# United States Patent

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[54] **EGG CARTON**
**16 Claims, 5 Drawing Figs.**


[52] **U.S. Cl.** ..... **229/44 R,** 229/2.5, 229/45
[51] **Int. Cl.** ..... **B65d 85/32**
[50] **Field of Search** ..... 229/44, 45, 2.5, 14 C, 29 M; 206/46; 217/27, 34, 35, 26.5



[56] **References Cited**

UNITED STATES PATENTS

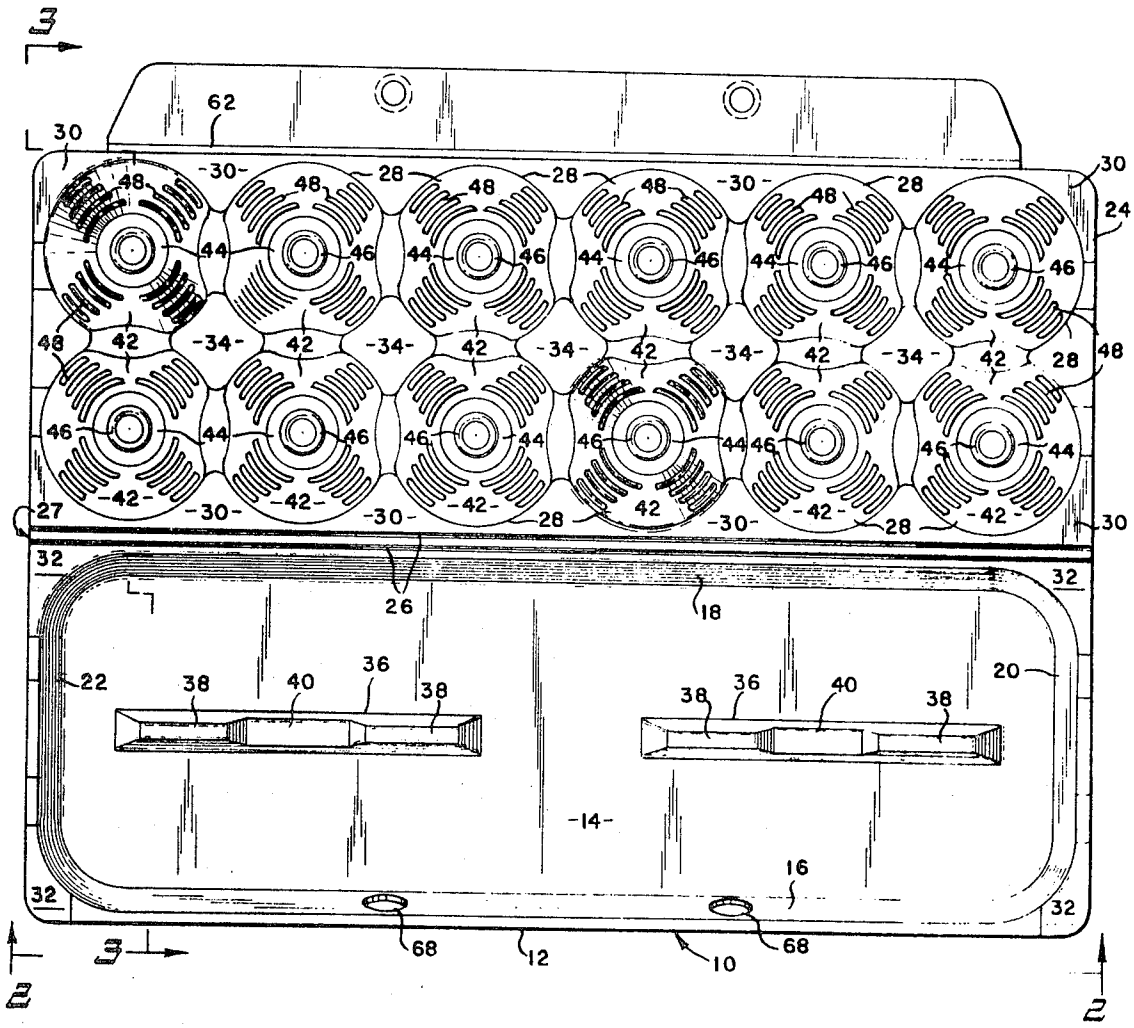
| | | | |
|---|---|---|---|
| 3,207,409 | 9/1965 | Reifers et al. | 229/2.5 |
| 3,282,458 | 11/1966 | Rudd | 217/26.5 |
| 3,298,594 | 1/1967 | Makowski et al. | 229/29 M |
| 3,458,108 | 7/1969 | Howarth et al. | 229/2.5 |
| 3,326,443 | 6/1967 | Burkett | 229/2.5 |



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**ABSTRACT:** A molded egg carton made from a foam plastic material which includes integrally hinged cover and tray portions. Support beams protrude from the internal surface of said cover and cooperate with posts protruding upwardly from the interior of the tray portion when the container is in a closed position so as to protect against vertical stress, and separate the contents. The tray portion includes a plurality of cells having annular segmented cushion rings integrally formed therein in a stepped ascending manner towards the top of the cell in order to protect the contents against breakage.

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SHEET 1 OF 2

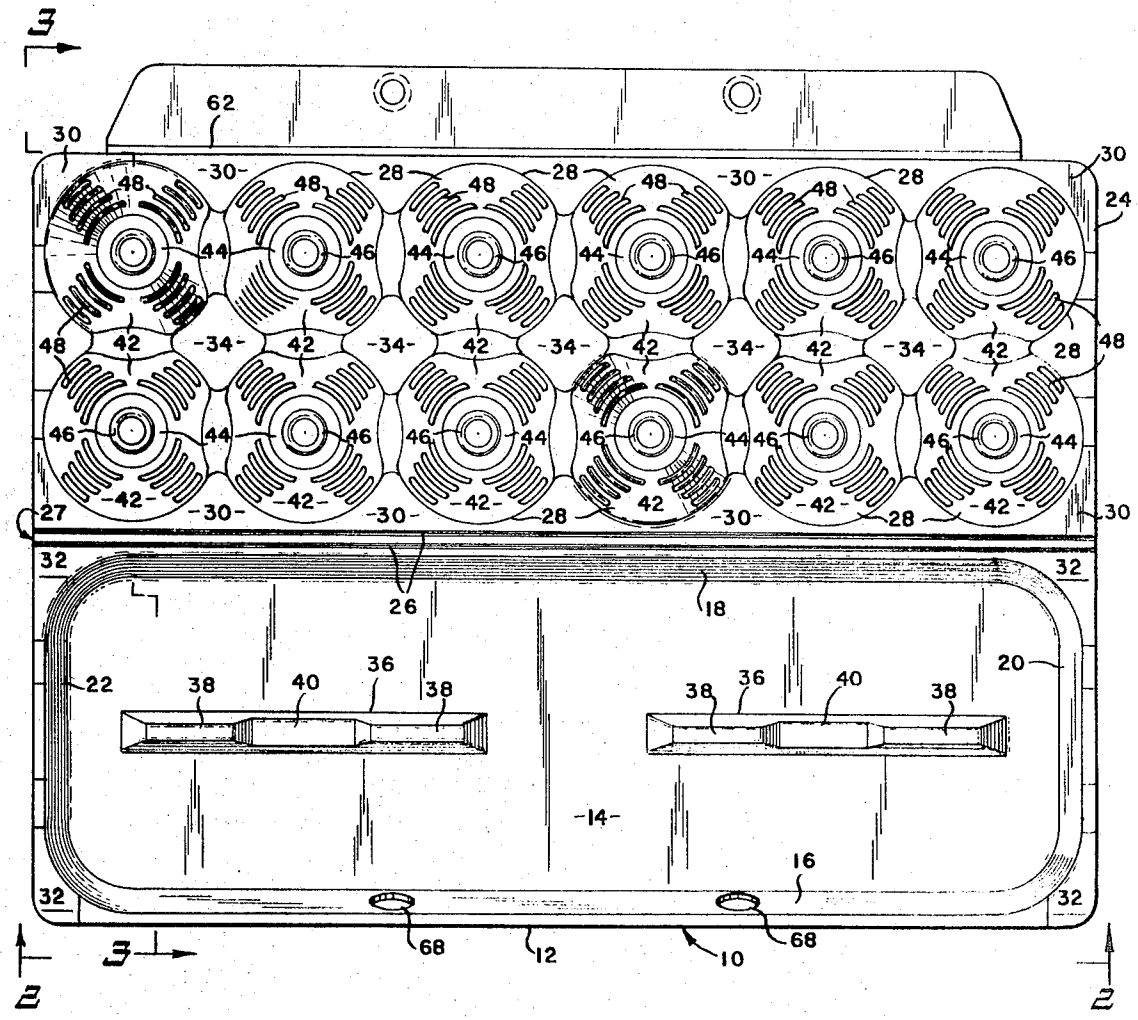



Fig. 1

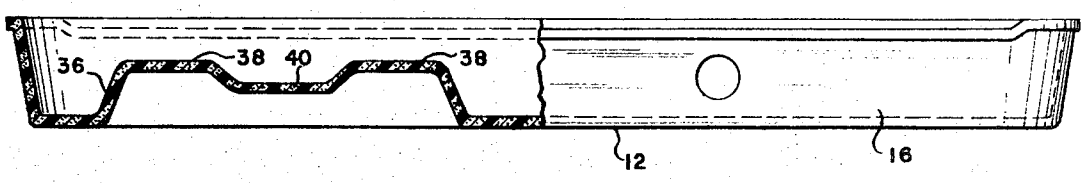



Fig. 2

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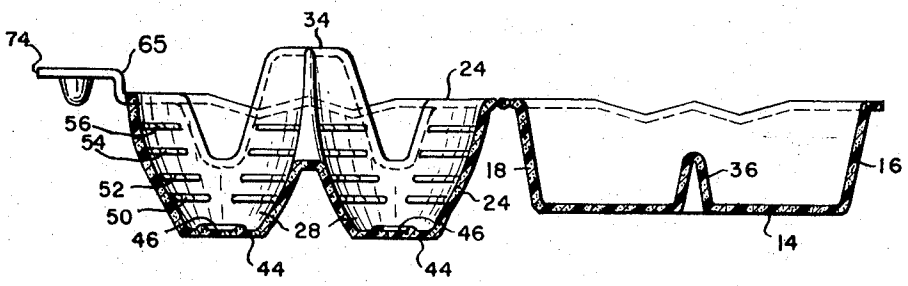



Fig. 3

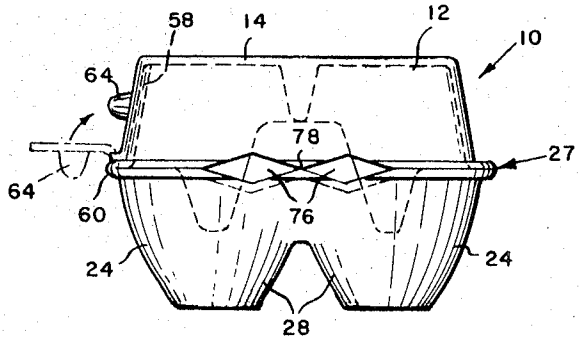



Fig. 4

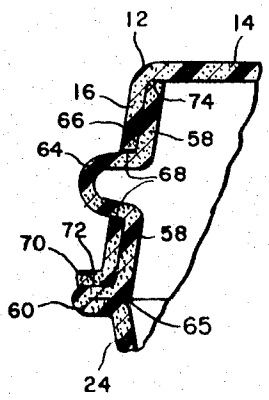



Fig. 5

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# EGG CARTON

## DESCRIPTION OF THE PRIOR ART

The present invention relates to molded containers for articles needing protection of which eggs are but one example. The invention is discussed primarily with reference to egg carton embodiments. Egg cartons generally have a tray portion formed with egg-receiving cells, a cover integral with and hingedly connected to the tray, and a locking flap integral with and hingedly connected to the front edge of the tray to fold upwardly and inwardly into an operative position in which it underlies the front wall of the cover when it is closed. The locking flap contains projections designed to hold the carton closed by cooperating with apertures in the front cover wall. Known container structures made either from molded pulp or foamed plastic material have encountered difficulty concerned with proper cushioning of the contents and the maintenance of adequate support, and bracing for the carton structure in attempting to protect fragile articles, such as eggs, during shipping, storing and handling. An additional problem in handling eggs or like articles is the difficulty of providing proper protection for eggs of varying sizes with one carton.

## BACKGROUND OF THE INVENTION

Field of the Invention

The present invention is directed to a molded egg carton. The eggs or like articles are designed to fit within individual cells arranged in longitudinally extending rows in the tray portion of the carton. The carton of this invention is made from a foamed plastic material and is characterized by having a particular unique cushioning means structurally arranged within the cells to protect the carton and its contents from stresses applied to the carton during packaging and handling. It is also adapted to be easily packed and closed using conventional equipment.

## SUMMARY OF INVENTION

According to the present invention, egg cartons are formed having a tray portion and a cover integrally hinged to the tray. The carton is locked by means of a locking flap hinged to the tray portion and containing locking lugs which are designed to extend through apertures in the front wall of the cover. The tray portion contains a plurality of cells formed therein which are adapted to receive the eggs.

The carton of the present invention is particularly adapted for packaging eggs in an efficient and protective manner, and is designed to accommodate eggs of varying sizes. Effective and unique means for protecting and cushioning the eggs in the cells is created by providing the interior of the cell walls of each of the egg receiving cells with a plurality of annular segmented cushion rings. These annular segmented cushion rings are integrally formed with the cell walls and are arranged in an ascending stepped relationship to one another, increasing in diameter approaching the top or opening of the cell.

Each of the annular cushion rings is segmented in that it includes a plurality of spaced ring sections arranged on the internal surface of the cell walls at predetermined spaced intervals from adjacent sections of the same cushion ring. These intervals will usually be equal. Corresponding sections of different annular segmented cushion rings may also be arranged at the same or different spaced intervals. One of the advantages of this cushioning structure is the provision of a large number of cushion ring sections engaging the outside of an egg or like fragile article thus distributing the force over a greater area, and accommodating eggs of different sizes relative to the rest of the eggs in the carton. Thus, the carton may be used to accommodate and effectively protect eggs of varying sizes.

Efficient support means are provided according to the present invention through the use of one or more depending support beams formed in the cover section of the carton. These support beams are designed to engage vertical posts extending upwardly from the tray portion of the carton. In a preferred embodiment these support beams are formed to include a plurality of protrusions separated by spaced depressed portions thus adding rigidity and strength to the carton while minimizing the amount of material required.



The carton of this invention will be made of a foam plastic material. The preferred material is expanded polystyrene. The expanded polystyrene in sheet form is fed through an oven, brought to forming temperature, and then molded to desired shape. The web with the formed parts is then fed through a trimming press for punching of the latch holes and trimming of the formed product from the sheet.

## BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a top plan view of the egg carton of the present invention.

FIG. 2 is a partial cutaway, front view of the cover portion of the present invention.

FIG. 3 is a sectional view taken along line 3—3 of FIG. 1.

FIG. 4 is an end view of the carton in closed position.

FIG. 5 is a detailed sectional view of the locking means.

## DETAILED DESCRIPTION OF INVENTION

FIG. 1 discloses a preferred embodiment of the present invention wherein a one piece molded egg carton is generally indicated as **10**. The carton **10** includes a shell-like cover **12** with base panel **14** and front, rear, and sidewalls **16**, **18**, **20**, and **22** respectively. Cover **12** is integrally hinged to tray **24**. Hinging is accomplished by a pair of parallel V-shaped cuts **26** which define the hinge **27**, which joins the cover and tray portions of the carton.

The tray **24** includes a plurality of egg-receiving cells **28** integrally formed in two adjacent longitudinally extending rows. Each of the cells **28** opens at its top to form in part a substantially planar peripheral flange **30**. Flange **30** is peripheral in that it surrounds the two adjacent longitudinal rows of cells. Flange **30** is planar to provide a supporting base for the peripheral edge of the cover portion **32** when the carton **10** is in its closed position. This also aids in protecting the contents of the carton against vertical stresses applied to the cover **12**.

A row of support posts **34** are integrally formed on the tray **24**. They form in part the tops of the cells **28** and are arranged in equal spaced relationship between the rows of cells. Each of the posts **34** protrude above peripheral flange **30** an equal distance so as to engage depending beams **36** formed in the cover **12**. The beams **36** are depressed in base panel **14** so as to protrude out of the plane defined by the inner surface of base panel **14** toward the posts **34** when the carton is in closed position. These beams **36** may end in a single plane, or in a preferred embodiment, may have a depressed area and extending protrusions, particularly located to cooperate with posts **34** in a manner making efficient use of material and yet providing adequate support and protection against vertical stress applied to the closed container. Beams **36** will thus have depending protrusions **38** which are separated by detent or depressed portions **40**. Posts **34** and beams **36** are formed to protrude away from the tray **24** and cover **12**, respectively, a predetermined distance so as to allow proper engagement of tray **24** with cover **12** when the carton **10** is closed.

In use, the individual cells are designed to receive eggs therein. Accordingly, cushioning means are integrally formed on the internal wall **42** and bottom **44** of each cell so as to protect each egg against both lateral and vertical stresses to which the carton is subjected.

Cushions **46** are formed on the bottom **44** of cells **28** and are arranged into a substantially toroidal shape so as to cradle the ends of the eggs. These bottom cushions **46** may be substantially continuous or in a preferred embodiment segmented.

An important feature of the present invention is cushioning means **48** comprising a plurality annular segmented cushion rings **50**, **52**, and **56** integrally formed on the interior walls **42** of cells **28** in a stepped ascending fashion towards the opening at the tops of the cells.

As shown in FIGS. 1 and 3, the segmented cushion ring sections 48 of each segmented annular cushion ring 50–56 are equally spaced about the interior wall 42 of the cells 28. The segmented cushion rings 48 are arranged in increasing diameter as they approach the opening at the top of each cell. As viewed in FIG. 3, the cushion rings are arranged in stepped ascending relation so as to provide an efficient cushioning means for eggs of varying size and shape. Based on the particular size and shape of a given egg, the cushion sections 48 of each of the various annular cushions 50–56 may engage the shell of the egg at a plurality of spaced points thereby providing an efficient means of both lateral and vertical support to the egg, and distributions of external forces over a large area of its surface. In a preferred embodiment, there are four or five cushion ring sections 48 in each of the annular segmented cushions 50 through 56. Each cushion section 48 is arranged on the internal walls 42 of cells 28 at approximately 90° from corresponding sections of the same annular cushion ring. Regardless of the number of sections 48, the individual sections of each succeeding ring are arranged in a stepped ascending manner.

The locking means of the present invention comprises a locking flap 58 integrally hinged at 60 to the longitudinal edge 62 of the tray portion 24 of the carton 10.

The locking flap 58 may be planar, except for two or more locking lugs 64 depending therefrom. In a preferred embodiment, the locking flap 58 will also contain stopping means in the form of interiorly extending protrusions or shelves 65 located near the hinge area integrally formed therein and so designed as to rest against the peripheral flange 30 when the locking flap is rotated extremely interiorly. The lugs 64 protrude away from surface 66 of flap 58 so as to cooperate with apertures 68 in front wall 16 of cover 12. Apertures 68 are formed in the approximate transverse center of front wall 16 of cover 12 so as to properly engage lugs 64 holding the carton in a closed position. Hinge 60 allows flap 58 to rotate upward to a position inside and behind front wall 16. This allows lugs 64 to protrude through apertures 68 in the manner clearly shown in FIG. 5.

Additional support is also provided by this locking means in that the edge of front wall 16 is formed into a flange 70 which rests on the longitudinal ledge 72 formed by hinge 60 when flap 58 is rotated upward into locking position as shown in FIG. 5. Similarly, longitudinal edge 74 of flap 58 engages the internal surface of base panel 14 to provide additional support against stress applied to the closed carton.

Additional structural features of the subject invention include two generally diamond-shaped vents 76 formed in both ends of the carton. The vents are formed by cooperating and correspondingly shaped depressions in the adjacent end walls of both the cover 12 and tray 24. When the carton is closed, the vents 76 are separated by peak 78 as shown in FIG. 4. This structure provides efficient venting facilities having a maximum support feature provided by peak 78.

An additional advantage is the allowance of a maximum printing area on the outer surface of base panel 14 while maintaining an efficient support structure in beams 36. This is accomplished by making beams 36 relatively thin thereby allowing channel 80 to be formed relatively narrowly relative to the width of panel 14.

What is claimed is:

1. A molded egg container comprising: a tray, a plurality of cells integrally formed in said tray, a cover hinged to said tray, cooperating locking means mounted on said tray and said cover, and a plurality of annular segmented cushion rings integrally formed on the interior walls of said cells, said annular segmented cushion rings arranged in ascending stepped relation to one another towards the cell opening.

2. A molded egg container as in claim 1, wherein said cover comprises a base panel, peripheral front, rear, and sidewalls angularly extending from said base panel to form a shell-like cover, one or more support beams impressed in said cover, said support beams protruding from the internal surface of said cover, and a plurality of protrusions from said support beam integrally formed in said beams and separated by a depressed spaced area.

3. A molded egg container as in claim 2 further comprising: a substantially planar peripheral flange formed on said tray about the opening of said cover, a plurality of support posts integrally formed on said tray and protruding upwardly above the plane of said peripheral flange, whereby said posts engage and are adapted to meet said protrusions on said support beams when said container is in closed position so as to protect and form partitions preventing the eggs from contacting one another.

4. A molded egg container as in claim 1 wherein said cover includes a front wall and said locking means comprises a locking flap hinged to said tray, at least one locking lug integrally formed on said locking flap, at least one aperture arranged in the approximate transverse center of said front wall of said cover, whereby said flap is rotated about said hinge such that said lug protrudes through said aperture in a cooperating locking fashion.

5. A molded egg carton as in claim 4 wherein said front cover wall is substantially planar and wherein said locking flap contains stopping means integrally formed therein, and adapted to rest against said peripheral flange of said tray portion when said locking flap is rotated inwardly.

6. A molded egg carton as in claim 4 wherein both said locking flap and said cover front wall are substantially planar.

7. A molded egg carton as in claim 1 wherein each of said annular segmented cushion rings includes a plurality of cushion ring sections laterally spaced on equal distance from adjacent sections of the same annular segmented cushion rings and equally vertically spaced from corresponding cushion ring sections of corresponding annular cushion rings.

8. A molded egg carton as in claim 7 wherein said plurality of annular segmented cushion rings are formed on the internal walls of said cells in successively increasing diameters approaching each cell opening.

9. A molded egg container as in claim 1 further comprising: said cells arranged in a pair of longitudinally extending rows, a substantially planar peripheral flange surrounding said pair of cell rows, a plurality of support posts integrally formed on said tray and protruding above said flange, said posts arranged between said rows in equal longitudinally spaced relation, a plurality of beams integrally formed in said cover so as to extend toward said posts when said container is in closed position, said beams each including a plurality of depending protrusions separated by a depressed spaced area integrally formed on each of the said beams, whereby each of said protrusions engages a separate post when said container is in closed position so as to protect against vertical stress and preventing the eggs from contacting one another.

10. A molded egg carton as described in claim 1 wherein said carton is composed of a foamed plastic material.

11. A molded egg carton as in claim 10 wherein said material is expanded polystyrene.

12. A molded egg carton comprising: a tray portion, a shell-shaped cover member integrally hinged to a longitudinal edge of said base member, said cover including a base panel, front and rear walls along the longitudinal edges of said base panel, end walls on said base panel between the ends of said front and rear walls, one or more depending beams extending from the interior surface of said cover base panel, a plurality of cells formed in said tray, toroidal-shaped cushion pads formed in the cell bottoms, annular segmented cushion rings integrally formed in spaced ascending relation to one another on the internal walls of said cells, locking means comprising at least one aperture arranged on said front wall of said cover in the approximate center thereof, at least one locking lug, protruding from said flap, whereby said flap is designed to rotate outwardly about said integral hinge so as to engage the internal surface of said front cover and allow said lug to protrude through said aperture when the container is in a closed position.

13. A molded egg carton as in claim 12 wherein each of said annular segmented cushion rings includes a plurality of cushion ring sections laterally spaced an equal distance from adjacent sections of the same annular segmented cushion ring, and equally vertically spaced from corresponding cushion sections of corresponding segmented annular cushion rings.

14. A molded egg carton as in claim 13 wherein said plurality of annular segmented cushion rings are formed on the internal walls of said cells in successively increasing diameters as they approach each cell opening.



15. A molded egg carton is described in claim 12 wherein the cells contain support means adapted to cradle the bottom of the eggs.

16. A molded egg carton as described in claim 15 wherein said support means are segmented toroidal-shaped pads.