Feb. 8, 1966 E. KNIRIM 3,234,030

EGG PACKAGE

Filed Jan. 3, 1963 2 Sheets-Sheet 1

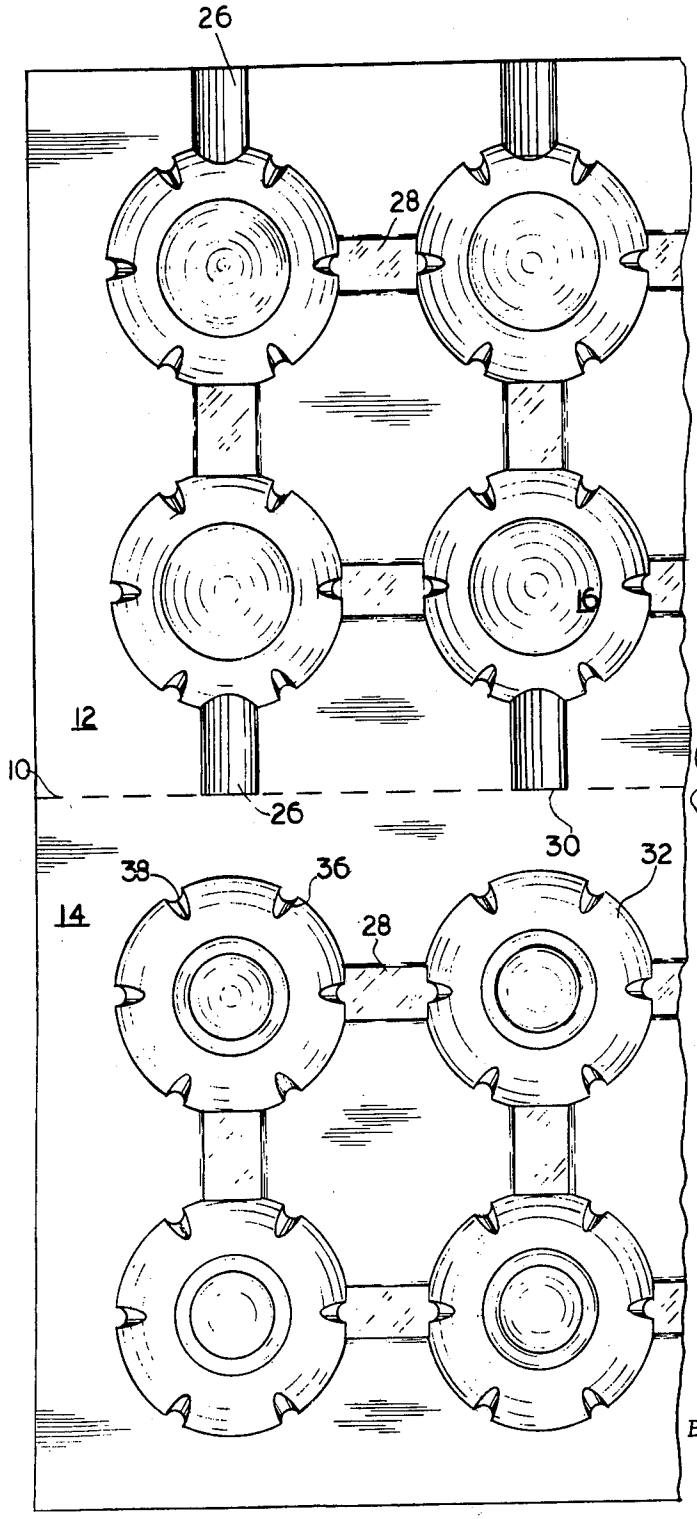

FIG. 1

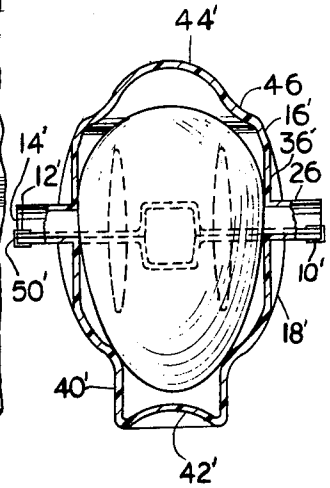

FIG. 5

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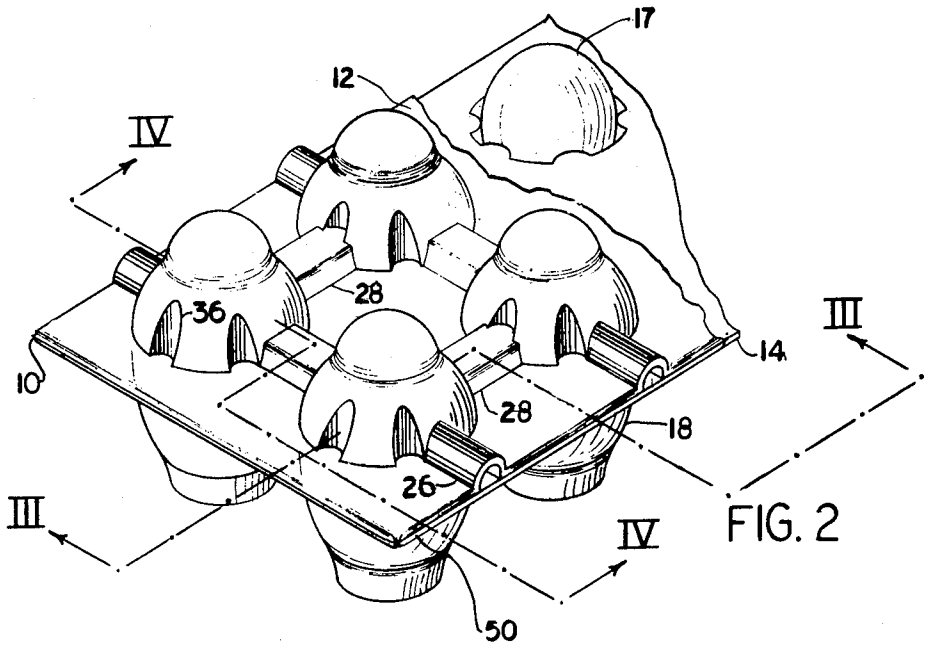

FIG. 2

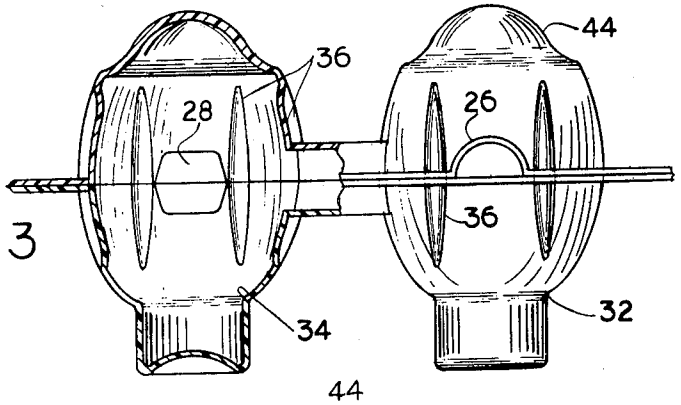

FIG. 3

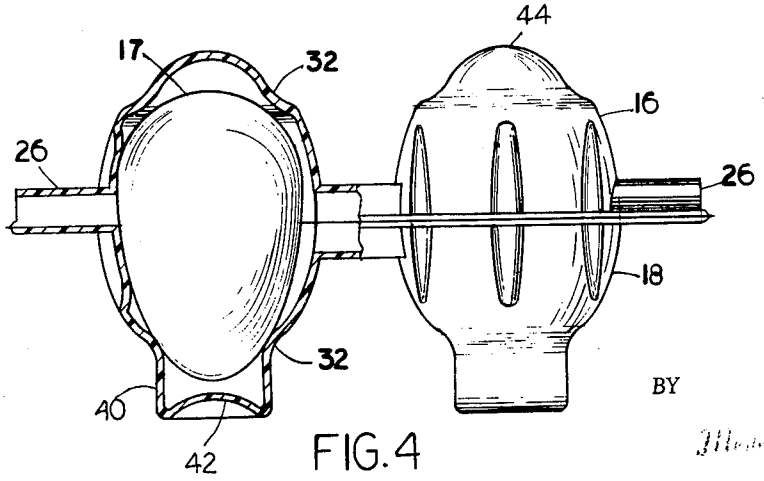

FIG. 4

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United States Patent Office

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3,234,030

EGG PACKAGE

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2 Claims. (Cl. 99—177)

The present invention relates to the packaging of eggs and, more particularly, to an improved egg package and method of making same.

Generally eggs are shipped in crates or cartons containing several dozen eggs nested in compartments or positioned upon so-called "flats" which, like the usual egg spacer, is composed of a liquid-absorbing fibrous material. Moreover, raw eggs are commonly retailed in paper, papier-mâché or cardboard containers formed with removable compartments or individual recesses adapted to receive the eggs.

All of these packaging techniques have several disadvantages. Firstly, the packaging material is, for the most part, opaque, thereby preventing complete and ready inspection of the contents of the package. This is particularly important since eggs are notoriously fragile and tend to crack in shipping. It has thus been necessary, in instances where complete inspection is not economical, to assume a certain proportion of cracks, thereby reducing the selling price. Secondly, the packaging materials are readily deformed by the application of even moderate forces during normal handling thus forcing portions of the carton wall into such contact with the shell that cracking of the latter results.

Another disadvantage of earlier techniques resides in the fact that paper-based packaging materials are liquid-absorptive so that the contents of a cracked egg which leaks from the shell is drawn into the interstices of the packaging material, simultaneously preventing recovery of the egg and rendering the packaging material unfit for reuse. A further disadvantage derives from the fact that many types of egg cartons are incapable of withstanding the compressive stresses that arises from stacking of the containers so that, in most instances, the eggs themselves must withstand these forces. This factor prevents stacking of eggs to any substantial height and, therfore, results in a requirement for greater storage area.

It is an object of the present invention to provide an egg package which is capable of avoiding the aforementioned disadvantages and providing an inexpensive unit characterized by ease in handling and storage.

This object is attained, in accordance with the invention, by providing an egg package consisting of an upper and a lower foil member of a substantially fluid-impermeable resilient sheet material formed with respective corresponding arrays of spaced cups registering with and open in the direction of corresponding cups of the other member in a juxtaposed position of the two members in which the cups extend outwardly from a median plane at the interface. Advantageously, the foil members have marginal portions in surface contact along the periphery of each array so that the corresponding cups of the two members form an enclosure for the egg capable of

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retaining for prolonged periods even the liquid contents thereof should cracking occur.

Since eggs are usually stored in an upright condition, that is to say with their axis generally vertical and their narrower end downwardly, the cups of the upper member are shaped generally to conform to the configuration of the broader end of the egg while those of the lower member conform generally to the narrower end. Preferably, the respective arrays of cups extend substantially longitudinally and may be orthogonally aligned so that package can receive six, ten or twelve eggs as the case may be. It must be pointed out, however, that the method described in conjunction with this invention is equally applicable to the packaging of greater or fewer numbers of eggs.

While substantially and relatively liquid-impermeable foil may be employed in connection with the invention, it is preferred to make use of a sheet material which is transparent as well as tough but yet can be easily shaped into the desired configuration. It has been found that synthetic resin foils (e.g. of hard polyvinylchloride etc.) are sufficiently transparent to enable total inspection of the contents if the package while affording tthe egg protection required. When an opaque package is desired, however, it is possible to use one of the metal foils (e.g. aluminum foil) or a substrate porvided with a metallic layer. The metal should, of course, be inert to the liquid contents of the egg. When the synthetic resin sheet material is employed, it may be of the thermally fusible type to enable heat sealing of the periphery of the package to produce a substantially totally enclosed unit. The storage of eggs, however, requires ventillation of the egg compartments to permit the air sac in the broad portion of the egg to "breathe" and to allow the escape of gases. To this end at least one of the foil members is provided with a channel communicating with the respective cups and open to the atmosphere. Further channels may be provided in one or both of the members to interconnect the compartments for facilitating the circulation of air therethrough.

Another important feature of the instant invention resides in the formation of corrugations in the walls of the cups to reinforce the latter against axial compressive forces of the type involved in the stacking of the egg packages. These corrugations may lie along axial planes of each cup and be angularly spaced about the axis thereof while extending perpendicularly to the interface. The corrugations also increase the resilience of the enveloping wall of the cup so that lateral shock is, to a certain extent, taken up by the elastic packaging material. Moreover, the corrugations may form ribs extending into the interior of each cup to reinforce the latter in the usual manner against compressive forces having components in the direction of the ribs. The latter may also serve, in part, for holding the eggs away from substantial engagement with the cup wall whereby indentation of the latter as a consequence of handling cannot result in egg breaking. These ribs, which may extend radially into the interior of the cup to a distance of 1 or 2 mm. also serve to center the egg and prevent repeated jostling of the latter against the cup wall. It has been found that these ribs play another significant role in the egg package in that they space the egg away from the wall to permit passage of air toward the upper and

lower portion of the egg and facilitate ventilation as previously noted. In addition, the upper and lower foil members are provided with complementary formations whereby the lower part of one package may engage the upper part of another in a stacked condition without danger that the upper one might slip off the lower.

According to a more particular feature of the invention, the cups of at least one of the foil members, preferably the lower but possibly both, are formed with seating means such as an annular seating surface for the eggs. This seating surface, in peripheral engagement with the egg, serves to center the latter and to hold it out of engagement with the upper and lower portions of the compartment. These portions are provided with the aforementioned formations and are, therefore, spaced from the egg so that they may yield to a certain extent without danger that a substantial part of the stacking load will be transferred to the eggs.

The above and other objects, features and advantages of the instant invention will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is a fragmentary plan view of a foil provided with cups, in accordance with the invention, prior to completion of the package;

FIG. 2 is a fragmentary perspective view of the completed package;

FIG. 3 is a cross-sectional view taken generally along line III—III of FIG. 2;

FIG. 4 is a cross-sectional view taken generally along the line IV—IV of FIG. 2; and

FIG. 5 is a cross-sectional view similar to FIG. 4 but illustrating a modification of an egg package according to the invention.

The egg package shown in FIGS. 1–4 is formed from a single sheet of transparent polyvinylchloride foil in which cups **16** and **18** are provided. The cups may be produced by vacuum drawing, pressure molding, stamping or die-pressing the foil to plastically deform the latter (e.g. in a heated state). Cups **16** and **18** form two orthogonal arrays on opposite sides of the median line **10** parallel to the arrays and open at the common surface of the foil while extending codirectionally therefrom. Median line **10** bisects the foil into two halves or members one of which is adapted to overlie the other upon folding of the foil along the line **10**. A plurality of angularly spaced radial ribs **36** lie generally along generatrices of the axially symmetrical cups **16** and **18**, the former of which are shaped to receive the broad end of an egg while the latter have a configuration corresponding to that of the narrower or pointed end of the egg. These ribs **36** are constituted by corrugations in the wall of the cups which reinforce the latter against axial force and simultaneously increase its resilience while spacing the egg therefrom.

The cups **16** and **18** of each array are interconnected by channels **28** of the generally rectangular cross-section which register with those of the other member to form a conduit of substantially square cross-section, facilitating the circulation of air into the interior of the enclosure formed by the cups. Main channels **26** extend, however, to the periphery of each array and, therefore, to the median line **10** in order to permit entry of air into the compartments when the unit is sealed along its peripheral edges **50**. To open the channels **26** at their junction with the foldline **10**, this junction is incised at **30**. The maximum depth to which the ribs **36** extend into the compartment is indicated at **38** and may be from 1–2 mm. as previously mentioned. An egg **17** is indicated in solid lines to show its relation to the cups. It should be noted that an upward bulge or built-up portion **32** is provided at the lower end of the lower cup to form a seating surface for the narrow end of the egg, thereby centering it generally out of contact with the major wall portions of the cups. It should be noted that the egg will only contact the ribs when of a sufficient size to bear thereagainst, it being generally the case that the egg will be sufficiently small to rest upon the seat **32** out of engagement with these walls.

In FIG. 5 I show a similar arrangement wherein the ribs **36'** of the upper and lower cups **16'** and **18'** extend parallel to the axis of symmetry of the cups, the upper cups being formed with an indentation **46** forming a seat for the broader end of the largest size eggs to be received in the cup. The cups of both embodiments are formed along the upper portions **44**, **44'** with domed parts out of engagement with the egg which are complementarily receivable within concavities **42**, **42'** in generally cylindrical lower parts **40**, **40'** of the bottom cups. These complementary formations facilitate stacking of the packages in their closed condition as is shown schematically in dot-dash lines in FIG. 5. In the latter embodiment the upper and lower foil members **12'**, **14'** are not integral as is the case with the members **12** and **14** of the embodiments of FIGS. 1–4 but are joined at the fold **10'** by a flexible strip. Sealing along the edges is effected also by an adhesive strip **50'**. It should be noted that the marginal portions of either of the arrays may be provided with a pressure-sensitive adhesive for effecting sealing with minimal contact pressure.

The invention as described and illustrated is believed to admit of many modifications and variations within the ability of persons skilled in the art, all such modifications and variations being deemed to be included within the spirit and scope of the appended claims.

I claim:

1. An egg package comprising an upper and a lower foil member of a resilient transparent, fluid-impermeable, synthetic-resin sheet material, each of said members being provided with a longitudinal array of spaced axially symmetrical egg-containing cups axially registering with and open in the direction of corresponding cups of the other member in a juxtaposed position of said members while extending outwardly from a median plane intermediate said members and parallel to said array the cups of one of said arrays having cylindrical extensions centered on the respective cup axes and forming annular seats for the eggs, said members being integral with one another along one edge of said package and having marginal portions in surface contact along the periphery of said array, said marginal portions being sealed together at least over part of said periphery, at least one of said members being formed with channels communicating with the cups thereof and open at said periphery and at said one edge to the atmosphere for ventilating said cups.

2. An egg package comprising an upper and a lower foil member of a resilient transparent, fluid-impermeable, synthetic-resin sheet material, each of said members being provided with a longitudinal array of spaced cups registering with and open in the direction of corresponding cups of the other member in a juxtaposed position of said members while extending outwardly from a median plane intermediate said members and parallel to said array, said members being integral with one another along one edge of said package and having marginal portions in surface contact along the periphery of said array, said marginal portions being sealed together at least over part of said periphery, at least one of said members being formed with channels communicating with the cups thereof and open at said periphery and at said one edge to the atmosphere for ventilating said cups, said lower member being provided with annular seating surfaces at the bottom of each of its cups for receiving a respective egg and engaging the latter axially above the bottom thereof, said cups of said lower member having cylindrical extensions transverse to said median plane and extending outwardly thereof from the respective seating surfaces, each of said cups being provided with a plurality of mutually aligned angularly

spaced ribs lying substantially along generatrices of the respective cups to stiffen the latter against axial compression forces, said ribs being generally transverse to said median plane and parallel to said extensions while projecting inwardly into said cups for engagement with an egg disposed therein.

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