

Sept. 20, 1955

W. H. INMAN

2,718,347

COLLAPSIBLE CELLULAR SUPPORT

Filed Oct. 14, 1952

4 Sheets-Sheet 1

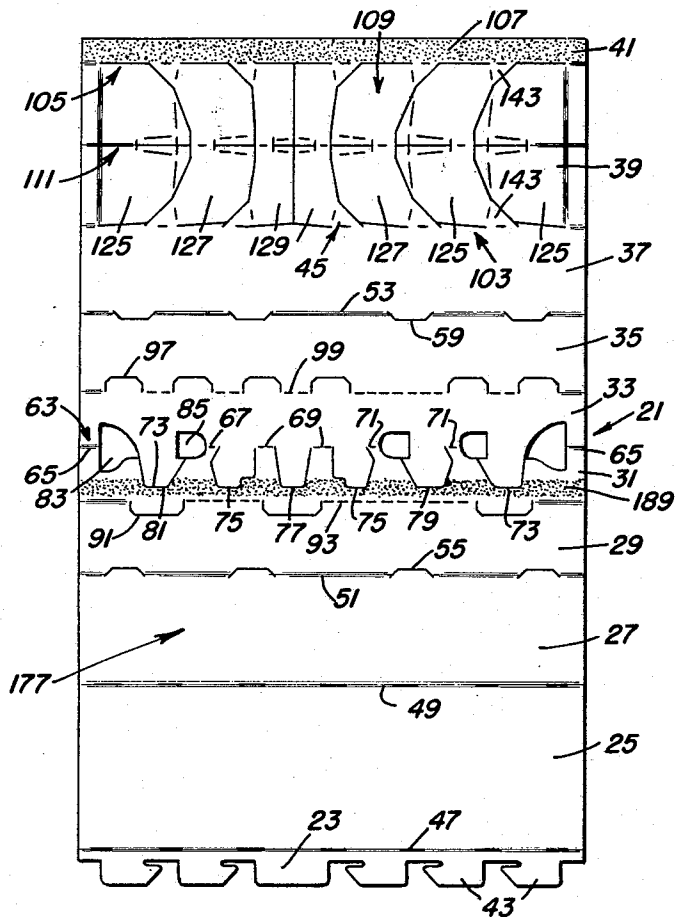


FIG. 1.

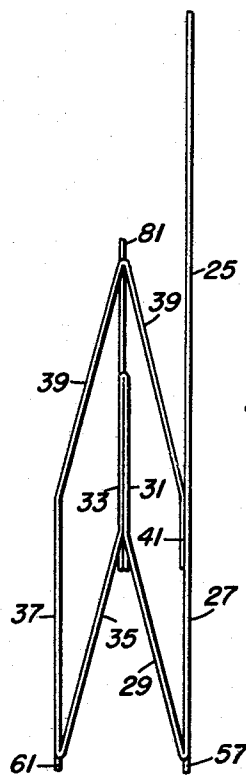


FIG. 9.

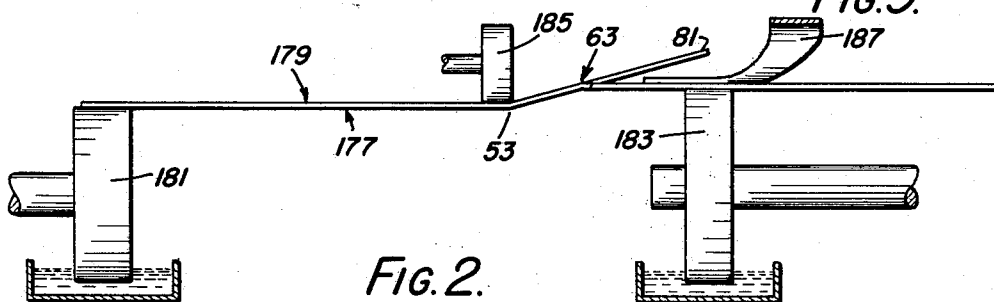


FIG. 2.

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4 Sheets-Sheet 2

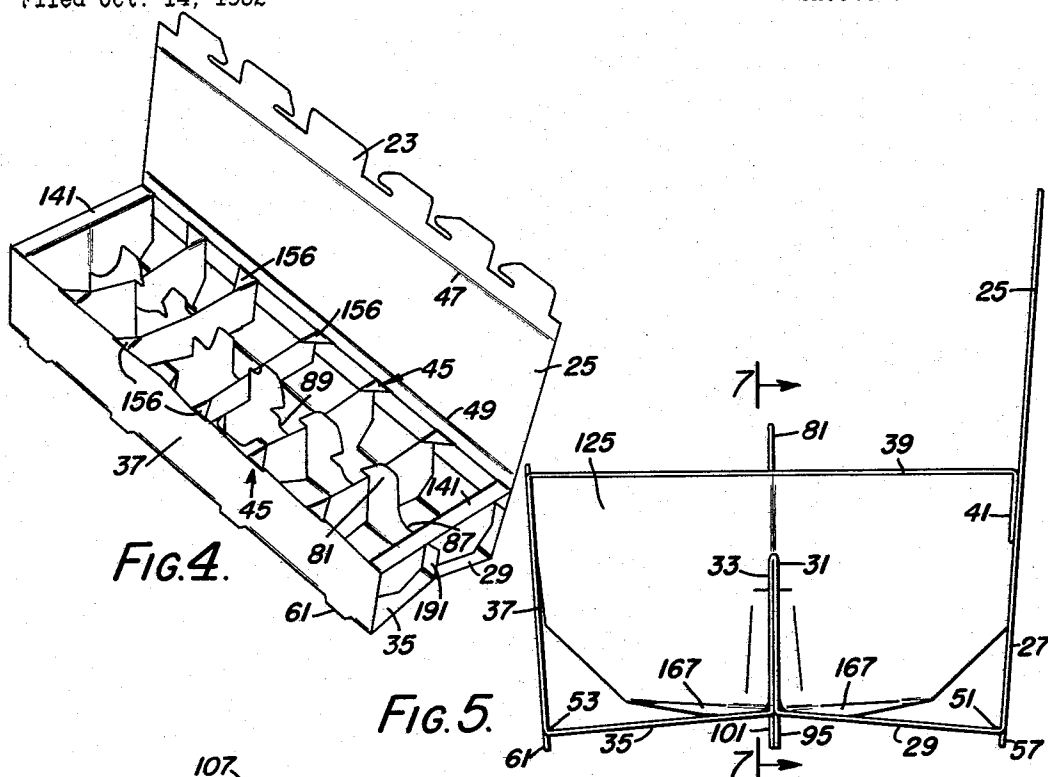
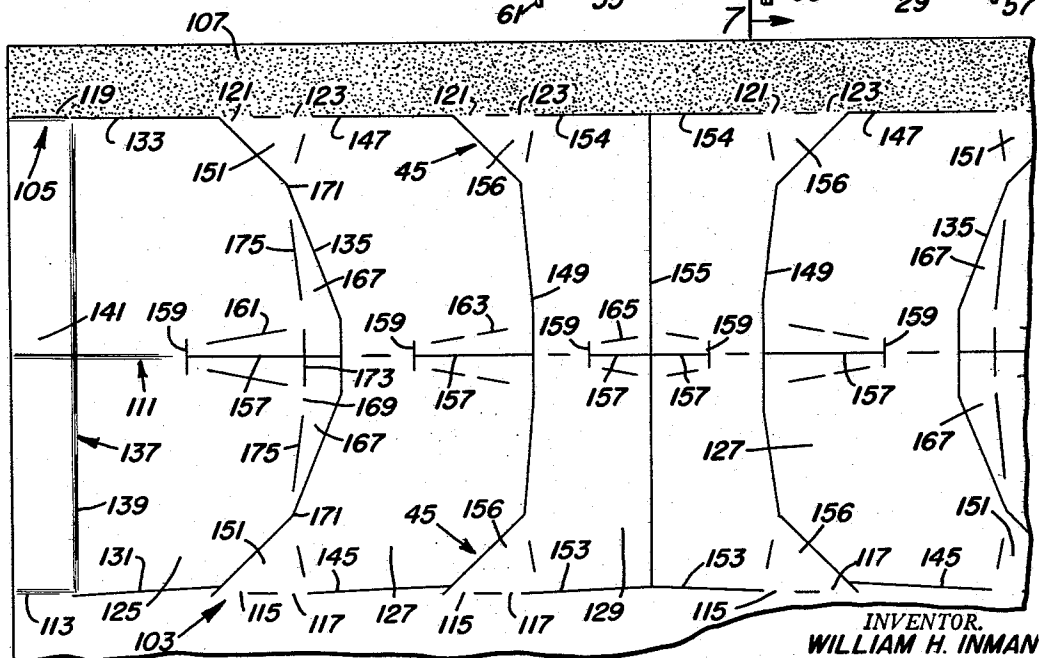


FIG. 3.

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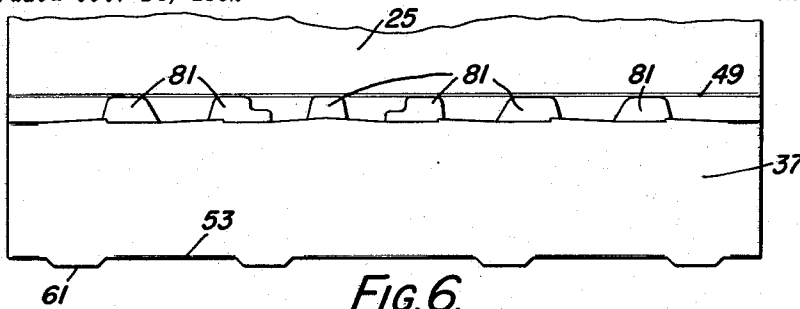


FIG. 6.

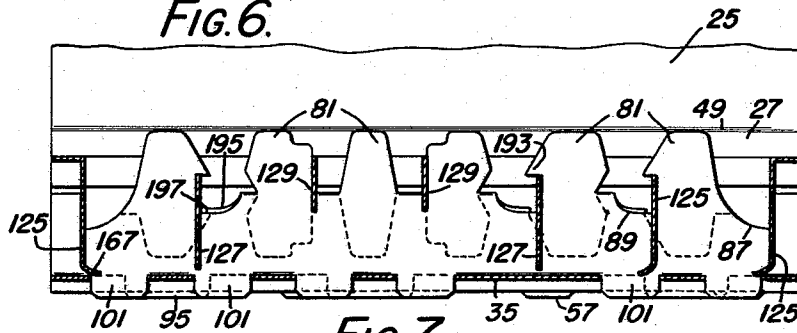


FIG. 7.

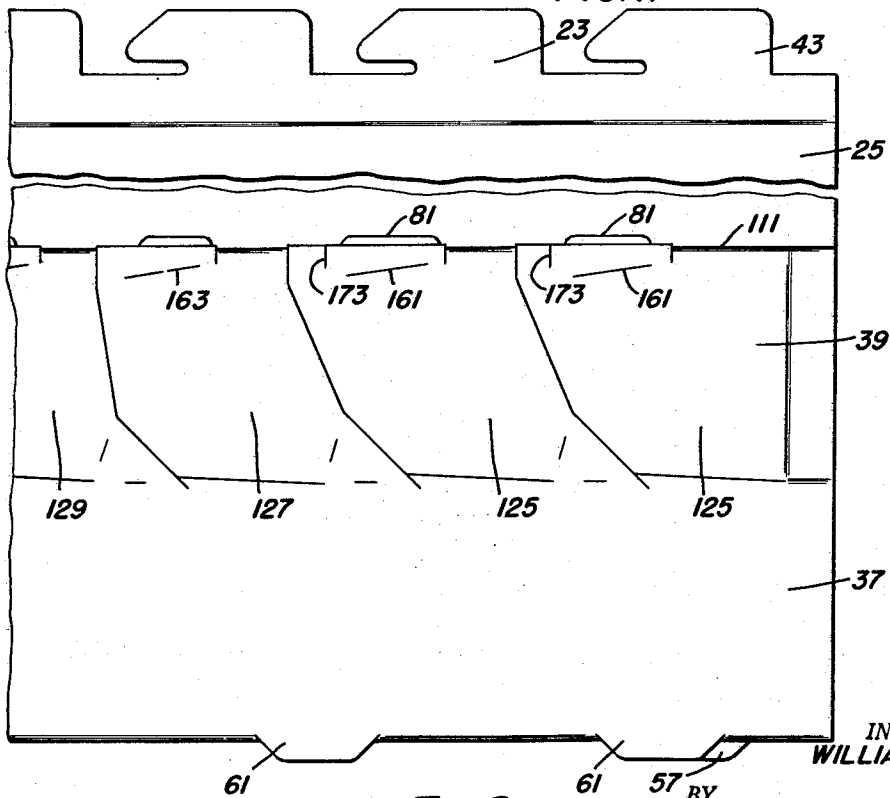


FIG. 8.

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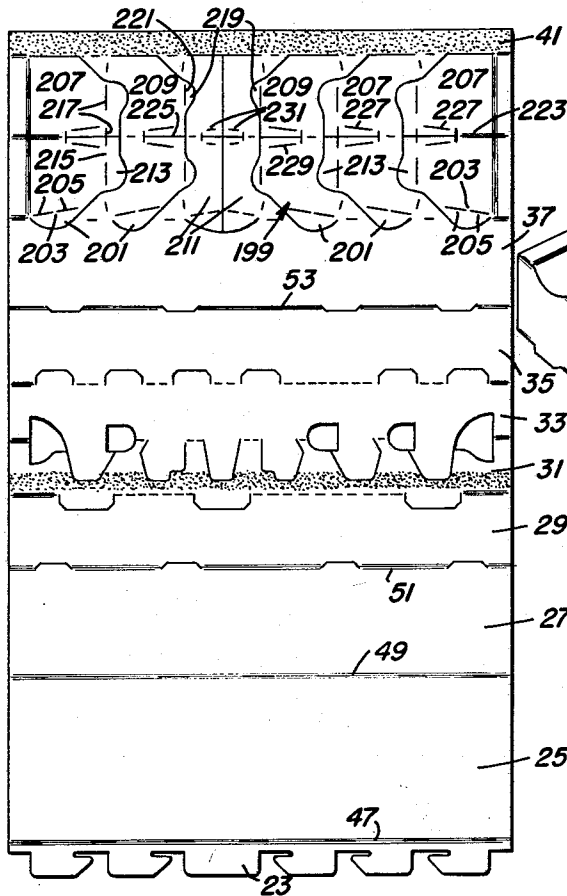


FIG. 10.

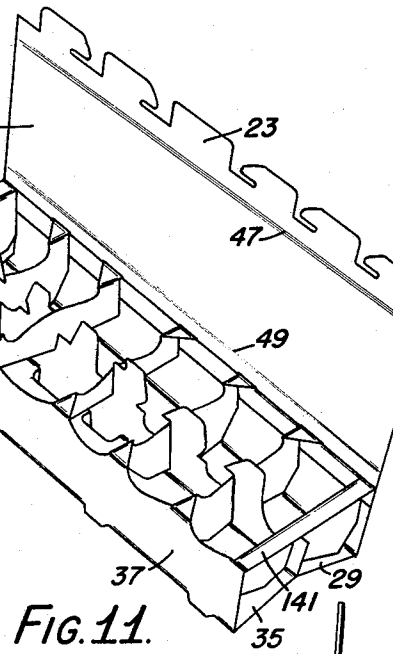


FIG. 11.

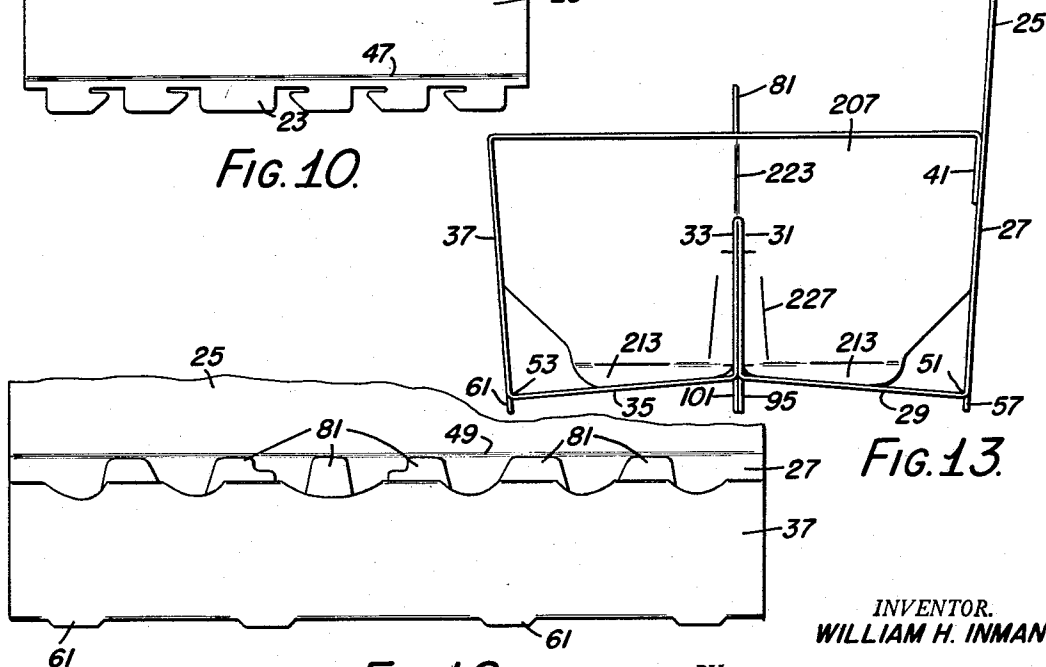


FIG. 12.

FIG. 13.

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2,718,347

COLLAPSIBLE CELLULAR CARTON

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Application October 14, 1952, Serial No. 314,603

10 Claims. (Cl. 229—28)

This invention relates to collapsible cartons made of cardboard or other foldable material and, more particularly, to the cellular variety thereof adapted for holding eggs, fruit, cakes and other fragile articles, one object of the invention being to provide an improved carton of this character having a more rigid, economical and convenient construction and mode of operation.

Another object is to provide an improved carton of the above character in which the central longitudinal partition is formed in part from a single thickness of stock and at the same time said partition is provided with means for more securely locking together the longitudinal partition and certain ones of the transverse partitions, when the carton is in erected position, for increasing the strength and rigidity of the carton.

A further object is to provide a carton of the above type in which the transverse partitions are formed with tab portions which frictionally engage the inner surfaces of the carton walls thereby increasing the transverse rigidity of the carton.

A further object is to provide a carton having the above advantages in which the longitudinal partition is provided with a series of depending feet for supporting the central portion of the bottom of the carton in raised position thereby providing a cushioning effect for the contents thereof.

Still a further object is to provide a carton having the above improved construction in which the longitudinal partition extends into supporting engagement with the cover for increasing the protection of the contents and for allowing stacking of the cartons without injury to the contents thereof.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a view of a blank, cut and scored in accordance with my invention, preparatory to folding;

Fig. 2 is a fragmentary end elevation of the blank showing the application of glue to the same;

Fig. 3 is an enlarged fragmentary plan view of the top wall of the carton as shown in Fig. 1;

Fig. 4 is a perspective view of the carton in erected position;

Fig. 5 is an enlarged end elevation of the carton shown in Fig. 4;

Fig. 6 is a fragmentary, front elevation of the carton shown in Figs. 4 and 5;

Fig. 7 is a fragmentary sectional elevation along the line 7—7 in Fig. 5;

Fig. 8 is an enlarged fragmentary plan view of the carton in collapsed condition;

Fig. 9 is an enlarged elevation of one end of the collapsed blank;

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Fig. 10 is a view similar to Fig. 1, but shows a slightly modified form of my invention;

Fig. 11 is a perspective view of the modified carton formed from the blank shown in Fig. 10;

Fig. 12 is a fragmentary, front elevation of the carton shown in Fig. 11, and

Fig. 13 is an enlarged, end elevation of the carton shown in Figs. 11 and 12.

The preferred embodiment of the invention, herein disclosed by way of illustration, comprises a one-piece blank, indicated generally at 21 (Fig. 1), having, in order, a cover or locking flap 23, cover 25, rear side wall 27, rear bottom section 29, longitudinal partition walls 31 and 33, front bottom section 35, front wall 37, top or transverse partition wall 39, and attaching strip 41.

Cover flap 23 is preferably provided with a series of hooks, as at 43, for engagement with gusset or hinge parts closed by way of illustration, comprises a one-piece blank, indicated generally at 21 (Fig. 1), having, in order, a cover or locking flap 23, cover 25, rear side wall 27, rear bottom section 29, longitudinal partition walls 31 and 33, front bottom section 35, front wall 37, top or transverse partition wall 39, and attaching strip 41. Cover flap 23 is preferably provided with a series of hooks, as at 43, for engagement with gusset or hinge parts closed by way of illustration, comprises a one-piece blank, indicated generally at 21 (Fig. 1), having, in order, a cover or locking flap 23, cover 25, rear side wall 27, rear bottom section 29, longitudinal partition walls 31 and 33, front bottom section 35, front wall 37, top or transverse partition wall 39, and attaching strip 41. The blank is scored along lines 47 and 49 (Fig. 1) to facilitate accurate folding of flap 23 relative to the cover 25 and of the cover 25 relative to rear side wall 27. Heavier score lines 51 and 53 (Fig. 1) are provided for folding the side walls 27 and 37 upwardly relative to bottom sections 29 and 35, respectively. The bottom section 29 has formed therein adjacent fold line 51 a series of longitudinally-spaced, U-shaped cuts, as 55, connected together by fold line 51 for forming a series of spaced feet 57 (Fig. 5) which, when rear wall 27 is folded at substantially right angles to bottom section 29, form depending extensions thereof. Bottom section 35 has a similar series of U-shaped cuts 59 formed therein which form a series of depending extensions or feet 61 (Fig. 5) when front wall 37 is folded at substantially right angles to bottom section 35 along score line 53.

Longitudinal wall sections 31 and 33 are preferably divided by a central, interrupted longitudinal score line shown generally at 63 (Fig. 1). The broken fold line 63, as shown, has a series of spaced aligned fold lines 65, 67, 69 and 71 (Fig. 1). Between the ends of adjacent spaced fold lines 65, 67, 69 and 71 and located in partition wall 31, are formed cutouts 73, 75, 77 and 79, which are preferably shaped and positioned as shown in Fig. 1. Cutouts 73, 75, 77 and 79 form extensions or tabs 81 which, when the longitudinal partition wall sections are reversely folded on the broken fold line 63, constitute upstanding projections. Tabs 81, as shown in Fig. 4, extend above fold line 63 and lie in the plane of longitudinal partition wall 33 to form extensions thereof. Partition walls 31 and 33 are formed with a series of spaced openings 83 and 85 which are nearly symmetrically located on the axis of fold line 63 and which form a series of notches 87 and 89, respectively, (Figs. 4 and 7) for the reception of the mid-portions of the transverse partitions, as hereafter more fully described.

Bottom section 29 preferably has a series of longitudinally-spaced, U-shaped cuts, as 91 (Fig. 1), connected by a fold line 93 along which longitudinal wall section 31 is folded upwardly as shown in Fig. 5, the cuts 91 producing feet 95 (Figs. 1 and 7), which are thereby thrown downwardly in the plane of wall 31 to hold the inner edge of bottom section 29 in elevated position relative to the support, for cushioning contents of the carton. Bottom section 35 preferably has a series of longitudinally-spaced, U-shaped cuts, as 97, along the inner edge thereof connected by fold line 99 along which longitudinal partition wall 33 folds upwardly as shown in Fig. 5, when said partition walls 31 and 33 are reversely folded on fold line 63 in the formation of

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ed position tabs 167 frictionally engage the upper surface of the respective bottom sections and at the inner ends thereof frictionally engage the opposite sides of the longitudinal partition thereby more securely holding partitions 125 in erected position and increasing the vertical and horizontal strength of the erected carton.

Before the carton may be folded and set up, it is necessary to apply a line of glue or other suitable adhesive to one or both of the inner surfaces of longitudinal partition walls 31 and 33 so that when said walls are reversely folded along fold line 63 and are brought into contiguous relation, the same may be securely held together to form the longitudinal partition as shown in Fig. 5. Fig. 1 shows the blank with outer surfaces shown generally at 177 (Fig. 1) of the various wall sections uppermost in order to more clearly show the lines of scoring and cutting as hereinabove referred to. It can be seen that the line of glue 107 may be readily applied by the roller of an automatic gluing machine. I have also devised a method whereby the glue may be similarly and simultaneously applied to one of the longitudinal partition walls. For this purpose, the blank is preferably turned over with the inner surfaces shown generally at 179 (Fig. 2) of the respective parts thereof uppermost, and the blank is passed over a pair of glue rollers 181 and 183 (Fig. 2) and under a positioning roller 185 which, in conjunction with a curved guide bar or knife 187, partially fold the blank as shown in Fig. 2. Partition extensions 81 are raised upwardly by the above action of the rollers and stationary guide bar so that roller 183 of an automatic gluing machine may apply a line of glue or other suitable adhesive, as 189 (Fig. 1) on the undersurface of partition wall 31. By this method, I am able to eliminate the need for a timed or spot gluer and at the same time to secure the desired amount of glue. This is important, for the application of glue to the upper portions of partition extensions 81 or an excess of glue seeping through the cut-out portions of wall 31 which form said extensions, would cause an unwanted adhesion between the longitudinal partition and the undersurfaces of the transverse partitions 109 when the carton is in collapsed position as shown in Fig. 8 and prevent the setting up of the carton. The application of glue line 107 to attaching strip 41 may be done at a later time or it may be done concurrently with the application of glue strip 189 as by glue roller 181 which is part of the above gluing machine.

After the blank has been cut, scored and provided with the lines of gluing, as above described, and is in the condition shown in Fig. 1, the blank is folded. One of the advantages of the box of my invention is that it may be readily folded by an automatic folding machine. The first step in the folding operation is to complete the reverse folding of longitudinal partition walls 31 and 33 about fold line 63. During the next step of the folding operation, front wall 37 is folded on line 53 relative to bottom section 35 into contact therewith. Transverse partitions 109 are then reversely folded on line 111 over the collapsed longitudinal partition and back wall 27 and bottom section 29 are brought into contiguous relationship by folding the same on line 51, thereby bringing the glued surface of attaching strip 41 which lies between wall 27 and bottom section 29 in contact with the inner surface of the back wall for securing the same thereto. This completes the folding of the carton and the same is now in collapsed, flat position, as in Fig. 8, for shipment to the customer who may readily set it up by automatic machines.

Fig. 9 shows the carton after the completion of the folding operation, at the start of the erection thereof and clearly shows the arrangement of the parts of the carton in set-up position. When setting up the carton in its fully-erected position shown in Fig. 4, front wall 37 is moved away from rear wall 27 by a suitable means and the top and bottom walls brought to substantially horizontal position. The transverse partitions may there-

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after be swung to their substantially vertical, erected positions straddling the longitudinal partition, as shown in Fig. 4. The first four partitions from the right-hand end of the carton, as viewed in Fig. 4, are swung in a counterclockwise direction while the remaining three partitions are swung in a clockwise direction as can be seen in Fig. 4. The end partitions 125 enter notches 87 formed by cutouts 83 while the remaining partition 125 and partitions 127 enter notches 89 formed by cutouts 85. The remaining partitions 129 are narrower and swing downwardly into engagement with the double thickness portion of the longitudinal partition as shown in Fig. 7.

The downward swinging movement of the various transverse partitions is limited by engagement with various ones of extensions 81 as shown, while end partitions 125 strike against the double thickness end portions 191 (Fig. 4) of the longitudinal partition. It has been common practice to arrest the downward swinging movement of the transverse cell partitions by engagement with portions of the longitudinal partition.

However, heretofore there has been no means for effectively holding the transverse partitions in erected position, and it is one object of my invention to provide an improved carton having such means. For this purpose, several of the extensions 81 are formed with a hook 193 (Fig. 7) adjacent the upper ends thereof for engaging the upper edge of the respective transverse cell partitions for holding the same in erected position and for transferring any downward thrust on extensions 81 to the rest of the carton through the respective transverse partitions. In the present instance, the two right-hand and the extreme left-hand extensions 81 are each formed with the above hook construction. In addition to hooks 193, which tend to prevent the respective transverse partitions from swinging out of erected position, I have also devised a novel lock or catch which, by itself, and in conjunction with associated hooks 193, holds the respective transverse partitions in erected position. These locks comprise an upstanding abutment 195 (Fig. 7) which is formed by cutting cutouts 85 slightly off center in regard to the axis of fold line 63 so that a portion of wall 33 will extend above the corresponding portion of wall 31, as shown in Fig. 7, when said walls are brought together for forming the longitudinal partition, as above described. The end 197 (Fig. 7) of the abutment 195, against which the respective transverse partitions strike when they are moved from erected position, is the point formed by the cutting out of the tip portions of hooks 193. Thus, by a single cutting, I am able to provide cooperating hooks and locks for more securely holding certain of the transverse partitions in erected position.

In Figs. 10 through 13, I have shown a modified carton in which the transverse partitions, shown generally at 199 (Fig. 10) are of somewhat different outline than those heretofore described, but which is similar in other respects to the carton described above. In my modified construction, each of the transverse partitions 199 is preferably formed with a side tab 201 which is cut from the front wall of the carton and is hingedly connected to the respective transverse partition by a diagonally-extending fold line 203 which is preferably formed with a series of spaced cuts 205 therein to insure proper bending of tabs 201 relative to respective partitions 199 when the partitions are swung to erected position.

Partitions 199 preferably have three different contours or outlines, as in the case of the first carton described, and the opposite end partitions plus the second partition from the right, designated at 207 (Fig. 10), are identical while the third from the right and the second from the left partitions are preferably identical and are designated at 209, and the remaining two partitions 211 are narrower than partitions 207 or 209 and correspond to partitions 129 in the first carton described. Partitions 207 have feet or tab portions 213 which are hingedly connected thereto by fold lines 215, each of

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in which a series of spaced feet are cut from each bottom section adjacent the inner edge thereof, said feet extending beyond the fold line connecting respective ones of said bottom sections with the adjacent longitudinal partition wall and forming downward extensions thereof to provide support for the central portion of the carton bottom, said feet cut from one of said bottom sections extending between and overlapping a plurality of feet cut from the other of said bottom sections.

8. A collapsible cellular carton made of foldable blank material cut, scored and folded to form a box structure having longitudinally extending, spaced side walls, a bottom wall formed of two sections each of which has its outer side edge foldably connected with the bottom edge of the respective one of said side walls, a cover hinged to one of said side walls, a longitudinal partition comprising two wall sections each foldably connected along one longitudinal edge thereof with the inner side edge of the respective bottom section, said longitudinal partition walls being interconnected at the inner edges thereof along a longitudinal fold line, portions of one of said partition walls being cut out and extending beyond said fold line substantially in the plane of the other of said partition walls to form upward extensions when the two partition walls are brought contiguous to each other by folding the blank on the interposed fold line, said extensions having their upper edges located in supporting proximity to said cover, notches formed in said longitudinal partition between said extensions thereof, a series of transverse partitions hingedly connected at opposite ends thereof to said side walls and foldable into erected position in straddling relation with said longitudinal partition to separate the carton cells, said transverse partitions having slitted lower edges for engaging said longitudinal partition in said notches thereof, a plurality of said notches each being formed with an abutment adjacent the lower end thereof for holding said transverse partitions against swinging movement from erected position, a plurality of said ex-

tensions being formed with a hook for engaging the upper edge of the respective ones of said transverse partitions for holding the same in erected position, and a series of spaced feet cut from each bottom section adjacent the inner edge thereof, said feet extending beyond the fold line connecting respective ones of said bottom sections with the adjacent longitudinal partition wall and forming downward extensions thereof to provide support for the central portion of the carton bottom, said feet cut from one of said bottom sections extending between and overlapping a plurality of feet cut from the other of said bottom sections.

9. A collapsible cellular carton as specified in claim 8 in which said transverse partitions include tab portions cut from one of said carton side walls, said tab portions frictionally engaging the side wall from which they are cut for holding said transverse partitions in erected position and increasing the transverse strength and rigidity of the carton.

10. A collapsible cellular carton as specified in claim 8 in which certain of said transverse partitions include curved foot tabs cut from the upper edge of the adjacent transverse partition, said foot tabs frictionally engaging the inner surfaces of the bottom section and the opposite sides of the transverse partition for frictionally holding said transverse partitions in erected position.

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