

March 17, 1970

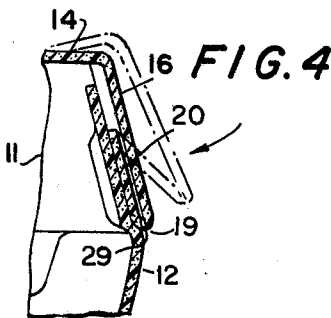
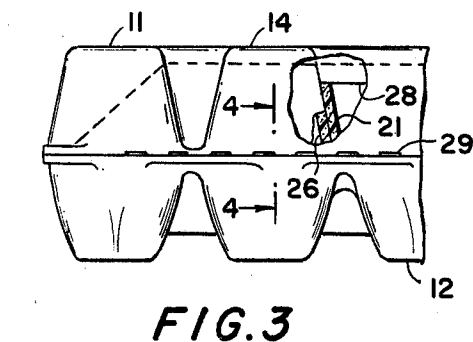
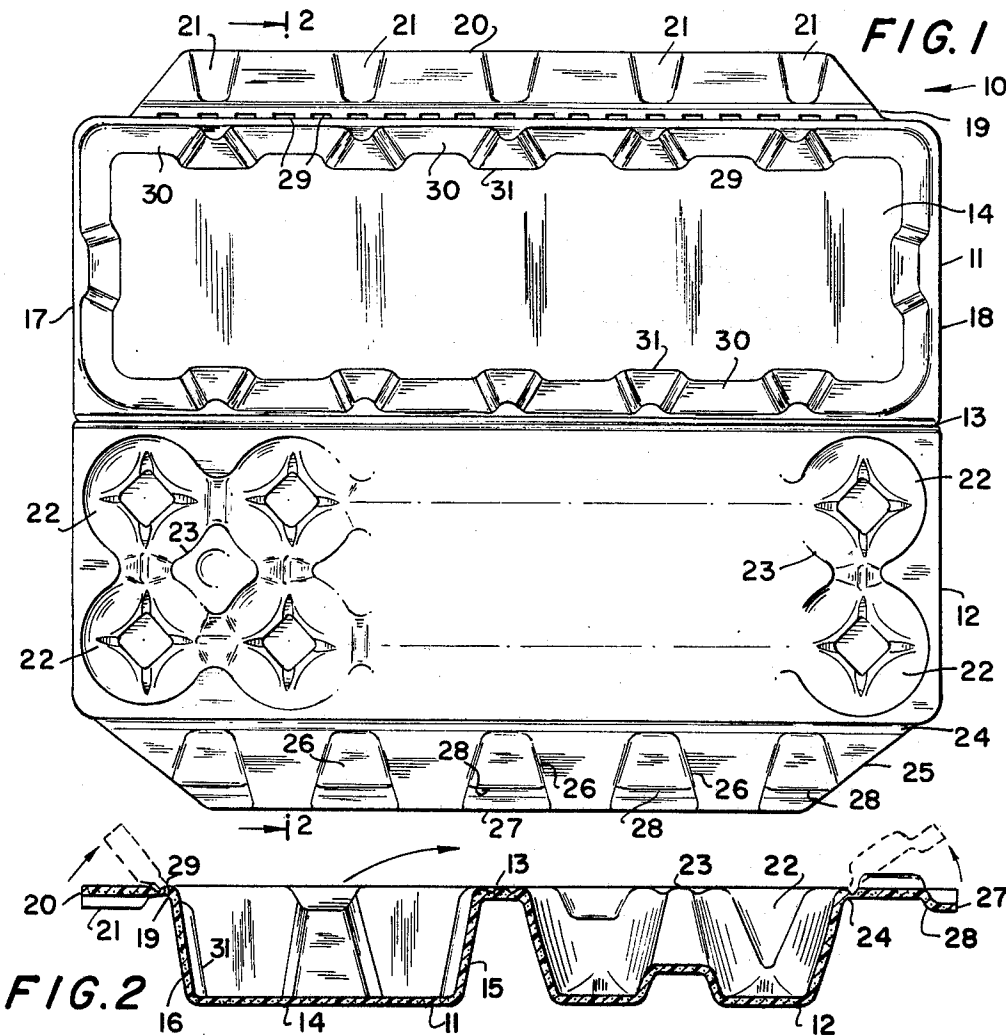
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3,501,083

EGG CARTON CONSTRUCTION

Filed Feb. 19, 1968

3 Sheets-Sheet 1



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FIG. 5

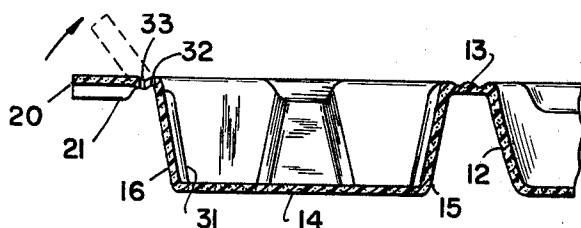
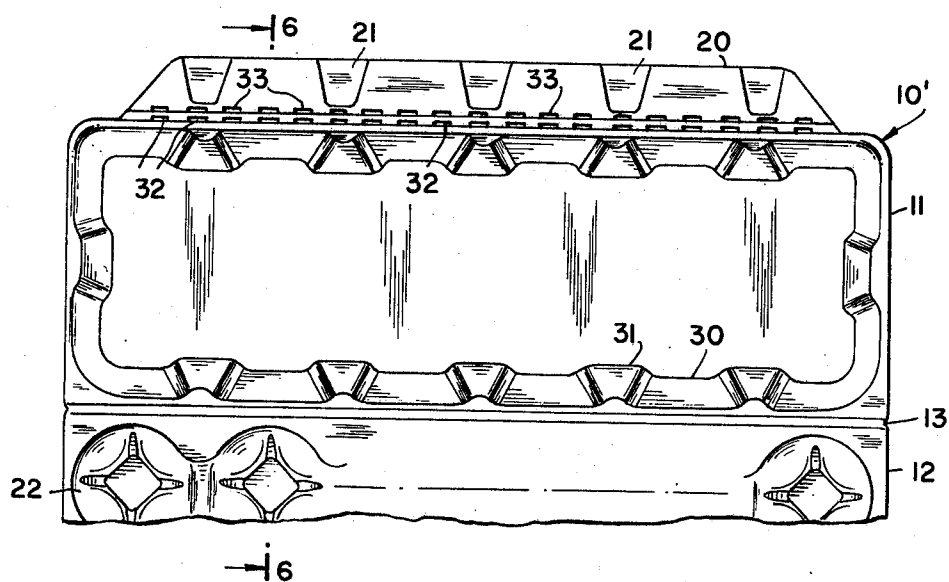


FIG. 6

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FIG. 7

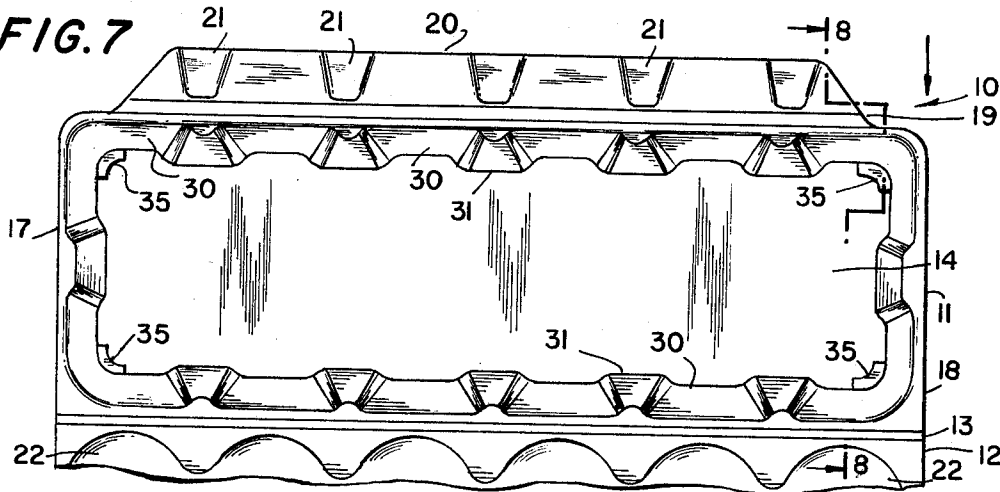


FIG. 9

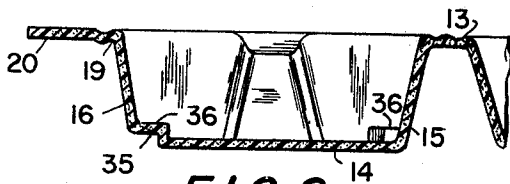
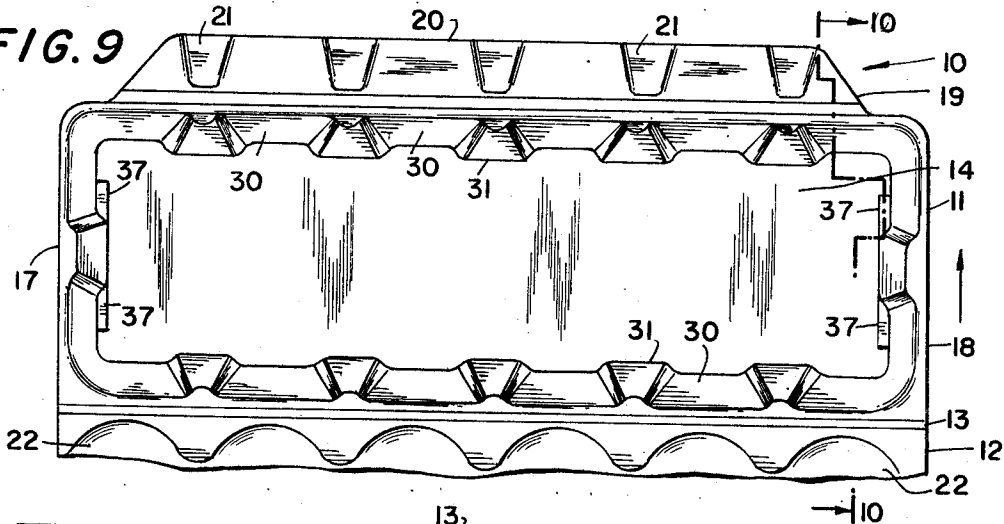
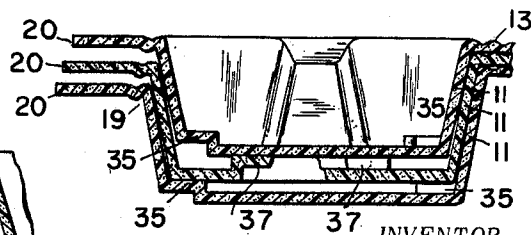


FIG. 8

FIG. 11



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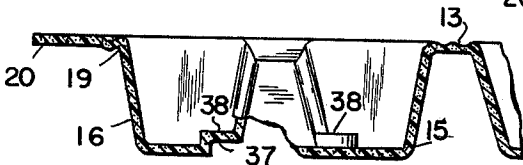


FIG. 10

1

2

3,501,083

EGG CARTON CONSTRUCTION

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U.S. Cl. 229—45

4 Claims

ABSTRACT OF THE DISCLOSURE

A molded egg carton including closable cover and bottom egg-receiving sections and integral foldable flanges operating cooperatively to provide a carton closing arrangement. The inwardly folding cover locking flange incorporates hinge perforations to facilitate rotation of the locking flange without damage thereto. The molded egg cartons also include raised projections or lands in the cover portions adapted to provide means for preventing jamming or wedging between the open cartons when nested for shipping or storage.

The present invention relates to improvements in molded cartons and, more particularly, to an integral locking device for releasably locking together the cover and bottom sections of the carton. Additionally, the present invention is also directed to the provision of a molded carton incorporating structure adapted to prevent jamming when the carton is nested with similar cartons during shipment or storage.

The molded egg carton, according to the present invention, in essence, comprises a dishd top or cover section which is hinged to a bottom cellular section. Essentially, the bottom cellular section of the egg carton is provided with a plurality of egg-receiving pockets or cells. Although the number of cells may vary, in practice, this section consists preferably of a dozen cells arranged in two parallel rows, each of which is constituted of six cells.

In many of the prior art molded egg carton constructions, problems have been encountered in providing effective and satisfactory locking devices for releasably locking together the top cover and bottom cellular sections. Various solutions of this problem have been proposed, such as through the use of extraneous fastening materials in the form of, for example, adhesive tapes or glue. This, of course, provides for an arrangement subject to the disadvantage that once the carton has been opened it must then be closed by either re-applying the adhesive tape or other adhesive materials. In order to eliminate this and other drawbacks of earlier carton constructions, certain molded cartons incorporated as an integrally molded feature various locking means. These locking means frequently comprise projecting tab or lug members adapted for insertion into mating recesses and slots in order to releasably secure the top cover and bottom cellular sections of the molded egg cartons. These locking means, although superior to the extraneous adhesive devices, were and are still not completely successful, inasmuch as they require excessive amounts of manipulation in attempting to either open or close and lock the carton. Additionally, such prior art locking devices failed to afford adequate positive locking action to the cartons, thereby frequently resulting in the inadvertent opening thereof, with resultant damage to the eggs stored in the cartons.

Recently, an improve and novel locking device has been developed in conjunction with a molded egg carton having a top cover section and a cellular egg-receiving bottom section. The egg carton incorporates a bracing and locking flange which is integral with the cellular bottom section of the carton and with the flange telescoping slidably

upwardly into locking engagement with a locking flange provided in the cover section, as the cover is brought down toward the bottom section for the purpose of closing the carton. The cover section locking flange is formed integrally with a side wall margin of the cover section thereby providing an interlocking member for engagement with the bottom locking flange when the carton is in a closed condition. A locking arrangement as referred to hereinabove, is described and disclosed in Connie Lake U.S. Patent No. 3,356,284, issued Dec. 5, 1967.

Although the above mentioned carton locking arrangement is generally satisfactory and greatly superior to prior art carton locking devices, some difficulties have been encountered in folding the carton cover locking flange inwardly in order to provide the proper telescoping and locking sequence with the bottom bracing and locking flange during closure of the molded carton top cover and bottom cellular sections. The resistance to inward folding of the top cover locking flange about a hinge line or edge so as to be generally parallel to the inner wall surface of the cover section in order to telescope with the mating bottom locking flange is due to the inherent rigidity of the flange construction as an integral portion of the carton cover section. As a result, it becomes necessary to utilize cumbersome and expensive apparatus in folding the carton cover locking flange inwardly of the carton. In addition, the rigidity or stiffness of the locking flange may cause it to be broken off the cover section at the hinge line during the folding operation, thereby rendering the carton closing arrangement completely ineffectual.

The present invention obviates the shortcomings of the afordescribed egg carton locking arrangement, by providing one or more lines of perforations in the hinge line or edge of the cover section locking flange of the molded egg carton. This, in effect, will facilitate the inward folding of the locking flange in a simple and effective manner along the line or lines of perforations provided along the hinge edge, while minimizing the danger of carton breakage. Further, the simplified and advantageous carton cover locking flange folding arrangement also obviates the need for special folding machines or devices heretofore employed in the prior art.

Another important aspect of the molded egg carton, in accordance with the present invention, lies in provision of novel and unique carton structure adapted to effectively prevent jamming between similar molded egg cartons when these are stacked or nested one within the other during shipment or storage. In general, the egg cartons are nested in large quantities in order to save space whereby the egg-receiving cells of each bottom cellular section snugly receives the cells of each next adjacent upper carton. Similarly, the carton cover section of each next adjacent upper carton is snugly received in the lower carton in which it is nested. In the absence of suitable means for preventing jamming or wedging together between adjacent nested cartons, it is virtually impossible or at best extremely difficult to separate nested cartons of this type in question without either distorting or tearing them when using presently available equipment. Usually, individual cartons are removed from a nested stack by a mechanism which incorporates gripping fingers adapted to be inserted between adjacent carton rims. The gripping fingers apply a pulling or yanking force on the end-most carton, thus releasing it from the nested stack of cartons. Generally, most of the mechanisms employed, pull on the carton at the cellular or bottom section. This frequently, in the absence of means for preventing jamming or sticking, will damage the cartons since the nested cover sections tend to wedge together.

Accordingly, one of the novel features of the present invention lies in the provision of novel raised wall struc-

tural portions or lands at predetermined regions in the cover sections of the cartons which will effectively prevent the jamming or wedging together of adjacent nested molded egg carton cover sections. Essentially, the lands comprise raised surface portions or projections in the interior of the carton cover top wall along segments of the end walls or positioned at the four corners of the cover section. When nesting cartons in which every other cover section has lands or projections of different physical configurations, i.e. one carton with lands along the end walls and the next adjacent carton with corner projections, a space will be created between adjacent carton cover sections which will prevent jamming or sticking together of the cover sections while not appreciably increasing the overall stacking height of the cartons.

The molded egg carton may be produced from a wide variety of materials such as, for example, pasteboard, molded paper pulp, or thermoplastic material and the like. A preferred material has been found to be thermoplastic foam such as foam polystyrene. Other types of thermoplastic polymers such as polyethylene, polypropylene and polyvinyl chloride have also been found to be satisfactory.

Accordingly, it is an object of the present invention to provide for an improved molded carton incorporating integral carton locking means.

Another object of the present invention is to provide a locking arrangement for a molded carton adapted to releasably lock the carton in a simple and positive manner.

A further object of the present invention is to provide a molded carton including integral structure adapted to prevent jamming or wedging between adjacent similar cartons when in a nested relationship.

The invention herein will be clearly understood by consideration of the following description thereof, reference being made to the appended drawings, wherein:

FIG. 1 is a top plan view of a molded carton according to the present invention, in an open position;

FIG. 2 is a transverse sectional view of the open carton along line 2—2 in FIG. 1;

FIG. 3 is a partial front elevational view, partially in section, when the carton is in a closed position;

FIG. 4 is a fragmentary view in vertical section along line 4—4 in FIG. 3;

FIG. 5 is a partial top plan view of a second embodiment of a molded carton according to the present invention, in an open position;

FIG. 6 is a transverse sectional view along line 6—6 of FIG. 5;

FIG. 7 is a partial top plan view of a third embodiment of a molded carton according to the present invention, in an open position;

FIG. 8 is a transverse sectional view along line 8—8 in FIG. 7;

FIG. 9 is a partial top plan view of a fourth embodiment of a molded carton according to the present invention, in an open position;

FIG. 10 is a transverse sectional view along line 10—10 in FIG. 9; and

FIG. 11 is a transverse sectional view of a stack of cartons according to the embodiments of FIGS. 7 and 9 in a nested relationship.

Referring now to the drawings, and in particular, to FIGS. 1 to 4, a molded egg carton, generally designated as 10, comprises a cover section 11 and a bottom cellular section 12 integrally connected thereto along a common longitudinal margin by an integral hinge member 13.

The cover section 11 includes a generally planar, rectangular top surface portion 14 and four wall members integrally formed therewith. The wall members comprise side walls 15 and 16 respectively, and a pair of end walls 17 and 18. As illustrated more clearly in FIGS. 2 through 4, the walls 15, 16, 17 and 18 depend downwardly from top surface portion 14 and flare outwardly at a slight angle to the vertical. The lower longitudinal edge of side wall 15 extends into and is integrally connected with

hinge member 13 which secures cover section 11 and bottom cellular section 12 in hinged relationship.

A hinge 19 connects the lower longitudinal margin or edge of side wall 16 with a cover section locking flange 20, the latter of which is molded integrally with the lower front edge of cover section wall 16 along hinge 19. As shown in FIG. 2, cover section locking flange 20 may be integrally molded in flat position extending outwardly substantially perpendicular to cover section 11. The locking flange 20 is adapted to be rotated inwardly of the cover section 11 to a position adjacent to and generally parallel with the inner surface of side wall 16 when the carton sections 11 and 12 are in closed relationship. The surface of locking flange 20 is provided with a plurality of wedge shaped projections 21 disposed at locations intermediate pairs of adjacent cells in the bottom section 12 when the carton 10 is in a closed position.

The cellular bottom section 12 of the carton 10 comprises a series of egg-receiving pockets or cells 22 arranged in two parallel rows of six cells each, and divided by upstanding hollow, substantially pyramidal shaped post member 23.

As illustrated in FIGS. 1 and 2, integrally hinged at edge 24 along the longitudinal length of the cellular bottom section 12, and opposite hinge 13, is a bottom section locking flange 25 which extends along substantially the entire length of bottom cellular section 12. Locking flange 25 may be integrally molded in a flat position extending outwardly, and substantially perpendicular to bottom section 12, and is adapted to be rotated about hinge edge 24 to a substantially vertical position, so as to be located interiorly of the front side wall 16 when the carton sections 11 and 12 are in closed relationship.

A plurality of longitudinally spaced wedge shaped detents or recesses 26 are provided on the surface of bottom locking flange 25, and disposed at locations intermediate adjacent egg-receiving cells 22 contained in bottom section 12. The wedge shaped recesses 26 conform in shape and are generally complementary to the wedge shape projections 21 provided on the surface of cover locking flange 20, and are adapted to receive the projections 21 in interlocking, mating engagement when the carton 10 is in a closed relationship. As may be noted, the base portions of wedge shaped recesses 26 are located somewhat below the leading edge 27 of bottom locking flange 25 whereby a series of locking detents 28 are provided along the upper portion of locking flange 25.

In order to effect locking closure of the carton 10, bottom locking flange 25 is rotated about hinge 24 from its normal horizontal position to an upstanding or vertical position as illustrated by the dotted lines in FIG. 2. Subsequently, cover section 11 is rotated about hinge 13 toward closing relationship with bottom cellular section 12. Simultaneously, cover locking flange 20 is rotated about its integral hinge 19 to a position adjacent to the inner surface cover section side wall 16.

Previously, in prior art carton constructions, when folding or rotating locking flange 20 inwardly of the cover section 11, the inherent stiffness thereof and resistance to rotation frequently caused the flange to break along hinge edge 19. This, in effect, necessitated the use of special and expensive apparatus for carefully rotating the flange 20 about hinge edge 19. According to the present invention, this problem and drawback encountered in the prior art is completely avoided by providing a line of perforations 29 along hinge 19. The perforations 29, which extend through the thickness of locking flange 20, extend along the full length of carton cover section 11, adjacent to the outer surface of cover side wall 16. As illustrated in FIG. 1, the perforations 29 comprise a series of slits which in essence provide a fold line for the locking flange 20 about hinge 19, thus facilitating the ready inward rotation of locking flange 20 into cover section 11 without the need for special equipment, while reducing the potential of carton breakage or damage dur-

ing this sequence. Although the perforations 29 are described as a series of slits, it should be readily apparent that other types of perforations such as, for example, circular apertures or holes, may also be used to advantage. The perforations 29 may be provided in the cartons by means of ordinary, widely known perforating cutters, well known in the art.

As the carton 10 is completely closed, the top and bottom locking flanges 20 and 25 come into face to face contact within the closed carton section. Wedge shape projections 21 on cover locking flange 20 engage the oppositely positioned wedge shaped and complementary recesses 26 carried on the surface of bottom locking flange 25, whereby the interlocking of the complementary and mated projections and recesses is completed and the carton sections 11 and 12 are in locked engagement.

The natural tendencies of the integrally molded flanges 20 and 25 to assume their normally horizontal positions cause them to be urged into locking engagement with one another when the carton 10 is closed, and assists in preventing inadvertent opening of the carton. As shown in FIGS. 3 and 4, when the carton 10 is in a closed position, locking detents 28 carried on flange 25 are in engagement with the base portions of projections 21 on locking flange 20. Thus, when forces are applied to the carton sections during handling thereof, the carton 10 resists opening under the weight of eggs contained in the cells 22, and the carton sections remain firmly locked in a closed relationship.

When it is desired to open the carton 10, projections 21 are disengaged from the corresponding recesses 26 on locking flange 25 by exerting a slight upward and outward pressure or pull against the exposed surface of longitudinal hinge 19 while concurrently grasping the carton's cellular bottom section 12. This, as shown in FIG. 4 by means of the dotted lines, results in the leading edge of top section locking flange 20 pivoting about the points of engagement of wedge shaped projections 21 and recesses 26, i.e. at detents 28 carried on the leading edge of bottom locking flange 25. The result is the disengagement of the locking flanges 20 and 25 as the carton sections 11 and 12 rotate about interconnecting hinge 13 to an open position.

In the present embodiment of the carton structure, as illustrated in the drawings, cover section walls 15, 16, 17 and 18 are each of a scalloped shape, including longitudinally spaced outwardly curved or recessed bays 30 formed by frusto-conical surfaces 31 or sections molded into the side walls 15, 16 and end walls 17, 18 of the cover section 11 to increase the egg room in the cover section above egg cells 22 of bottom cellular section 12.

A second embodiment of an egg carton, generally designated as 10', is illustrated in FIGS. 5 and 6 of the drawings, and is in most respects quite similar to the construction of carton 10. In this embodiment, however, in order to facilitate rotation of locking flange 20 about hinge 19 into the interior of cover section, a first line of perforations 32 extends through flange 20 adjacent to the outer wall surface of side wall 16 of cover section 11. A second line of perforations 33 extends through flange 20 in closely parallel spaced relationship to the first line of perforations 32. The second line of perforations should be preferably spaced from the first line of perforations by approximately the thickness of the wall of the molded carton, and is located outwardly spaced on the flange 20 relative to the outer surface of side wall 16 on cover section 11.

As the locking flange 20 is folded inwardly or rotated about hinge 19 during the closing of the carton 10', the perforation lines 32 and 33 form two convenient folding lines for the locking flange 20. This will permit the ready and simple inward rotation of flange 20 into carton cover section 11 without any distortion of the integrally molded flange and cover section, thereby avoiding the need for

special folding equipment and reducing the danger of damage to the carton.

When shipping or storing the molded egg cartons, in order to conserve space they are generally stacked and nested one within the other in a flat open position, cover section within cover section, and bottom cellular section within bottom cellular section. As the individual cartons are needed, they are removed from the nested carton stack by suitable means, usually stripping fingers which are inserted between adjacent nested cartons. Generally, the stripping fingers apply forces to the end carton in the region of the bottom cellular section. Frequently, however, the carton cover sections tend to jam or wedge together during nesting, thereby resulting in tearing or breaking of the nested cartons during separation thereof.

Accordingly, in order to avoid damage or destruction of the nested cartons during separation, the present invention contemplates the provision of novel separating means for the nested carton cover sections adapted to prevent jamming or wedging of adjacent carton cover sections. To this effect, the carton embodiment illustrated in FIGS. 7 and 8 of the drawings, provides for interior projections or lands 35 integrally molded in the corners of carton cover section 11 connecting top wall or surface portion 14 and side and end walls 15, 16, 17 and 18. The projections 35 are generally arcuate extending around the corners between adjacent cover section side and end walls and extend interiorly of the cover portion 11 by approximately one wall thickness, although not limited thereto. Each land or projection 35 thereby presents a raised surface portion 36 parallel to end and spaced below or interiorly of the inner surface of cover surface wall portion 14. In all other respects, the carton illustrated in this embodiment may be identical to the carton 10 or carton 10' illustrated hereinabove. It is also obvious that the carton referred to in this embodiment and incorporating the anti-jamming projections 35 may be produced without the locking flange perforations of the other carton embodiments.

The embodiment of the molded egg carton, illustrated in FIGS. 9 and 10 of the drawings, is quite similar to the construction of the carton of FIGS. 7 and 8. In this embodiment, however, the projections 37 are positioned in the centrally located segments of cover section end walls 17 and 18 and extend downward from top surface wall 14 interiorly of the cover section 11. This, in effect, will provide two projections 37 having raised interior surfaces 38 within the cover section 11 and positioned adjacent to the end walls 17 and 18.

When nesting a stack of molded egg cartons, as illustrated in FIG. 11, cartons according to the embodiment of FIGS. 7 and 8 are alternately nested with cartons according to the embodiment of FIGS. 9 and 10. As illustrated, the bottom-most carton includes corner projections 35 which prevent jamming or wedging with a carton section 11 positioned in immediate upper nested position and which has end wall projections 37. The bottom surface of wall 14 of the upper carton cover section 11 thus rests on projections 35. Another carton having corner projections 35 may then be nested above and within the carton having a cover section 11 with the end wall projections 37. The cover section surface will then be supported by the projections 37 on the lower carton cover, herein illustrated as the center cover section. The nesting of the cartons may then be continued to the desired height and amount suitable for shipping and storage, using carton cover sections having alternately corner projections 35 or end wall projections 37.

Although the cartons have been described as having corner projections 35 or end wall projections 37, it should be obvious that other locations along walls 15, 16, 17, and 18 peripherally about surface wall 14, for projection combinations would be equally suitable in order to provide the required means for preventing jamming between nested cartons.

Having described the invention in detail, it will be apparent that various modifications will occur to those skilled in the art.

What is claimed is:

1. A molded carton comprising a cover section and a bottom article-receiving cellular section, said cover section including a generally planar top wall, and an upstanding front wall, a rear wall and two side walls, said bottom cellular section including a front side, a rear side and two ends and being connectively hinged to said cover section along the margin of the rear side of the bottom section to the margin of the rear side of the cover; and said cover section including integrally molded projecting land means interiorly joining portions of said top wall and at least some of said upstanding walls so as to provide a structure which is adapted to prevent jamming when nesting similar cartons one within the other; wherein when a plurality of said cartons are in a nested relationship, said land means of alternate nested cartons comprise projections connecting said top wall and the corner portions of said front, rear and side walls, and said land means of the other nested cartons comprise projections connecting said top wall and portions of said side walls, said last-mentioned projections being laterally offset relative to the corner projections of said other alternate cartons so as to effectively prevent jamming between adjacently nested cartons.
2. A carton as defined in claim 1 characterized by having a cover locking flange with a longitudinal edge thereof hinged to the longitudinal edge of the front wall of said cover section, said cover locking flange having a line of perforations extending therethrough along said hinged edge adjacent to said cover front wall, said cover locking flange being pivotable about said hinged edge and line of perforations so as to be positionable inside of the front wall of said top section and substantially in parallel relationship therewith.
3. A molded carton as defined in claim 1 including a locking arrangement for securing said cover and bottom sections in a closed relationship, said locking arrangement comprising:
 - (1) a bottom locking flange having a longitudinal edge hinged to the longitudinal edge of the front side of said bottom cellular section, said bottom locking flange including locking detent means on the opposite longitudinal edge of said flange; and

- (2) a cover locking flange having a longitudinal edge hinged to the longitudinal edge of the front wall of said top section, said cover locking flange including a line of perforations extending therethrough along said hinged edge adjacent to said top section front wall, said cover locking flange being pivotable about said hinged edge and line of perforations so as to be positionable inside of the front wall of said top section and substantially in parallel relationship therewith, said cover locking flange further including projections located along the length of said cover locking flange, which projections are adapted to, when the carton is closed, matingly engage with said detent means on said bottom locking flange, said bottom locking flange being positionable inwardly toward said connecting hinge whereby, when said carton is closed, said bottom locking flange is substantially adjacent to said cover locking flange and an edge of a projection on the cover locking flange abuts against said locking detent means on said bottom locking flange.
4. A molded carton as defined in claim 3 wherein said cover locking flange includes a second line of perforations extending therethrough, said second line of perforations extending along said hinged edge in parallel spaced relation to said first line of perforations and in proximity to said top section front wall, and said cover locking flange being pivotable about said hinged edge and said first and second lines of perforations so as to be positionable inside of the front wall of said top section and substantially in parallel relationship therewith.

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