ABSTRACT: An egg carton, having two rows of cavities of six each, has the cavities separated from each other longitudinally by integrally formed walls extended upwardly with projecting tips (29), and transversely by at least one transverse wall extending across the carton structure, the walls having sloping sides and meeting at a point intermediate the depth of the cavities to provide for easy egg removal, while cradling the eggs; in one form, the top cover has a depression of sufficient depth to bear against a transverse wall between cavities.
The present invention relates to egg carton structures, and more particularly to egg carton structures made of molded paper pulp, paste board, plastic, and the like. Egg carton structures to retain a dozen eggs in two rows of six each, and formed of molded material are well known — see, for example, U.S. Pats. 3,337,110 and 3,356,284. A preferred material is a thermoplastic foam such as, for example, foam polystyrene, and other polymers. Egg carton structures, particularly of foamed polystyrene are light in weight and have the dual property of being stiff and resistant to deformation, thereby cradling the eggs and preventing crushing, while at the same time being resilient and able to absorb minor shocks to prevent damage to the eggs in the carton structure. Such molded cartons can be made with an integral cover, secured to a tray section by a plastic hinge along one longitudi- nal edge. The other longitudinal side of the top cover and the tray section are molded to provide locking tabs and recesses to interengage, to secure the top cover to the tray section and hold the cover closed thereagainst. Since egg cartons are disposable items, it is of importance that as little material be used therefor, as is consistent with secure cradling of the eggs, and strength of the packaging.

It is an object of the present invention to provide an egg carton, particularly suitable to be molded of plastic material, which is of high strength and resistant to deformation, while securely cradling the eggs, and which uses only little material.

SUBJECT MATTER OF THE PRESENT INVENTION

Briefly, the eggs are arranged in rows of cavities, the walls between cavities in the two rows being brought up to items located walls of the cavities, leaving a free space diagonal of the cavities to permit ready removal of the eggs; at least one, and preferably two, or even all of the walls traverse of the carton structure, and separating the cavities in the rows extend completely across the carton structure to provide for sufficient lateral stiffness of the carton and to prevent twisting thereof when loaded with eggs. These transverse walls are at least as high, and preferably slightly higher than the depth of the cavity from the edge of the tray section, to pro- vide lateral stiffness to the carton against twist. Longitudinal stiffness of the carton is obtained by the attached hinge connecting the carton with the top cover, as well as the locking structure secured to the tray section itself; thus, a carton re- sistant against transverse twisting as well as against longitudi- nal bending is provided, without requiring any additional reinforcements or stiffening not part of the cavity structure itself.

In accordance with a feature of the invention, each one of the two adjacent egg cavities in the rows is separated from the next one, in the row, by a transverse wall; alternatively, only every other egg cavity is so separated, and the transverse and a separating section, for example formed by pinching plastic material together is formed between the first two adjacent cavities on the rows, and the center cavities, two transverse wall sections being formed between cavities 2 and 3, and 4 and 5.

In accordance with another feature of the invention, the top or cover section has a depression formed therein of sufficient depth and so located that it bears against the top ridge of one of the transverse walls. The upwardly extending wall sections of the tray portion have sloping sides which merge with the sloping sides of the transverse wall section, where provided, or terminate in a small platform. Viewed from the opposite side, the cavities to hold the eggs will appear as bulges, intercon- nected by small ridge lines where the sloping sides of the lon- gitudinal walls meet the sides of the transverse walls, to pro- vide a corrugation-like interconnection of the egg cups for additional stiffness of the entire carton structure.

The invention will be described by way of example with reference to the accompanying drawings, wherein:

FIG. 1 is a perspective view of one embodiment of an open carton; FIG. 2 is a fragmentary, perspective view, to a greatly en- larged scale of a portion of the carton structure of FIG. 1; FIG. 3 is a transverse sectional view along lines III-III of FIG. 1; FIG. 4 is a fragmentary, perspective view of the bottom of the tray section; FIG. 5 is a perspective view of another embodiment of the egg carton, with the top open; and FIG. 6 is a partial, perspective view, to an enlarged scale, of the embodiment of FIG. 5, with the top closed and partly cut away.

Referring now to the drawings, and particularly to FIGS. 1 to 3, the egg carton structure of the present invention includes a bottom, or tray section 10 and a top, or cover section 20. The tray section 10 is formed of a plurality of contoured walls, the first four of which are numbered 11 to 15, defining egg-receiving cavities 21, 22, 23, 24, the other walls and egg- receiving cavities not being separately numbered and being similar. The egg-receiving cavities are separated from each other by longitudinally extending walls seen at 19, to separate the egg-receiving cavities into two rows of six each. These walls 19 are brought together as extending tips 29 (FIG. 2), in the form of a top pinch; from the tips 29, sloping sides 28 ex- tend to the space between the egg-receiving cavities. The height of the tips 29 of walls 19 is essentially the same as the depth of the cavities, so that they will be approximately at the same level as the rim of the tray section 10. They may project slightly thereover, or be slightly depressed; preferably they project somewhat, but not more than a small fraction of an inch, say 1/4" or so, that they will still be essentially at the same height as the rim of tray 10.

The egg-receiving cavities in a row are separated from each other by walls 17, 18, which may be similar to walls 19 and likewise be brought out to a pinched tip. The sloping sides of all these walls, between the egg-receiving cavities, terminate at a platform 5 (FIG. 2).

According to the invention, the egg carton not only is formed with transverse walls which extend only partly around the upper sides of the cavities, but include at least one wall which extends across the egg carton, to link the walls of two egg cavities together. Such a transverse wall is seen at 27 which, likewise, has sloping side 25. At the lowermost point of the sloping sides 25 as seen from the top, that is where sloping sides 25 intersect with sides 28, ridges 6 (FIG. 4) are formed which interconnect the lower portions of the egg cups to pro- vide additional stiffness to the entire structure and prevent deformation upon twisting stresses being applied thereto (see FIG. 4).

At least one transversely extending wall 27 is provided, for example separating the egg carton into two sections of six egg cavities each; or, in the alternative, the walls 27 may separate cavities 2 and 3, as well as 4 and 5, in a row, as best seen in FIG. 1. In accordance with another construction, and as best seen in FIGS. 5 and 6, transverse walls are formed to separate all aligned cavities from each other. The small, upstanding tips 29 of the longitudinal walls permit insertion of fingers to take out the eggs from the egg cups, individually, without breakage.

The top cover structure 30 is secured to the tray section 10 by means of an integral, plastic hinge, as well known in the art. The top cover section 30 is box-shaped, and has a cover panel 31 and four side panels 32, 33, 34, 35, which are flanged and fit on top of the tray section 10. The free, longitudinal side of the top cover section 31 has an integral locking tab 45 which has internally extending projections 47 thereon, the projec- tions 47 matching similar projections 46 pressed into sides 32 and 34 of the top cover section 30. The locking tab 45 is ar- ranged to be bent inwardly against the natural tendency of tab 45 to be distanced from sidewall 32. A similar, matching tab 40 is secured to tray section 10, formed with depressions 41 in which the projections 46 and 47 fit. The tendency of tab 40 to be bent forwardly, and the tendency of tab 45 to extend away from the sidewall 32 provides for a resilient, and secure en- gagement of the projections 46, 47 into depressions 41, thus securely locking the cover section to the tray section.
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The inwardly directed projections 46 on the side walls 32, 34 of the cover section 30 provide additional stiffness and rigidity; preferably, these projections are arranged intermediate the egg-receiving cavities. The eggs within the cavities are thus cradled by the central walls 19, the transverse walls 17, 18 and 27, and at their upwardly extending region, that is the one which extends beyond the bottom tray section 10, by the inwardly extending projections 46 and 47, as well as by the inward side of depressions 41.

In FIG. 1, tab 45 is shown extending into the box-shaped structure 30; in FIG. 3 tab 45 is shown folded against side wall 32, for example as it would be held prior to being snapped over tab 40.

FIGS. 5 and 6 illustrate a modified form of the invention, in which the top cover structure 130, as before, has sidewalls 32, 33, 34, 35, but the lid 131 is formed with a central depression 137, having a bottom ledge 138 which meets and bears against the top edge 27 of a transverse wall of the egg carton structure, as shown. The depth of depression 137 is so arranged that, when the cover is closed, the ledge 138, in contact with the upper edge of transverse wall 27 forms a bearing support capable of transferring weight. While more than one depression 137, with an inside bearing ledge 138 may be provided in the lid 131 of cover section 130, the depressions should be aligned with one of the transversely extending walls 27.

The entire structure will be rigid, partly due to the transverse walls 27 and the ridges formed by the intersection of the transverse walls with the longitudinal walls separating the egg cavities, partly due to the stiffness of the side walls 32, 34 of the top section due to the projections 46, and partly due to the depressions 137 (if provided) of the cover lid — the various stiffening features contributing each to the overall weight-carrying capability and stiffness of the resulting carton structure.

Various changes and modifications of the structure may be made within the inventive concept.

We claim:

1. Molded egg carton structure to hold one dozen eggs in two rows of six each, said structure comprising:
   a bottom tray section (10) and a top cover section (30) movably secured to said bottom tray section, said bottom tray section including a plurality of contoured walls (11, 12, 13, 14, 15) defining egg-receiving cavities (21, 22, 23, 24) therebetween, open at the top and arranged in two rows of each, adjacent transverse walls (17, 18) and longitudinal walls (19) between egg-receiving cavities being integrally connected, the walls (19) between the rows of cavities being extended upwardly to form projecting tips (29) located centrally of said cavities and having downwardly sloping side walls (28);
   at least one partition wall (27) being provided between two adjacent cavities of a row being of substantially the same height as said projecting tips and extending across said rows of said cavities in the carton structure, each partition wall having sloping sides (25) meeting the sloping side walls (28) of said tips at a level below the top edge of the partition walls and said tips to permit ready removal of eggs while providing protection over an extended area around the egg; and
   said top cover section (30) being essentially box-shaped and fitting against said tray section and including a flat cover panel (31) and side panels (32, 33, 34, 35) extending therefrom.

2. Egg carton structure according to claim 1, wherein two partition walls are provided extending across the carton structure, located symmetrically in said structure and between cavities No. 2 and 3, and 4 and 5 in a row of cavities; and the transverse walls (FIG. 2: 17, 18) between the remaining cavities of opposite rows are extending upwardly to form projecting tips located centrally of said cavities of each row and having downwardly sloping side walls.

3. Egg carton structure according to claim 2, wherein the downwardly sloping side walls of the tips separating the cavities in the rows and the cavities across the rows, converge to a flat platform (5) located intermediate four cavities and symmetrically with respect to each one of the cavities.

4. Egg carton structure according to claim 1, wherein each of the cavities in a row is separated from an adjacent cavity by a partition wall extending across said rows of the cavities of the carton structure.

5. Egg carton structure according to claim 1, (FIGS. 5 and 6), wherein the cover panel (131) of the cover section (130) has at least one depression (137) formed therein extending transversely to said carton structure and located in alignment with a partition wall (27) of the tray section, said depression terminating in a bearing strip (138) having an inner surface bearing against the top surface of said partition wall (27).

6. Egg carton structure according to claim 5, wherein each cavity in a row is separated from an adjacent cavity by a partition wall (FIG. 5: 27) extending across said rows of the cavities of the carton structure, said depression of the top section bearing against a partition wall.

7. Egg carton structure according to claim 5, wherein said depression (137) in the cover section is centrally positioned therein.

8. Egg carton structure according to claim 1, wherein the top of said walls (17, 18, 19, 27) located between said cavities is essentially at the same level as the top of the contoured walls (11, 12, 13, 14) defining the egg-receiving cavities.

9. Egg carton structure according to claim 1, including separable, interengaging locking means (40, 45) secured to said top and said bottom sections, respectively, to releasably hold said sections closed together.

10. Egg carton structure according to claim 9, wherein said cover section is attached along at least one longitudinal side wall (32) to said tray section by an integral hinge strip and said interengaging locking means includes:
    an integral locking strip (45) located along the other longitudinal side wall and foldable inwardly of said cover, the adjacent side panel (32) of said top section and said strip (45) being formed with projections (46, 47) extending inwardly of said box-shaped structure; and
    a locking tab strip (40) integral with the tray section and extending therefrom and formed with depressions (41) matching the projections (46, 47) on said top section strip and releasably engageable therewith.

11. Egg carton structure according to claim 10, wherein the other longitudinal side panel (34) of said top cover section is formed with inwardly extending projections (48) similar to the projections (46) on the other side panel (32).

12. Egg carton structure according to claim 10, wherein the cover panel (131) of the cover section (130) has at least one depression (127) formed therein extending transversely of said carton structure and located in alignment with a partition wall (27) of the tray section, said depression being deep enough to bear against the top surface of the partition wall of the tray structure.