United States Patent

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[54] LOCKING MECHANISM FOR EGG CARTONS

12 Claims, 6 Drawing Figs.

[52] U.S. Cl. 229/44, 229/2.5, 229/45
[51] Int. Cl. B65d 5/66
[50] Field of Search ..... 229/2.5, 29(M), 44, 45

[56] **References Cited**

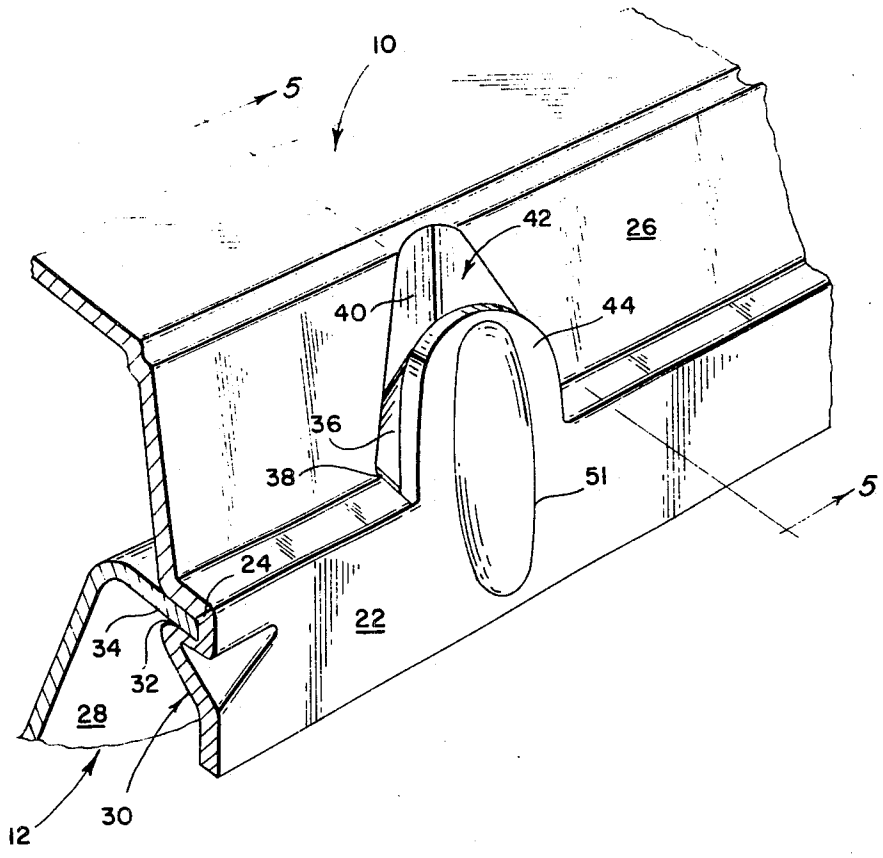
UNITED STATES PATENTS

2,217,455	10/1940	Price et al.	229/44X
2,771,233	11/1956	Cox	229/29X
3,258,187	6/1966	Greatman	229/2.5
3,285,491	11/1966	Bessett	229/45X
3,458,108	7/1969	Howarth et al.	229/45X

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ABSTRACT: A locking mechanism for an egg carton having an integrally hinged tray and cover. The locking mechanism includes a locking flap hingedly connected to the front of the cover and locking detents extending inwardly from the flap that engage the underside of a protruding lip on the carton's tray when the carton is closed. Lugs are provided on the top of the tray that extend through the cover and pivot the locking flap into locking engagement as the tray and cover are moved into closed position.



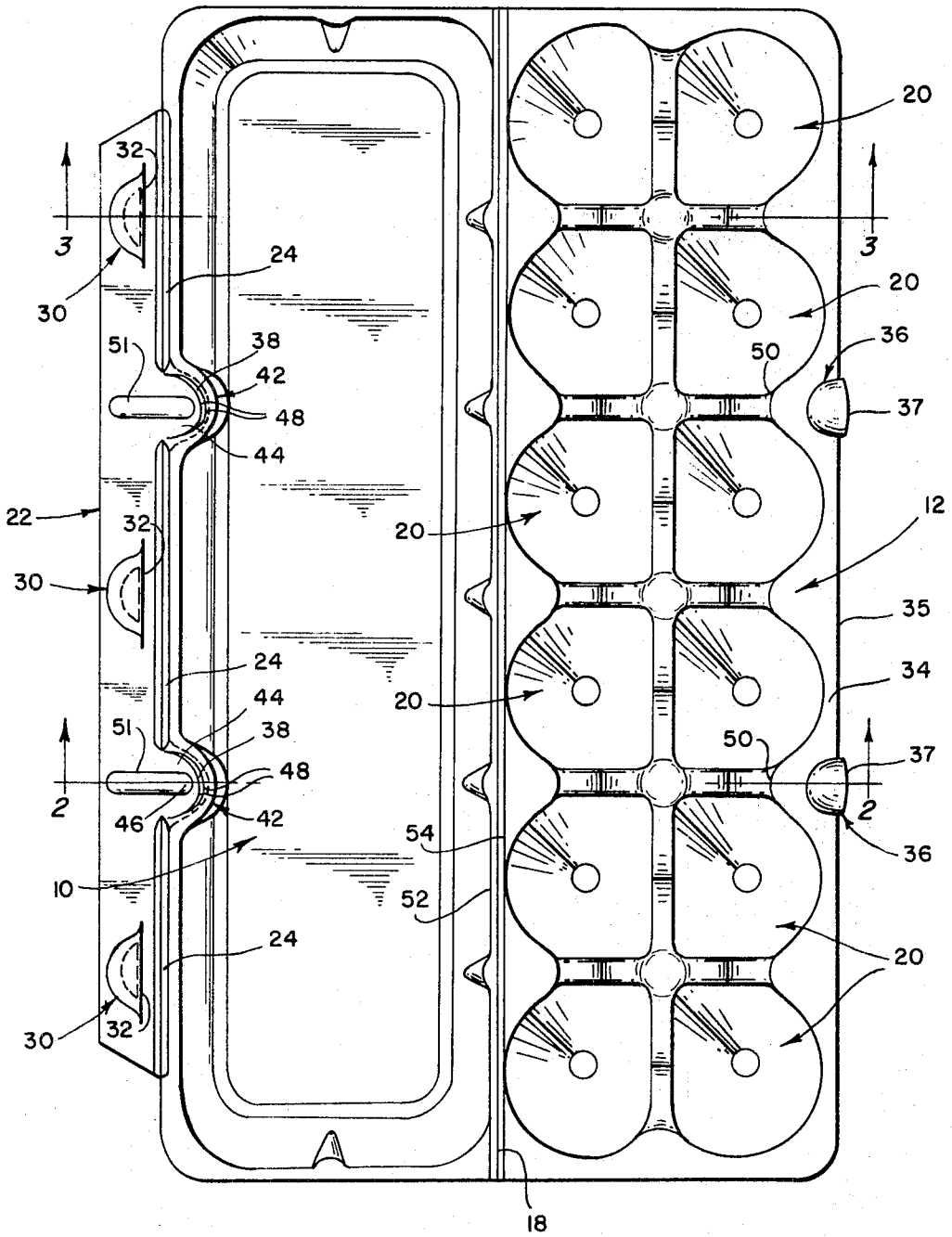


FIG. 1

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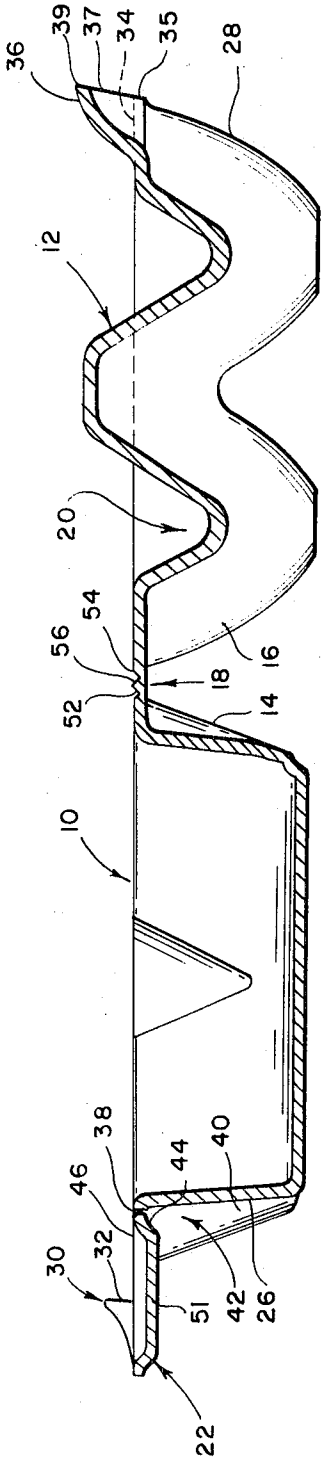


FIG. 2

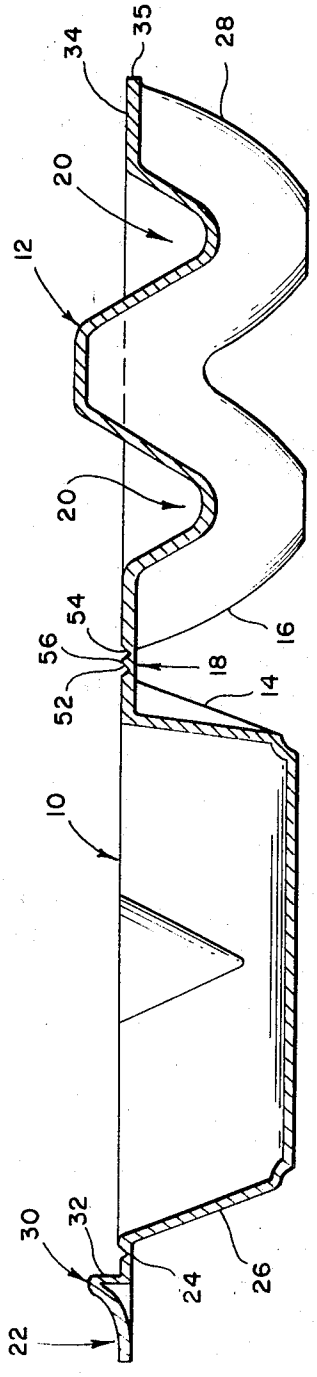


FIG. 3

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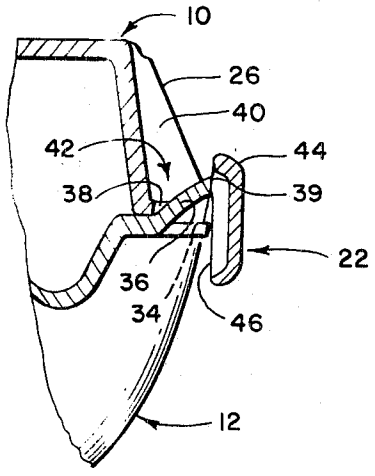


FIG. 5

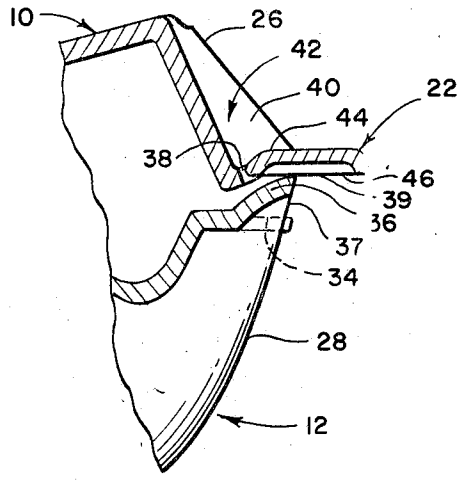


FIG. 6

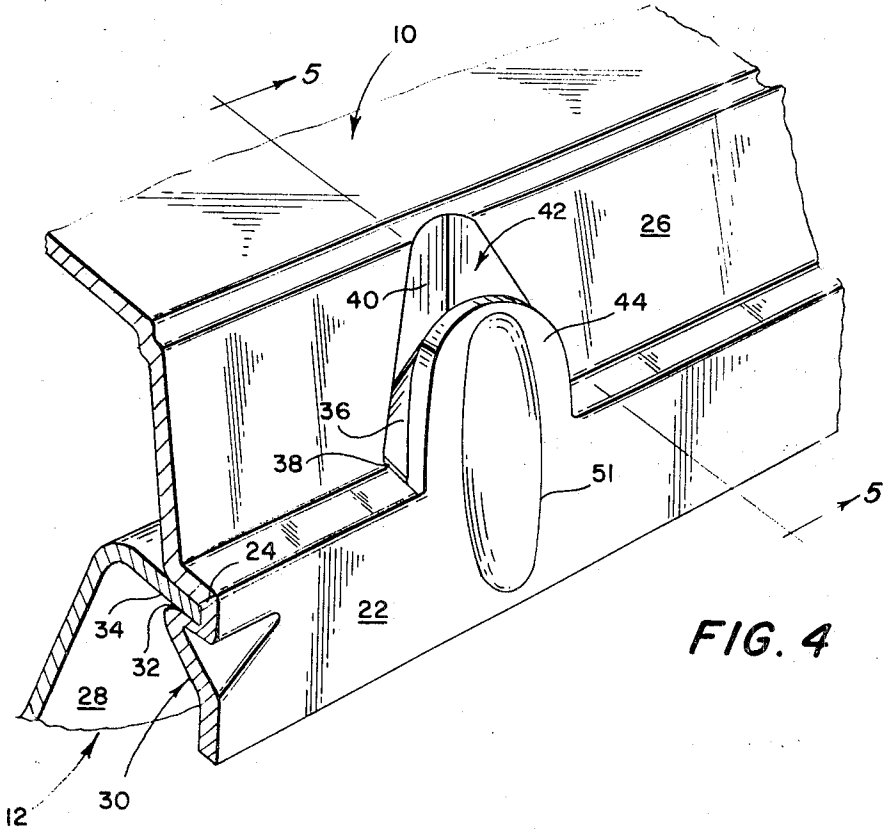


FIG. 4

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LOCKING MECHANISM FOR EGG CARTONS

SPECIFICATION

This invention relates to packaging cartons, and more particularly to a new and improved locking mechanism for molded egg cartons.

Molded with various types of integrally molded locking mechanisms have been provided in the past for the packaging of eggs. Exemplary of one widely used type of mechanism provides a pair of lugs protruding outwardly from a flap hingedly connected to the front of the carton's tray and matable apertures in the front wall of the carton's lid through which the lugs extend to lock the lid to the tray.

Cartons utilizing this type of locking mechanism, however, have generally proven unsatisfactory to housewives and other users because they are difficult to open and close. The lug-locking feature, for example, requires flexing of the carton's walls, and due to the inherent stiffness of the material used in the manufacture of such cartons and the outward pressure of the packaged articles, it is difficult for the user to flex the structure sufficiently to allow for easy opening and closing. During closing, for example, the front wall of the lid must be pulled outward to insert the lugs through the openings and during opening the front wall of the tray must be pushed inwardly to free the lugs from the openings. Such difficulties, of course, are not only inconvenient to the user, but render the carton and the packaged articles prone to being damaged during repeated opening and closing of the carton.

In accordance with the present invention, a new and improved locking mechanism for packaging cartons is provided in which the carton includes a bottom section having a front wall with a protruding lip and a rear wall; and a cover section having a front wall and a rear wall, the cover and bottom section's rear walls being hingedly connected so that the cover section can assume a closed-superimposed position with the respect to the bottom section.

Interlocking means are provided on the front walls of the cover and bottom sections for releasably holding the carton closed, in which the interlocking means includes a locking flap hingedly connected to the cover section's front wall and at least one locking detent protruding inwardly from the flap, the locking detent engaging the underside of the protruding lip of the bottom section's front wall when the carton is closed to lock the sections together.

The interlocking means further includes cam means for pivoting and holding the locking flap in locking position as the sections are moved into closed position, in which the cam means comprises at least one lug protruding upwardly from the top of the bottom section's front wall, and an aperture in the cover section's front wall through which the lug extends as the sections are moved into closed position, a said locking flap being engaged by the lug as it passes through the aperture to pivot the locking flap down and its attached locking detent into locking engagement with the underside of the bottom section's protruding lip.

Preferably, the packaging carton is an egg carton and the carton and interlocking means are of unitary molded construction.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory but are not restrictive of the invention.

The accompanying drawings which are incorporated in and constitute a part of a specification illustrate an embodiment of the invention, and together with the description serve to explain the principles of the invention.

Of the drawings:

FIG. 1 is a plan view of an open egg carton showing the locking mechanism of this invention;

FIG. 2 is a sectional view taken along the line 2–2 of FIG. 1;

FIG. 3 is a sectional view taken along the line 3–3 of FIG. 1;

FIG. 4 is a fragmentary perspective view of the front of the carton of FIG. 1 in a closed position;

FIG. 5 is a sectional view taken along the line 5–5 of FIG. 4; and

FIG. 6 is a sectional view similar to FIG. 5 but modified to show the carton in a slightly open position.

Reference will now be made in detail to the present preferred embodiment of the invention, an example of which is illustrated in the accompanying drawings.

The packaging carton illustrated in the drawings and contemplated for use with the locking mechanism of this invention is an egg carton having a cover section or lid **10** and a bottom section or tray **12**. The cover and bottom sections' rear walls **14** and **16**, respectively, are hingedly connected by an integral web **18**. Bottom section **12** has a plurality of egg accomodating cells **20** arranged in parallel rows. While the number and rows of cells may vary, the bottom section preferably consists of a dozen cells arranged in two (2) parallel rows of six (6) cells each.

A wide variety of materials may be used in the manufacture of the carton structure illustrated in the drawings. Molded paper pulp, pasteboard, plastic and the like, for example, may be used. A preferred material, however, is thermoplastic foam, such as, for example, foam polystyrene, or other polymers, such as polyethylene, polypropylene, polyvinylchloride, and the like. For purposes of illustration, and as a preferred embodiment, the drawings show an egg carton and locking mechanism for the carton of unitary construction produced by vacuum molding or match-molding techniques from the sheet of polystyrene foam.

In accordance with the invention, interlocking means are provided on the front walls of the cover and bottom sections for releasably holding the carton closed. The relationship between the interlocking means and the top and bottom sections of the carton as shown in the drawings will be used for clarity in the specification and claims, but it is to be understood that the various parts of the interlocking means may be reversed with respect to the carton's sections without departing from the scope of this invention.

As embodied, the interlocking means includes a locking flap **22** hingedly connected at **24** to the bottom of the front wall **26** of cover section **10** so that the flap, when the carton's sections are in closed position as shown in FIG. 4, will be located in front of the front wall **28** of bottom section **12**. Locking flap **22** has a plurality of locking detents **30**, three (3) being shown in the drawings, that protrude inwardly from the flap, with each detent having an upper locking edge **32**.

In closed position, the locking edges **32** on each locking detent **30** engage the underside of a protruding lip **34** on the top of bottom section's front wall **28** to lock the sections together.

The interlocking means further includes cam means for pivoting locking flap into **22** into locking position as the cover and the bottoms sections are moved into closed position. As embodied, the cam means comprises a plurality of lugs **36**, two (2) of which are shown in the drawings that protrude upwardly from lip **34** on the bottom section's front wall. **28**. As best shown in FIG. **2**, the front surface **37** of lugs **36** slants upwardly and outwardly so that its top edge **39** is slightly forward of the front edge **35** of the bottom section's protruding lip **34**. Preferably, and as best shown in FIG. **1**, lugs **36** are located between adjacent pairs of locking detents **30**.

Matable with lugs **36** are a plurality of apertures **38** in the bottom of the cover section's front wall **26**. Lugs **36** and apertures **38** are located on the front walls of their respective sections so that the lugs extend through the apertures without interference and without flexure of either wall when the sections are moved into closed position.

As best shown in FIG. **4**, the cover section's front wall **26** has plurality of pairs of angularly offset vertical walls **40**, the walls of each pair intersecting one another to form a channel **42** that extends vertically up from apertures **38**. The purpose of channels **42** will be more fully described below.

The cam means also includes a plurality of cam projections **44** located adjacent each channel **42**. Projections **44** are integral with and extend upwardly from the top of locking flap **22** and have a height slightly less than the depth of the base of channels **42**.

As best shown in FIG. **6**, and when the sections of the egg carton are moved into closed position, the plurality of lugs **36** on bottom section's front wall **28** pass upwardly through cor-

responding apertures 38 in cover section's front wall 26 and the top edges 39 of lugs 36 push against the inner surface 46 of cam projections 44. Lugs 36 acting against projections 44 thus pivot locking flap 22 down about hinge 24 to automatically engage the locking edges 32 of locking detents 30 with the underside of protruding lip 34 on the bottom section's front wall 28 (see FIG. 4). After closure, the slanted surfaces 37 of lugs 36 hold locking flap 22 in locked position.

For convenience in molding the egg carton and its attached locking mechanism, and with reference to FIG. 1, cam projections 44 are most advantageously formed by simply cutting or stamping out a half moon cut 48 on the bottom of channels 42 on the cover section's front wall 26. Such a cut simultaneously forms projections 44 on locking flap 22 and corresponding apertures 38 at the bottom of channels 42.

To strengthen the interlocking means during use, lugs 36 are located on the top of carton ribs 50 that form the egg accommodating cells 20, and ribs 51 are molded integral with locking flap 22 to strengthen projections 44.

Lugs 36 and corresponding projections 44 on locking flap 22 further assist in the unlocking and separation of the bottom and cover sections of the carton. During unlocking and opening, and as best shown in FIG. 6, locking flap 22 is pulled outwardly and upwardly and about hinge 24, by inserting the fingers between the flap and the bottom section's front wall 28, pulling locking detents 30 out of engagement with the underside of protruding lip 34. During upward movement of locking flap 22, the inner surfaces 46 of projections 44 act against the top edges 39 of lugs 36, tending to separate the cover from the bottom section. Channels 42 in cover section's front wall 26 permit projections 44 to pivot inwardly and downwardly about hinge 24 and against lugs 36 until they reach a position essentially closing apertures 38 when the locking flap is substantially co-planar with the bottom of cover section 10 (*i.e.*, as shown in FIG. 2).

The integral web 18 connecting the rear walls 14 and 16 of the cover and bottom sections, respectively, is preferably doubly creased at 52 and 54 to provide a double-hinge with a compressible midportion 56 that resiliently urges the cover and bottom sections apart. Thus, locking detents 30 snap tightly into engagement with the underside of the bottom section's protruding lip 34 when the carton is closed.

It will be understood that while the preferred construction for the locking mechanism has been described, the illustrated shape of locking detents 30, lugs 36, or projections 44, for example, may be varied. For example, cut 48 can be rectangular or even V-shaped, instead of the U-shaped cut shown in the drawings. Further, a single locking detent may extend substantially all along the inner surface of locking flap 22. Other variations within the scope of the invention will, of course, be apparent to those skilled in the art.

It is to be further understood that the carton described in the drawings and utilizing the locking mechanism of this invention is a preferred carton design for eggs. The invention, however, is applicable to a variety of egg carton shapes and other similar cartons. An egg carton, for example, have three (3) parallel rows of four (4) egg accommodating cells each could readily be used with the present locking mechanism.

The invention thus provides a new and improved locking mechanism for packaging cartons, and particularly molded egg cartons. The locking mechanism facilitates the easy closing with automatic and positive locking, and the easy opening of the carton without the need for applying excessive pressure to the carton, and without fear of damage to the carton or to its contents. Further, the locking mechanism of this invention can be integrally molded with the egg carton from a sheet of suitable material using conventional molding techniques.

The invention in its broader aspects is not limited to the specific details shown and described, and departures may be made from such details without departing from the principles of the invention and without sacrificing its chief advantages.

I claim:

1. A packaging carton comprising a bottom section having a front wall with a protruding lip and a rear wall; a cover section having a front wall and a rear wall, the cover and bottom sections' rear walls being hingedly connected so that the cover section can assume a closed-superimposed position with respect to the bottom section; and interlocking means on the front walls of the cover and bottom sections for releasably holding the carton closed, said inner interlocking means comprising:
   a. a locking flap hingedly connected to the cover section's front wall;
   b. at least one locking detent protruding inwardly from the flap, the locking detent engaging the underside of the protruding lip of the bottom section's front wall when the carton is closed to hold the sections together; and
   c. cam means for pivoting and holding the locking flap in locking position as the sections are moved into closed position, said cam means comprising:
      i. at least one lug protruding upwardly from the top of the bottom section's front wall, and
      ii. an aperture in the cover section's front wall through which the lug extends as the sections are moved into closed position; said locking flap being engaged by the lug as it passes through the aperture to pivot the locking flap down and its attached locking detent into locking engagement with the underside of the bottom section's protruding lip.

2. The carton of claim 1, in the form of an egg carton with the bottom section having a plurality of egg accommodating cells.

3. The carton of claim 1, wherein the carton is of unitary molded construction.

4. The carton of claim 3, wherein the molded carton is formed of foamed polystyrene.

5. The carton of claim 1, including a plurality of locking detents protruding inwardly from the locking flap.

6. The carton of claim 1, including a plurality of lugs protruding upwardly from the top of the bottom section's front wall, and a plurality of corresponding apertures in the cover section's front wall.

7. the carton of claim 6, wherein the locking flap is hingedly connected substantially along one side to a protruding lip on the cover section's front wall, and a plurality of projections, integral with the locking flap, extends in a direction opposite of the flap from the hinged connection, said projections being engaged by the lugs as the lugs pass through the apertures to urge the locking flap down into locking position.

8. The carton of claim 7, in which the faces of the lugs adjacent the projections on the locking flap slant upwardly and outwardly.

9. The carton of claim 7, wherein the front wall of the carton includes a plurality of sets of angularly offset vertical walls that intersect one another to form a plurality of inwardly extending channels, said channels being open at the bottom to form the apertures in the cover section's front wall and permitting the projections to partially close the apertures when the locking flap is substantially coplanar with the bottom of the cover section's front wall.

10. The carton of claim 7, in which the projections act against the lugs to separate the cover and bottom sections as the locking flap is pulled out of locking position.

11. The carton of claim 1, wherein the locking detent and the underside of the protruding lip of the bottom section's front wall are tightly engaged.

12. The carton of claim 11, wherein the hinged connection between the cover and bottom sections' rear walls resiliently urges the sections apart so that the locking detents snap into tight engagement with the underside of the protruding lip of the bottom section's front wall when the sections are moved into closed position.