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**2,686,002**

TAPERED COLLAPSIBLE CARTON

Filed April 30, 1953

2 Sheets-Sheet 1

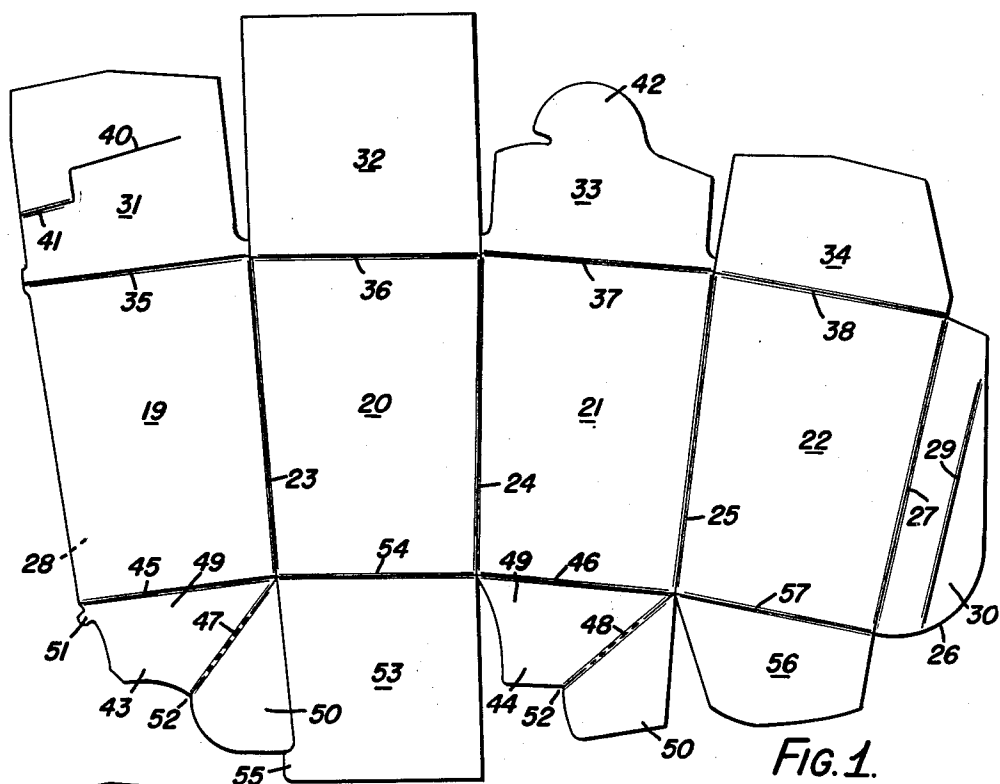


**FIG. 1.**

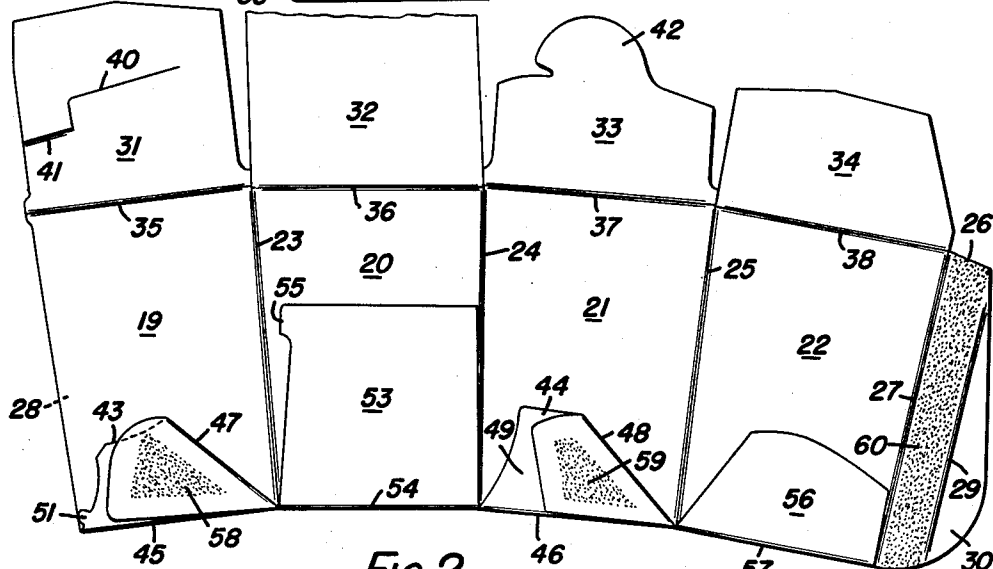


**FIG. 2.**

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2 Sheets-Sheet 2

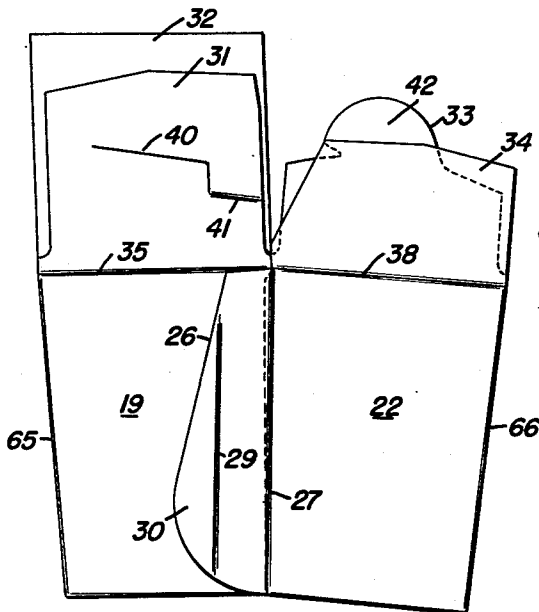


FIG. 3.

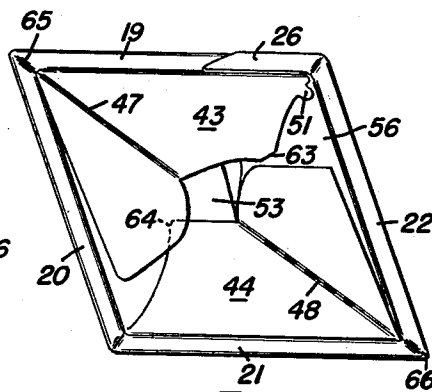


FIG. 6.

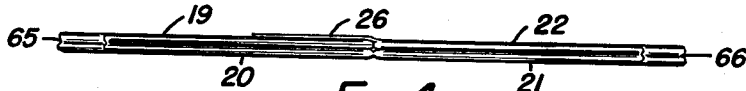


FIG. 4.

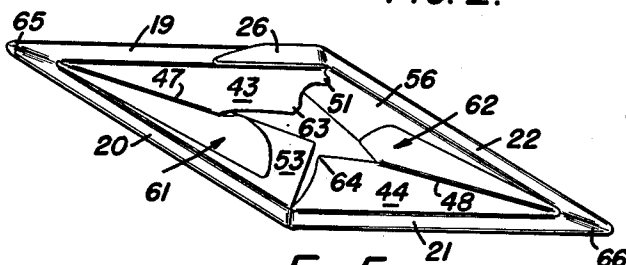


FIG. 5.

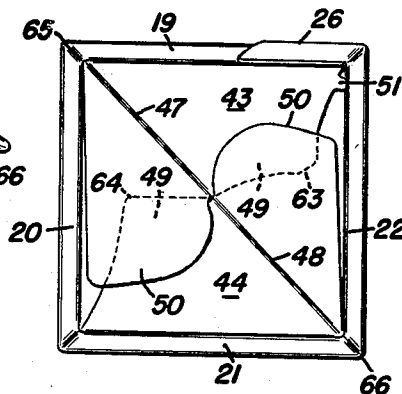


FIG. 7.

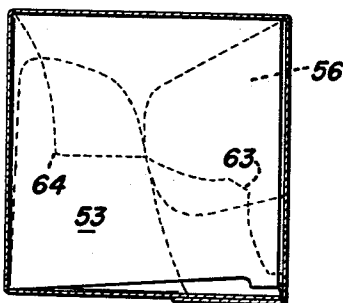


FIG. 8.

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## UNITED STATES PATENT OFFICE

2,686,002

## TAPERED COLLAPSIBLE CARTON

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3 Claims. (Cl. 229—39)

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This invention relates to collapsible cartons made of fibrous material such as cardboard, for packaging ice cream and other frozen comestibles and the like, and more particularly to set-up, collapsible cartons of the variety having bottom flaps so constructed as to be automatically unfolded and extended by erecting manipulation of the side walls, to conveniently distend the carton for filling with the desired contents.

One object of the present invention is to provide an improved carton of the general character described and so constructed as to be readily set-up in erected condition, but which is also so constructed as to be readily nested or stacked in the set-up condition.

A further object is to provide a carton having the above advantages which is provided with means for insuring the predetermined sequential closing of the bottom flaps in case of irregularity in the folding and gluing of the carton.

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 plan view of a one-piece blank, cut and scored ready for folding to form a carton embodying the present invention;

Fig. 2 is a similar view with the bottom flap portions folded over and glue applied;

Fig. 3 is a similar view with the outer wall portions folded over in glued position;

Fig. 4 is an enlarged end elevation of the carton shown in Fig. 3, looking toward the outside of the bottom of the carton;

Figs. 5, 6 and 7 are end elevational views of the outside of the bottom of the carton in progressive positions of erection for filling, and

Fig. 8 is a sectional plan view showing the inside of the carton in erected position.

The invention is embodied, in the present instance, in a container made from a one-piece cardboard blank, such as shown in Fig. 1, cut from a sheet of stock, the entire surfaces of both sides may be coated or otherwise treated with paraffin, or other waxes, or cellulose laquers, or other known materials to render the same impervious to moisture, vapor, water and grease.

The blank is preferably scored as indicated by multiple lining in the drawings, to form front, side, rear and closure walls 19, 20, 21 and 22, respectively, separated by scored fold lines 23, 24 and 25, as shown. Closure wall 22 carries a se-

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curing strip or flap 26 foldably connected therewith along a score line 27 and adapted to be folded over and detachably glued to the free edge portion 28 of the opposite or front wall 19 when the walls are folded over as hereafter described. Flap 26 has a longitudinally extending score line 29 extending substantially parallel to score line 27, as shown in Fig. 1, for forming a hinged pull tab 30, which may be easily grasped for opening the carton.

Walls 19 to 22, inclusive, are preferably provided with top closure flaps 31 to 34, respectively, which are foldably connected therewith along score lines 35 to 38, respectively. Flap 31 is formed with a slit 40 cut therethrough which has one end thereof connected to a score line 41 for facilitating the bending of the flap to open slit 40 for the reception of a tongue or hook 42 on flap 33 for securing these top flaps in position for closing the top of the carton through which it is filled with the desired contents.

Front and rear walls 19 and 21 preferably carry bottom closure flaps 43 and 44, respectively, foldably connected therewith along score lines 45 and 46, respectively. These flaps are provided with cut-score lines 47 and 48, respectively, extending diagonally across and separating each of them into two sections, as 49 and 50, so that each may be folded upon itself and folded over the side wall to which it is connected, as further described hereafter. Flap 43 carries along the inner free edge thereof, a projecting part or finger 51, for a purpose to be hereafter more fully described.

The inner free edges of flaps 43 and 44 preferably have the irregular shape shown in the drawings, including notches 52 for engagement with each other in erected position of the carton, as hereafter described. Side wall 20 has a substantially rectangular inner bottom flap 53 foldably connected therewith along score line 54, between flaps 43 and 44. Part of flap 53 is cut away along the left hand edge thereof, as viewed in Fig. 1, in order that flap 43 may be of desired size and shape, thereby leaving a projecting tip or portion 55. Closure wall 22 has an inner bottom flap 56 foldably connected therewith along a score line 57.

As I desire to construct a carton which is substantially square in cross section, but which is larger at the top thereof than at the bottom, closure walls 19-22, inclusive, are substantially trapezoidal in shape in that the score lines which define the top and bottom are substantially parallel, while the free edge 28 of front wall 19

and score lines 23, 24, 25, and 27 are not parallel, but rather, are convergent toward the bottom of the blank, as shown in Fig. 1. This produces a tapered carton which may be nested or stacked when in erected position.

In the folding and gluing of the blank, as shown in Fig. 2, flap 53 is folded over side wall 20 and flap 56 is folded over closure wall 22. Flap 43 is folded upon itself and folded inwardly over wall 19 while flap 44 is folded on itself and inwardly over wall 21, as shown. Glue is applied to a restricted area 58 on flap 43, and to a restricted area 59 on flap 44. Glue is likewise applied in a narrow band or strip 60 on securing strip 26, between fold lines 27 and 29, as shown.

In the further folding of the blank, the front wall 19 with inwardly folded flap 43, is folded over side wall 20, about the intermediate score line 23 and the closure wall 22 with the inwardly folded flap 56 is folded over side wall 21 about the intermediate score line 25. This brings flap 43 into glued cohesion with inner bottom flap 53 and brings inner bottom flap 56 into glued cohesion with flap 44. The glued area 60 of securing strip 26 is brought into contact with the free edge 28 of front wall 19 and is held in glued cohesion therewith, thus, completing the folding and gluing of the carton in the compact, collapsed position, shown in Figs. 3 and 4, ready for storage and shipment to the ice cream dispenser.

Flaps 43 and 53, when secured together by adhesive 58, form a bottom section shown generally at 61 (Fig. 5) while flaps 44 and 56, when secured together by adhesive 59, form a second bottom section shown generally at 62 (Fig. 5).

When it is desired to erect the carton for filling, this is quickly accomplished by inward pressure against the opposite folded edges 65 and 66 (Fig. 3), which serves to separate and distend the side walls in the progressive manner shown in Figs. 5, 6, and 7, as viewed from the bottom of the container. The separation of the front wall 19 from the side wall 20 tends to pull the inwardly folded flap 43 and the inner bottom flap 53 to erected position, while the separation of closure wall 22 and rear wall 21 pulls inwardly folded outer flap 44 and inner bottom flap 56 toward erected position. However, in order to secure a strong and substantially leak-proof bottom construction, it is desirable that the bottom flaps move to fully erected position in a definite sequential order and that the outer flaps 43 and 44 form the outer or bottom surface of the bottom closure.

More specifically, it is desirable that the outer flap of each bottom section lie outside of the inner flap of the respective opposite bottom section, and to this end, outer flaps 43 and 44 are each formed with an outwardly projecting surface 63 and 64, respectively (Figs. 1 and 6). Bearing surface 63 engages the outer surface of inner flap 56 and tends to hold back the erecting movement of bottom section 62; i. e., inner flap 56 and outer flap 44, and accelerate the erection of the opposite bottom section 61 relative thereto. Flap 43 is also caused to move toward erected position faster than flap 56 by the frictional engagement between the left hand edge, as viewed in Fig. 2, of flap 53, including projecting portion 55 thereof, and the inner surface of front wall 19. This tends to retard the movement of inner flap 53 toward erected position and causes flap 43 to unfold more rapidly under the erecting action of the side walls than would be the case if flap 53 were allowed to move freely along the inner sur-

face of wall 19. Bearing surface 63 rides along flap 56 and beneath the outer portion 50 of outer flap 44 to bring the inner portion 49 of flap 43 under the outer curved portion 50 of flap 44 and over inner flap 56, as shown in Fig. 7.

Bearing surface 64 engages the outer surface of inner flap 53 shortly after the above engagement of flaps 43 and 56, and performs substantially the same function in that it presses inwardly on the outer surface of inner flap 53 and guides the inner portion 49 of outer flap 44 under the outer portion 50 of outer flap 43 and along the outer surface of inner flap 53, as shown in Fig. 7. This erection movement continues until notches 52 are brought into engagement, as shown in Fig. 7, at which point a portion of each outer bottom flap has been caused to move between the outer bottom flap and the inner bottom flap of the opposite bottom section. That is, each of the outer bottom flaps 43 and 44 has the inner portion, as 49, engageable inside of the opposite outer flap and also has a portion, as 50, engageable outside of the inner portion of the opposite outer flap, so that the outer flaps, by such engagement, serve to flatten each other and the associated bottom closure and maintain the bottom closure normal to the side walls in the erected position of the carton. In addition, this over-laying and inter-engagement of the bottom parts, serve to hold the bottom in substantially flat erected position, normal to the side walls of the carton.

Near the completion of the erecting movement, inner bottom flap 56 is pulled downwardly and outwardly by the outward movement of flap 44, to which it is adhesively secured and, similarly, inner flap 53 is pulled downwardly by the outward movement of flap 43. Flap 53 moves into its above erected position after flap 56, so that flap 53 forms a smooth and uniform inner bottom surface substantially covering the entire bottom of the carton. Inner flaps 56 and 53 reinforce and strengthen the bottom and close any gap that might occur between the bottom sections, so as to afford a substantially leak-proof construction.

I have found, however, when this type of bottom construction is used with a tapered carton having non-rectangular side walls, as shown in the drawings, there arise certain problems which have heretofore made such a construction impractical. That is, when the carton side walls are trapezoidal, the blank does not have parallel opposite sides either in the initial unfolded position thereof, as shown in Fig. 1, or in the folded position, as shown in Fig. 3, so that it is extremely difficult to accurately guide and control the path of the blank through the folding and gluing operations so that, many times, the blank would be improperly folded and glued. As a result of this improper folding, the juncture between the front wall 19 and closure wall 22 would not be uniform, nor would the lower edges of walls 19 and 22 meet at a common point, as shown in Fig. 3. When these improperly folded cartons were moved to erected position, inner flap 56, instead of passing under outer flap 43, as described above and as necessary for the proper setting-up of the bottom structure, would be so thrown out of position that the edge thereof would strike against the inner edge of flap 43 and prevent the proper setting-up of the bottom structure. As a result of this interference between flaps 56 and 43, said flaps often became torn, with the resultant damage to the carton closure structure, or flap 56 would ride over flap 43 and slide along the outer

surface thereof, thereby preventing the inner portion 49 of flap 43 from passing between flaps 56 and 44, as described above in the description of the proper operation of the bottom closure.

However, I have devised a novel solution to this problem which insures the proper sequential closing of the bottom flaps despite minor inaccuracies in the folding and gluing of the blank so that it is now possible to readily manufacture tapered cartons having the above automatic bottom closure, without fear that a large proportion of the cartons will be useless because of improper bottom closure.

That is, I have found that by the addition of a small projecting part or finger 51, to the edge of flange 43, I am able to eliminate the above described interference and improve the action of the bottom closure. Finger 51 is preferably located adjacent fold line 45 separating flap 43 from wall 19, as shown in Figs. 1 and 2. Finger 51 is so positioned that at the very early stages of the erection, and before the projecting portions 63 and 64 of flaps 43 and 44, respectively, have been brought into engagement with inner flaps 56 and 53, respectively, as shown in Fig. 5, it engages the outer surface of inner flap 56 and positively guides outer flap 43 over inner flap 56 so that portion 63 will engage the outer surface of flap 56, as described. Finger 51 retards or delays the erecting movement of inner flap 56 and at the same time hastens the erecting movement of outer flap 43 so that the above sequential closing of the flaps is achieved. As a result of the guiding action of finger 51, inaccuracies in the folding and gluing of the carton are no longer important and they no longer result in the improper closing of the carton.

As stated, the carton may be readily moved from its collapsed position shown in Figs. 3 and 4, to its erected position, shown in Figs. 7 and 8, by pressure on the folded opposite corners 65 and 66. The carton may then be filled through the open top end thereof, or, due to its tapered shape, it may be readily stacked or nested and set aside for future filling. After the carton has been filled, the top is closed by first swinging flap 32 downwardly across the open end of the carton, followed by flaps 34, 31, and 33, in that order. Tongue 42 is slipped into slit 40 in flap 31, thereby locking the top flaps in closed position.

The consumer may open the carton for dipping out the contents by merely unlocking the top closure flaps. The contents may be more fully exposed for removal by slicing or otherwise as desired, by merely grasping the lower edge of tab 30, which may be folded upwardly about score line 29, for easy accessibility, and pulling securing strip 26 away from front wall 19, breaking the detachable connection therebetween and moving bottom section 62 out of engagement with bottom section 61. This action also pulls tongue 42 out of slit 40 so that the rear wall 21 is free to fall into substantially the same plane as side wall 20, which for purposes of the above explanation, is assumed to be the wall upon which the carton is resting. Thus, with one motion, the side walls are separated, the top closure completely opened, and the bottom partially opened. If it is desired to further unfold the carton to more fully expose the contents thereof, outer flap 43 may be pulled away from inner flap 53, thereby separating bottom section 61 and allowing front wall 19 to be swung downwardly into substantially the same plane as walls 20 and 21. In this position, the contents rest solely on wall 20 and are exposed on all sides thereof so that the purchaser may

readily slice or otherwise remove the contents as desired. In addition, bottom section 62 may be separated by pulling apart flaps 44 and 56, thereby allowing the carton to unfold to its original position, as shown in Fig. 1. However, it is believed that this will not be necessary in most instances.

When it is desired to remove only a portion of the contents and return the partially filled carton to a refrigerator for subsequent access, the carton is partially opened, as described above, without destroying the bottom closure sections 61 and 62. After removing the desired portion of the contents, rear wall 21 and closure wall 22 may then be folded back around the remaining contents and the bottom sections 61 and 62, thereby reengaged with each other to close the bottom and hold the bottom in substantially closed position, the top closure flaps being also refolded and reengaged with each other, if desirable.

Thus, it will be seen that as a result of my invention, it is now possible to readily manufacture tapered cartons having the above automatic bottom closure structure which will not be subject to tearing or improper bottom closure because of inaccuracies in the folding and gluing of the carton. The addition of finger 51 requires no more stock as it is formed from stock that normally would be wasted so that it does not result in an increase in the cost of the cartons. As a result, it is now possible to manufacture tapered cartons having automatic bottom closure which may be completely folded and glued at the place of manufacture, shipped to the user in compact flat position, who may then erect the cartons by a simple inward force on the opposite edges of the carton and should he desire not to immediately use all of the set-up cartons, they may be readily stacked or nested for future use.

It will thus be seen that the invention accomplishes its objects and while it has been herein disclosed by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative, rather than a limiting sense, as it is contemplated that various modifications in the construction and arrangement of the parts will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

I claim:

1. A collapsible carton with self-erecting bottom comprising a one-piece blank cut, scored and folded to form four hingedly-connected side walls, each of said side walls being trapezoidal in shape with the opposite sides thereof flaring outwardly towards the top of the carton, a detachable connection between two of said side walls, said side walls having top and bottom closure flaps foldably connected thereto at the opposite ends thereof, said bottom flaps being arranged in pairs of opposed inner and outer flaps, each of said outer flaps being secured to the adjacent inner flap for forming the bottom of the carton in two sections, said sections being located on opposite sides of a hinge connection between adjacent side walls and on opposite sides of said detachable connection, said sections in their erected positions being normal to the side walls and frictionally engaging one another for holding said carton in erected position, the outer flap in each of said bottom sections having a score line extending diagonally across said flap, one of said outer flaps having a part projecting from the free edge thereof between said diagonal score line therein and the line of connection be-

tween said outer flap and the respective one of said side walls for engagement with the inner flap of the opposite bottom section prior to other engagement between said sections to delay the closing of said opposite section and provide predetermined sequential closing of said bottom flaps relative to each other in the erection of the carton; said outer flaps being adapted to fold inwardly about said diagonal score lines upon relative lateral shifting of the side walls to their collapsed position, and locking means on two of said top closure flaps for releasably locking said top flaps in closed position in the erected position of said carton; said detachable connection being adapted to be broken for distending the side walls and for moving one of said bottom sections out of engagement with the other of said bottom sections for partially unfolding said carton to expose contents thereof.

2. A collapsible carton with self-erecting bottom comprising a one-piece blank cut, scored and folded to form four hingedly-connected side walls, each of said side walls being trapezoidal in shape with the opposite sides thereof flaring outwardly towards the top of the carton, a detachable connection between two of said side walls, said side walls having top and bottom closure flaps foldably connected thereto at the opposite ends thereof, said bottom flaps being arranged in pairs of opposed inner and outer flaps, each of said outer flaps being secured to the adjacent inner flap for forming the bottom of the carton in two sections, said sections being located on opposite sides of a hinge connection between adjacent side walls and on opposite sides of said detachable connection, said sections in their erected positions being normal to the side walls and frictionally engaging one another for holding said carton in erected position; the outer flap in each of said bottom sections having a score line extending diagonally across said flap, one of said outer flaps having a part projecting from the free edge thereof adjacent the line of connection between said outer flap and the respective one of said side walls for engaging the inner flap of said opposite section prior to any other engagement between said sections to delay the closing of said opposite section and provide predetermined sequential closing of the bottom flaps relative to each other in erection of the carton; said outer flaps being adapted to fold inwardly about said diagonal score lines upon relative lateral shifting of said walls to their collapsed position, and locking means on two of said top

closure flaps for releasably locking said top flaps in closed position in the erected position of said carton; said detachable connection being adapted to be broken for distending the side walls and for moving one of said bottom sections out of engagement with the other of said bottom sections for partially unfolding said carton to expose contents thereof.

3. A collapsible carton with self-erecting bottom comprising a one-piece blank cut, scored and folded to form four hingedly-connected side walls, each of said side walls being trapezoidal in shape with the opposite sides thereof flaring outwardly towards the top of the carton, a detachable connection between two of said side walls, said side walls having top and bottom closure flaps foldably connected thereto at the opposite ends thereof, said bottom flaps being arranged in pairs of opposed inner and outer flaps, each of said outer flaps being secured to the adjacent inner flap for forming the bottom of the carton in two sections, said sections being located on opposite sides of a hinge connection between adjacent side walls and on opposite sides of said detachable connection; said sections in their erected positions being normal to the side walls and frictionally engaging one another for holding said carton in erected position; the outer flap in each of said bottom sections having a score line extending diagonally across said flap, one of said outer flaps having a part projecting from the free edge thereof adjacent the line of connection between said outer flap and the respective one of said side walls for engaging the outer surface of the inner flap of said opposite section prior to any other engagement between said sections to delay the closing of said opposite section and guide said outer flap along the outer surface of said opposite inner flap and under the other of said outer flaps in the erection of the carton, said outer flaps being adapted to fold inwardly about said diagonal score lines upon relative lateral shifting of the side walls to their collapsed position, and locking means on two of said top closure flaps for releasably locking said top flaps in closed position in the erected position of said carton; said detachable connection being adapted to be broken for distending the side walls and for moving one of said bottom sections out of engagement with other of said bottom sections for partially unfolding said carton to expose contents thereof.

No references cited.