United States Patent

[11] 3,552,635

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[21] Appl. No. **827,240**
[22] Filed **May 23, 1969**
[45] Patented **Jan. 5, 1971**

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[54] **LOCKING MECHANISM FOR EGG CARTONS**
7 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **229/44,**
229/2.5, 229/45
[51] **Int. Cl.** **B65d 85/32,**
B65d 1/24
[50] **Field of Search** 229/2.5, 44,
45

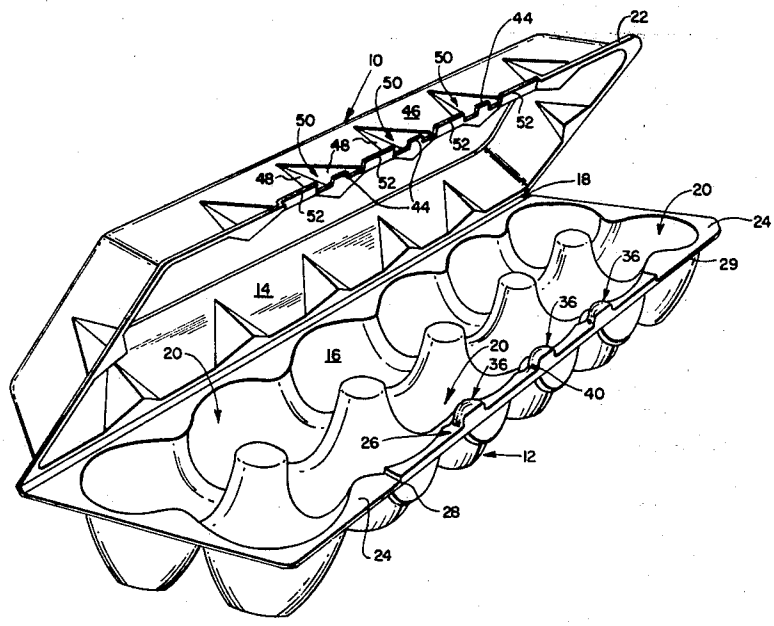
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ABSTRACT: A locking mechanism for an egg carton having an integrally hinged tray and cover. The locking mechanism includes a plurality of locking flanges that extend forwardly from the bottom longitudinal edge of the cover's front wall and that fit into a plurality of rearwardly opening locking fingers on the top of the tray's front wall when the carton is closed. To prevent inadvertent opening of the carton, the fingers form part of a locking flap that is hingedly connected to the tray's front wall and that folds into the interior of the tray, where the packaged eggs hold the flap and its attached fingers in proper locking position.



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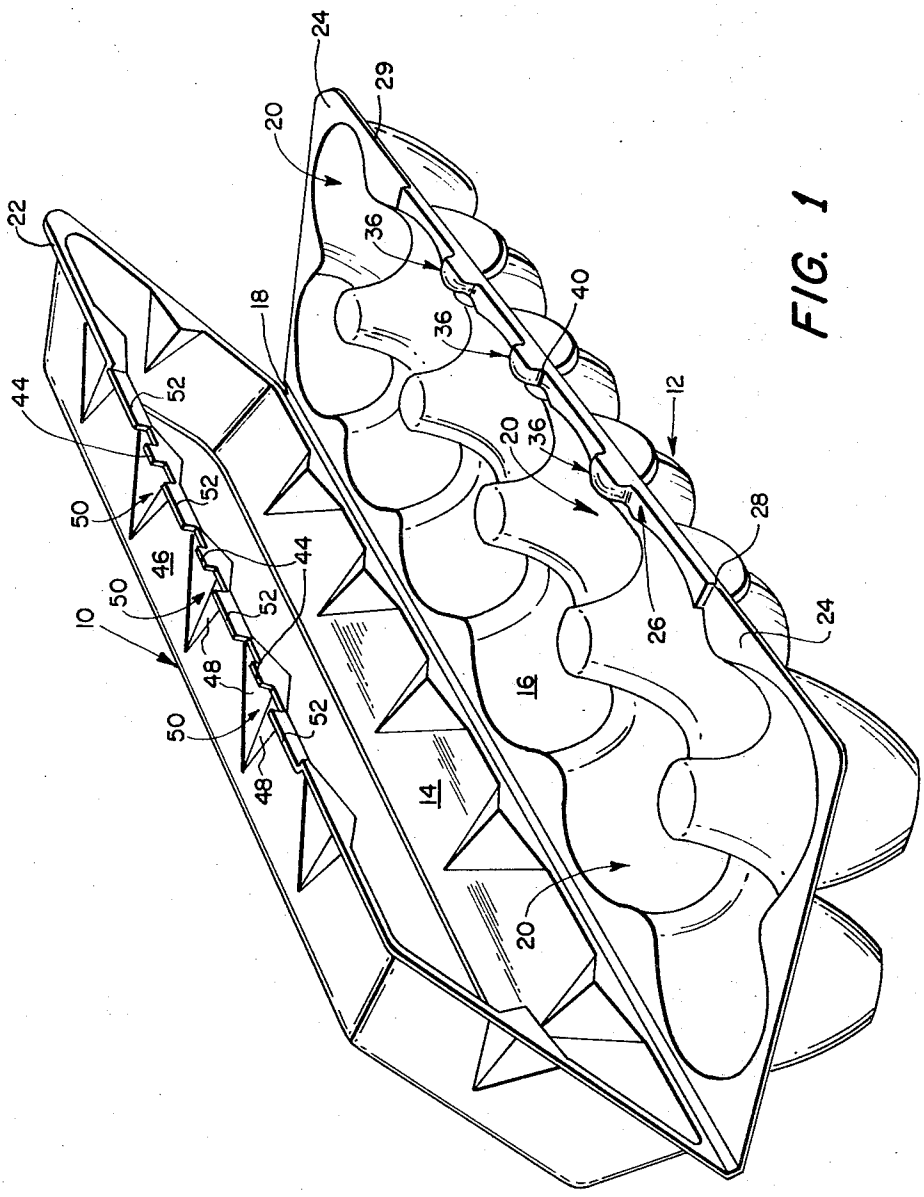


FIG. 1

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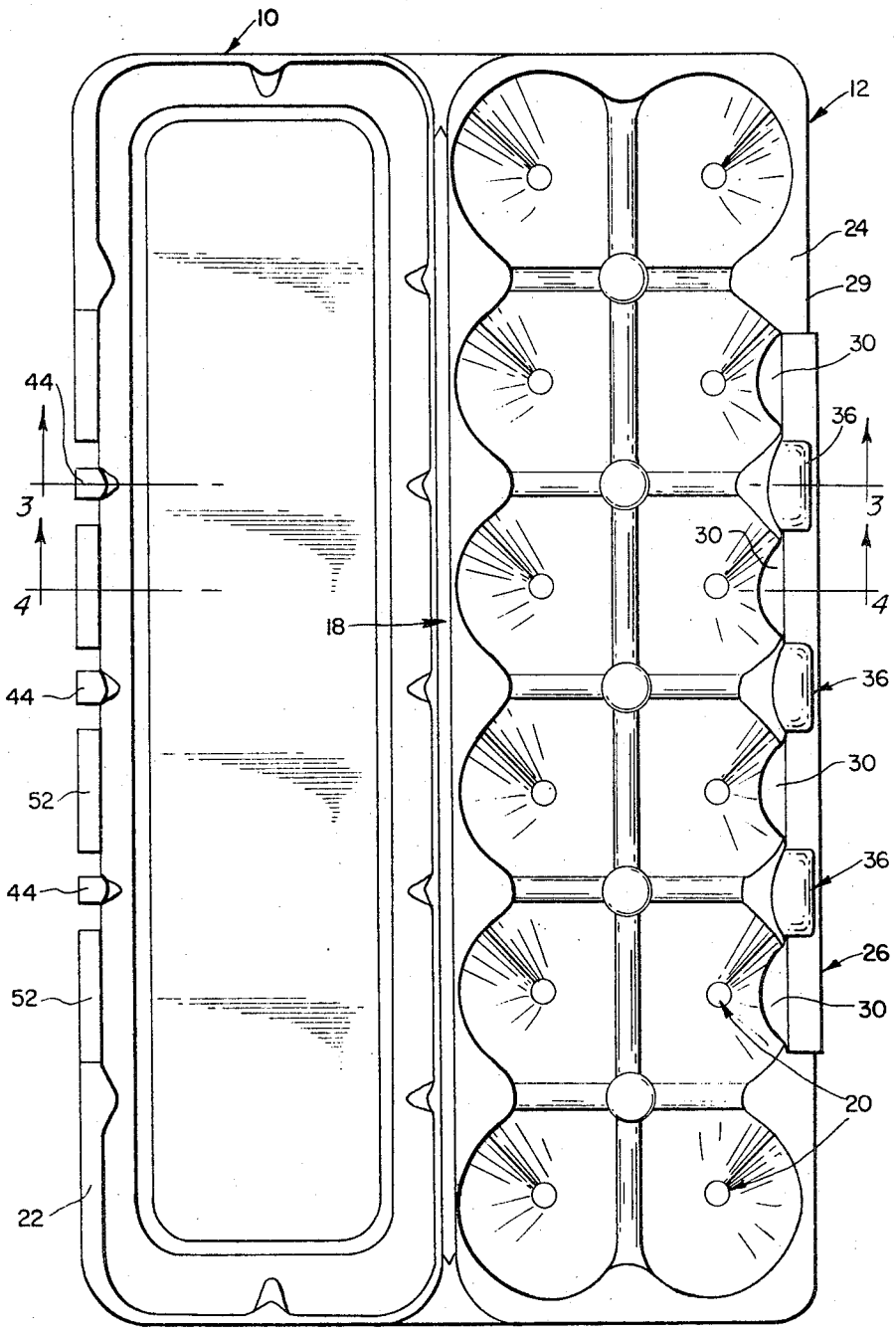


FIG. 2

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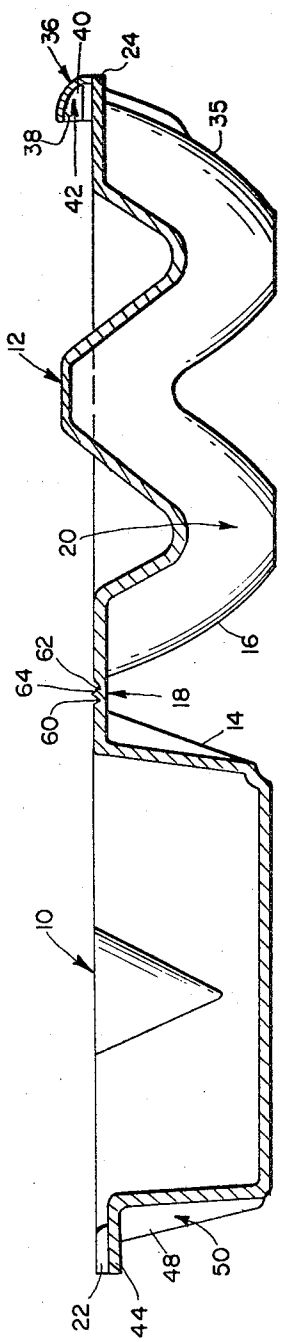


FIG. 3

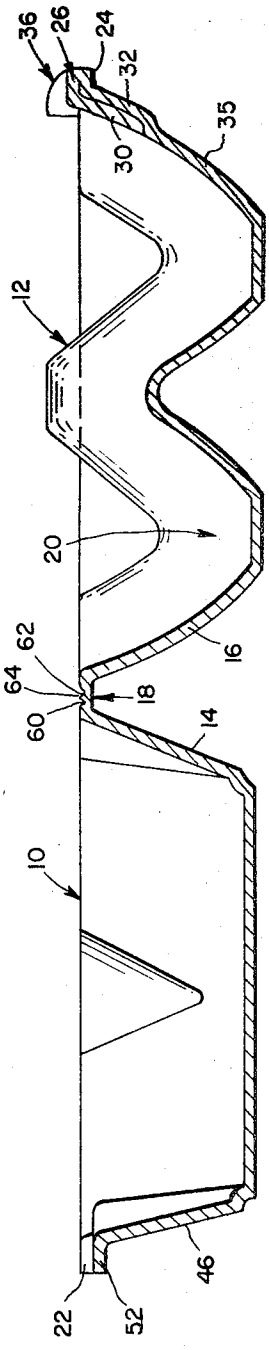


FIG. 4

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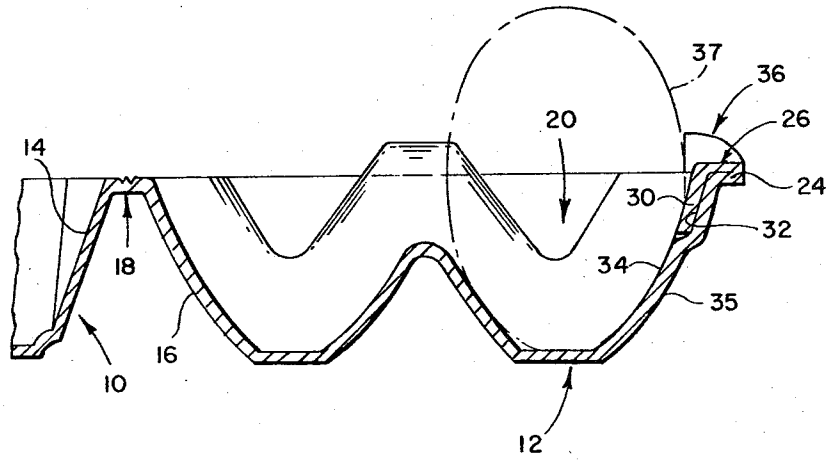


FIG. 5

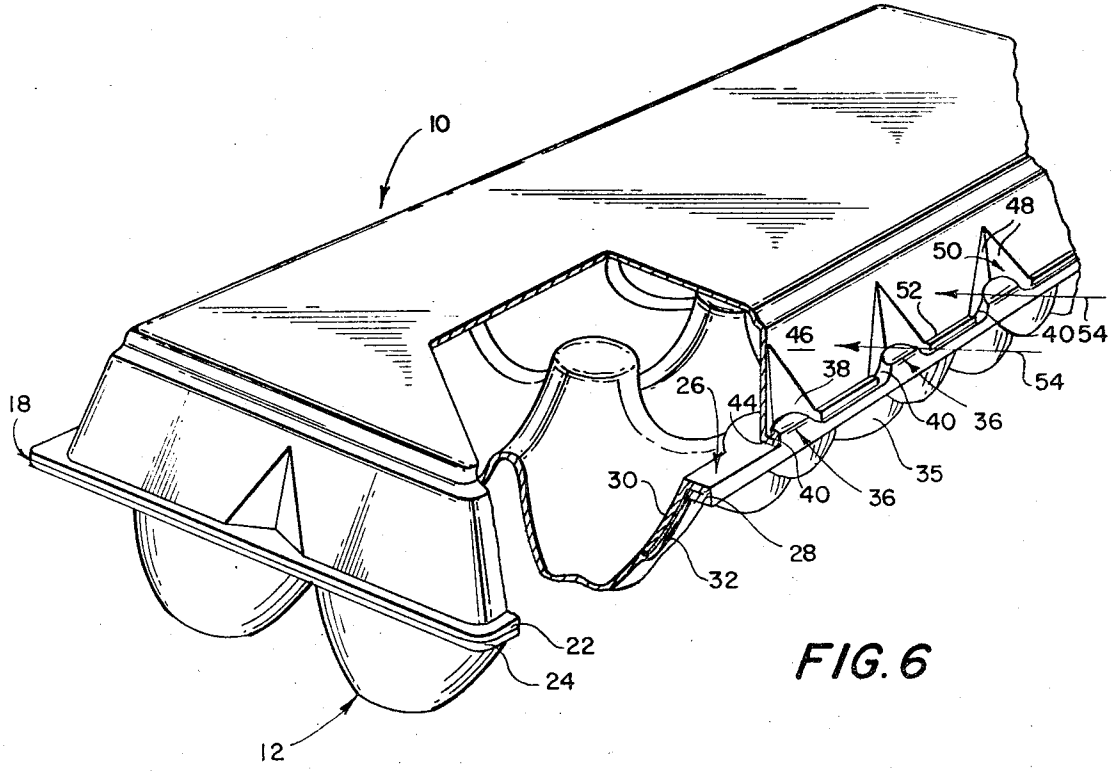


FIG. 6

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LOCKING MECHANISM FOR EGG CARTONS

SPECIFICATION

This invention relates to improvements in locking mechanisms for molded egg cartons.

Molded cartons with various types of integrally molded locking mechanisms have been provided in the past for the packaging of eggs. One type of latch arrangement includes mating rib and channel elements along the front longitudinal edges of an egg carton that snap into and out of engagement to releasably hold the carton closed. Conventionally, the top rim of the front wall of the carton's tray curves upwardly and inwardly to form a latch channel, and the bottom rim of the front wall of the carton's cover projects outwardly to form a mateable rib. The rib snaps into the channel when the carton is closed where it is releasably held by the resilience of the carton's structure.

A disadvantage of this type of latch arrangement, however, is the tendency of the rim forming channel to be pushed outwardly when top to bottom compressive forces are encountered during normal handling, thus allowing the carton to open unexpectedly or interfere with the packaging of a plurality of loaded cartons in a larger container.

Attempts to improve the latch arrangement have included the application of an adhesive material between the channel and rib elements to strengthen their interlocking engagement. The requirement of an adhesive application step, however, necessarily adds to the time and expense of an automatic egg packaging operation in addition to making the carton inconvenient to open by the housewife.

In accordance with the present invention, a new and improved locking mechanism for an egg carton is provided in which the carton has hingedly connected bottom and cover sections that can assume a closed superimposed position with respect to each other, and a plurality of rows of egg accommodating cells in the bottom section of the carton.

The locking mechanism includes a locking flap hingedly connected to the top of the bottom section's front wall that is folded into overlapped relation with the inside of bottom section's front wall and held in folded position by the eggs packaged in the forward row of egg accommodating cells; a plurality of rearwardly opening locking fingers integral with the locking flap and having an upper locking edge, said fingers projecting upwardly from the top of the bottom section's front wall when the flap is in folded position; and a plurality of spaced locking flanges projecting forwardly from the bottom longitudinal edge of the cover section's front wall, the locking flanges fitting into the locking fingers and engaging the underside of the fingers' upper locking edges when the carton is closed to hold the sections together.

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 this 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 perspective view of an open egg carton embodying the locking mechanism of this invention;

FIG. 2 is a top plan view of the egg carton of FIG. 1 in an open position;

FIG. 3 is an enlarged sectional view taken along the line 3–3 of FIG. 2;

FIG. 4 is an enlarged sectional view taken along the line 4–4 of FIG. 2;

FIG. 5 is an enlarged fragmentary sectional view similar to FIG. 4 and showing a packaged egg holding the locking flap in folded position; and

FIG. 6 is a fragmentary perspective view of the carton of FIG. 1 in a closed position.

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

The 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 accommodating 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 egg 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. Preferably, and as shown in the drawings, the egg carton and locking mechanism are of unitary molded construction produced by vacuum molding or match molding techniques from a sheet of polystyrene foam.

Conventionally, the carton includes an outwardly and laterally extending flange **22** that extends around the bottom of the cover section's rear, side, and front walls and a corresponding lateral flange **24** that extends around the top of the bottom section's rear, side, and front walls. The flanges **22** and **24** are in substantial flush load-bearing engagement when the carton is closed to provide support against crushing of the carton when loaded cartons are arranged in stacked relation.

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. As embodied, and as shown in the drawings, the interlocking means includes a locking flap **26** hingedly connected at **28** to the forward edge **29** of the bottom section's lateral flange **24**. As best shown in FIGS. **1** and **6**, locking flap **26** is folded into overlapped relation with the top of flange **24** to place the flap in locking position.

In accordance with the invention, locking flap **26** includes a plurality of depending tabs **30** that extend into the interior of the forward row of egg accommodating cells **20** when the flap is folded into locking position. As best shown in FIG. **5**, each tab **30** fits into a corresponding recess **32** on the inside surface **34** of the bottom section's front wall **35** and is of sufficient length so that it is engaged by an egg **37** packaged in the forward row of cells **20** to hold locking flap **26** in its folded and locking position.

The interlocking means further includes a plurality of rearwardly opening locking fingers **36** integral with locking flap **26** that project upwardly from the top of the bottom section's lateral flange **24** when the flap is in folded position. As best shown in FIG. **3**, each locking finger **36** includes an upper locking edge **38** and depending sidewalls **40** connecting the locking edge to flap **26** and defining a rearwardly opening recess **42**.

Further, and as best shown in FIG. **1**, a plurality of spaced locking flanges **44** corresponding to locking fingers **36** project forwardly from the bottom longitudinal edge of the cover section's front wall **46**. In closed position, and as shown in FIG. **6**, locking flanges **44** fit into the recesses **42** in locking fingers **36** and engage the underside of the fingers' top edges **38** to hold the cover and bottom sections together.

To provide clearance for locking fingers **36** when the carton is in closed position, the cover section's front wall **46** has a plurality of pairs of angularly offset vertical walls **48**. The walls of each pair intersect one another behind each locking flange **44** to form a channel **50** that extends vertically up from the flange. Thus when the carton is locked shut, and as best shown in FIG. **6**, fingers **36** extend into channels **50** so that the flanges **44** can fit into and engage the underside of the fingers' locking edges.

Preferably, locking flanges **44** are coplanar with and separated by lateral flange segments **52** that form a part of the cover section's lateral flange **22**. The flange segments **52** and locking flanges **44** are raised above the flange **22** along the

front of the carton a distance sufficient to provide clearance for folded flap **26**, so that flange segments **52** lie in substantial flush load-bearing engagement with the top of the flap when the carton is closed.

During packaging, the eggs being inserted into cells **20** depress tabs **30** of locking flap **26** into recesses **32** to hold flap **26** in its folded and locking position. Thereafter, and to lock the carton shut, cover section **10** is rotated about hinge **18** toward closing relationship with bottom section **12**, and the front wall **46** of cover section **10** is pressed inwardly in the direction of arrows **54** (see FIG. **6**) to permit locking flanges **44** to pass behind the rearward edge of locking fingers **36**. After closure, pressure on the cover section's front wall **46** is released, allowing locking flanges **44** to snap forward into recesses **42** under the resilience of the carton's structure, and engage the underside of the fingers' locking edges **38**.

To open the carton, the front wall **46** of cover section **10** is pressed inwardly to push locking flanges **44** out of locking fingers **36** and the cover is pulled upwardly.

As best shown in FIGS. **3** and **4**, integral web **18**, hingedly connecting the cover and bottom sections, is preferably doubly creased at **60** and **62** with a compressible midportion **64** to resiliently urge the cover and bottom sections apart. Thus, locking flanges **44** tightly engage the underside of the top edge **38** of locking fingers **36** when the carton is closed for more positive locking.

The invention thus provides a new and improved locking mechanism for molded egg cartons that facilitates easy closing on automatic egg packaging machines and that provides more positive locking by utilizing packaged eggs to hold the mechanism in locked position to prevent inadvertent opening of the carton during handling, shipping, or storage. Further, the locking mechanism of this invention can be integrally molded with the basic structure of the egg carton from a sheet of suitable material, using conventional molded 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.

We claim:

1. An egg carton comprising a bottom section having a front wall, a rear wall, and a plurality of rows of egg accommodating cells; 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 along the front walls of the cover and bottom sections for releasably holding the carton closed, said interlocking means comprising:

a. a locking flap hingedly connected to the top of the bottom section's front wall and folded into overlapped relation with the inside of the bottom section's front wall, said flap being held in folded position by eggs packaged in the forward row of egg accommodating cells;

b. a plurality of rearwardly opening locking fingers integral with the locking flap and having an upper locking edge, said fingers projecting upwardly from the top of the bottom section's front wall when the flap is in folded position; and

c. a plurality of correspondingly spaced locking flanges projecting forwardly from the bottom longitudinal edge of the cover section's front wall, the locking flanges fitting into the locking fingers and engaging the underside of the fingers' upper locking edge when the carton is closed to hold the sections together.

2. The carton of claim **1**, wherein the carton and interlocking means are of unitary molded construction.

3. The carton of claim **2**, wherein the carton and interlocking means are formed of molded polystyrene foam.

4. The carton of claim **1**, including a laterally extending flange along the top of the bottom section's front wall, in which the locking flap is hinged to the forward edge of the lateral flange so that it overlies the top of a portion of the flange when in folded position and in which the locking flap includes a plurality of depending tabs that extend into the interior of a plurality of egg cells, said tabs being engaged by the eggs packaged in said cells to hold the flap in folded position.

5. The carton of claim **4**, including a laterally extending flange along the bottom of the cover section's front wall lying in substantial flush engagement with the bottom section's flange when the carton is closed, the portion of said cover's flange adjacent the locking flap being raised so that is lies flush with the top of the folded flap when the sections are in closed position.

6. The carton of claim **5**, wherein the locking flanges on the cover section are coplanar with and interrupt the raised portion of the cover section's lateral flange adjacent the locking fingers.

7. The carton of claim **1**, wherein the hinged connection between the cover and bottom sections' rear walls resiliently urges the sections apart so that the locking flanges tightly engage the underside of the locking fingers' upper locking edges when the sections are in closed position.