March 24, 1959 W. H. INMAN 2,878,987

COLLAPSIBLE CARTON

Filed June 6, 1956

2 Sheets-Sheet 1

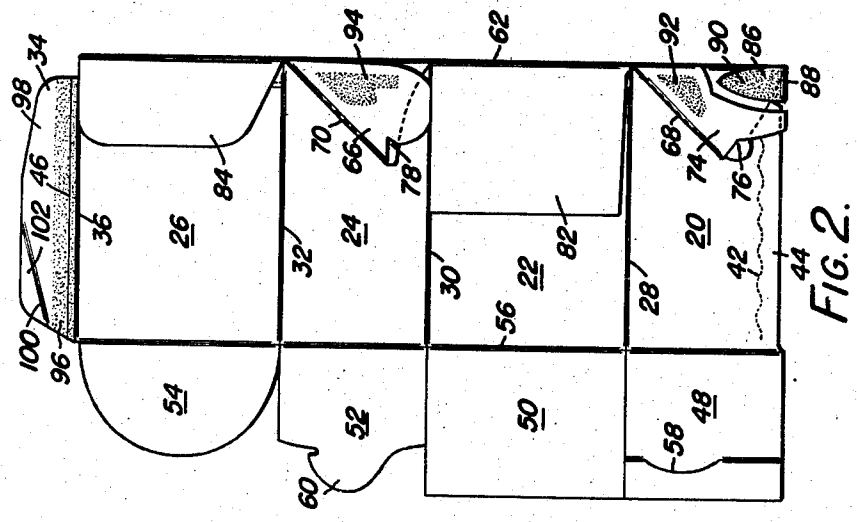


FIG. 2.

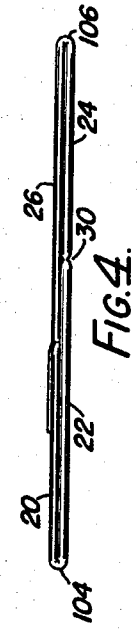


FIG. 4.

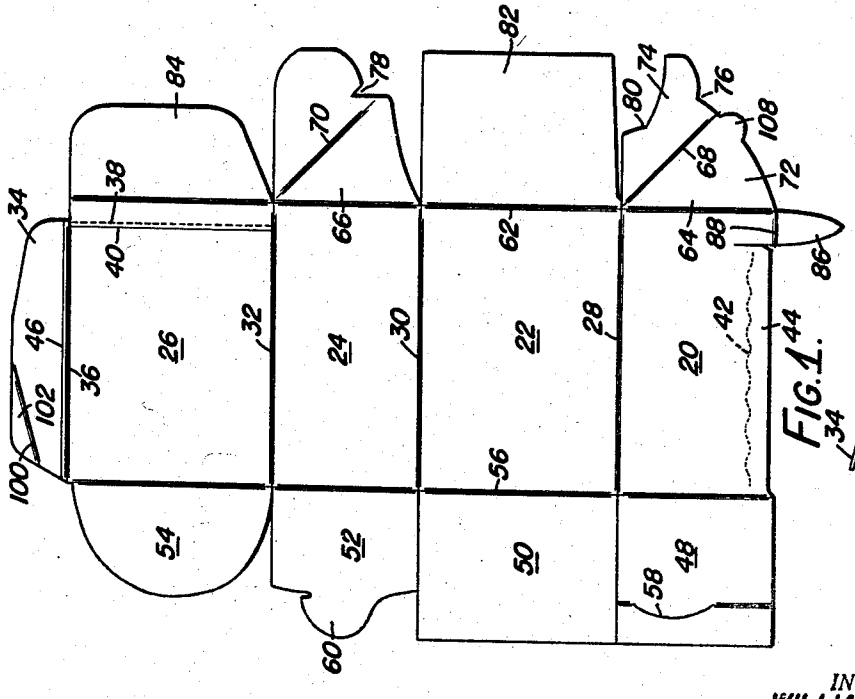


FIG. 1.

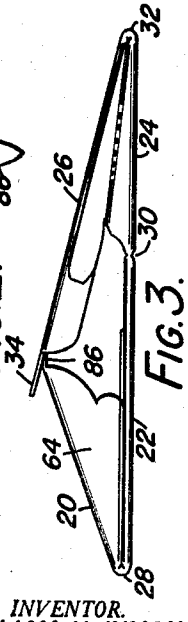


FIG. 3.

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COLLAPSIBLE CARTON

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2 Sheets-Sheet 2

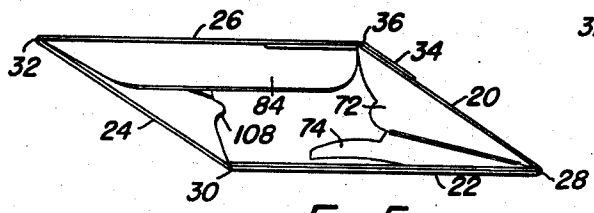


FIG. 5.

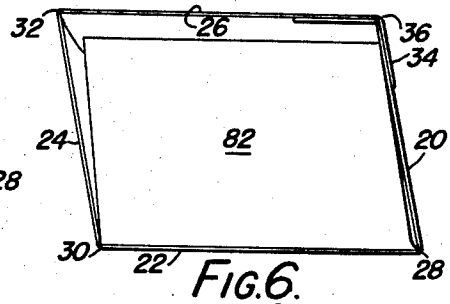


FIG. 6.

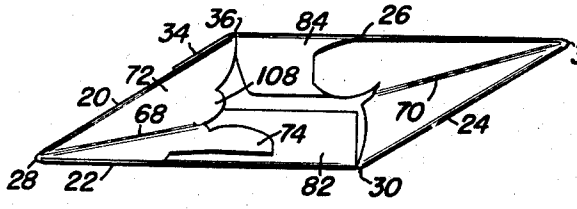


FIG. 7.

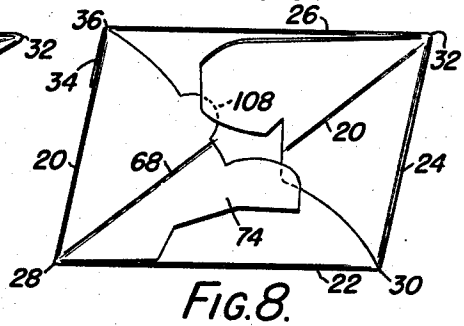


FIG. 8.

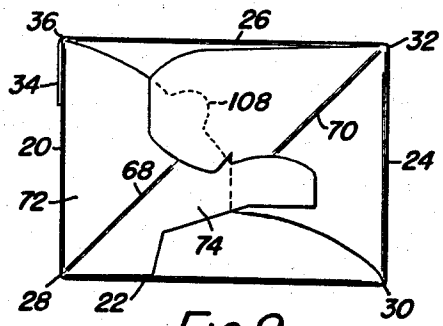


FIG. 9.

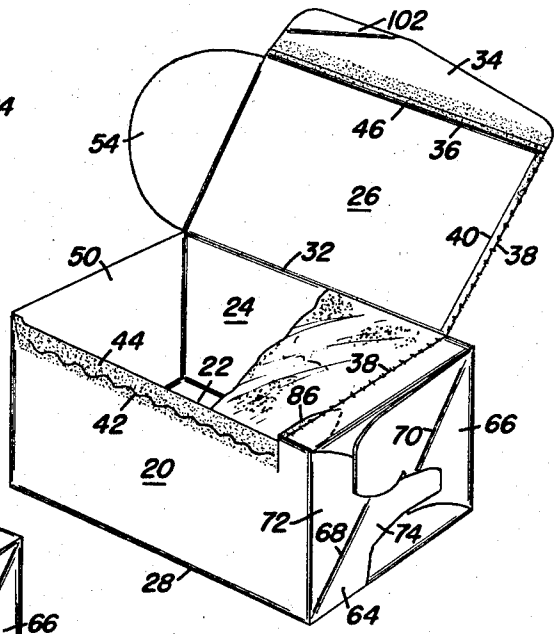


FIG. 11.

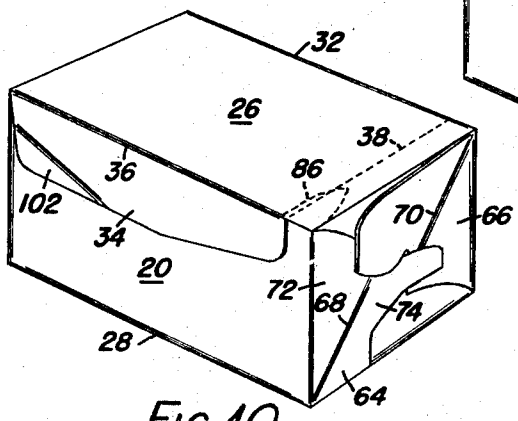


FIG. 10.

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2,878,987

COLLAPSIBLE CARTON

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Application June 6, 1956, Serial No. 589,698

2 Claims. (Cl. 229—41)

This invention relates to collapsible cartons made of fibrous material, such as cardboard, for packaging ice cream and other frozen comestibles, and the like. As the result of a recent invention, such cartons have been provided with bottom flaps so constructed as to be automatically unfolded and extended by manipulation of the side walls. This automatic bottom construction has been combined with a side opening pull flap and has resulted in a practical and useful carton, which has been widely used in the field. However, these cartons were so constructed that when the side opening flap was pulled and the closure wall opened, the bottom flaps were moved out of engagement and the carton became partially unfolded and unfit for further use.

One object of the present invention is to provide an improved carton of the general character described, so constructed as to be kept substantially intact when opened for the partial removal of the contents, and thus, kept in condition for being reclosed for further preservation of the remaining contents.

Another object is to provide a carton having the above advantages which, in addition to the bottom closure flaps, is also provided with a structural connection extending between the front and rear walls of the carton for holding the walls and bottom flaps erect when the carton is opened by opening the closure wall.

Another object is to provide a carton of the above nature which requires no more material than cartons described above in which the bottom flaps are moved out of engagement when the side opening flap is pulled.

Another object is to provide a carton having the above advantages and is so constructed as to be readily manufactured, conveniently erected for filling and conveniently opened by the consumer, as described above.

A further object is to afford a carton having the above advantages in a form capable of being manufactured in quantity lots, by known machines and at relatively low cost.

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 an edge view of the blank as seen from the right in Fig. 2, but with the outer wall portions partly folded over toward glued position;

Fig. 4 is similar to Fig. 3, but with the parts glued together and the carton in collapsed condition;

Figs. 5 and 6 are top plan views of the inside of the carton in progressive positions of erection for filling;

Figs. 7 and 8 are bottom plan views from the outside of the carton in progressive positions of erection for filling substantially corresponding to Figs. 5 and 6, respectively;

Fig. 9 is a bottom plan view of the carton in fully erected position;

Fig. 10 is a perspective view of the carton showing the same erected, filled and closed, and

Fig. 11 is a perspective view of the carton as viewed in Fig. 10 showing the carton after being opened for removal of a portion of the contents.

The preferred embodiment of the present invention, herein disclosed by way of illustration, is preferably made of a one-piece blank such as shown in Fig. 1, cut and scored to form front, intermediate, rear and closure walls **20**, **22**, **24** and **26**, respectively, separated by parallel scored fold lines **28**, **30** and **32**, as shown. A securing strip **34** is foldably connected with closure wall **26** along a fold line **36** which is parallel to fold lines **28**, **30** and **32**, as shown in Fig. 1. Securing strip **34** is adapted to be detachaby glued to the free edge portion of the opposite or front wall **20** when the walls are folded over, as hereafter described. Closure wall **26** is preferably provided adjacent the bottom of the carton with a line of weakening which may comprise, singly or in combination, a line of perforations **38**, a single slit **40** extending partially through the material forming the closure wall, or any known means whereby the material forming the closure wall is weakened for controlling the direction and extent of the tearing action of the closure wall. Line of perforations **38** preferably comprises a series of spaced short slits which may extend partially or completely through the material forming the closure wall, as shown in Fig. 1, and this line of perforations **38** extends substantially transversely across the closure wall and is spaced upwardly from the bottom edge of the closure wall, as shown in Fig. 1. Slit **40** which is partially cut through the closure wall on the under surface thereof (upper surface as viewed in Fig. 1) extends substantially transversely across closure wall from the front to the rear edge thereof and is spaced slightly upwardly from the line of perforations, as shown in Fig. 1, and for a purpose hereafter described.

Front wall **20** has an undulating slit **42** extending thereacross adjacent the upper free edge thereof, as shown in Figs. 1 and 11. Slit **42** extends only partially through the structure forming front wall **20** and provides a weakened surface area **44** to aid in the opening of the carton and to prevent peeling of front wall **20** when the carton is opened. Securing strip **34** is preferably provided with a slit **46**, adjacent score line **36**, to prevent an extension of surface peeling of strip **34** into the closure wall when the carton is opened.

Side walls **20**, **22**, **24** and **26** are provided with top closure flaps **48**, **50**, **52** and **54**, respectively, which are foldably connected therewith along a score line **56**. Flap **48** is formed with a slit **58** to receive a tongue or hook **60** on flap **52** for securing these top flaps in position for closing the top of the carton. The carton is erected and filled through the top, after which the top flaps are folded over and locked in position for closing the carton. When the carton is opened, as hereafter described, the top flaps preferably remain in locked position for holding the top of the carton erect.

My carton is also preferably provided with bottom closure flaps which are so constructed that the carton may be completely folded and glued by the manufacturer and then shipped in collapsed, flat condition to the user who may erect it by merely applying pressure to the opposite corners of the collapsed carton, as hereafter described. The bottom flaps are so constructed that they will fold inwardly inside the carton when the carton side walls are collapsed and will automatically move outward-

ly into their erected positions normal to the side walls of the carton when the carton is erected.

To this end, I preferably provide four bottom closure members or flaps which are foldably connected with carton walls **20**, **22**, **24** and **26** along a score line **62** (Fig. 1). Front and rear walls **20** and **24** preferably carry inwardly folding flaps **64** and **66**, respectively. These flaps are provided with score lines **68** and **70**, respectively, extending diagonally across and separating each of them into two portions, as at **72** and **74** (Fig. 1) so that each may be folded over itself and over the side wall to which it is connected, as hereafter described.

The outer free edges of flaps **64** and **66** have the irregular shape shown in the drawings, including notches **76** and **78**, respectively, for engagement with each other in the erected position of the carton. Flap **64** is cut away along one side thereof, as at **80** (Fig. 1) for a purpose hereafter described. Intermediate wall **22** has a substantially rectangular inner bottom flap **82** foldably connected therewith along score line **62** between flaps **64** and **66**. Closure wall **26** has an inner bottom flap **84** foldably connected therewith along line **62**. A member or finger **86** is foldably connected by a fold line **88** to the upper or free edge of front wall **20** adjacent the bottom end thereof, for a purpose hereafter described.

In the folding and gluing of the blank, as shown in Fig. 2, bottom flap **64** is folded upon itself along score line **68** and then folded inwardly over front wall **20** as shown. Flap **66** is similarly folded upon itself and folded over rear wall **24**. Flap **82** is folded over intermediate wall **22** and flap **84** is folded over closure wall **26**, as shown. Finger **86** is folded along score line **88** over flap **64**. As shown in Fig. 2, cut away portion **80** of flap **64** is positioned to receive finger **86** so that finger **86** folds over into contact with the inner portion **72** of flap **64**. In this position of the parts, glue or other suitable adhesive is applied to a restricted area **90** of finger **86**, to a similarly restricted area **92** of flap **64**, and to a restricted area **94** of flap **66**. Glue is likewise applied in a narrow band **96** on securing strip **34** adjacent its line of fold leaving an unglued outer portion **98** to provide a free pull tab. Outer portion **98** is preferably formed with a diagonally extending fold line **100** adjacent one end thereof for forming an extension **102** which may be readily grasped for initiating the opening of the carton.

In the further folding and gluing of the blank, closure wall **26** and flap **84** are folded over rear wall **24** and its inwardly folded flap **66**. At the same time, front wall **20** together with inwardly folded flap **64** and finger **86** are folded over intermediate wall **22** and flap **82**. During this latter operation finger **86** is directed and guided to enter between closure wall **26** and its bottom flap **84**, as can be seen in Fig. 3, with the result that finger **86** is glued to the inside of closure wall **26** adjacent the bottom end of the carton. The above action causes flap **64** to become attached to inner bottom flap **82** and causes flap **66** to become attached to inner bottom flap **84**, thereby forming the bottom closure of the carton in two sections, each section comprising an inner and outer flap. Securing strip **34** is simultaneously pressed down over and glued to the weakened area **44** of front wall **20**, thus completing the folding and gluing of the carton in the compact, collapsed, flat position shown in Fig. 4, ready for storage and shipment to ice cream dispensers and the like.

When it is desired to erect the carton for filling, this is quickly accomplished by inward pressure against the opposite edges **104** and **106** (Fig. 4) which serves to separate and distend the side walls in the progressive manner shown in Figs. 5 and 6, as viewed through the open top of the container, and as shown in Figs. 7 and 8, as viewed from the bottom of the container. The separation of front wall **20** from intermediate wall **22** tends to pull inwardly folded flap **64** and bottom flap **82** to erected position, while the separation of closure wall **26** from rear wall **24** pulls inwardly folded flap **66** and inner bottom flap **84** to erected position. A projection **108** on flap **64** rides along the outer surface of flap **84** and guides flap **64** over flap **84**, as shown in Fig. 8, thereby initiating proper movement of the flaps towards erected position. As the carton continues toward erected position, the inner portion of flap **64** rides along the outer surface of flap **84** and passes beneath the outer portion of opposite flap **66**, as can be seen in Fig. 8. Similarly, the inner portion of flap **66** passes beneath the outer portion of flap **64**. As a result, the opposing edges of flaps **64** and **66** slide along the outer surfaces of the opposite inner bottom flaps until flaps **64** and **66** come into interengagement, with notches **76** and **78** interengaged as shown in Fig. 9. Such engagement of the notches tends to limit the erecting movement of flaps **64** and **66** with these flaps in a position normal to the walls of the carton. The erecting movement of the flaps is also preferably limited by the engagement of inner bottom flap **84** with the inside of flaps **64** and **66** along the bottom corners of the carton.

With the bottom flaps in erected position, as shown in Fig. 8, the outer portion of flap **64** overlies the free end of score line **70** in flap **66** while the outer portion of flap **66** overlies the free end of score line **68** in flap **64**. Inner flap **82** overlies the intersection of notches **76** and **78**. Inner flap **84** is preferably substantially the same size as the bottom of the carton and overlies flap **82** and diagonal score lines **68** and **70** for substantially the full length thereof, thereby providing a strong, substantially leakproof construction and also providing a smooth interior for the bottom end of the carton. It is to be noted that with the carton bottom in its fully erected position as shown in Figs. 9, 10 and 11, the bottom flaps are not in interlocked relationship, but rather they are merely in frictional interengagement with one another thereby releasably holding the bottom closure and the lower end of the carton in erected position. Since each bottom closure section comprises an inner and outer flap, the bottom closure sections frictionally engage each other.

Flaps **64** and **82**, and flaps **66** and **84**, when secured together as above, form two interengaging bottom closure sections, each comprising an inner and outer bottom flap.

The bottom closure sections are quickly snapped to their erected positions by merely pressing on the opposite corners of the carton **104** and **106**, leaving the top closure flaps in open position to receive the contents. The carton, resting on its bottom, is then filled and the top closed by folding flaps **50** and **54** down across the filling opening, in order, after which flap **48** is folded down followed by flap **52**, the tongue **60** of which is engaged in slit **58** of flap **48** to secure the closure of the top or filling opening. It will be noted that tongue **60** is on the flap of the rear wall to which the closure wall is attached and is pointed in the direction of the closure wall so that an opening pull of the latter serves to keep the tongue engaged in slit **58** and to maintain that end of the carton closed. The carton is now in the condition shown in Fig. 10, and is ready for delivery to the consumer.

To open the carton, it is only necessary to grasp and pull the unglued free edge **98** or extension **102** of securing strip **34**. For this purpose, tab or extension **102** may be bent relative to securing strip **34** along diagonal fold line **100**. The opening of closure wall **26** is made easier by the provision of weakened area **44** on the upper free edge of front wall **20**. This weakened area which is defined by slits **42**, not only makes it easier to break the detachable connection between securing flap **34** and front wall **20**, but it also prevents undesired surface peeling of either the front wall or securing strip.

The surface peeling of closure wall **26** is also prevented by slit **46**.

After securing strip **34** is separated from front wall **20** it is necessary to separate closure wall **26** from the bottom flap **84** which is foldably connected therewith. I have found it desirable to separate the above wall and flap along a line extending substantially transversely across the closure wall adjacent the lower or bottom end of the carton. I have found that if the carton is made of cylinder board, and the blank is positioned so that the fibers extend substantially transversely across the closure wall, closure wall **26** may be readily moved to open position, as shown in Fig. 11, and separated from bottom flap **84** by merely exerting sufficient force in the opening direction, as by means of an upward pull on securing strip **34**.

However, I have found that closure wall **26** may be more easily separated from bottom flap **84** if the closure wall is provided with a suitable line of weakening along which the tearing action may readily take place in a predetermined manner and direction. To this end, closure wall **26** is preferably provided with line of perforations **38** or slit **40**, or both, extending substantially transversely thereacross adjacent the lower end of the carton. I have also found that while the tearing action can be controlled by means of a line of perforations, the tearing action is easier and more readily controlled if slit **40** is provided on the under surface of the closure wall, in addition to perforations **38**.

Line of perforations **38** preferably extends substantially transversely across closure wall **26**, as shown in Fig. 1. Perforations **38** are spaced upwardly from the bottom edge of the carton by a distance somewhat less than the width of finger **86** at its base along fold line **88**. Slit **40** preferably extends parallel to perforations of line **38** and is spaced slightly upwardly from the line of perforations, as shown in Fig. 1. Slit **40** not only limits any upward tearing of the closure wall at an angle to the line of perforations, but slit **40** also prevents any undesired surface peeling of the closure wall, which might result from the opening action. In addition, slit **40** may serve as either a supplemental line of weakening for the closure wall or as a substitute line of weakening. That is, closure wall **26** may separate along slit **40** instead of perforations **38**, or it may separate partially along the line of perforations and partially along slit **40**.

Regardless of the exact line of separation of closure wall **26** from bottom flap **84**, both ends of the carton remain erect when the carton is in opened position, as shown in Fig. 11. The upper end of the carton remains erect because flap **54** which is foldably connected with closure wall **26** may move independently of top locking flaps **48** and **52**, and flap **50**, and therefore, the opening of the closure wall does not disturb the position and locking action of flaps **48** and **52**. That is, although top flap **54** is held in closed position by flaps **48** and **52**, when the carton is in closed position, as shown in Fig. 10, flap **54** is at the same time held out of contact with the contents of the carton by flap **50**. Therefore, when closure wall **26** is raised, flap **54** readily moves upwardly with the closure wall to its position shown in Fig. 11, while the remaining top flaps are maintained in closed position, thereby holding the upper end of the carton in shape, as shown in Fig. 11.

The lower end of the carton remains erect because of a positive connection between the front and rear walls of the carton adjacent the lower end. This connection is unaffected by the opening of closure wall **26**, and thus, continues to hold the lower end of the carton erect after the closure wall is opened. The above connection comprises finger **86** and the lower portion of closure wall **26** which is left attached to the finger when the closure wall is swung to open position. That is, finger **86** is attached to the front wall of the carton, while closure wall **26** is attached to the rear wall of the carton, and thus, finger **86** and that portion of closure wall **26** to which the finger is attached, provide a positive structural connection extending from the front to the rear wall of the carton.

As a result of the above construction, the carton may be readily opened to its position shown in Fig. 11 to expose the carton contents for removal by dipping to the desired extent. The top and bottom ends of the carton remain erect and in closed position so that the carton may be readily reclosed for replacing under refrigeration to preserve the residue of the contents for further consumption. This is done by merely guiding flap **54** into position outside of top flap **50** and inside of locking flaps **52** and **48** and then swinging closure wall **26** downwardly to its closed position. It will be understood that if desired, the upper end of the carton may also be opened by merely disengaging locking tongue **60** and slit **58**.

Thus it will be seen from the above description that my invention provides a carton which may be readily and economically manufactured with the usual materials and by known methods and standard machines in compact, collapsed condition for storage or shipment to food dispensers. The latter may erect the carton by merely pressing on its opposite corners to erect the automatic bottom construction. Thereafter, the carton may be easily filled at the top and closed in the usual manner until ready for delivery to the consumer. The consumer can readily open the carton to remove a portion of the contents by pulling on tab **102** so as to swing the closure wall into open position in which the contents are exposed for dipping out to the extent desired. Thereafter, the carton may be reclosed to preserve the remaining contents. In addition, it will be seen that cartons having the above advantages may be readily manufactured with a minimum of wastage of cardboard stock material.

The invention, as herein disclosed, comprises related embodiments of the invention disclosed in my copending patent applications, Serial Nos. 514,957, now Patent No. 2,804,256, and 589,786, filed June 13, 1955 and June 6, 1956, respectively, and certain features disclosed but not claimed herein are claimed in my said copending applications.

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 having a self-erecting bottom comprising a blank cut, scored and folded to form foldably connected front, side, rear and closure walls, a detachable connection between said closure wall and said front wall for securing said closure wall in closed position, said 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 fixedly secured to the adjacent inner flap for forming the bottom of the carton in sections, said sections being located on opposite sides of said detachable connection and on opposite sides of a hinge connection between the side and rear walls, each of said outer flaps being formed with a substantially diagonal fold line and being adapted to fold inwardly at said fold line between said walls together with the respective inner flap when said walls are collapsed, said bottom closure sections being moved to erected closed position normal to said walls and into frictional and detachable engagement by the erecting movement of said walls, said closure wall being divisible adjacent the bottom of the carton into two portions, one of said portions being connected to said closure wall bottom flap, the other of said portions being detachable from said front

wall and separable from said first mentioned portion for movement to open position to expose the carton contents, and a member integral with and foldably connected at one end to said front wall and having a glued connection with the underside of said first mentioned portion of said closure wall, said member and said first mentioned portion of said closure wall maintaining a fixed connection between said front and rear walls for holding said bottom sections in erected closed position.

2. A collapsible carton having a self-erecting bottom comprising a blank cut, scored and folded to form foldably connected front, side, rear and closure walls, a detachable connection between said closure wall and said front wall for securing said closure wall in closed position, said 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 fixedly secured to the adjacent inner flap for forming the bottom of the carton in sections, said sections being located on opposite sides of said detachable connection and on opposite sides of a hinge connection between the side and rear walls, each of said outer flaps being formed with a substantially diagonal fold line and being adapted to fold inwardly at said fold line between said walls together

with the respective inner flap when said walls are collapsed, said bottom closure sections being moved to erected closed position normal to said walls and into frictional and detachable engagement by the erecting movement of said walls, said closure wall having a line of weakening extending thereacross adjacent the bottom of the carton for dividing said closure wall into two portions, one of said portions being connected to said closure wall bottom flap, the other of said portions being detachable from said front wall and separable along said line of weakening from said first mentioned portion for movement to open position to expose the carton contents, and a member integral with and foldably connected at one end to said front wall and having a glued connection with the underside of said first mentioned portion of said closure wall, said member and said first mentioned portion of said closure wall maintaining a fixed connection between said front and rear walls for holding said bottom sections in erected closed position.

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