

May 4, 1954

H. S. CRANE
MOLDED PULP CARTON

2,677,490

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2 Sheets-Sheet 1

Fig. 1

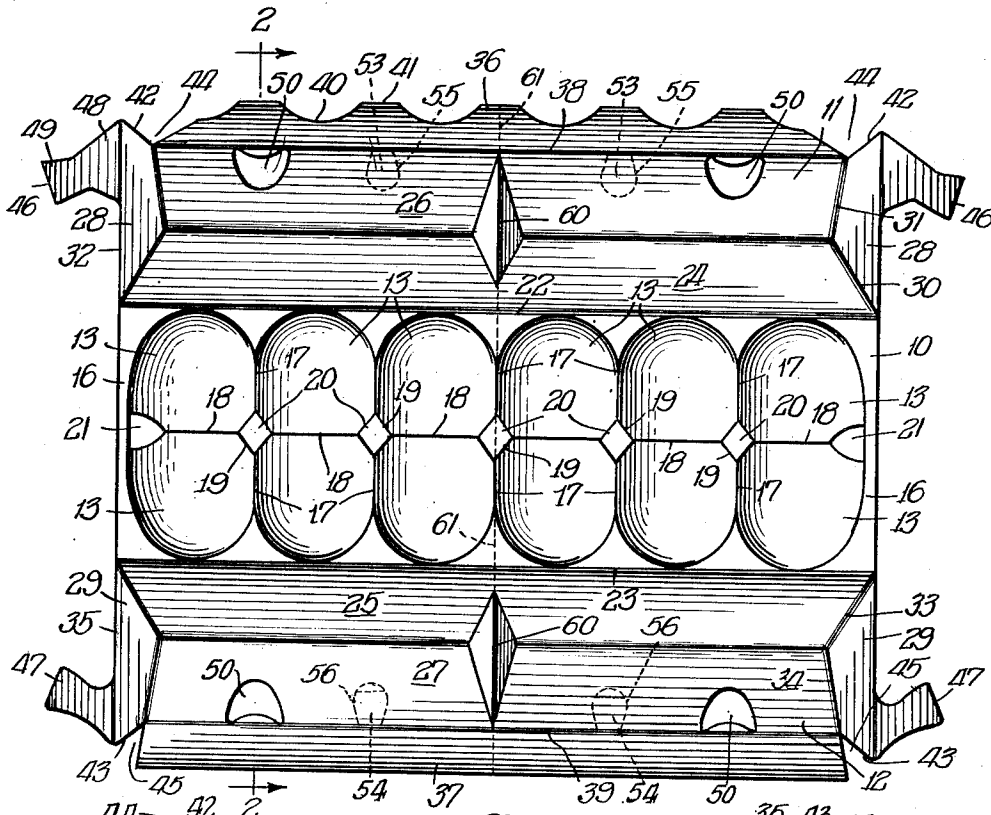


Fig. 2

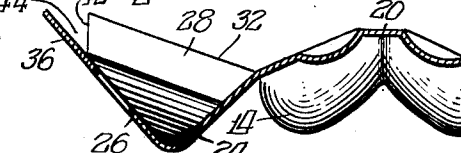


Fig. 8

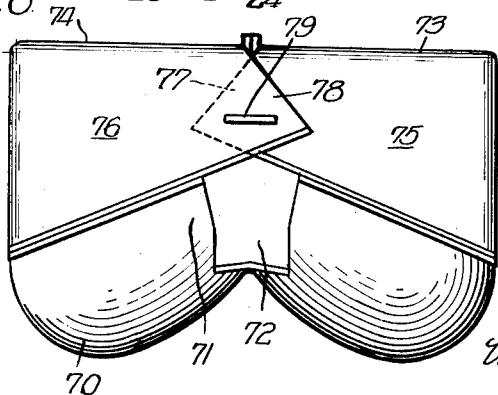
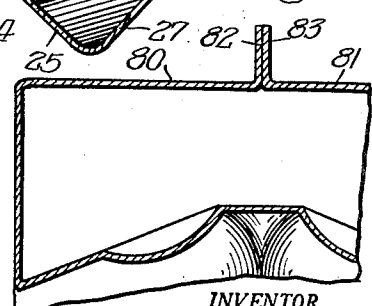


Fig. 9



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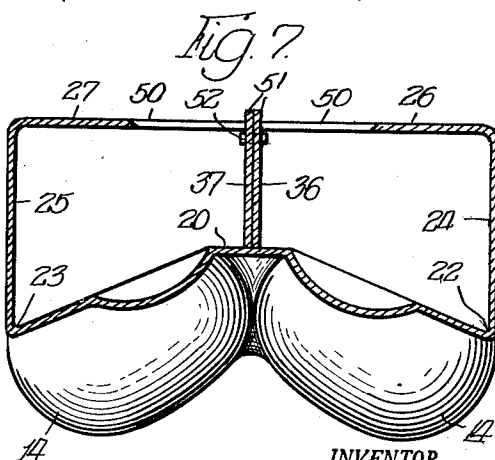
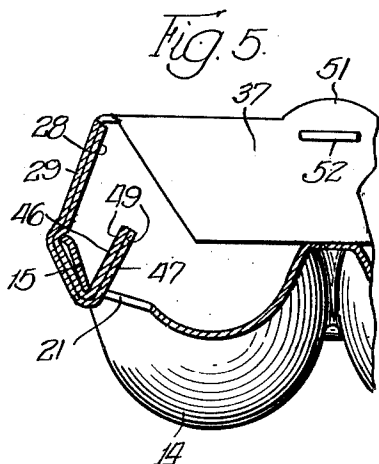
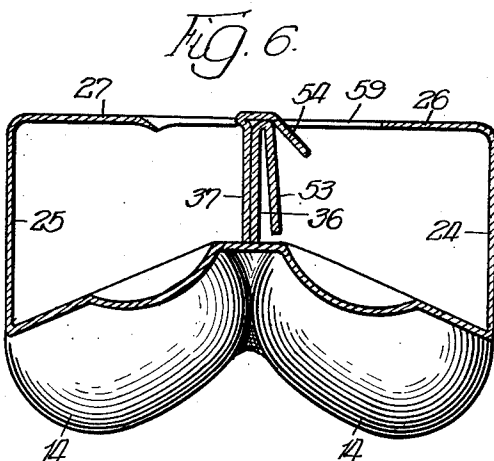
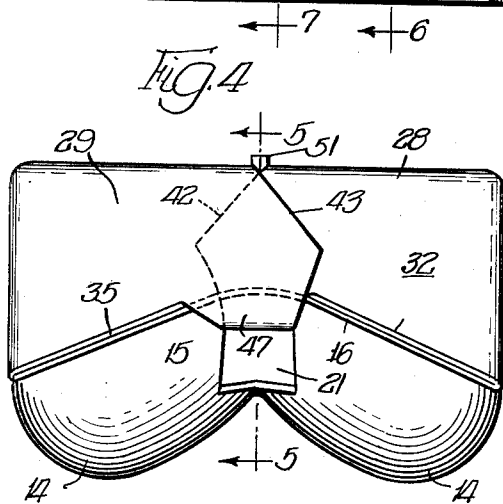
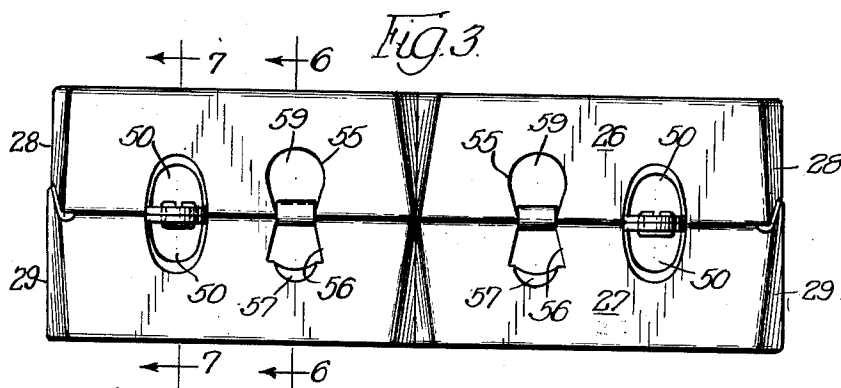
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2 Sheets-Sheet 2



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2,677,490

MOLDED PULP CARTON

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Application July 23, 1948, Serial No. 40,358

13 Claims. (Cl. 229—15)

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This invention relates to improvements in molded pulp cartons of the type which are particularly adapted for use in packaging eggs or other articles of a similar nature.

It is an object of the invention to provide a cellular carton of the type which may be molded from a watery slurry of paper pulp fibers and which is characterized by a body portion having a plurality of upwardly opening cells for receiving eggs or similar articles and hingedly connected side wall and top forming portions which are adapted when closed to form with the body portion a container of generally rectangular cross section.

It is a more specific object of the invention to provide a cellular carton adapted to be molded from a watery slurry of paper pulp fibers which comprises in the open position in which it is removed from the mold a central bottom forming portion having a plurality of upwardly opening ovoid cells and integral side wall and cover forming portions on the opposite sides of the bottom forming portion having the side wall and cover sections thereof extending in upwardly diverging angular relation to each other.

It is another object of the invention to provide a molded pulp carton of the type described which includes a central bottom forming portion having end wall formations terminating at the top in abutment forming edges which extend downwardly and outwardly in diverging relation and side portions on opposite sides of the central portion having angularly related side wall and cover forming sections which are connected at their ends by generally triangular shaped end walls the upper edge of which extends upwardly and outwardly relative to the abutment edges of the bottom end walls.

It is a further object of the invention to provide a cellular molded pulp carton of the type described wherein the central bottom forming portion is provided with a plurality of cell formations separated by a medial row of upwardly extending pyramidal partition members which terminate in top abutments and wherein the side wall and cover forming portions which are hingedly connected along opposite sides of the bottom forming portion are provided with partition forming flaps on their outer edges which are adapted to be folded into downward juxtaposed relationship in the closed position to bring them into edge abutting relation with the tops of the pyramidal partition members.

It is another object of the invention to provide a molded pulp carton of the type described wherein elements are provided which are adapted to be arranged in interengaging relation for securing the cover members in the closed position.

It is a further object of the invention to provide a cellular molded pulp carton of the type

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described wherein locking apertures are provided in the end walls of the bottom portion and co-operating locking tongues are provided on the end walls of the side wall and cover portions for engagement in the apertures.

It is a still further object of the invention to provide a cellular egg carton which is particularly adapted for accommodating large eggs while still being capable of being packed in a standard egg crate and which affords increased protection for the eggs packed in the carton.

These and other objects of the invention will be apparent from a consideration of the cartons which are shown by way of illustration in the accompanying drawings, wherein:

Fig. 1 is a molded pulp carton which incorporates therein the principles of the invention, the carton being shown in the open position in which it is removed from the mold;

Fig. 2 is a cross section taken on the line 2—2 of Fig. 1;

Fig. 3 is a top plan view of the carton with the side wall and cover members in the closed position;

Fig. 4 is an end elevation to an enlarged scale of the carton in the closed position;

Fig. 5 is a partial longitudinal section taken on the line 5—5 of Fig. 4;

Fig. 6 is a transverse section to an enlarged scale taken on the line 6—6 of Fig. 3;

Fig. 7 is a transverse section to an enlarged scale taken on the line 7—7 of Fig. 3;

Fig. 8 is an end elevation similar to Fig. 4 showing a modified form of the carton; and

Fig. 9 is a partial transverse section similar to Fig. 7 showing a further modified form of the carton.

In order to provide a carton which is capable of being molded in the usual manner from a watery slurry of paper pulp fibers, it is necessary to design the carton without any overhanging or downwardly flaring portions so that it may be readily removed from the mold after it has been formed without any damage to the carton members. The surfaces of all recessed portions of the carton must be tapered or curved upwardly and outwardly to facilitate removal from the mold member. Where there are apertures or lines of weakening to be formed in the carton they must be designed so that the projecting mold members which form the same are provided with a taper or curvature which will permit unobstructed removal of the carton from the mold. These limitations on the design of molded articles have made it difficult to produce a satisfactory molded pulp carton having straight or vertical side walls.

Referring to Figs. 1 to 7 of the drawings, there is illustrated a carton which is generally rectangular in cross section when in closed condi-

tion and which may be successfully molded in opened out or unfolded condition. This carton conforms generally in cross section to a conventional paperboard carton and is adapted when filled and closed to fit within the space available in a standard size egg crate.

The carton comprises, in the opened out or unfolded condition in which it is molded, a central body forming portion 10 and side wall and cover portions 11 and 12 which are integrally connected along opposite sides of the body forming portion 10.

The body portion 10 of the carton is provided with two longitudinally extending rows of six pocket forming recesses or cell formations 13, which are adapted to accommodate a dozen eggs. The cell-forming recesses 13 are generally semi-circular or ovoid and open upwardly and inwardly, being arranged in transversely aligned pairs. The downwardly projecting bottom wall portions 14 of the cells 13 constitute the bottom of the carton. The outer wall portions of the pair of cells 13 at each end of the carton form carton end walls 15 which terminate at the top in abutment forming edges 16 which extend outwardly and downwardly from the longitudinal center of the carton in diverging relation. The walls of adjacent cells 13 merge with each other and form relatively shallow transverse and longitudinally extending vertical partition members 17 and 18, respectively. The partition forming walls of adjacent pairs of cells 13 also merge to form central upstanding pyramidal partition members 19 which provide a row of top abutments 20 spaced along a longitudinal medial line. The longitudinal partition members 18 extend between the pyramidal abutment forming members 19 connecting the same along the medial line. The transverse partition members 17 extend from the pyramidal members 19 toward opposite side edges of the bottom forming portion 10 of the carton. Each of the end walls 15 is provided with a central locking aperture 21 which is spaced from the top edge 16 and extends downwardly and into the end longitudinal partition member 18.

The side wall and cover forming portions 11 and 12 extend on opposite sides of the bottom portion 10 of the carton. Preformed hinge lines 22 and 23 define the connecting edges of the respective side portions 11 and 12 and the bottom portion 10. The side portions 11 and 12 are provided with identical side wall panels or members 24 and 25, respectively, and cover panels or members 26 and 27, respectively. The side walls 24 and 25 extend downwardly and outwardly from the bottom portion 10 and are in substantially right-angled relationship with the cover members 26 and 27, respectively.

At the ends members 24 and 25 are connected by generally triangular shaped end walls 28 while members 26 and 27 are connected by similar end walls 29. The end walls 28 are connected along two right-angled edges 30 and 31 to the side wall 24 and cover member 26, respectively. The outer edge 32 of the end wall 28 extends from the end of the top edge 16 of the end wall 15 in an outward and upward direction when the carton is in the opened out condition. The end walls 29 are connected along the right-angled side edges 33 and 34 to the ends of the side wall 25 and cover member 27, respectively. The outer edge 35 extends outwardly and upwardly from the end of the top edge 16 of the end wall 15 on the opposite side of the bottom 10.

The cover members 26 and 27 slope outwardly

and upwardly and are provided along their outer margins with partition forming portions or flap members 36 and 37 which are separated therefrom by preformed hinge lines 38 and 39. The partition forming flap members 36 and 37 are not connected at their ends to the end walls 28 and 29, respectively, and are free to hinge along the lines 38 and 39 to form a medial partition when the carton members are in closed condition. The outer edge of the partition forming flap 36 is relieved by spaced semi-circular recesses 40 which are separated by abutment forming edge portions 41 which are adapted to rest on the top abutment surfaces 20 of the pyramidal partition members 19 when the carton is closed. The partition forming flap 37 has a straight or plain outer edge which is adapted to rest on the surfaces 20 in the closed position.

The end walls 28 and 29 are not connected to the ends of the partition flaps 36 and 37 but terminate in relatively short downwardly extending edges 42 and 43, respectively, which define one side of generally V-shaped slots 44 and 45 separating the end walls from the flaps 36 and 37. Adjacent the outer ends of the end walls 28 and 29 there are provided integral longitudinally extending locking tabs 46 and 47, respectively. The locking tabs 46 and 47 each comprise a base portion 48 and a head portion 49 with a section of reduced width separating the same.

When the side wall and cover forming portions 11 and 12 of the carton are hinged about the lines 22 and 23 to the closed position the outer portions of the end walls 28 and 29 overlap (Fig. 4) at the ends of the carton and the locking tabs 46 and 47 carried thereon are brought into superimposed relation so that the head portions 49 thereof may be forced through the aperture 21 in the bottom end wall 15 and into interlocking engagement therein, the head portions 49 of the tabs moving into the space between the eggs in the adjacent pair of cells at the end of the carton.

As previously described, the partition forming flaps 36 and 37 are adapted to extend downwardly in a generally vertical plane when the carton is in the closed position (Fig. 6) and to engage in abutting relation with the free edges thereof abutting the tops 20 of the pyramidal members 19. The partition members 36 and 37 are adapted to be held in such position by engagement of the locking tabs 46 and 47 in the apertures 21 in the end walls 15. Additional locking means are preferably provided in connection with cover members 26 and 27.

The cover members 26 and 27 are provided with generally semi-circular apertures 50 which are spaced some distance from each end adjacent the hinge lines 38 and 39. The apertures 50 at corresponding ends of the carton are in transverse alignment in the closed position of the cover members. The apertures 50 are shaped so that tab portions 51 are formed on the partition flaps 36 and 37 which extend upwardly slightly above the top surface and in abutting relation in the closed position. The tab portions 51 may be secured together by conventional fastening means such as staples 52. The apertures 50 and the tabs 51 are preferably aligned with the cross partition formation 17 between the two end pairs of cells 13 so that the stapling operation does not result in egg breakage, the staple 52 being inserted in the space between the upwardly projecting portions of the eggs in these cells. The apertures 50 also permit observation of the con-

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tents of the two end pairs of cells 13 when the carton is closed.

The cover members 26 and 27 may also be provided with cooperating locking members 53 and 54 which are arranged in alignment with the cross partition formation 17 between the second and third pairs of cells from each end of the carton. The locking members 53 and 54 are provided by generally horseshoe-shaped weakening lines 55 and 56 extending away from the hinge lines 38 and 39. The one locking member 54 is made somewhat shorter than the other member 53 so that the fingernail may be inserted beneath the member 54 in a space 57 and the member 54 may be torn loose along the weakened line 56 and bent up and over the surface of opposite cover 27 and pressed against the top of member 53 to break it away along the weakened line 55 and thereafter move both members down into the resulting aperture 59 in the cover member. The horseshoe shape of the members 53 and 54 causes them to be engaged in interlocking relation in the aperture 59 in the cover. The apertures which are formed in the cover members by tearing or punching out the locking members 53 and 54 also permit observation of the contents of the two central pairs of cells in the carton.

The illustrated carton is adapted to accommodate two rows of six eggs each with the eggs aligned transversely. In order to permit the carton to be readily divided into two half-dozen containers, both side wall and cover forming portions 11 and 12 are formed at the longitudinal center with a transversely extending ridge formation 60 which is generally V-shaped and which extends across the cover member and partially down the adjacent side wall in the closed condition of the carton. A line of weakening indicated at 61 extends transversely of the bottom portion 10 and side portions 11 and 12 along the partition formations 17 between the center pairs of cells 13 and through the apex of the ridge formations 60. The locking members 53 and 54, when in locking engagement in the aperture 59 in the cover member 26, hold the cover members firmly in closed relation for dividing the carton along the weakened line 61 by a breaking or tearing operation. The half-carton containers are held in closed condition by these locking members at one end and at the other end by the locking tabs 46 and 47 which engage in the end wall aperture 21.

The eggs at the end of the half-cartons adjacent the dividing or tearing line 61 are retained in the half-cartons by the ridge formations 60 which form end wall sections.

In Fig. 8 there is illustrated a carton which is modified at the ends to provide an alternative form of locking means. The bottom portion 70 is provided with end walls 71 having a central aperture 72 of generally rectangular shape and opening upwardly. The side wall and cover forming portions 73 and 74 are provided with end walls 75 and 76 which are formed without the longitudinally extending locking tabs which are provided in the form of carton previously described. The outer portions 77 and 78 of the end walls 75 and 76 are overlapped and secured by conventional fastening means such as staple 79. The upwardly opening aperture 72 permits the insertion of the stapling anvil into the carton in the space between the upper portions of the end pair of eggs for the application of the staple 79 without damage to the eggs.

A further modification of the carton is illustrated in Fig. 9 wherein the side wall and cover

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forming portions 80 and 81 are formed with integral flap extensions 82 and 83. The carton is molded with flaps 82 and 83 arranged so that they are moved into upstanding abutting relation when the carton is closed whereby they may be secured together by adhesive, stitching, staples or other fastening means to retain the cover members in closed position.

In the opened out position of all forms of the carton the side and cover forming portions extend laterally along opposite sides of the bottom forming portion, the walls being arranged so that in transverse section they have the general form of a spread-out letter W. In this condition the carton may be molded as a single integral member and readily removed from the mold. A plurality of the carton may be readily nested in the open condition for shipment, requiring a minimum of shipping space.

When the carton is filled and closed the side walls are positioned in substantially vertical planes. The filled cartons may be readily stacked in superimposed self-sustaining relation. When arranged in layers in a crate of standard size all available space in the crate is utilized due to the vertical side walls and adjacent cartons are subject to very little movement because their side walls are in abutting relation.

Due to the shape of the egg-receiving pockets or cells in the carton the eggs are supported in a tilted position at an angle displaced from the vertical. This permits the packaging of longer eggs in the carton than would be possible if the eggs were supported with the longer axis in vertical position. The length of the eggs which the carton will accommodate is not limited by the vertical dimension of the carton but by a diagonal dimension which is greater than the vertical dimension. When the filled cartons are packed in layers or tiers in a crate the tilted position of the eggs results in the eggs in the superimposed layers being misaligned with each other. Consequently the eggs in the lower layers are not required to directly support the eggs in the upper layers. The weight of the eggs above does not bear directly on the eggs below, and breakage is greatly reduced.

While specific details of construction and materials have been referred to in describing the illustrated forms of the carton, it will be understood that other details of construction and other materials may be resorted to within the spirit of the invention.

I claim:

1. A molded pulp egg carton, comprising, in the open position in which it is molded, a central bottom forming portion having a plurality of upwardly opening ovoid cells, and side wall and cover forming portions on opposite sides of said bottom forming portion, the end cells in said bottom forming portion defining end walls which terminate at the top in lateral downwardly and outwardly extending oblique abutment edges, and said side wall and cover forming portions having generally triangular end wall members connected at two sides to the respective side wall and cover forming members thereof and adapted to engage along a third side in abutting relation with the top abutment edges of the bottom end walls when the side wall and cover forming portions of the carton are moved into closed position over the bottom portion thereof.

2. A molded pulp egg carton comprising a central bottom portion having a plurality of egg receiving cells therein which are separated along

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a longitudinal medial line by a row of spaced upwardly extending pyramidal dividing members terminating in top abutment surfaces, the end cells of said bottom portion defining end walls which terminate in downwardly and outwardly diverging abutment edges, side wall forming members hingedly connected along opposite edges of the bottom portion and extending in a substantially vertical plane when in the closed position, integral cover forming members extending from the outer edges of the side wall forming members in a substantially horizontal plane in said closed position, end wall forming members of generally triangular shape connected along two sides to the ends of the side wall and cover forming members, a third side of said end wall forming members being adapted to engage said abutment edges of the bottom end walls and hingedly connected medial partition forming members extending downwardly from said cover forming members having their free edges in abutting relation with the abutment surfaces on the pyramidal dividing members.

3. A molded pulp egg carton comprising a central bottom portion having a plurality of egg receiving compartments therein which are separated along a medial line by a row of upwardly extending pyramidal dividing members terminating in generally horizontal abutment surfaces, the end compartments of said bottom portion providing outer carton wall members which terminate at their upper edges in downwardly and outwardly extending oblique abutments, side wall members hingedly connected along opposite edges of the bottom portion and extending downwardly and outwardly thereof, integral cover forming members extending upwardly and outwardly from the edges of the side wall members whereby the carton walls form in transverse section which is taken between said egg receiving compartments substantially the letter W, end wall members integrally connected along two sides with the ends of the side wall and cover forming members, a third side of each of said end wall members forming an abutment edge for engagement in the closed position with the end wall abutments on the bottom portion, and integral partition forming extensions on the outer edges of said cover forming members which are adapted to be folded into depending relation with said cover forming members to bring the free edges thereof in abutting relation with the abutment surfaces on the pyramidal dividing members in the closed position.

4. A molded pulp egg carton having a cellular bottom portion and side wall and cover forming portions which are integrally joined in laterally extending relation to said bottom portion when the carton is in an opened out condition with the longitudinal walls of the carton having in transverse cross section taken between the cells thereof substantially the form of the letter W, end walls on said bottom portion having a central aperture therein, end walls on said side wall and cover forming portions having portions which are moved into overlapping relation above the end walls of said bottom portion when the carton is closed, and integral locking tabs extending from said overlapping end wall portions which are bendable into interlocking engagement in the apertures in the bottom end walls.

5. A molded egg carton having a cellular bottom portion and side wall and cover forming portions which are integrally joined in laterally extending relation to said bottom portion when

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the carton is in an opened out condition with the longitudinal walls of the carton having in transverse cross section taken between the cells thereof substantially the form of the letter W, end walls on said bottom portion having a central aperture therein, end walls on said side wall and cover forming portions having portions which are moved into overlapping relation above the end walls of said bottom portion when the carton is closed, and integral locking tabs on the outer edges of said overlapping end wall portions which are bendable into overlapping relation and into interlocking engagement in the apertures in the bottom end walls.

6. A molded pulp egg carton comprising a central bottom portion having a plurality of egg receiving cells therein which are separated along a longitudinal central line by a row of upwardly extending pyramidal dividing members terminating in horizontal top abutment surfaces, the end cells of said bottom portion defining end walls which extend upwardly and terminate in downwardly and outwardly extending oblique abutment edges, side wall forming members hingedly connected along opposite edges of the bottom portion and extending in a substantially vertical plane when in the closed position, integral cover forming wall members extending from the top edges of the side wall forming members in a substantially horizontal plane, end wall members of generally triangular shape integrally connected along two sides with the ends of the side and cover forming wall members, the third side of said end wall members being adapted to engage said oblique abutment edges on the bottom end walls, and hingedly connected partition forming members extending downwardly from said cover forming wall members with their free edges abutting the horizontal top surfaces on the pyramidal dividing members.

7. A molded pulp egg carton, comprising, in the open position in which it is molded, a central bottom forming portion having a plurality of upwardly opening egg receiving cells, and side wall and cover forming portions on opposite sides of said bottom forming portion, the end cells in said bottom forming portion defining bottom end walls which terminate at the top in lateral diverging downwardly and outwardly extending abutment forming edges, and said side wall and cover forming portions having members extending between and connecting the ends of the respective side wall and cover members thereof which members form top end walls, said top end walls having edges arranged to engage in abutting relation with the top abutment edges of the bottom end walls when the side wall and cover forming portions of the carton are folded into closed position over the bottom forming portion thereof.

8. A molded pulp egg carton comprising a central bottom portion having a plurality of egg receiving cells therein which are separated along a longitudinal medial line by a row of spaced upwardly extending pyramidal dividing members terminating in top abutment surfaces, the end cells of said bottom portion having outer walls forming bottom end walls, said bottom end walls having the top edges thereof extending laterally and inclined outwardly and downwardly, side wall forming members hingedly connected along opposite edges of the bottom portion and extending in a substantially vertical plane when in the closed position, integral cover forming members extending from the outer edges of the

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side wall forming members in a substantially horizontal plane in said closed position, and end members connected along two side edges of the ends of the side wall and cover forming members and having the edges along a third side positioned in abutting relation with the inclined top edges of said bottom end walls when in the closed position.

9. A molded pulp egg carton, comprising, in the open position in which it is molded, a central bottom forming portion having a plurality of upwardly opening egg receiving cells, and angularly-related side wall and cover forming members connected by hinge forming portions to opposite sides of said bottom forming portion, the end cells in said bottom forming portion having bottom end walls which terminate at the top in downwardly and outwardly diverging lateral edges, said side wall and cover forming members having top end wall forming members connecting adjacent ends of the respective side walls and cover members thereof, said top end wall forming members extending less than the full width of the bottom forming portion and having inner portions thereof extending in partial overlapping relation to each other above the top edges of the bottom end walls when the side wall and cover forming members of the carton are hinged into closed position over the bottom forming portion thereof and means for securing said top end wall portions in said overlapping relation.

10. A molded pulp egg carton having a cellular bottom portion and side wall and cover forming portions which are integrally joined in laterally extending relation to said bottom portion when the carton is in an opened out condition, the longitudinal walls of the carton being arranged when in the opened out condition to provide in transverse section taken between the cells thereof substantially the form of the letter W, bottom end walls on said bottom portion, top end walls on said side wall and cover forming portions, said top end walls extending less than the full width of said bottom portion and having free marginal portions which are moved into overlapping relation in the plane of said top end walls above the bottom end walls when the carton is closed, and fastening means for securing said overlapping marginal end wall portions together.

11. A molded pulp egg carton having a cellular bottom portion and side wall and cover forming portions which are integrally joined in laterally extending relation to said bottom portion when the carton is in an opened out condition with the longitudinal walls of the carton having in transverse cross section taken between the cells thereof substantially the form of the letter W, bottom end walls on said bottom portion having an upwardly opening central aperture therein and top end walls on said side wall and cover forming portions which are moved into upwardly extending generally vertical relation above the bottom end walls when the carton is closed, said top end walls extending less than the full width of the bottom forming portion and having free marginal portions which overlap in the vertical plane above said aperture in the bottom end walls and which receive a staple member for securing said portions together in the closed position.

12. A molded pulp egg carton comprising a central bottom portion having a plurality of egg receiving cells therein which are separated along a longitudinal medial line by a row of spaced up-

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wardly extending pyramidal dividing members terminating in top abutment surfaces, the end cells of said bottom portion having outer walls forming bottom end walls which terminate at the top in laterally diverging downwardly and outwardly extending abutment forming edges, side wall forming members hingedly connected along opposite edges of the bottom portion and extending in a substantially vertical plane when in the closed position, integral cover forming members extending from the outer edges of the side wall forming members in a substantially horizontal plane in said closed position, top end wall forming members connected to the ends of the respective side wall and cover forming members, said top end wall forming members having edges arranged to engage in abutting relation with the top abutment edges of the bottom end walls and hingedly connected medial partition forming members extending downwardly from said cover forming members having their free longitudinal edges in juxtaposed relation to the abutment surfaces on the pyramidal dividing members, the ends of said partition forming members being spaced from said end wall forming members, said side wall and cover forming members having transverse inwardly extending partition formations which are V-shaped in cross section and arranged centrally of longitudinally adjoining cell formations, the apex thereof defining a dividing line for separating the carton into two sections by tearing along said line.

13. A molded pulp egg carton comprising a central bottom portion having parallel rows of egg receiving cell formations therein, said bottom portion having end walls which extend upwardly and terminate in lateral downwardly and outwardly extending oblique abutment edges, side wall forming members hingedly connected along opposite edges of the bottom portion and extending in a substantially vertical plane when in the closed position, integral cover forming wall members extending from the top edges of the side wall forming members in a substantially horizontal plane, generally triangular end wall members integrally connected at two sides with the ends of the side and cover forming wall members, said end wall members being moved to bring the third side thereof into engagement with said abutment edges on the bottom end walls and flap forming members extending upwardly from the free edges of said cover forming walls in abutting relation and adapted to be secured together to hold said cover forming wall members in closed position.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,822,936	Reichel	Sept. 15, 1931
2,088,603	Kronenberger	Aug. 3, 1937
2,423,756	Chaplin	July 8, 1947
2,446,264	Cox	Aug. 3, 1948
2,455,295	Cox	Nov. 30, 1948
2,466,579	Cox	Apr. 5, 1949
2,529,140	Cox	Nov. 7, 1950
2,569,681	Lennon	Oct. 2, 1951

FOREIGN PATENTS

Number	Country	Date
748,732	France	Dec. 20, 1932