July 24, 1956 R. F. REIFERS 2,755,984

EGG CARTON

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Fig. 1

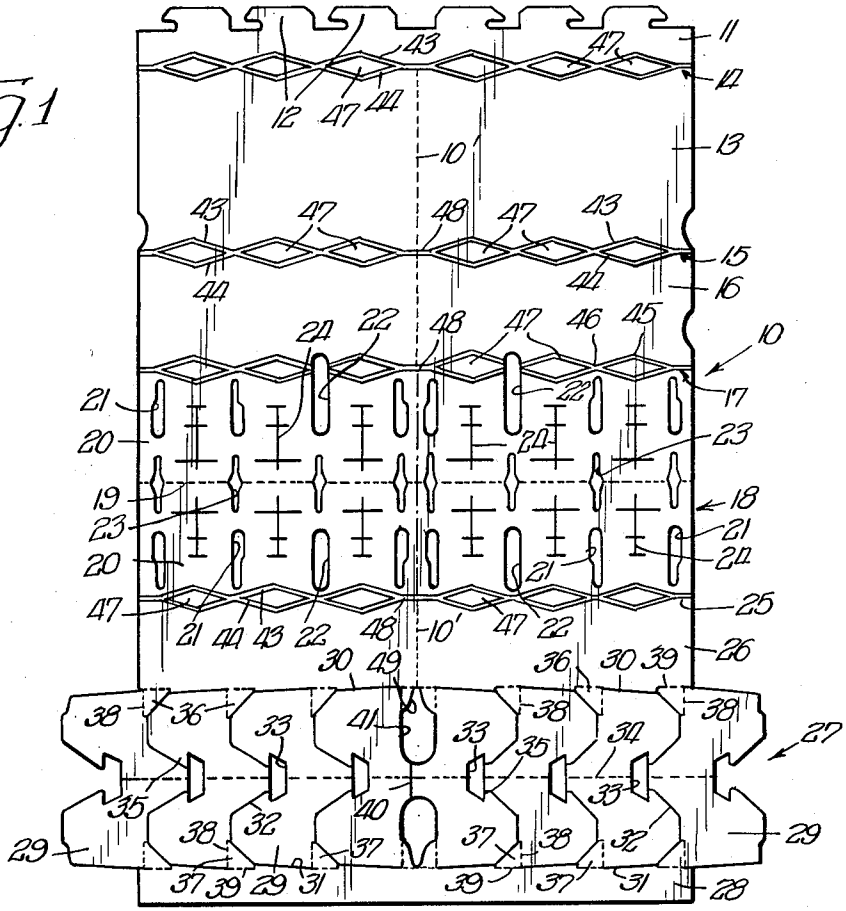

Fig. 2.

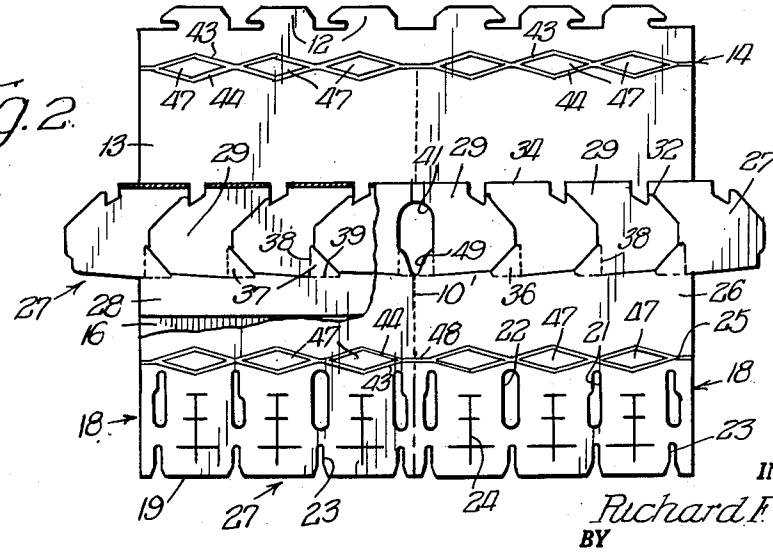

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Fig. 3.

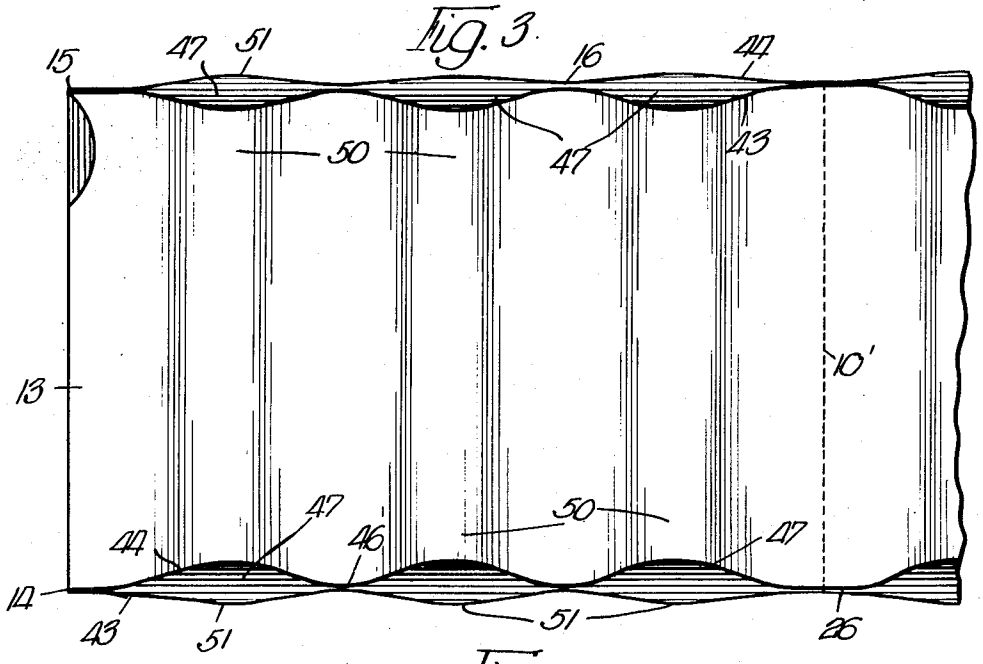

Fig. 4

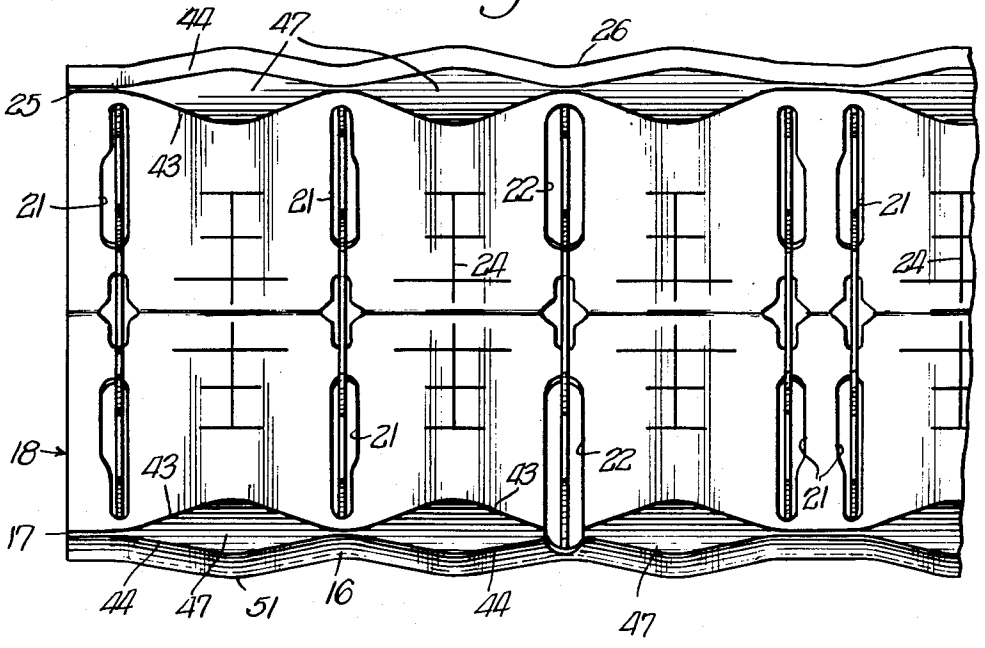

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Fig. 5

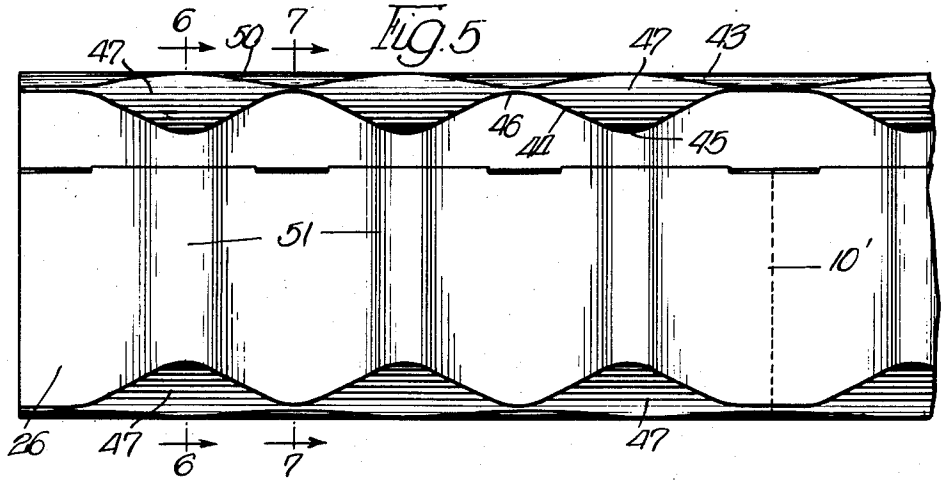


Fig. 6

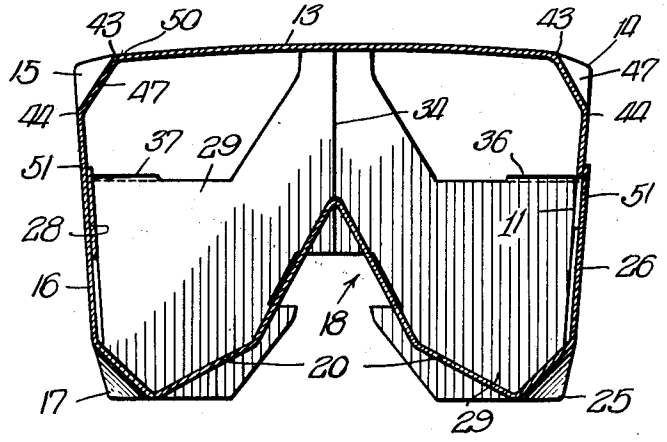
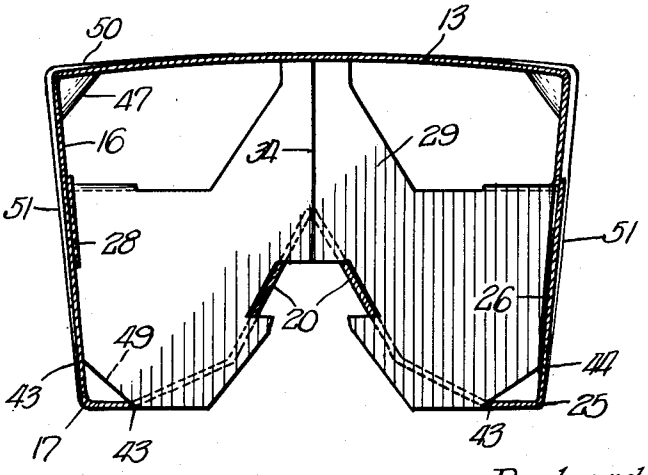


Fig. 7



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EGG CARTON

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Application April 29, 1952, Serial No. 284,981

7 Claims. (Cl. 229—28)

The present invention relates to improvements in a cellular paperboard egg carton which render the same stronger and more rigid to resist load or impact, and at the same time provide greater room for eggs in the carton cells.

More specifically, it is an object of the invention to provide an improved paperboard egg carton which when closed has novel creased formations along the outer side margins to improve its appearance, feel and egg cushioning ability, increase the space in its egg receiving cells, and in general to augment the protection which it affords eggs in shipment or handling.

Another specific object of the invention is to provide an improved paperboard egg carton which is rendered more attractive in appearance and more comfortable to the user's feel in grasping the same by a line or series of creased, diamond-shaped formations or scallops extending along the opposite side margins of its top and/or bottom, which formations increase the strength and column rigidity of the side walls, top and bottom of the carton, and augment the egg receiving capacity of its cells.

A further object is to provide a cellular paperboard carton of the type shown in Troyk Patent No. 1,783,397, in which a series of diamond-shaped formations or scallops are defined by a special creasing of the carton along the side edges of its bottom, or all four edges, the diamond-shaped formations having the effect of causing the adjacent walls and cover surface of the carton to bulge outwardly in an undulatory outline at the wide portions of the diamonds, thus not only increasing the egg room in the carton cells but also stiffening and rigidifying the carton by the column action of the undulatory bulges, and imparting an improved cushion effect to the carton when loaded with other cartons in a thirty dozen case.

The foregoing statements are indicative in a general way of the nature of the invention. Other and more specific objects will be apparent to those skilled in the art upon a full understanding of the construction and operation of the device.

A single embodiment of the invention is presented herein for purpose of illustration. It will be appreciated that the invention may be incorporated in other modified forms coming equally within the scope of the appended claims.

In the drawings:

Fig. 1 is a plan view of a paperboard blank employed in fabricating the improved carton, illustrating the manner in which the blank is died out, slitted, slotted and creased;

Fig. 2 is a plan view of the carton formed from the blank of Fig. 1, in the flat, knocked-down condition of the carton;

Fig. 3 is a top plan view of the completed and erected carton, in the closed condition thereof, showing the undulatory bulging result of the forming of the edges of its cover in the manner referred to;

Fig. 4 is a bottom plan view of the closed carton, showing the similar effect of the bottom side edge formations;

Fig. 5 is a view of the improved carton in front elevation; and

Figs. 6 and 7 are, respectively, views in vertical transverse section along lines 6—6 and 7—7, respectively, of Fig. 5 further illustrating structural details of the improved carton and the novel manner in which the characteristic diamond corner formations or scallops thereof increasing egg room in the cells of the carton interior.

Referring to Fig. 1 of the drawings, the flexible paperboard blank 10 employed in constructing the improved carrier is of generally rectangular outline. It is intended for the manufacture of a divisible style egg carton, i. e., one which may be separated into two equal halves of six egg capacity each, being provided with a transversely extending line of perforations 10' at its midpoint for this purpose. Proceeding from top to bottom, as viewed in Fig. 1, the blank 10 is cut and creased to provide a terminal locking flap 11 which is provided, on either side of perforated line 10', with sets of oppositely oriented locking tongues 12 along a margin thereof. Flap 11 is hingedly articulated to a rectangular carton cover panel 13 by means of a specially shaped, longitudinally extending crease formation 14, with the particular details of which the present invention primarily deals. The nature of these crease features will be hereinafter enlarged on, together with their function and advantages.

Cover panel 13 is hingedly connected by a special crease formation 15, corresponding in all respects to crease 14, to a rear wall panel 16, and the last named panel is in turn connected by a further special crease formation 17 to a longitudinal partition and bottom forming panel, generally designated by the reference numeral 18. Panel 18 is subdivided by a medial, longitudinally extending crease 19 into two like sections 20, which are provided with sets of cross partition receiving slots of different shape. The slots of one of these sets, designated 21, are arranged in a keyhole shape and are located adjacent the opposite ends of the respective panel sections 20. Slots 22 of another type, larger and parallel-sided in shape are disposed in intermediate position in sections 20, while a third series of centrally enlarged slots 23 are arranged in longitudinally spaced relation along the medial crease 19. The functions of these slots will be hereinafter pointed out. Bottom and longitudinal partition forming panel 18 is also provided with egg cushioning slits 24 of a well known type, disposed in longitudinally spaced relation along the respective panel sections 20.

Panel 18 is connected by specially shaped crease formation 25, similar in shape and function to crease 17, to a front wall panel 26, and the latter is in turn hinged to a cross partition panel which is generally designated 27. Finally, a glue lap 28 is hinged to the opposite margin of the panel 27.

Panel 27 comprises two oppositely oriented sets of cross partitions 29, one set on either side of medial perforation 10'. The endmost partitions of these sets project outwardly of the line of the end margins of panels 13, 16, 18 and 26, and the cross partitions which are located within the minimal side-to-side dimension of the blank are separated by longitudinally spaced longitudinally extending slits 30 from front wall panel 26, and from glue lap 28 by similar slits 31. Successive cross partitions 29 on opposite sides of the medial crease 11 are separated from one another by shaped slits 32 which act in conjunction with a series of apertures 33 along a medial fold line 34 of panel 27 to define locking hooks 35 on the inner margins of cross partitions 29.

Triangular web areas 36, 37 are arranged in longitudinally spaced relation along the hinge line of panel 27 to front wall panel 26 and glue lap 28, respectively. These webs serve in well known fashion as members hinging the cross partitions to the panels referred to, being

provided with short, transversely extending creases **38** and short, longitudinally extending creases **39** for this purpose. These features are well known and further descriptive details are unnecessary.

The respective sets of cross partitions **29**, four to each set, are separated from one another adjacent the midpoint of the blank by a transversely extending slit **40** which extends between a pair of relatively large, specially shaped apertures **41** and is aligned with the medial perforation **10'**. It is to be understood that when the carton is erected to operative position cross partitions **29** of the respective sets are foldable downwardly in opposite directions about the respective transverse partition hinge creases **38**, after which the cross partitions are interengaged with the apertures **21**, **22** and **23** of longitudinal partition and bottom forming panel **18**. Cross partition hooks **35** then serve to lock the parts and to support the bottom in its intended, inverted V-shaped outline (see Figs. 6 and 7).

The special crease formations **14**, **15**, **17** and **25** which hinge the various panels of the carton to one another at the parallel upper side edges of its cover and the parallel lower side edges of its cellular bottom section contribute materially to a substantially increased strength and rigidity of the completed and erected carton, and also to an augmented egg receiving space in the individual cells of the latter. The formations are, in each instance, of a repeated diamond-shaped outline, constituted by zigzag creases of relatively shallow depth, transversely of the blank, i. e., in the direction of medial perforation **10'**. Crease apices **45** and points of intersection **46** alternate to form a scallop-like, undulatory succession of diamonds, designated **47**, along the length of the respective hinge formations **14**, **15**, **17** and **25**, and apices **45** coincide with the centers of the cells defined by cross partitions **29**.

In the case of the divisible carton chosen for purpose of illustration, the crease formations have central, relatively elongated rectilinear portions **48** intersecting the transverse line of perforation **10'**, bridging the non-cellular central zone of intended subdivision of the carton. In a non-divisible style carton, the diamond formations **47** repeat uniformly in uniform spacing along the entire length of the respective creases.

In completing the egg carton from the blank **10** of Fig. 1, the latter is folded about the longitudinally extending, medial crease **34** of the cross partition panel **27**, bringing its two halves into superposed relation to one another. Adhesive is now applied to the upwardly exposed surface of the glue lap **28**, whereupon the thus folded and glued blank is again folded about the longitudinally extending, medial crease **19** of bottom and longitudinal partition section **18**. The glue lap is adhered to the rear wall panel **16**, in side-by-side, depending relation to that wall along a zone paralleling and lying just underneath the undulatory hinge crease formation **15**. This leaves the blank in a completed, knocked-down, flat condition illustrated in Fig. 2 of the drawings. It is erected to its operative, egg receiving position, illustrated in Figs. 3–7 of the drawings, preferably by means of automatic carton setup apparatus of a known type, in an operation involving the spreading of front and rear walls **26**, **16** and the two other panels **18**, **27** to a generally rectangular outline, the swinging of the cross partitions **29** about the hinge creases **38** of triangular connecting webs **36** into parallel relation to one another, in which they extend at a right angle to the various panels referred to, and the shaping of the bottom and longitudinal partition panel **18** to an inverted V-outline, during which the hooks **35** of the various cross partitions **29** are lockingly interengaged with the respective apertures **21**, **22** and **23** of panel sections **20**. Cover **13** is closed by swinging the same about the crease formation **15** and engaging the tongues of the locking flap **11** with the cross partition corner webs **37**.

When the carton is completed and closed as described, it exhibits a distinctive scalloped corner construction

along its upper and lower longitudinal side edges, and the effect of this construction is carried into the adjoining cover, front and rear side walls and bottom. The diamond formations **47**, lying in transverse alignment with the centers of the successive longitudinally arranged egg cells, cause cover **13** to bow or bulge upwardly at these medial cell areas and along its outer longitudinal edges, as illustrated particularly in Figs. 3, 5 and 7, the bulges being designated **50**. An undulatory outline along the cover edge is distinctly perceptible. By the same token, the formations **47** at the upper and lower edges of the carton side walls **16**, **26** have the same effect of outwardly bowing or bulging those walls in the transverse zones of the cell centers, the bulges in this instance being designated **51**.

The undulations referred to increase the individual volumes of the egg cells, and any increase in this respect represents an advantage of substantial importance. However, equally important, and in addition to augmenting cell volume, the diamond scallop formations **47** materially rigidify the walls **16**, **26** of the carton by imparting an undulatory outline thereto, thrusting the walls outwardly at the cell centers. A series of longitudinally spaced, pillar-like columns of noticeable transverse depth extend vertically across the full height of the closed carton. Substantially increased carton strength results from this sort of corrugating or ribbing the side walls of the carton.

Furthermore, the bending which occurs at the respective scalloped hinges is less acute than is the case with a plain rectilinear crease. This means that there is less disturbance of the paperboard fibers in bending, and less loss of strength upon repeated bending. Moreover, all of these advantages are obtained without any increase in the dimensions of the blank **10** for a carton of a given over-all size when completed.

It has also been found that closure of the carton cover is facilitated by the bulge effect on the front side wall. Moreover, the scalloped, undulatory edge configuration affords a softer and more agreeable feel in handling than is found in conventional cartons having straight line corner edge formations.

In many cases the diamond shaping of the hinge creases of the carton panels may be confined to the lower edge of the carton. Also the shape of the engaged sections may vary from that shown. Advantages corresponding to those described above are still imparted to the carton. Matters of selection such as this are contemplated to be included within the scope of the invention.

I claim:

1. In a cellular paperboard carton construction having adjoining panels angularly connected to one another by a straight, longitudinally extending creased hinge zone about which the panels are bent, and cross partition members disposed normal to said panels and coacting therewith to define a series of longitudinally spaced cells, the improvement comprising a series of longitudinally spaced crease formations constituting said hinge zone, said crease formations including pairs of shaped portions which are outwardly convex in relation to the longitudinal center line of said hinge zone and which extend oppositely of said center line into said respective panels with the respective oppositely extending shaped portions being in general transverse alignment, said crease formations being arranged in a longitudinally extending straight line and in close succession so as to localize bending of said panels about said center line as an axis, and the centers of the respective crease formations being in approximate alignment with the centers of the cells in the direction transversely of the carton whereby said panels are buckled outwardly at said centers adjacent said hinge zone.

2. In a cellular paperboard carton construction having adjoining panels angularly connected to one another by a longitudinally extending creased hinge zone about which the panels are bent, and cross partition members disposed normal to said panels and coacting therewith to define a series of longitudinally spaced cells, the improvement com-

prising a series of longitudinally spaced crease formations constituting said hinge zone, said crease formations including shaped portions which are outwardly convex in relation to the longitudinal center line of said hinge zone and which extend oppositely of said center line into said respective panels, the respective oppositely extending shaped portions being in general transverse alignment and in generally symmetric relation to one another about said center line as an axis, said crease formations being arranged in a longitudinally extending straight line and in close succession so as to localize bending of said panels about said center line as an axis, and the centers of the respective crease formations being in approximate transverse alignment with the centers of the cells in the direction transversely of the carton whereby said panels are buckled outwardly at said centers adjacent said hinge zone.

3. In a cellular paperboard carton construction having adjoining panels angularly connected to one another by a longitudinally extending creased hinge zone about which the panels are bent, and partition members disposed normal to said panels and coacting therewith to define a series of longitudinally spaced cells, the improvement comprising a series of longitudinally spaced crease formations and aligned crease portions longitudinally connecting the same to constitute said hinge zone, said crease formations including pairs of obtusely angled crease portions which are outwardly convex in relation to the longitudinal center line of said hinge zone and which extend on opposite sides of said center line and into said respective panels, the respective oppositely extending parts of said angled crease portions being in general transverse alignment, and the centers of the respective crease formations being in approximate alignment with the centers of the cells in the direction transversely of the carton whereby said panels are buckled outwardly at said centers adjacent said hinge zone.

4. In a cellular paperboard carton construction having adjoining panels angularly connected to one another by a longitudinally extending creased hinge zone about which the panels are bent, and partition members disposed normal to said panels and coacting therewith to define a series of longitudinally spaced cells, the improvement comprising a series of longitudinally spaced crease formations and aligned crease portions longitudinally connecting the same to constitute said hinge zone, said crease formations including pairs of obtusely angled crease portions which are outwardly convex in relation to the longitudinal center line of said hinge zone and which extend on opposite sides of said center line and into said respective panels, the respective oppositely extending parts of said angled crease portions being in general transverse alignment and in generally symmetric relation to one another about said center line as an axis, said aligned connecting crease portions being longitudinally aligned along said center line, and the centers of the respective crease formations being in approximate alignment with the centers of the cells in the direction transversely of the carton whereby said panels are buckled outwardly at said centers adjacent said hinge zone.

5. A cellular carton fabricated of flexible paperboard and characterized by an article receiving section having opposed upstanding and generally parallel side walls, a bottom connected to and extending between said side walls adjacent the bottom thereof, and a plurality of partitions extending transversely between said side walls and subdividing the interior of said section into at least one longitudinally extending row of cells, said bottom being connected to at least one of said side walls by pairs of crease formations arranged in a straight line longitudinal succession along the zone of connection of said bottom and side wall, the respective formations of each pair of crease formations being oppositely and outwardly convex in shape, so as to define between the respective formations of each pair a surface disposed at an angle to both said bottom and side walls, said pairs of crease formations being in relative close longitudinal order and being aligned transversely of said carton in centered relation with said cells whereby to enable said side wall to flex to angular relation to said bottom about a longitudinal axis extending medially through said surfaces and said wall being bulged transversely outwardly at said cells by said formations.

6. A cellular carton fabricated of flexible paperboard and characterized by an article receiving section having opposed upstanding and generally parallel side walls, a bottom connected to and extending between said side walls adjacent the bottom thereof, and a plurality of partitions extending transversely between said side walls and subdividing the interior of said section into at least one longitudinally extending row of cells, said bottom being connected to at least one of said side walls by pairs of crease formations arranged in a straight line longitudinal succession along the zone of connection of said bottom and side wall, the respective formations of each pair being oppositely and outwardly convex in shape and being substantially centered in transverse alignment with said cells, so as to define between the respective formations of each pair a diamond shaped surface disposed at an angle to both said bottom and side wall, with the major axes of said surfaces extending longitudinally of the carton, said pairs of crease formations being in sufficiently close order longitudinally to enable said wall to flex to angular relation to said bottom about an axis extending longitudinally of the container and medially through said surfaces whereby said wall is bulged transversely outwardly at said cells by said formations.

7. A cellular carton fabricated of flexible paperboard and characterized by an article receiving section having opposed upstanding and generally parallel side walls, a bottom connected to and extending between said side walls adjacent the bottom thereof, and a plurality of partitions extending transversely between said side walls and subdividing the interior of said section into at least one longitudinally extending row of cells, said bottom being connected to at least one of said side walls by pairs of crease formations arranged in a straight line longitudinal succession along the zone of connection of said bottom and side wall, the respective formations of each pair being oppositely and outwardly convex in shape and being substantially centered in transverse alignment with said cells, so as to define between the respective formations of each pair a surface disposed at an angle to both said bottom and side wall, with the major axes of said surfaces extending longitudinally of the carton, said pairs of crease formations being joined by connecting elements in sufficiently close longitudinal order to enable said side wall to flex to angular relation to said bottom about an axis extending longitudinally of the carton and medially through said connecting elements, whereby said wall is bulged transversely outwardly at said cells by said crease formations.

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