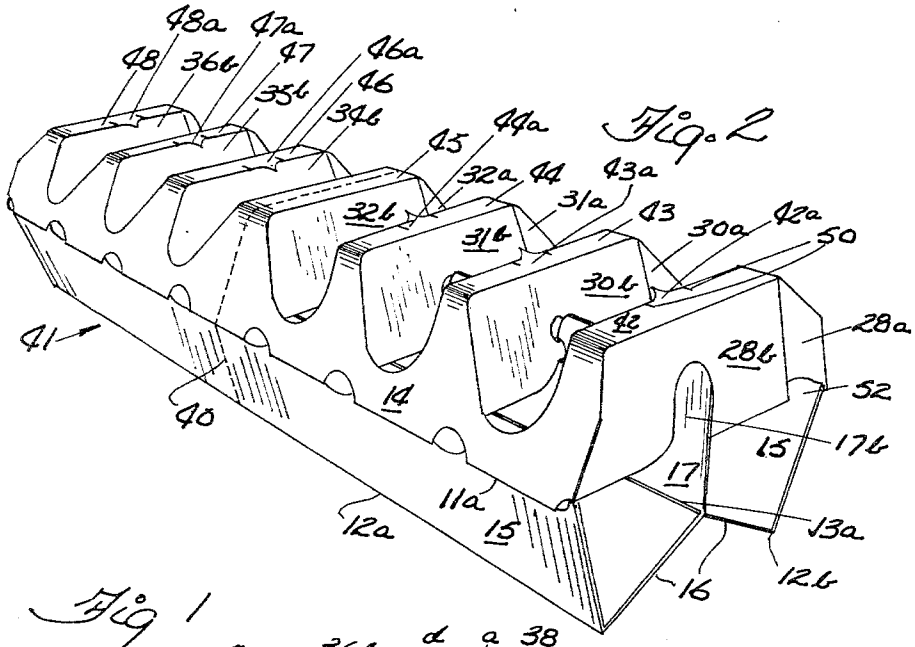
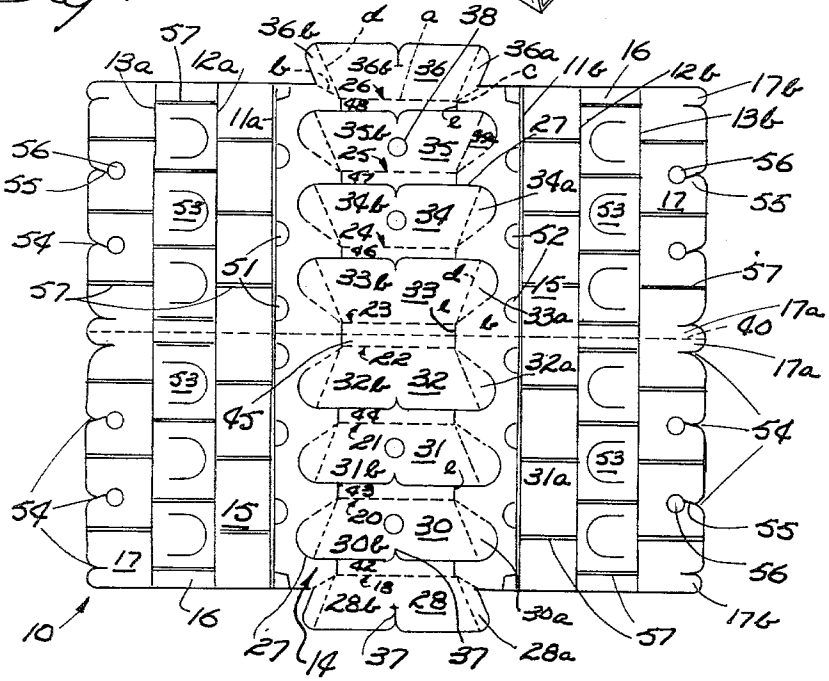


Fig. 1



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Fig. 3

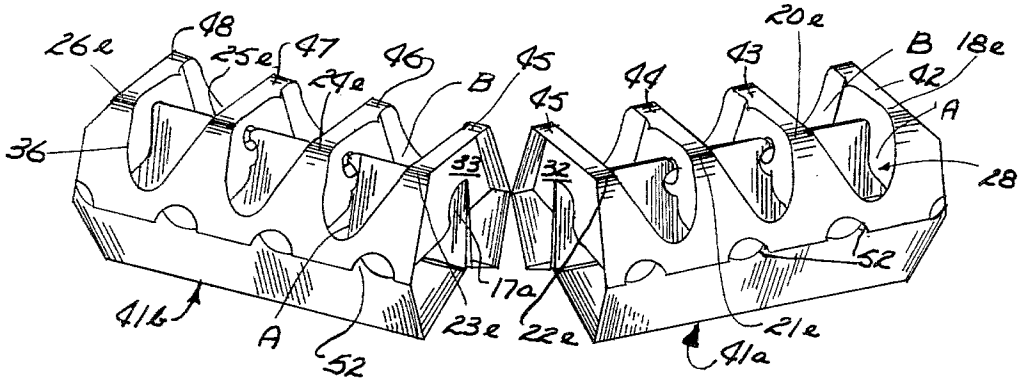
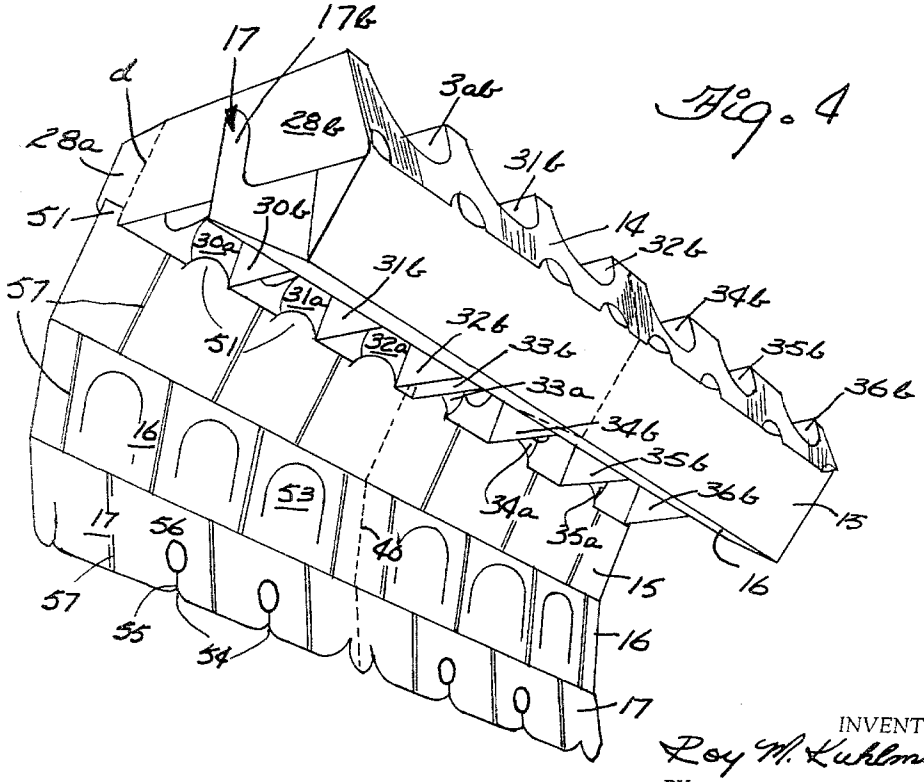


Fig. 4



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3,223,307

CARTON CONSTRUCTION

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11 Claims. (Cl. 229—28)

This invention relates to a carton construction and more particularly to a foldable, yet separable, carton suitable for use in the packaging of eggs or other similar type fragile articles. The carton, when separated, forms complemental sections, each of which may have a configuration similar to the carton configuration shown in United States Patent No. 2,983,427.

In the retailing of eggs, for example, in supermarkets or the like, it has become customary to sell such items in cartons of one dozen size. Such cartons are either of the conventional 3 x 4 or 2 x 6 style. In either case, the packing of eggs into the individual cartons normally occurs at a location remote from the retail outlet. Subsequent to the eggs being packed into individual cartons, a predetermined number of loaded cartons are then usually placed in large shipping cases for either storage or transporting to the retail outlet. Because of the amount of handling of the loaded cartons required before they eventually reach the ultimate buyer, the incidence of breakage is quite high. When breakage of an accommodated egg occurs, soiling or defacement of a portion of the accommodating carton results and in instances where the loaded cartons are arranged in stacked relation, soiling of the carton disposed therebeneath may also result.

Because of the unappealing appearance of a soiled egg carton, the retailer, upon encountering such a situation, is compelled to either remove from sale the loaded soiled carton; repack the remaining uncracked eggs in a new carton; or endeavor to separate the soiled portion of the carton from the remainder thereof and thereby sell the eggs in smaller quantities, e.g. in half dozen size cartons. Where a large quantity of eggs are handled by the retailer, it becomes impractical to attempt to repack the eggs in a new carton. Discarding the whole carton and its contents because of one or more of the accommodated eggs being cracked, is undesirable because of the waste and expense involved. Thus, the third alternative of separating the soiled portion of the carton from the remainder of the carton appears to be the most feasible solution.

Furthermore, in certain geographical areas there is a preference for purchasing eggs; for example, in quantities of a half dozen. In such a situation, the retailer for competitive reasons is disposed to offer such quantities for sale and thus, there is a need for a carton which can readily be converted into a half dozen size if the need arises.

Various separable cartons have heretofore been proposed in an effort to meet the aforenoted problems, however, because of certain design characteristics, these cartons, even before separation, are structurally weak or the resulting separated carton sections fail to provide adequate protection for the accommodated eggs. Furthermore, in many instances, the prior carton was of complex design involving awkward manipulations to effect set-up thereof, or required an excessive amount of material to form the blank, thus increasing substantially the cost of such carton.

It is one of the objects therefore of this invention to provide a separable foldable carton which is readily capable of being set up either manually or by automatic or semi-automatic equipment.

It is a further object of this invention to provide a separable foldable carton which affords adequate protection to its accommodated articles regardless of whether the carton is separated in complemental sections or not.

It is a further object of this invention to provide a separable foldable carton wherein there is no sacrifice of structural stability by reason of separating the carton into complemental carton units.

It is a still further object of this invention to provide a separable foldable carton which is of inexpensive, yet sturdy, construction, and permits its contents to be readily observed by the potential customer.

I is a still further object of this invention to provide a separable foldable carton which may be readily, manually separated into complemental carton sections by the customer at the time of sale.

Further and additional objects will appear from the description, accompanying drawings, and appended claims.

In accordance with one embodiment of this invention a separable foldable carton is provided which includes a bottom side panels extending upwardly therefrom, and a plurality of bridging elements arranged in spaced substantially parallel relation and interconnecting corresponding upper marginal portions of the side panels. Foldably connected to the bridging elements and depending therefrom are divider panels, each of which has peripheral segments thereof in interlocking engagement with corresponding portions of the respective bridging elements. The divider panels, bottom, and side panels cooperate with one another to form at least one row of article-accommodating pockets. One of the bridging elements, intermediate the end bridging elements, has a pair of spaced substantially parallel divider panels depending therefrom. The portion of the said one bridging element disposed intermediate said pair of divider panels and the portions of said bottom and side panels disposed intermediate the planes of said pair of divider panels are provided with means for effecting separation of the carton into complemental sections. Each divider panel of said pair of divider panels forms an end wall of the complemental carton section.

For a more complete understanding of this invention reference should be made to the drawings wherein:

FIG. 1 is a plan view of the blank for the improved carton.

FIG. 2 is an enlarged perspective view of the improved carton.

FIG. 3 is a perspective view of the improved carton of FIG. 2 shown in the state of being separated into complemental carton sections.

FIG. 4 is a perspective view of the improved carton in a partial state of set-up.

Referring now to the drawings and more particularly to FIG. 1, a blank **10** formed of suitable fibreboard or cardboard material is shown. The blank in the illustrated embodiment is provided with a plurality of spaced substantially parallel elongated foldlines, **11***a–b*, **12***a–b*, and **13***a–b* which are adapted to cooperate with one another so as to form a center section **14**, a pair of side walls **15**, a pair of bottom walls **16**, and a pair of partition walls **17**.

The center section **14**, in turn, is provided with a plurality of spaced, similar foldlines **18**, **20**, **21**, **22**, **23**, **24**, **25**, and **26** all of which are angularly arranged with respect to foldlines **11***a–b*. Each foldline **18**, and **20–26** is of like configuration and includes a center portion, designated by *a* in each instance, and first end portions *b* which extend divergently from the ends of said center portion. The distal ends of the end portions *b* of each foldline, except foldlines **18** and **26**, are interconnected by a curvilinear slit **27**.

From the junctures *c* between portions *a* and *b* of each foldline **18** or **20–26** there extend divergently a pair of second end portions *d*. The divergency of end portions

d is less than that of end portions *b* and thus, end portions *d* are disposed between end portions *b*. Each end portion *d* extends from juncture *c* to slit **27**, except in the case of foldlines **18** and **26** wherein the outer end limit of each portion *d* terminates at the periphery of the blank. A third pair of spaced substantially parallel end portions *e* extend from junctures *c* and are disposed at substantially right angles with respect to center portion *a*. The function of end portions *e* will be described more fully hereinafter.

The portions *a*, *b*, *d* and *e* of each foldline **18**, or **20–26** cooperate with one another, when the blank is set up, to form a depending divider panel **28**, **30**, **31**, **32**, **33**, **34**, **35** or **36**. By reason of the pair of foldline end portions *b* and *d*, the opposite ends **28***a*, **30***a*, **31***a*, **32***a*, **33***a*, **34***a*, **35***a* or **36***a* of each divider panel are angularly disposed with respect to the center portion **28***b*, **30***b*, **31***b*, **32***b*, **33***b*, **34***b*, **35***b* or **36***b* of the panel, see FIG. 4.

The lower marginal edge of each divider panel is provided with a short centrally disposed slot **37**. In panels **30**, **31**, **34** and **35**, an aperture **38** is also provided which is spaced from, but aligned with, the inner end of slot **37**. The function of slots **37** and apertures **38** will become apparent from the description hereinafter.

It will be noted in FIG. 1 that center portions *a* of foldlines **22** and **23** are disposed in spaced, yet proximate, relation. Extending between and in parallel relation with respect to portions *a* of foldlines **22** and **23** is an elongated perforated or weakened line **40**. Line **40**, it will be noted in FIG. 1, extends through the side, bottom and partition walls of the blank, and as will be described more fully hereinafter serves as a means of separating the set-up carton **41**, see FIG. 2, into two complemental carton sections or units **41***a* and **41***b*, see FIG. 3.

The remainder of the center section **14** of blank **10**, when the divider panels assume their depending positions, as seen in FIGS. 2 and 4, forms a plurality of bridging elements **42**, **43**, **44**, **45**, **46**, **47**, and **48**. The ends of each bridging element extend angularly downwardly from foldline portions *e* and terminate at foldlines **11***a* and **11***b*, and thus, serve to interconect corresponding upper marginal segments of side walls **15**.

It will be noted in FIG. 1, that the bridging elements **42**, **43**, and **44**, which are disposed to one side of center bridging eelment **45**, each has an overhanging marginal edge thereof, formed by the slit **27**, disposed inwardly toward the center bridging element **45**. The same arrangement prevails with respect to bridging elements **46**, **47**, and **48**. It will be noted further that this marginal edge of each bridging element **42**, **43**, **44**, **46**, **47** and **48** is provided with a centrally disposed tongue-like projection **42***a*, **43***a*, **44***a*, **46***a*, **47***a*, or **48***a* which corresponds in shape to slots **37**. Spaced at opposite sides of each projection are a pair of short slits **50** which serve to permit the marginal edge of each bridging element to yield downwardly slightly so an egg or other similar fragile article may be pushed past such overhanging bridging element portion into one of the pockets A or B formed in the set-up carton **41**, adjacent the particular bridging element, see FIGS. 2 and 3. The upper end of each pocket is provided with an opening which is normally smaller than the width of the egg or article being deposited into the pocket and thus, once the egg is positioned in the pocket, the inherent resiliency of the fibreboard or cardboard will cause the marginal edge of the bridging element to return to its normal overhanging position wherein the upper open end will be of such size as to prevent the egg from accidentally falling out of the pocket in the event the box is inverted or tilted while being handled.

It will be noted in FIG. 1 that formed in spaced relation along foldlines **11***a* and **11***b* are a plurality of tabs **51** and **52**, respectively, which are struck out from center section **14**. When the blank is set up to form a carton **41**, the tabs **51** and **52** will overlie the outer surface of folded end portion **28***a*, **30***a*, **31***a*, **32***a*, **33***a*, **34***a*, **35***a* or **36***a* of each divider panel and resiliently retain same against the inside surface of the downwardly extending end portions of the respective bridging element, see FIG. 4.

Each bottom panel **16** may be provided with a plurality of push-up tabs **53** which are adapted to facilitate removal of the eggs from the carton pockets. The tab **53**, when pushed up, will engage the underside of the accommodated egg or article and raise same so that the top of the egg or article will project up through the upper open side of the carton whereupon such egg or article can be readily grasped for further removal. In view of the upper side of each pocket being cut downwardly a substantial amount adjacent the side wall **15**, the egg or article accommodated therein may be readily grasped and pulled upwardly without resorting to push-up tabs **53**.

The partition walls or panels **17**, when the carton is formed, are adapted to assume an upright position, see FIG. 2, and engage the depending divider panels **28**, and **30–36**. Each partition panel **17** is of like construction and has the outer or upper peripheral edge thereof provided with a plurality of spaced notches **54**. It will be noted in FIG. 1 that certain of said notches terminate in angularly extending slits **55** wihch, in turn, lead to apertures **56** formed in walls **17**. The angular disposition of the slits **55** are to provide a more positive locking action between the depending divider panels and the partition panels, in a manner to be described more fully hereinafter.

To give added strength to the side, bottom and partition walls **15**, **16**, and **17** respectively, a plurality of spaced stiffening beads or ribs **57** are provided which extend transversely to the foldlines **11***a–b*, **12***a–b*, and **13***a–b*, see FIG. 1. Thus with such beads or ribs, a sturdy carton may be attained, notwithstanding that relatively thin fibreboard or cardboard is utilized in forming the blank.

Because of the arrangement of the slits and foldlines, the blank **10** may be readily set up, either manually or mechanically to form the carton **41**. In setting up the carton, side walls **15** are folded downwardly along foldlines **11***a–b* and simultaneously therewith the opposite ends of the bridging elements are urged together whereby such opposite ends will automatically bend downwardly about foldline portions **18***e*, and **20***e–26e* as axes causing the divider panels to assume their depending positions. As the divider panels assume their depending positions, the side walls **15** will be folded outwardly a slight amount causing tabs **51** and **52** to project inwardly towards each other a sufficient amount so that the end portions **28***a*, and **30***a–36a* of the divider panels will pass thereover and engage the adjacent inside surfaces of the downwardly disposed end portions of the corresponding bridging elements. Once the end portions of the divider panels have assumed such positions relative to the corresponding bridging elements, the side walls **15** are then swung towards one another causing the tabs **51** and **52** to resiliently overlie and engage said divider panel end portions, see FIG. 4.

The partition walls **17** are then brought to upright back-to-back position so that the upper (or outer) peripheral portions thereof will engage the lower marginal portions of the depending divider panels. Care should be exercised in aligning the notches **54** of the partition walls **17** with the respective slots **37** of the depending divider panels. The slits **55** formed in the marginal portions of the partition walls **17** will permit portions of divider panels **30**, **32**, **34** and **35**, disposed between slots **37** and apertures **38** to pass therethrough until the slits **55** are disposed within apertures **38**, see FIG. 3. Thus, an effective interlocking relationship is established between the divider panels and the partition walls and by reason of the angular disposition of the slits **55** disengaging the partition walls from the divider panels becomes difficult without causing rupture or tearing of the blank. Once the partition walls **17** have assumed their upright positions, the bottom walls **16** assume inclined convergent

relation, whereby foldlines 13*a–b* are the only portions of the carton which engage the supporting surface upon which the carton will rest.

As aforementioned carton **41** may be separated along line **40** into complemental carton sections **41***a* and *b*, see FIG. 3. By reason of the disposition of divider panels **32** and **33** and the foldline portions **22***a* and **23***a* being adjacent one another, each divider panel **32** or **33** will be recessed from one end of the complemental section **41***a* or **41***b*. It will be noted in FIG. 3 by reason of this recess, each partition wall will have a portion **17***a* thereof disposed between divider panel **32** or **33** and the end of the carton section which will prevent divider panel **32** or **33** from bulging or bowing outwardly when an egg or similar article is accommodated in the pockets formed in part by panels **32** and **33**. It will be noted in FIGS. 2 and 4 that similar portions **17***b* are formed in the opposite ends of partition walls **17** which serve the same purpose for end divider panels **28** and **36**. The complemental sections **41***a* and **41***b* are possessed of the same structural rigidity and sturdiness as the whole carton **41**. Because of the rigidity of the whole carton, separation thereof into the complemental sections is readily accomplished in a manner as illustrated in FIG. 3 regardless of whether the carton be loaded or empty.

In the complemental carton sections **41***a–b* as well as in the whole carton **41**, the pockets A and B formed therein are of uniform configuration and an overhanging marginal portion of a bridging element is provided for each pocket so as to retain the accommodated egg or article in position within the carton or carton sections.

Because of the angular disposition of the side and bottom walls **15** and **16** in the set-up carton, the accommodated egg or article is provided with point, or line, contact support with portions of the side and bottom walls adjacent foldlines **12***a–b* serving to hold the accommodated egg or article in spaced relation with respect to the surface upon which the carton or carton section rests.

It will be observed in FIG. 1, that the blank design is such as to afford efficient use of the blank material. An extremely small amount of material waste is occasioned in forming the blank **10**. By rendering the carton **41** separable no excessive amount of blank material is required and the carton sections **41***a* and *b* are of substantially the same construction at both ends.

Thus, it will be seen that an improved separable foldable carton is provided which effectively overcomes the problems which had heretofore beset the prior art structures. The improved carton is formed from a blank wherein there is a minimum of material waste, and yet the blank is readily capable of being set-up to form a carton possessed of a high degree of structural stability and strength.

While a particular embodiment of this invention has been shown, it is to be understood, of course, that such invention is not limited thereto, as modifications thereof are contemplated and such modifications are intended to come within the scope of the claims appended hereto.

I claim:

1. An elongated foldable carton for eggs and the like, comprising a pair of elongated side panels arranged in spaced substantially coextensive relation, bottom panels extending angularly from the lower marginal portions of said side panels, elongated partitioning means disposed intermediate said side panels and extending upwardly from said bottom panels, a plurality of bridging elements arranged in spaced substantially parallel relation and interconnecting corresponding segments of the upper marginal portions of said side panels, and a plurality of divider panels depending from said bridging elements and cooperating with said side and bottom panels and said partitioning means to form rows of egg-accommodating pockets, peripheral end portions of each divider panel being in interlocking engagement with portions of the respective bridging elements and said partitioning means

and retaining said divider panels in depending relation with respect to said bridging elements; one of said bridging elements intermediate the end bridging elements being provided with a pair of spaced substantially parallel divider panels, said one bridging element and the portions of said side and bottom panels and the partitioning means disposed intermediate the planes of said pair of divider panels being provided with means whereby said carton is separable into complemental carton sections and each divider panel of the separated pair of divider panels has the peripheral end portions thereof in interlocking engagement with portions of the separated bridging element and becomes an end face of a complemental carton section.

2. The carton recited in claim **1** wherein one of the bridging elements disposed adjacent each of said pockets has a portion thereof projecting toward the adjacent bridging element and extending partially over said pocket, said bridging element projecting portion having a resilient segment cooperating with the adjacent bridging element to form a restricted opening whereby an egg accommodated in said pocket is restrained from accidental discharge from said pocket upon said carton assuming an inverted position.

3. The carton recited in claim **1** wherein each divider panel has opposed marginal portions angularly offset and disposed in substantial face to face contact with portions of the bridging element from which said divider panel depends, each bridging element is provided with locking means engaging and retaining said marginal portions in said face to face contact.

4. An elongated foldable carton for eggs and the like, comprising a bottom, a pair of elongated side panels extending upwardly from said bottom, a plurality of elongated bridging elements arranged in spaced substantially parallel relation and interconnecting corresponding segments of the upper marginal portions of said side panels, and a plurality of divider panels depending from said bridging elements and cooperating with said side panels and said bottom to form a row of egg-accommodating pockets, peripheral end portions of each divider panel being in interlocking engagement with end portions of the bridging element from which said divider panel depends and retaining said divider panels in depending relation with respect to said bridging elements; one of said bridging elements intermediate the end bridging elements being provided with a pair of spaced substantially parallel divider panels, said one bridging element and the portions of said side panels and bottom disposed intermediate the planes of said pair of divider panels being provided with means for separating said carton into complemental carton sections whereby each divider panel of the separated pair of divider panels has the peripheral end portions thereof in interlocking engagement with the end portions of the separated bridging element and becomes an end face of a complemental carton section.

5. The carton recited in claim **4** wherein the bridging elements disposed on each side of said one bridging element have the divider panels thereof depending from the elongated peripheral sides of said bridging elements farthest removed from said one bridging element.

6. An elongated foldable carton for eggs or the like comprising a bottom, upstanding sides connected thereto, a partition disposed intermediate said sides and extending longitudinally of said carton and projecting upwardly from said bottom, a plurality of relatively spaced substantially parallel bridging elements overlying the top of said carton and interconnecting corresponding upper marginal portions of said sides, said bridging elements being disposed substantially transverse to the longitudinal axis of said carton, and a plurality of divider panels depending from said bridging elements and having peripheral end portions of said divider panels interlockingly engaging end portions of said bridging elements and pe-

ripheral central portions of said divider panels interlockingly engaging said partition to form parallel rows of egg-accommodating pockets, the divider panels depending from the end bridging elements forming recessed end walls for said carton; one of said bridging elements intermediate said end bridging elements having a pair of spaced substantially parallel divider panels depending from opposed sides thereof; the portions of said one bridging element, said bottom, said sides, and said partition disposed intermediate the planes of said pair of divider panels beng provided with means whereby said carton may be separated into complemental carton sections and each divider panel of the separated pair of divider panels has the peripheral end portions thereof in interlocking engagement with the end portions of the separated bridging element and the central portion thereof in interlocking engagement with the separated partition and forming an end wall of a carton section.

7. The carton recited in claim 6 wherein a bridging element adjacent each egg-accommodating pocket has a portion thereof projecting toward an adjacent bridging element and extending partially over said adjacent pocket, said bridging element projecting portion having a resilient segment which cooperates with the adjacent bridging element to form a restricted opening whereby an egg accommodated within said adjacent pocket is restrained from accidental discharge from said pocket upon said carton assuming an inverted position.

8. A carton blank formed of foldable sheet material comprising an elongated top-forming first section, a pair of elongated side-forming second sections foldably connected to the elongated opposite sides of said first section, a pair of elongated bottom-forming third sections foldably connected to the sides of said second sections opposite those sides to which said first section is connected, and a pair of partition-forming fourth sections foldably connected to the sides of said third sections opposite those sides to which said second section are connected; said first section being provided with a plurality

of slits which define a plurality of divider panels, each of which has a peripheral segment thereof foldably connected to the remainder of said first section whereby each divider panel automatically assumes a depending position with respect to said first section upon said blank being set up to form a carton; said first section being further provided with a plurality of foldable tabs, the line of fold of each tab being substantially coincident to a line of fold connecting said first and second sections; said tabs being engageable with said divider panels and retaining same in their depending positions upon said blank being set up to form a carton; said first, second, third, and fourth sections being provided with coaxially aligned weakening scores angularly disposed relative to the fold connections between said sections whereby the set-up carton may be formed into complemental carton sections along said weakening scores.

9. The blank recited in claim 8 wherein the lines of fold between said sections are disposed in substantially parallel relation, and folding connections for said divider panels, are disposed substantially perpendicular to said section foldlines.

10. The blank recited in claim 8 wherein said aligned weakening scores are disposed substantially normal to the lines of fold between said sections.

11. The blank recited in claim 10 wherein the weakening score formed in said first section extends between two of said divider panels and the lines of fold of said two divider panels are adjacent and substantially parallel to said weakening score.

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