

June 29, 1965

A. E. COMSTOCK
MOLDED EGG CARTON

3,191,844

Filed Aug. 6, 1964

3 Sheets-Sheet 1

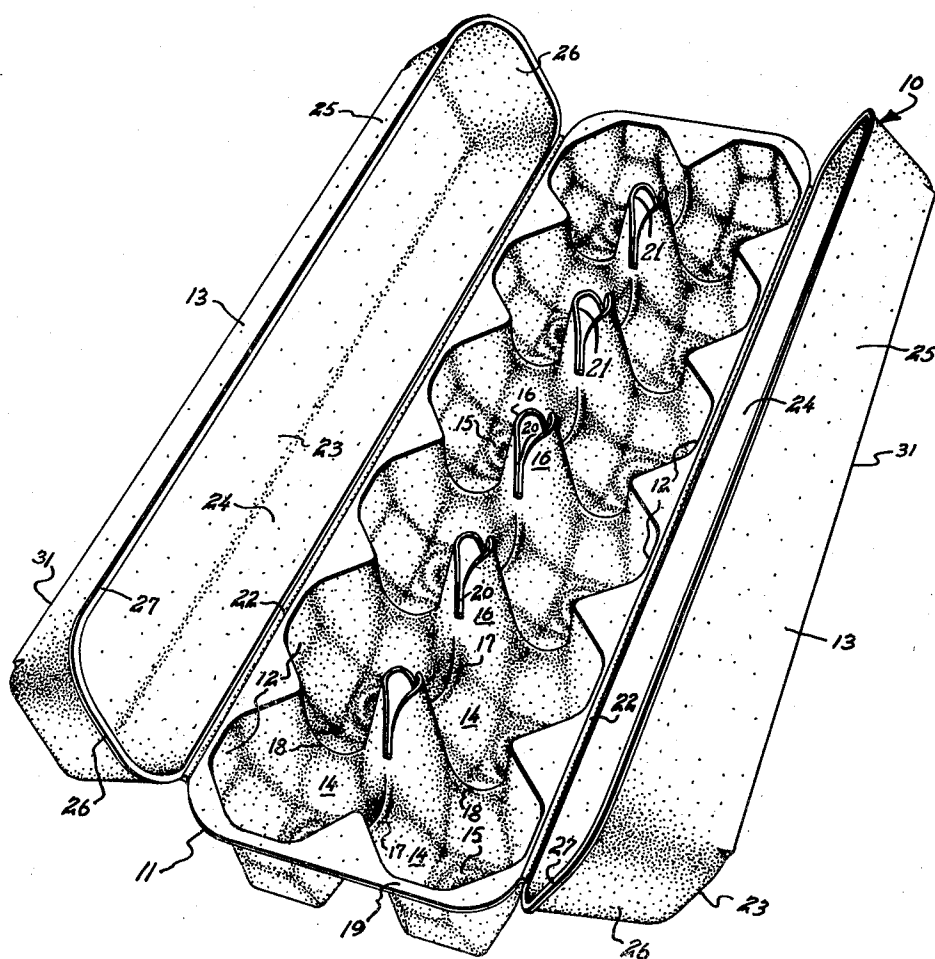


FIG. 1

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3 Sheets-Sheet 2

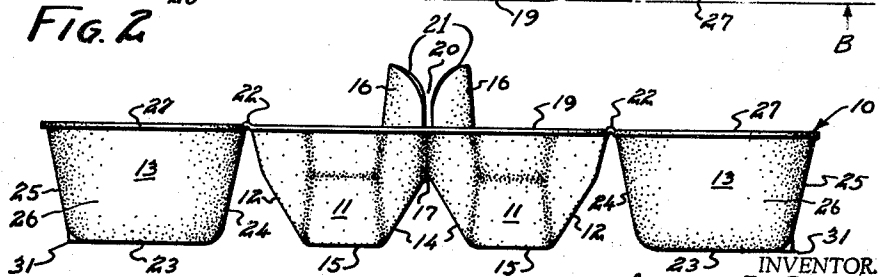
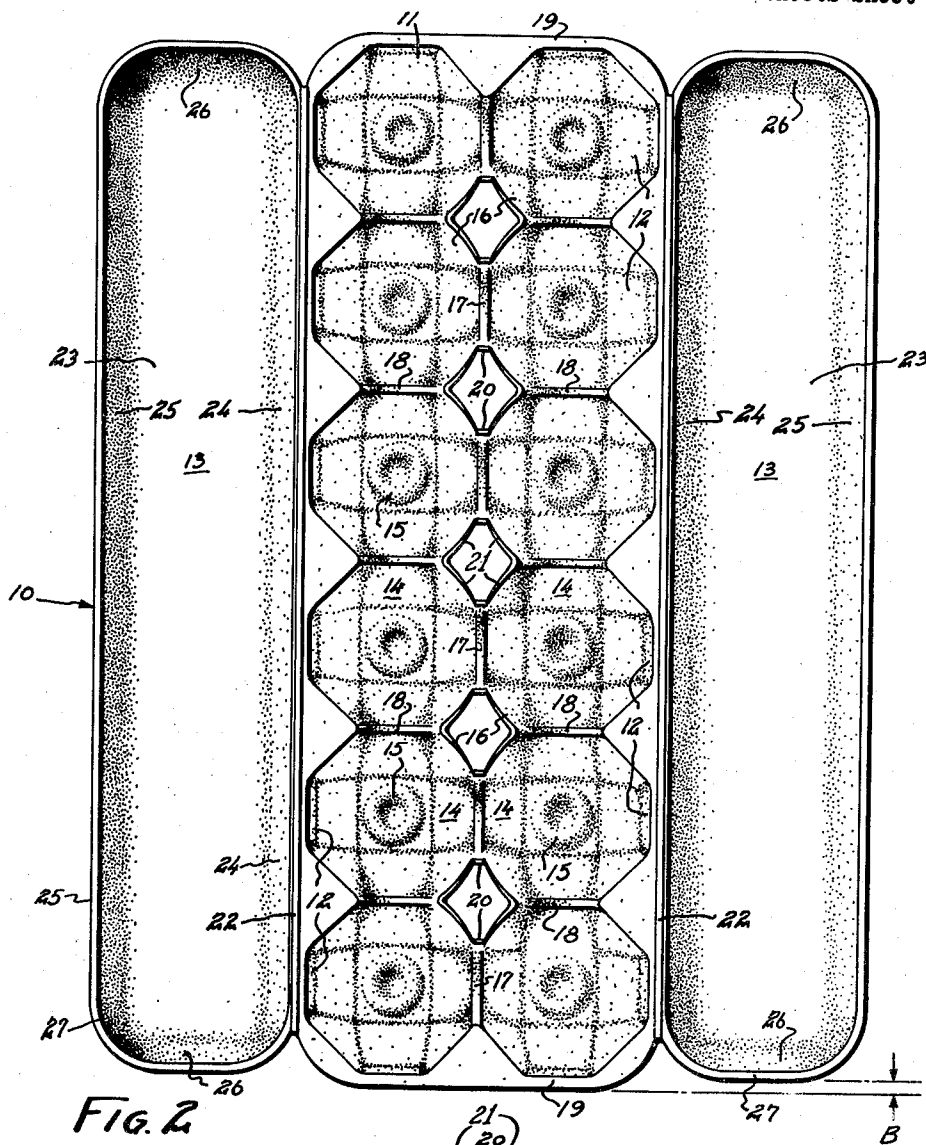


FIG. 3

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3 Sheets-Sheet 3

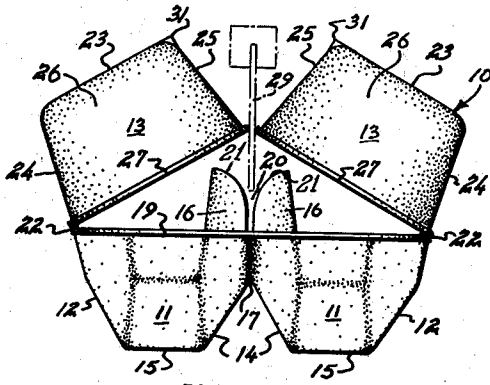


FIG. 4

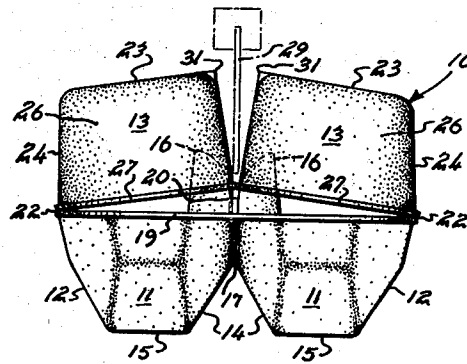


FIG. 5

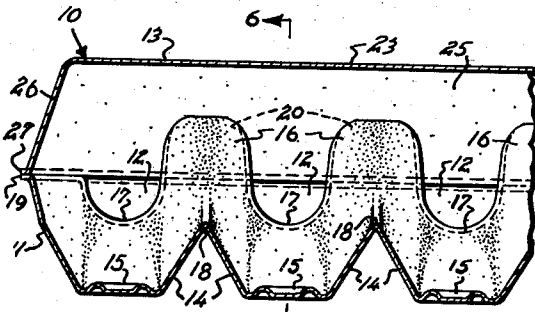


FIG. 6

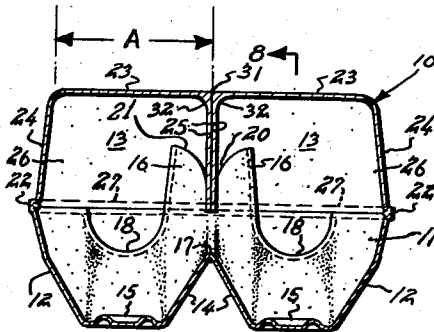


FIG. 7

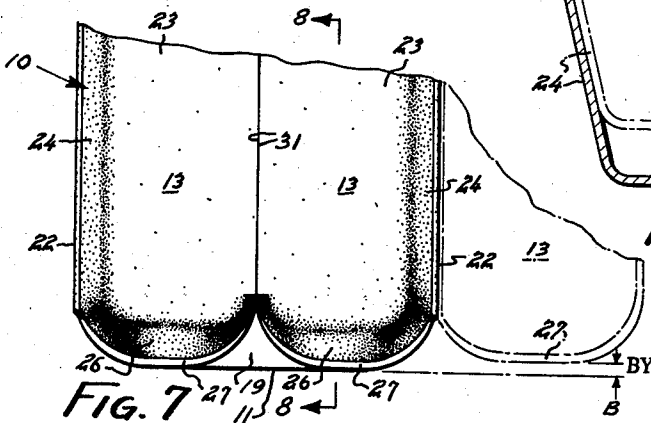


FIG. 8

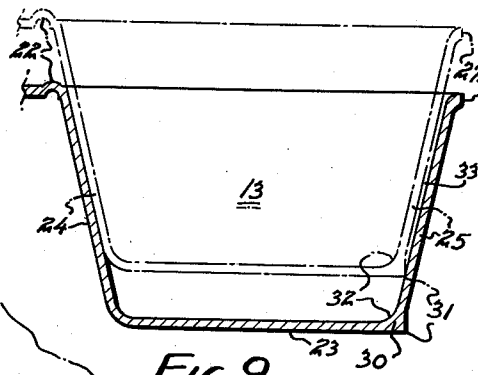


FIG. 9

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3,191,844

MOLDED EGG CARTON

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6 Claims. (Cl. 229-2.5)

This invention relates to an improved integrally molded cellular egg carton, and more particularly it relates to a so-called two-by-six style carton in which the cells are arranged in two rows of six each. This application is a continuation-in-part of my copending application Serial No. 277,906, filed on May 3, 1963, now abandoned.

One important object of the present invention is to provide an improved molded egg carton that has unusual strength characteristics, particularly for resisting the downward crushing or compression force on the carton that so often occurs during shipment and storage. My invention has solved this strength problem by a unique arrangement of hingedly articulated sections including a cellular bottom section and a pair of non-cellular top sections attached at opposite sides of the bottom section. Within the cellular bottom section are a series of spaced apart and uniquely shaped upstanding portions which cooperate with the top sections when the carton is closed to make it unusually rigid and strong and thus capable of withstanding severe loads, particularly along its longitudinal center line, as well as its sides and ends.

Another object of my invention is to provide a molded egg carton whose bottom and cover sections are originally formed with sloped side walls so that the open cartons will readily nest together with other like cartons, and a further object is to provide a carton wherein the sloped walls of each cover section are automatically flexed or deformed slightly from their originally molded shape and are forced closer together into a substantially non-sloped, vertical position when the carton is closed. This flexing or deformation of the cover side walls that occurs as the covers are closed results in an increased amount of space within each cell of the carton. Thus, even the largest sized eggs can be accommodated without any portion of the cover sections engaging and possibly damaging them. Also, when the two cover sections are rotated and closed, they are held tightly in a firm frictional locking engagement with each other within a series of aligned slots in the upstanding portions between the rows of egg cells. This unique closure retains the cover sections firmly in position during handling and shipment, but at the same time provides the user with easy access to the product within. Moreover, when the engaged side walls of the two cover sections are pressed tightly together within the slots and the engaged side walls assume a substantially upright position, the compression strength of the carton is thereby increased.

Another feature of my improved carton is that when stacked and nested with other such cartons before being filled, the cartons will not wedge or jam together. Also, with large stacks of cartons there will be no slumping or irregularity in the level of any of the cartons, and all cartons in the stack, including the uppermost one, will naturally maintain a level position. This can be a particularly important factor when the cartons are used in large numbers for machine filling and packaging. In my invention these stacking problems have been solved without the need for the horizontal stacking flange heretofore provided along the outer edges of cover sections on prior art cartons.

Still another object of my invention is to provide an improved molded pulp egg carton having a unique configuration that presents a particularly clean and attractive package. The cover sections, when moved to the closed

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position and held closely together, form a plane smooth top on the carton that is free from indentations and is therefore readily usable for various printing designs.

Yet another important object of my invention is to provide an egg carton that can be molded from relatively simple molding apparatus using conventional molding procedures.

While fibrous pulp material is most commonly used in making molded egg cartons, my carton may also be readily manufactured from any suitable thermoplastic sheeting material. The latter material has certain advantages because of its light weight and transparency which can enhance the display of the cartons. The use of this relatively thin thermoplastic material is made possible because of the remarkable strength characteristics afforded by the unique structural features of my carton.

A further object of the present invention is to provide an egg carton that can be loaded and closed with particular ease and efficiency at high production rates by automatic egg loading apparatus.

Other objects, advantages and features of my invention will become readily apparent from the following detailed description of one embodiment thereof presented with reference to the accompanying drawings, in which:

FIG. 1 is a view in perspective of a two-by-six egg carton embodying the principles of the invention;

FIG. 2 is a plan view of the egg carton shown in FIG. 1 with both cover sections open;

FIG. 3 is a view in end elevation of the carton shown in FIG. 2;

FIG. 4 is a view in end elevation with portions in section showing the cover sections of the carton in FIGS. 1 to 3 as they are being closed;

FIG. 5 is a view in end elevation showing the carton of FIG. 4 with its cover sections almost fully closed;

FIG. 6 is a view in end elevation and in section showing the carton of FIGS. 4 and 5 with its cover sections fully closed;

FIG. 7 is a fragmentary plan view showing the carton of FIG. 6 with the cover sections fully closed;

FIG. 8 is a view in elevation and in section taken along line 8-8 of FIG. 7;

FIG. 9 is an enlarged fragmentary end view in elevation showing details of the cover section for cartons embodying the principles of the invention.

Referring to the drawings, FIG. 1 shows a view in perspective and FIG. 2 shows a plan view of an integrally molded pulp carton 10 embodying the principles of the invention. Essentially, it comprises a cellular bottom section 11 having opposite sides 12 to which are connected a pair of cover sections 13. The bottom or tray section 11 is partitioned into two longitudinal rows of egg-receiving compartments or cells 14, each of which is tapered downwardly and has an embossed bottom portion 15 for cushioning an egg contained therein. The cells 14 may utilize any suitable geometric configuration which provides the generally tapered shape adaptable to receive an egg. The particular shape of the cells 14 shown in the drawings is illustrative only and is not meant to limit the scope of the invention. Integral with the bottom section 11 of the carton 10 and spaced apart along its longitudinal center line are a number of hollow upstanding members 16 which are generally frusto-conical in shape and open at their upper end. These latter members 16 extend well above the level of the bottom section 11 and are unique elements of my carton both in structure and in function. Essentially, the egg receiving cells 14 are formed by the combination of the lower portions of the upstanding members 16, by a series of longitudinal partition elements 17 connecting adjacent upstanding members 16, and by transverse partition elements 18 con-

necting the upstanding members 16 and the opposite side walls 12 of the bottom section 11. Around the upper edges of the cells 14 at the ends of the bottom portion 15 and along the side walls 12 is a horizontal flange or rim portion 19.

The tapered upstanding members 16 extend well above the surrounding rim of the cells 14 and all are provided with a diametrical slot 20 across their upper open end which extends downward to a point substantially in the same plane as the upper rim 19 of the bottom section 11. These slots 20 through the upstanding members 16 are aligned with themselves and with the longitudinal partition elements 17 along the longitudinal center line of the bottom section 11. At the upper end of each tubular post member 16, the slot 20 flares open to form upwardly divergent curved edges 21 that cooperate with the cover sections 13 when they are articulated in closing the carton, as described below. However, near their lower ends the slots 20 narrow to a uniform width that is approximately twice the wall thickness of the cover sections 13.

Each cover section 13 is connected integrally with a side wall 12 of the bottom section 11 by a longitudinal hinge joint 22 that is formed as a score line in the conventional manner during the molding of the pulp carton 10. The cover sections 13 may be identical in size and shape, each being substantially tub shaped and having a rectangular planar top 23 connected to opposite inboard and outboard side walls 24 and 25, respectively. The latter are joined together by end walls 26 that are at least partially curved to form rounded corners on the cover sections. A very narrow integral flange or rim portion 27 is preferably provided around the upper edges of both cover sections. The side walls 24, 25 and the end walls 26 of the cover sections 13 are outwardly inclined when the carton is molded as are the side walls 12 of the bottom section 11. This sloping of all side walls enables the carton to be easily stripped from a mold as it is made. Moreover, it enables the cartons to be nested together and conveniently stacked in large quantities for shipment or storage or for use in automatic loading devices.

The carton 10 is preferably made from conventional paper pulp materials commonly used for egg cartons and the like, although other suitable moldable materials may possibly be utilized. When formed, the carton 10 is molded as a single unit with the cover sections 13 in their extended open position. The rim 27 extending from the upper edges of the side walls 24 and 25 and from the end walls 26 is in the same plane as the rim portion 19 at the upper edge of the cells 14 on the bottom section 11. This is an important feature of my invention because it enables the molds for my carton to utilize a simple single plane molding strap. Such molds are relatively inexpensive and easier to operate and service than molding apparatus heretofore used for cartons having complicated configurations that require multiple plane molding straps. A major advantage of my carton is that its unique but relatively simple configuration makes possible the utilization of automated apparatus and methods for efficient, high speed production.

In the present invention particular advantages are derived from the fact that the cover sections 13 are caused to flex and thereby change their shape a significant amount as they are closed after the carton has been loaded. This flexing is due in part to the construction and shape of the cover sections as originally formed and to a new cooperation between them and the upstanding members 16 in the bottom section of the box. This feature of the invention will now be described in greater detail with reference to FIGS. 4 to 7. These figures illustrate how the cover sections of a carton 10 change their shape as they are closed by automatic closing apparatus on a carton-loading production line. The complete closing apparatus is not shown since it forms no part of the present invention. However, a closure plate

29 which is part of such a mechanical closing apparatus is shown in the position where it would normally be oriented, that is vertically above the carton, partially within the slots 20 and aligned with the longitudinal axis of the carton. Assuming that a carton has been de-nested mechanically from a supply stack of cartons and the carton cells have been loaded with eggs, a force would be applied by the automatic closing apparatus to the cover sections to rotate both of them simultaneously about their scored longitudinal hinge lines 22. When the cover sections 13 are rotated to the position shown in FIG. 4, the outer sloped wall 25 of each cover member 13 engages the closure plate 29. Now, as the cover sections are rotated further, these outer walls 25 press against the closure plate 29 and flex from their original sloped shape toward a substantially vertical position with respect to the planar top 23 of the cover section. When the cover walls 25 approach the lower end of the slots 20 in the members 16 they slide off the closure plate 29 and push against each other as they are forced the rest of the way into the slots. Since the width of the slots 20 near their lower ends and for a substantial distance above the side walls of the bottom section is approximately twice the thickness of the cover walls 25, as stated previously, these slots provide opposed surfaces that serve to grip the cover sections firmly when they are closed. Thus, when completely closed the cover sections are frictionally engaged and locked in place and are now in an upright or substantially vertical position (FIG. 6).

During the flexing of the outer walls 25 of the cover sections 13 as just described, the inner walls 24 also may flex toward the vertical position. The amount that the inner walls will flex from their originally molded sloped shape depends on the width of the cover section planar top 23 indicated typically by the dimension A in FIG. 6. For example, if the dimension A was increased from that shown, the inboard walls 24 would come closer to being vertical when the cover sections 13 are closed due to the fact that the outer walls 25 of both cover sections are in abutment and would force the inboard wall members 24 to flex outwardly. As shown in FIG. 6, the full flexing of the outboard side walls 25 and even partial flexing of the inboard side walls 24 increases the amount of space available within the carton. Thus, even the larger sized eggs can be accommodated without the cover walls touching them and possibly causing breakage during shipment or handling of the cartons. However, if needed, even more egg space can be provided by increasing the dimension A. When the width of its planar top member 23 on each cover section (the dimension A) is substantially equal to the distance between the hinge joints 22 and the longitudinal center line of the carton 10 which extends midway through the slots 20 of all the upstanding members 16, both walls 24 and 25 will become vertical when the box is closed and maximum egg space is provided.

As stated above, when the inner and outer walls of the cover sections flex and are pushed together, the end walls 26 simultaneously bulge outwardly in a longitudinal direction. To accommodate this compensating longitudinal distortion in the cover sections, the carton is initially formed, as shown in FIG. 2, with the cover sections 13 somewhat shorter than the bottom section 11 by an amount designated typically by the letter B. Now, when the cover sections are closed, as shown in FIG. 7, their end walls 26 bulge out just enough due to the flexing of the originally sloped side walls 24 and 25 so that the cover rim portions 27 become even with and substantially match the rim portion 19 of the bottom section 11 of the carton.

While I have described the carton 10 as being easily closable by automatic production line machinery, it can of course, be readily closed by hand or by other means wherein one cover section is closed first before the other cover section. In this latter instance no closure plate is required and the upper curved edges 21 of the slots 20 in the post members 16 function to help cam the first cover

section into position. As this first cover section is rotated, its outer wall initially engages the opposite curved edges 21 of the center post slots 20, and as it is cammed downward to the bottom of the slots, its outer wall flexes from the sloped to the vertical position relative to the planar top portion 23. Now, when the other cover section is closed, its outer wall strikes the first cover section already in place and is cammed downwardly into a tight locking engagement with the other cover section at the lower end of the slots.

As stated previously, it is important that egg cartons be formed so that a large number of them can be conveniently nested together in large stacks for shipment and storage, and for use in automatic loading apparatus. Yet, when stacked in this manner it is necessary that the cartons do not tend to wedge or stick together, since they must be readily separable for feeding and handling by the egg loading machines. The carton 10 of the present invention fulfills both of these requirements. To facilitate nesting, the side walls 24 and 25 of the cover sections 13 when formed are sloped inwardly as previously described at a predetermined angle (e.g., approximately 12 degrees), and the cells 14 and the upstanding post members 16 of the bottom section 11 are also similarly tapered to facilitate the nesting of the cartons. To assure that the cartons 10 can be de-nested easily, the outboard side wall 25 of each cover section 13 has a particularly unique construction along its longitudinal junction 30 with the planar top 23. As shown in FIG. 9, the outside edge of the junction 30 is relatively sharp and is substantially a right angle, although just above the junction 30 of an open carton the side wall 25 slopes outwardly at the normal slope angle (e.g., 12 degrees). The inside of each cover section 13 has a smoothly curved fillet 32 between the side wall 25 and the planar top 23. Thus, due to the edge 31, as shown in FIG. 9, a small amount of space 33 is maintained between the outer walls of adjacent cover sections, and the cartons when stacked will not wedge tightly together, but will remain readily separable. Another function of the sharp outside edge 31 of each cover section is that it causes the open cartons to stack in a level position rather than slumping together despite the number of cartons in the stack.

From the foregoing it will be apparent that I have provided an improved molded egg carton that has unusual structural strength and egg protection features, as well as a clean, attractive appearance. The unique arrangement of its various structural elements, including the slotted upstanding members 16, enables the carton to be manufactured at relatively low cost using conventional molding procedures and also highly adaptable for use with automated egg handling machines.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

I claim:

1. A molded two-by-six egg carton including:

- a bottom section having egg supporting means, side and end wall means, and longitudinal and transverse partition means all cooperating together to form two rows of six egg receiving pockets;
- a pair of generally tub shaped cover sections having outboard side walls and inboard side walls integrally connected to the opposite side wall means of said bottom section and curved end walls at opposite ends of each cover section between its side walls, said cover section side walls of an open carton being sloped outwardly when the carton is formed in the open position so that the distance between the outer edges of each cover side wall is greater than one half of the overall width of said bottom section;
- a plurality of integrally upstanding gripping members located at spaced apart intervals on said bottom sec-

tion and extending above the upper edges of the bottom section, said upstanding members being transversely slotted above the side walls of said bottom section and along the longitudinal center line thereof, each slot being substantially uniform in width at its lower end and diverging upwardly to form a relatively wide opening at its upper end;

said slots being adapted to receive the outboard sloped side walls of said cover sections, to flex them toward a substantially vertical position and thereby to retain them in frictional engagement when the carton is closed.

2. The carton as described in claim 1 wherein said cover sections are slightly shorter in length than said bottom section when the carton is formed in the open position, said cover sections tending to increase in length to match generally the shape of the bottom section when the end walls of the cover sections push outwardly as their side walls are pushed together when the carton is closed.

3. A molded egg carton comprising:

- a bottom section having egg supporting means, side and end wall means, and longitudinal and transverse partition means all cooperating together to form two rows of six egg receiving pockets;
- a pair of tub shaped cover sections having outboard side walls and inboard wall sides hingedly connected to opposite side walls of said bottom section the distance between the longitudinal edges of the side walls of each cover section being greater than one half the width of said bottom section;
- a plurality of upstanding members extending upwardly above the upper level of said bottom section at the junction of said longitudinal and transverse means, and spaced apart along the longitudinal center line of said bottom section, said upstanding members having transverse slots open at their upper ends and aligned along the longitudinal center line of said bottom section, each said slot being relatively narrow at its lower end and providing opposed gripping surfaces and diverging upwardly and outwardly at its upper end to provide camming surfaces, said slots receiving said outboard side walls of each said cover section and thereby retaining them in frictional engagement when the carton is closed.

4. A molded egg carton comprising:

- a bottom section having egg supporting means, side and end wall means, and longitudinal and transverse partition means all cooperating together to form two rows of six egg receiving pockets;
- a pair of tub shaped cover sections having outboard side walls and inboard side walls hingedly connected to opposite side walls of said bottom section, said side walls being sloped when the carton is molded in the fully open position, with the distance between the longitudinal edges of the side walls of each cover section being greater than one half the width of said bottom section;
- a plurality of tapered upstanding members extending upwardly above the upper lever of said bottom section at the junctions of said longitudinal and transverse means, and spaced apart along the longitudinal center line of said bottom section, said upstanding members having transverse slots open at their upper ends and aligned along the longitudinal center line of said bottom section, said slots forming upwardly divergent edges on each said upstanding member adapted to receive said outboard side walls of said cover sections and to cause them to flex toward a substantially upright position while retaining them in frictional engagement when the carton is closed.

5. A molded egg carton comprising:

- a bottom section having egg supporting means, side and end wall means, and longitudinal and transverse partition means all cooperating together to form two rows of six egg receiving pockets;

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a pair of tub shaped cover sections each having sloped outboard and inboard side walls flexibly attached to a planar top portion with said outboard side walls being integrally hingedly connected along longitudinal hinge lines to opposite side walls of said bottom section, the distance between the longitudinal edges of the side walls of each cover section when the carton is molded being greater than one half the width of said bottom section, each said outboard side wall having a relatively sharp angular edge along the outside longitudinal junction with its planar top portion, and a corresponding concave surface extending along the inside of said longitudinal junction within each cover section;

a plurality of tapered upstanding members extending upwardly above the upper level of said bottom section at the junctions of said longitudinal and transverse means, and spaced apart along the longitudinal center line of said bottom section, each said upstanding member having a transverse slot open at its upper end and aligned along the longitudinal center line of said bottom section, said slots being adapted to receive said outboard side walls of each said cover section and to retain them in frictional engagement when the carton is closed, said sharp outside edges thereby being brought together to form a substantially smooth surface on the top of the closed carton.

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6. An egg carton comprising an elongated tray provided with parallel rows of pockets and having end edges and longitudinal edges adjacent said pockets,

a cover section hingedly connected to each longitudinal edge of said tray, each cover section being generally tub shaped and having a bottom with connected end walls and side walls diverging outwardly therefrom and terminating in connected end edges and longitudinal edges, the distance between the longitudinal edges of each cover section being greater than one half the width of the tray,

and cover gripping means integral with the tray and extending above and between the pockets thereof for gripping and retaining the cover sections in position over the pockets.

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FRANKLIN T. GARRETT, *Primary Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,191,844

June 29, 196

Alfred E. Comstock

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 45, for "possible" read -- possibly --;
column 5, line 29, after "edge" insert -- 31 --; column 6,
line 10, strike out "to"; line 59, for "lever" read -- level

Signed and sealed this 28th day of December 1965.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents
