Dec. 15, 1953 H. V. BOLDING 2,662,682

MULTICELL COLLAPSIBLE CARTON

Filed Nov. 9, 1951 2 Sheets-Sheet 1

Fig. 1.

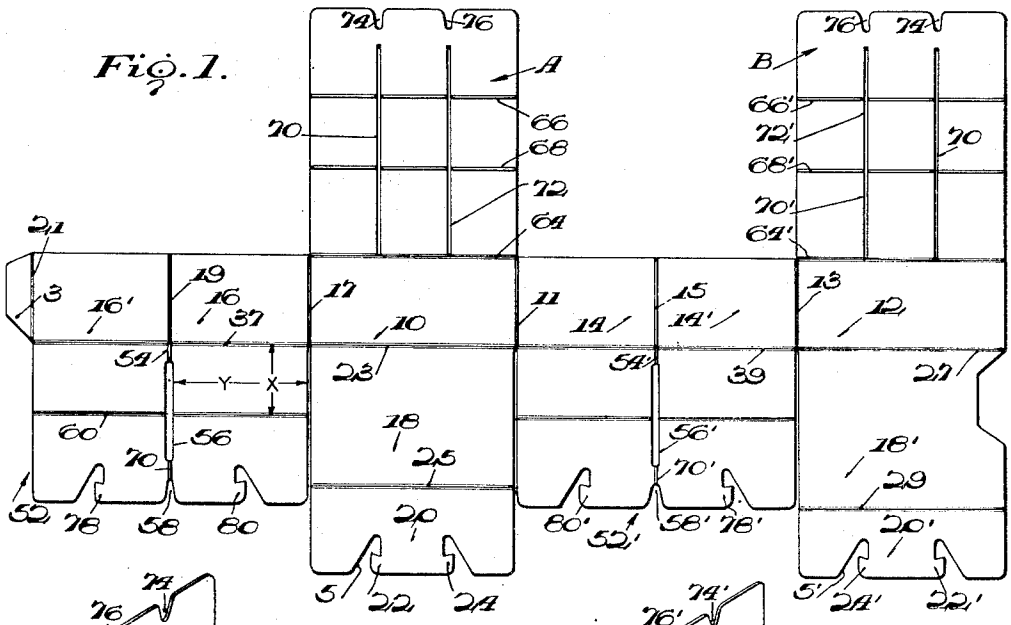


Fig. 2.

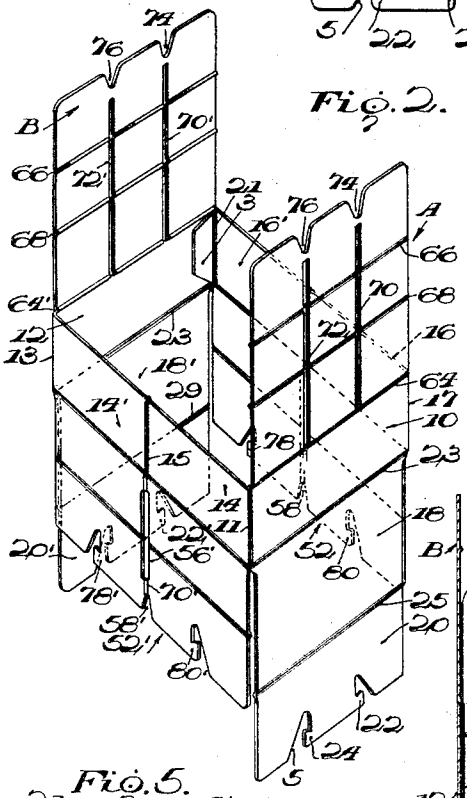


Fig. 3.

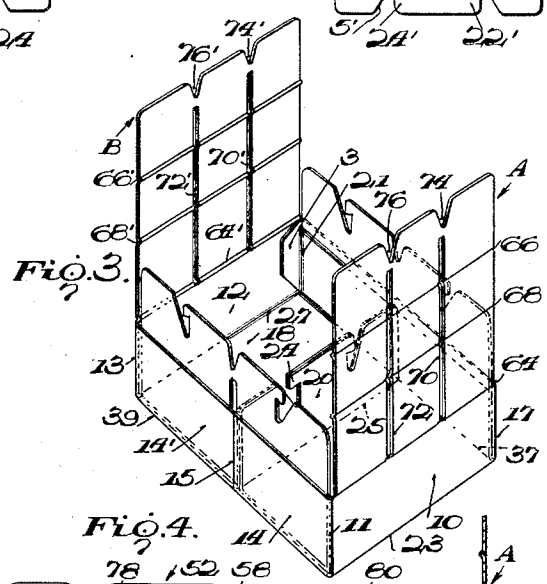


Fig. 4.

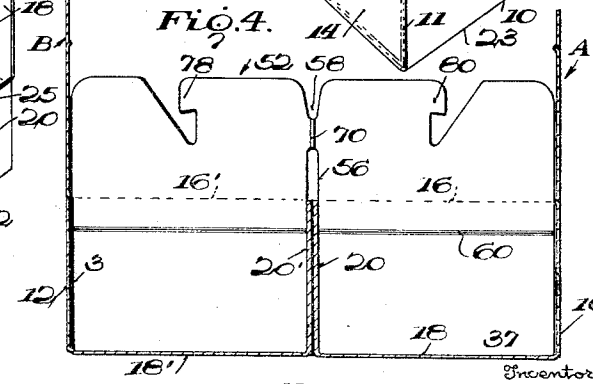
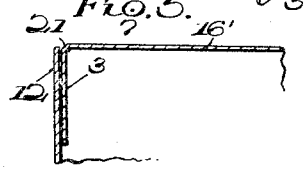


Fig. 5.



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MULTICELL COLLAPSIBLE CARTON

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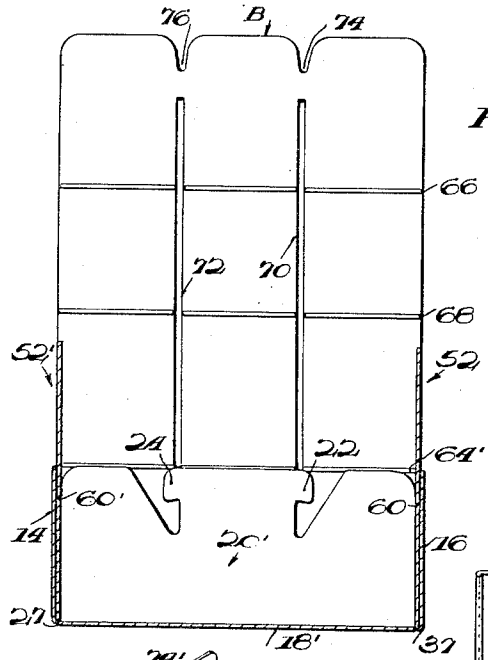


Fig. 6.

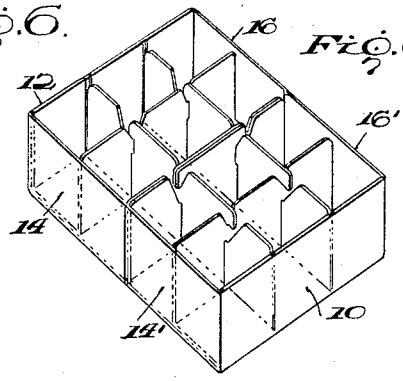


Fig. 9.

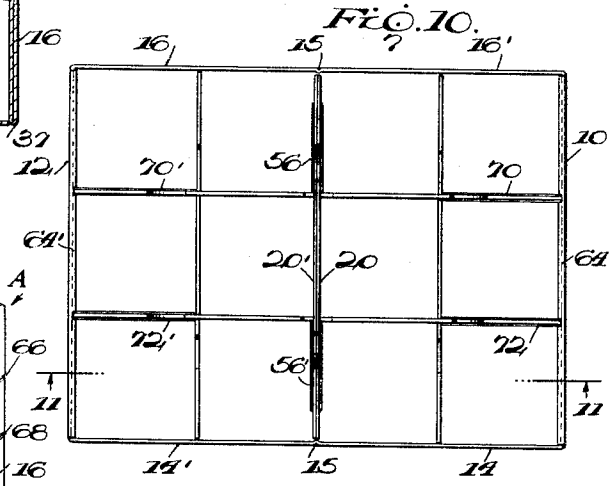


Fig. 10.

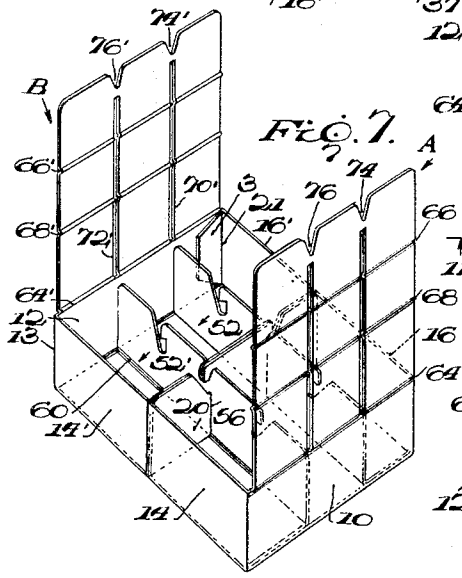


Fig. 7.

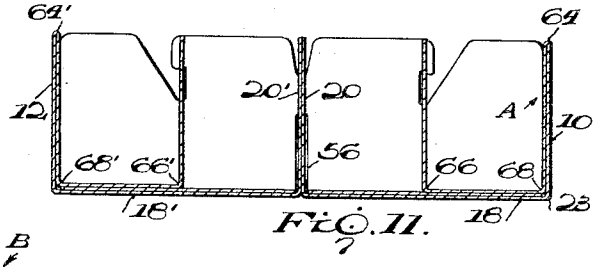


Fig. 11.

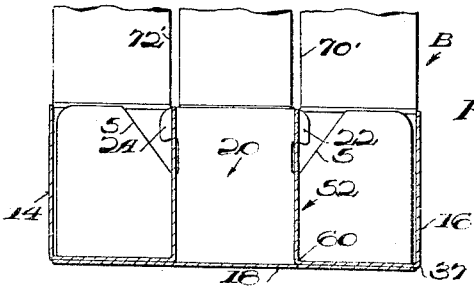


Fig. 8.

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MULTICELL COLLAPSIBLE CARTON

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Application November 9, 1951, Serial No. 255,617

5 Claims. (Cl. 229—28)

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This invention relates to cartons which are partitioned or cellular in nature and adapted to the packaging of such articles as bottles, light bulbs, eggs, candy novelties, fruits, vegetables, cookies, etc. This application is a continuation-in-part of my copending application Serial No. 34,952, filed June 24, 1948, now Patent Number 2,574,461, issue date of November 13, 1951.

An object of the invention is to so construct a single blank from sheet material that a cellular carton comprising walls, spaced partitions, and if desired a top or cover may be readily and quickly set up by automatic folding carton machinery at a high rate of speed, the carton being collapsible into flat form after being so set up to thereby facilitate storage, handling, and shipping.

Another object of the invention is to arrange the partitions which form the individual cells in such manner that they also function to strengthen certain portions of the carton, particularly the bottom and walls, and rigidify the same from top to bottom, side to side, and end to end. As a result, when some units are removed from a loaded carton the partitions will not collapse in the empty cell and the remaining contents are as securely positioned as though the entire carton were filled.

Still a further object of the invention is to so construct the various components of the forming blank that, after the carton is partially set up, excepting only the partitions which form the cell-like pockets, the collapsed or flatted units may be readily withdrawn from stock and quickly and easily opened by slight pressure exerted on the ends of the collapsed carton and the partitions positioned properly, thus rendering the carton ready for immediate use.

It should be understood that the invention is not limited to the use of any particular material. While in many instances the use of so-called pasteboard will prove most satisfactory, substantially any material may be used which is obtainable in sheet form such as plastics, sheet metal, plastic impregnated fabrics or paper, laminate of cellophane, plastic sheeting, etc. Use of transparent plastic sheets possesses the advantage of providing a completely transparent partitioned plastic box particularly suitable for packaging articles where it is desirable to display different species of a product in a single display assembly.

Various other objects and meritorious features of the invention will become apparent from the drawings, wherein like numerals refer to like parts throughout the several figures, and wherein:

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Fig. 1 is a plan view of the sheet material blank used in forming the carton;

Fig. 2 is a perspective illustrating an initial stage in setting up the carton from the blank illustrated in Fig. 1;

Fig. 3 is a perspective illustrating a somewhat more advanced stage of formation;

Fig. 4 is a transverse section through Fig. 3;

Fig. 5 is a top plan view of a corner of the carton illustrating the manner in which the walls are secured in position;

Fig. 6 is a longitudinal section through Fig. 3;

Fig. 7 is a perspective illustrating the initial step in disposing the partitions to form the interior cellular structure;

Fig. 8 is a longitudinal section through Fig. 7;

Fig. 9 is a perspective illustrating the completed carton;

Fig. 10 is a top plan view of said carton, and

Fig. 11 is a section through 11—11 of Fig. 10.

Referring now to Fig. 1, the blank formed from a single sheet of material is preferably die cut to form the container shown and scored in locations to be described hereinafter for facilitating the setting up operation. The blank comprises side walls 10 and 12 separated by score lines 11 and 13 from what may be termed a duplex end wall consisting of sections 14 and 14', the two components being identical in every way and joined by a score line 15 as illustrated. Incidentally, it should be borne in mind that the terms "end" and "side" are used arbitrarily in describing this invention and that it is immaterial whether certain partition forming flaps are associated with the longer walls or the shorter walls, or whether in fact the walls are of the same linear dimensions. At the other end of side wall 10 and separated therefrom by score line 17 is the other duplex end wall consisting of sections 16 and 16' divided by score line 19. Projecting beyond section 16' and separated therefrom by score line 21 is a tab 3, to one side of which adhesive is applied for a purpose described hereinafter.

Projecting from one side of wall 10 and separated therefrom by score line 23 is a wing comprising a bottom section 18 beyond which and separated therefrom by score line 25 is a longitudinal partition section 20. The outer margin of partition section 20 is die cut to provide locking tongues 22 and 24.

A substantially identical wing separated by score line 27 from the corresponding side margin of wall 12 is similarly provided with a bottom section 18', a longitudinal partition section 20', and locking tongues 22' and 24'. Cooperating

with each of the locking tongues 22, 22' and 24, 24' is a diagonally extending slot 5 leading to the underside of each tongue. Longitudinal partition section 20' may be coated with adhesive over all or a portion of its surface.

Beyond the ends of sections 16 and 16' and separated therefrom by a score line 37 is a transverse partition section broadly designated 52. This partition section is slotted from score line 37 delineating the margin of end sections 16 and 16', the slot being in alignment with score line 19 separating the sections, to provide a narrow slotted portion 54 at the base of the partition and a somewhat wider slotted portion 56 extending outwardly to a point near the end of the partition section. The partition section 52 is slotted at its outer free end in alignment with slot 56, as indicated at 58. A score line 60 extends across section 52. A partition section broadly designated 52' identical in every respect with section 52 projects beyond the ends of the duplex end wall 14, 14' and is separated therefrom by a score line 39.

Flexibly connected to the upper margin of side wall 10 by a score line 64 is a partition-forming wing broadly designated A which comprises a grid-like formation determined by horizontal score lines 66 and 68 and vertical slots 70 and 72. Vertical slots 70 and 72 terminate somewhat inwardly from the outer free margin of section A and slots 74 and 76 are cut into said outer margin in alignment with score lines 70 and 72.

The vertical dimension of the grid sections adjacent score line 64 is equal to the height of side wall 10, as is the vertical dimension of the grid sections adjacent the outer margin of wing A. The grid sections lying between score lines 66 and 68 are of a vertical dimension conforming to a specific fraction of the end wall formed by composite sections 16, 16' and 14, 14'. In this instance that dimension is one half the length of an end wall section such as 16.

Flexibly connected to side wall 12 by a score line 64' is a partition-forming wing broadly designated B which is identical in every respect with A.

In the particular modification herein illustrated it should also be noted tht the width X of the sections lying between score lines 37 and 39 is equal to one third the length of side wall 10 and the length Y of such section is equal to one half the length of the composite end wall, i. e., equal to the length of end wall section 16. It should be understood, of course, that these dimensions may be modified and the relationship between dimensions may also be modified without departing from the basic concept of the invention.

In setting up the carton from the blank illustrated in Fig. 1 the first step may be as illustrated in Fig. 2. The blank is folded along score lines 11, 13 and 17 and the adhesive-coated tab 3 is pressed against the inside of the free margin of side wall 12, thus setting up the side and end walls of the rectangular carton.

The next step illustrated in Fig. 3 involves folding the wings embodying bottom sections 18 and 18' and longitudinal partition sections 20 and 20' along score lines 23, 25, 27 and 29, respectively. The fold is inwardly along score lines 23 and 27 and outwardly along score lines 25 and 29. The partition sections 20 and 20', to one side of the latter of which adhesive has been applied, are then brought into face-to-face contact and the two partition sections are pressed together to form a single integral section extending upwardly from the longitudinal median line of the bottom of the carton. The bottom is formed by the two component sections 18 and 18', which sections are held in abutting relation by the integrated longitudinal partition formed of sections 20 and 20'.

Prior to folding inwardly the two wing sections as thus described to form the longitudinal partition and bottom of the carton, transverse partitions 52 and 52' are folded inwardly along score lines 37 and 39, positioning them within the four walls of the carton in juxtaposition with the end walls, respectively, as clearly shown in Figs. 3 and 6. It should be noted that the distance between score lines 37 and 60 of transverse partition section 52, and correspondingly in conjunction with transverse partition section 52' is equal to a specific fraction of the length of the carton, as hitherto described.

Referring now to Figs. 6 and 7, it will be noted that the next step in setting up the carton is to fold the transverse partitions 52 and 52' along score lines 60 and 60' by pushing downwardly on their upper edges, respectively. Slot 56 in transverse partition 52 and the corresponding slot in partition 52' receive the integrated longitudinal partition. The slots indicated at 58 in conjunction with transverse partition 52 and the corresponding slot in transverse partition 52' are then engaged with the firmly positioned under the integrated locking tongues 22, 22' and 24, 24' of the longitudinal partition. It will be noted that by reason of this construction the thickness of the bottom of the carton is doubled at the base of each of the two cells so formed along the end walls.

The final stage of setting up the carton is illustrated by the completed carton disclosures in Figs. 9, 10 and 11. Wing sections A and B are folded down along score lines 64 and 78, respectively, from the position illustrated in Fig. 7. Slots 70 and 72 of wing A will be received by the transverse partitions formed from sections 52 and 52' and the slots 74 and 76 at the extremity of each of the wings A and B will be received under locking tongues 78 and 80 located in the margins of sections 52 and 52'. Thus the side walls of the carton will be reinforced and the corner cells will have a bottom of three-ply thickness. Of the remaining cells, all except the geometrically central cell of the twelve cells thus formed will have a bottom of two-ply thickness.

When set up in the form illustrated in Fig. 3, the carton is readily collapsed by exerting pressure transversely of the carton against the lower corners of the side walls 10 and 12. Transverse partitions 52 and 52' should first be positioned as illustrated in Figs. 3 and 4 to lie adjacent and inside the duplex end wall sections and wings A and B extended above the upper margin of the walls illustrated. When pressure is so exerted the integrated longitudinal partition 20, 20' moves upwardly, carrying the bottom sections 18, 18' inwardly around score lines 23 and 27 into face-to-face contact. The ends of the carton formed, respectively, by duplex sections 14, 14' and 16, 16' collapse inwardly, respectively, about score lines 15 and 19 and the transverse partitions 52 and 52' fold inwardly along end central partition receiving slots and score line 70 extending between the outer end of slot 56 and notch 58 in the outer margin of each partition 52, 52'.

When the box is in the flatted or collapsed con-

dition, individual units are readily stacked for shipment and storage. In order to set a carton up it is only necessary to remove one from the stack, exert pressure against the extreme ends of the collapsed carton to straighten out the bottom and end walls, move the transverse partition 52 and 52' down into the operative position illustrated in Fig. 7, and then move wings A and B down to the position illustrated in Fig. 9, all as described above.

As will have been noted from the foregoing description, the operation of forming the box into flatted condition for storage is the essence of simplicity. Only the end tab 3 and one of the constituent units of the ultimately integrated transverse partition need be supplied with adhesive, and only two pressure operations at these adhesive-spotted locations, respectively, are required.

While I have described a carton comprised of twelve cells, it will be apparent that the essence of the invention comprising a single blank having longitudinal and transverse partition sections extending away from the walls of the blank and slotted to receive other partitions in locking engagement is susceptible of various modifications whereby cartons providing any number of cells may be developed. The use of separate cell-forming assemblies is entirely eliminated, thus obviating a separate assembly of outside carton and interior cell-forming structures. The carton and its compartments can be made to any desired dimensions, the practical limit being only the size of available manufacturing equipment. The number of compartments is limited only by the increasing conplexity of the assembling operation.

Having thus described a preferred embodiment of the invention, various modifications lying within its scope will be apparent to those skilled in the art and for that reason I wish to limit myself only within the scope of the appended claims.

What I claim is:

1. A cellular carton formed from a single blank of sheet material comprising side walls, end walls collapsible outwardly along their vertical median lines, a bottom wall collapsible inwardly along its longitudinal median line, a longitudinal partition centrally disposed within the carton integral with said bottom wall and movable upwardly into the carton on collapsing of the bottom wall, transverse partitions engaging said longitudinal partition at spaced points along its length, said transverse partitions being movable into face-to-face contact with said end walls and collapsible outwardly on collapsing movement of the end walls, and secondary longitudinal partitions engaging each transverse partition at spaced points along their lengths, said secondary longitudinal partitions being movable out of alignment with the remainder of the collapsed assembly.

2. A cellular carton comprising side walls, end walls collapsible along their vertical median line, a longitudinal partition centrally disposed within the carton and connected to the bottom wall, transverse partition sections connected to the bottom of each end wall movable into positions, respectively, to form within the carton in conjunction with the longitudinal partition a series of cells on each side of the same, each said transverse partition section including portions adapted to overlie and reinforce an adjacent portion of the bottom wall, and secondary longitudinal partition sections flexibly connected, respectively, to the upper margin of each side wall and movable into positions, respectively, to divide each cell of each of said series into additional cells.

3. A cellular carton comprising side walls, end walls collapsible along their vertical median line, a longitudinal partition centrally disposed within the carton and connected to the bottom wall, transverse partition sections connected to the bottom of each end wall movable into positions, respectively, to form within the carton in conjunction with the longitudinal partition a series of cells on each side of the same, each said transverse partition section including portions adapted to overlie and reinforce an adjacent portion of the bottom wall, and secondary longitudinal partition sections flexibly connected, respectively, to the upper margin of each side wall and movable into positions, respectively, to divide each cell of each of said series into additional cells, each said secondary longitudinal partition section including portions adapted to overlie and reinforce the adjacent portion of its respective side wall and the bottom wall.

4. A cellular carton comprising side walls, end walls collapsible outwardly along their vertical median line, a bottom wall collapsible inwardly along its longitudinal median line, a longitudinal partition centrally disposed within the carton integral with said bottom wall and movable upwardly into the carton on collapsing of the bottom wall, said longitudinal partition including notched tongues adjacent its ends, transverse partition members flexibly connected, respectively, to the bottom margins of the end walls, each said partition being divided by a transverse fold line into a bottom reinforcing portion and a cell wall portion and being slotted outwardly from a point adjacent its connection with its respective end wall for reception of the longitudinal partition and slotted inwardly from its outer free margin to form between adjacent ends of the respective slots a solid portion engageable in the notch of a locking tongue when the bottom reinforcing portion of the transverse partition member overlies the bottom and the cell wall portion is disposed normal thereto, each said transverse partition including on opposite sides of its slotted portion a notched locking tongue, and secondary longitudinal partitions connected, respectively, to the upper margins of the side walls, each said secondary partition being divided by parallel transverse fold lines into a side wall reinforcing portion, a bottom reinforcing portion, and a cell wall portion and being slotted outwardly from points adjacent its connection with its respective side wall for reception of the transverse partitions and slotted inwardly from its outer free margin to form between adjacent ends of the respective slots solid portions engageable in the notches of the locking tongues of the transverse partitions when the bottom reinforcing portion of the secondary partition overlies the bottom and the cell wall portion is disposed normal thereto.

5. A cellular carton comprising side walls, end walls collapsible outwardly along their vertical median line, a bottom wall collapsible inwardly along its longitudinal median line, a longitudinal partition centrally disposed within the carton integral with said bottom wall and movable upwardly into the carton on collapsing of the bottom wall, said longitudinal partition including notched locking tongues adjacent its ends, transverse partition members flexibly connected, re-

spectively, to the bottom margins of the end walls, each said partition being divided by a transverse fold line into a bottom reinforcing portion and a cell wall portion and being slotted outwardly from a point adjacent its connection with its respective end wall for reception of the longitudinal partition and slotted inwardly from its outer free margin to form between adjacent ends of the respective slots a solid portion engageable in the notch of a locking tongue when the bottom reinforcing portion of the transverse partition member overlies the bottom and the cell wall portion is disposed normal thereto, each said transverse partition including on opposite sides of its slotted portion a notched locking tongue, and secondary longitudinal partitions connected, respectively, to the upper margins of the side walls, each said secondary partition being divided by parallel transverse fold lines into a side wall reinforcing portion, a bottom reinforcing portion, and a cell wall portion and being slotted outwardly from points adjacent its connection with its respective side wall for reception of the transverse partitions and slotted inwardly

from its outer free margin to form between adjacent ends of the respective slots solid portions the margins of which are engageable in the notches of the locking tongues of the transverse partitions when the bottom reinforcing portion of the secondary partition overlies the bottom and the cell wall portion is disposed normal thereto.

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