

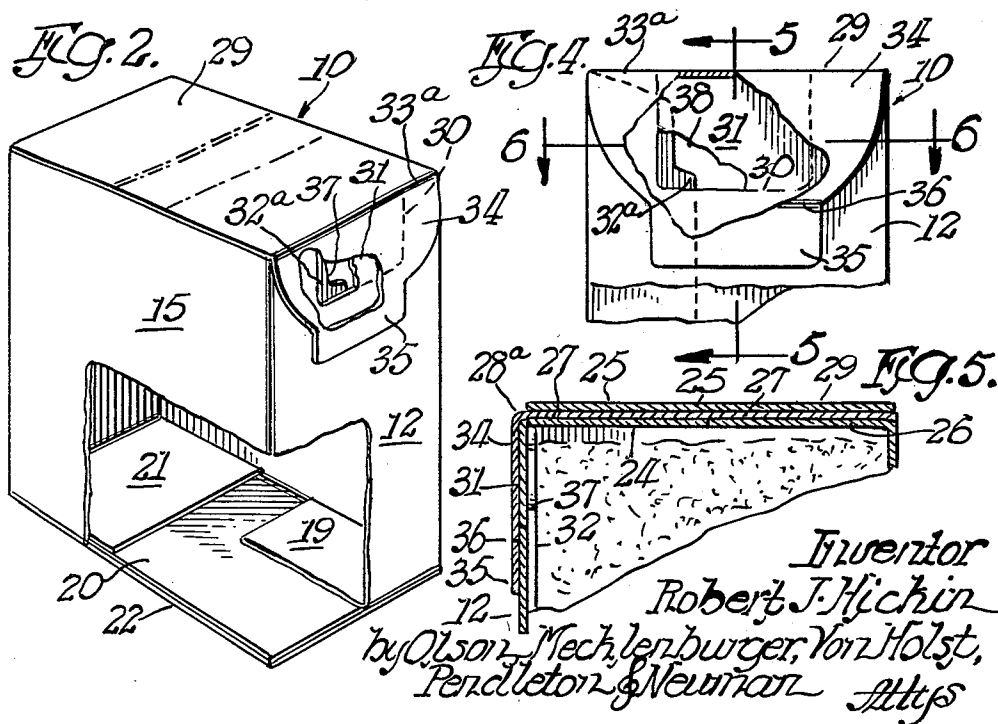
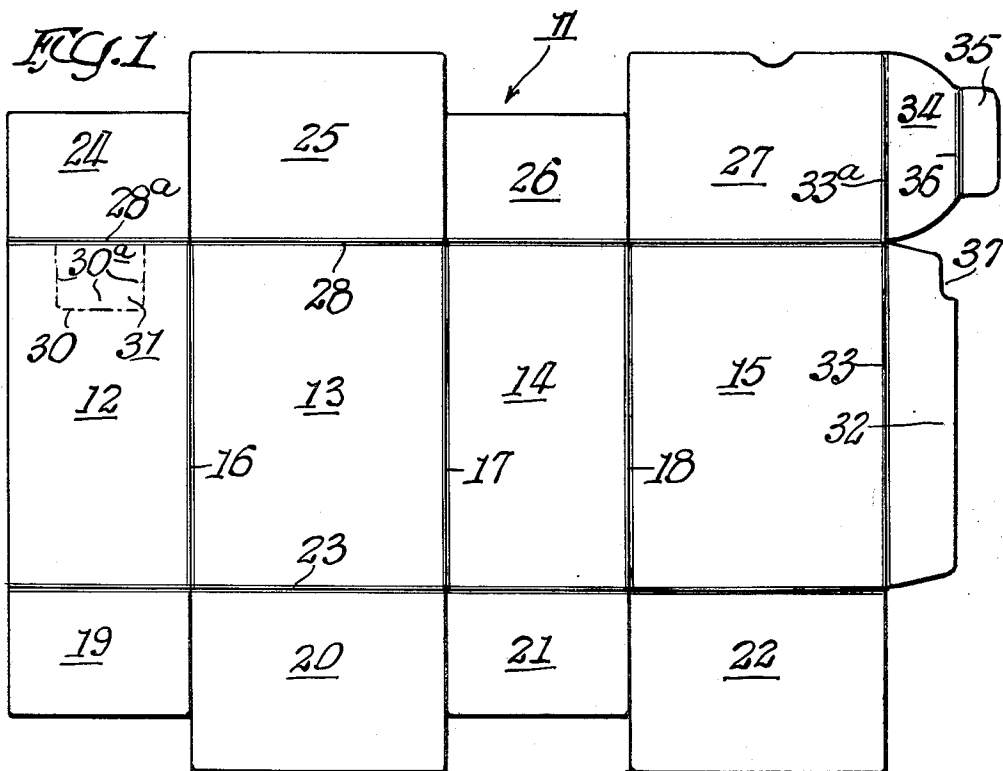
Sept. 24, 1963

R. J. HICKIN
BOX CONSTRUCTION

3,104,793

Filed Jan. 3, 1962

2 Sheets-Sheet 1



Sept. 24, 1963

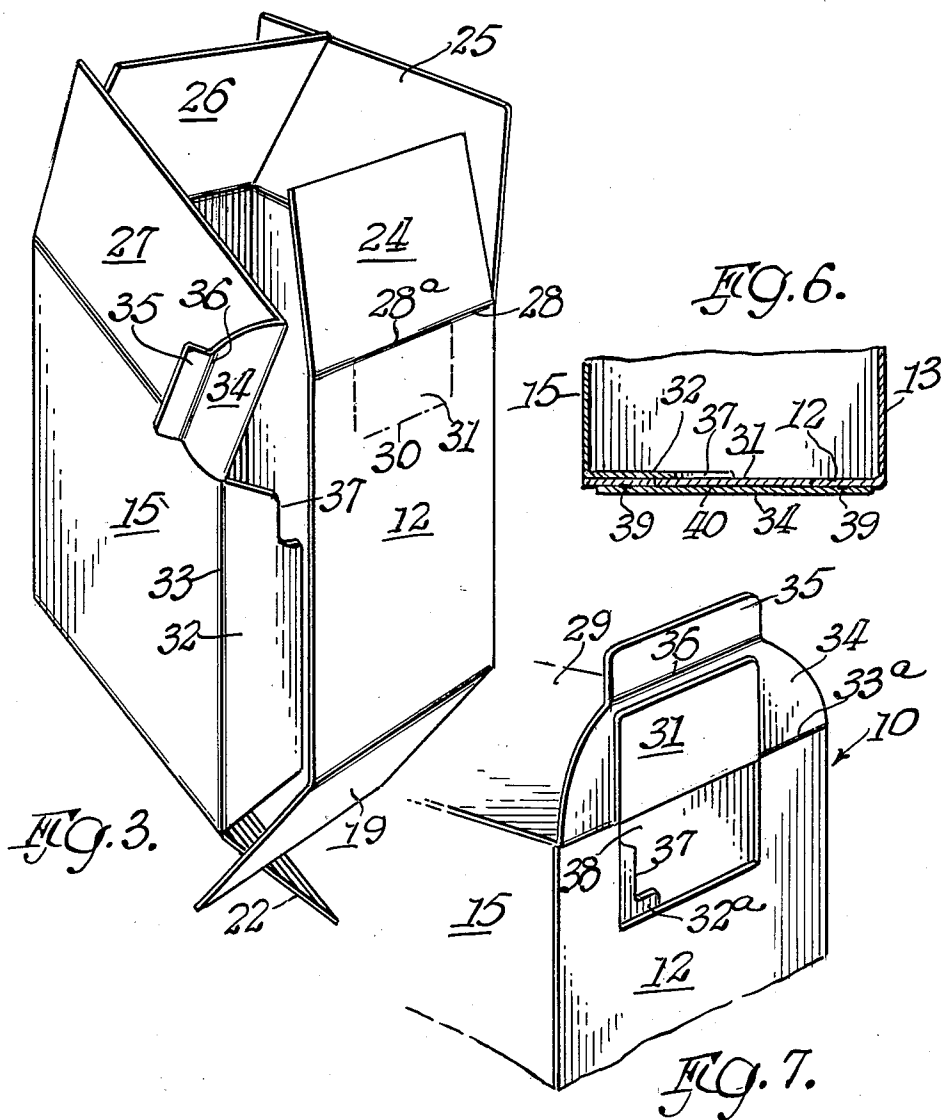
R. J. HICKIN

3,104,793

BOX CONSTRUCTION

Filed Jan. 3, 1962

2 Sheets-Sheet 2



Inventor
Robert J. Hickin
by Olson, Mecklenburger, Von Holst,
Pendleton & Neuman Attys

1

3,104,793

BOX CONSTRUCTION

Robert J. Hickin, Seville, Ohio, assignor to Packaging Corporation of America, Dover, Del., a corporation of Delaware

Filed Jan. 3, 1962, Ser. No. 164,130

9 Claims. (Cl. 229-17)

This invention relates to containers, and more particularly relates to the construction of boxes having a reclosable pouring opening.

A wide variety of flowable commodities are supplied to consumers in cartons or boxes of the type normally formed from a foldable, precut and prescored boxboard blank. Further, the nature of the packaged commodity and the quantity contained in a given box are often such that the entire contents of a box are not utilized by the consumer at one time. Rather, the boxes are intermittently opened, a part of the contents poured out, and the box then reclosed for storage until another portion of its contents is required at some future time. This gives rise to a requirement for boxes that are effectively closed and sealed during shipment and handling prior to delivery to the consumer and which may be easily opened by the consumer, but which may be simply and effectively reclosed and again reopened during intermittent usage of the contents by the consumer.

One development in this area has been to provide a tear-out plug defined by a weakened line, such as a line of perforations or an interrupted cut line, in one side wall of a boxboard carton for forming a pour opening. A hinged flap is then also provided and designed to overlie and be adhered to the plug. In some prior art structures the overlying flap covers the weakened line delimiting the plug and, together with the plug, effectively seals the carton during handling and shipment. The consumer gains access to the contents of such cartons by forcibly raising the overlying flap. Because of the securement of the flap to the plug and the weak attachment of the plug to the side wall, this tears the plug from its original position thereby opening a pour opening through the side wall. The adhesive bond between the ear flap and plug thus must transmit the force for tearing out the plug.

Boxes of this type are normally supplied to the packager in a collapsed tubular form. The packager then erects the box, places his commodity therein and closes the respective end flaps in appropriate sequence. As the flap overlying the tear-out plug is normally integral with one of the end flaps of the box, it cannot be secured to the plug until the box is erected, and is pressed into adherent relation with the plug at that time. The contents of the box cannot be relied upon to resist the force applied when the glue flap is pressed against the plug. Thus when the overlying flap is pressed toward the plug to obtain the adherent bond therebetween, the plug normally resists this force, and resists being separated from the surrounding portion of the side wall and being pushed inwardly into the carton, with only the same force as will ultimately resist the plug being torn from its position when a consumer wishes to open the package. If the plug is left only lightly secured to the surrounding side wall, it will readily yield to the force exerted via the overlying flap during the adhering operation. Poor adherence will then be obtained between these two members, and the bond therebetween may part without removing the plug when the flap is raised. Also the plug might be prematurely torn from its closed position during the adhering step and the seal of the package destroyed. Conversely, if the plug is left firmly connected to the surrounding side wall, the plug will be hard to tear out of its

2

closed position, thus requiring more effort on the part of the consumer in raising the overlying flap and increasing the risk of failure of the bond between these two members without removal of the plug. It will be appreciated that two concurrent and apparently conflicting requirements are thus raised. First, the plug must be rather lightly attached to the surrounding side wall so that it may be easily torn from its position, and secondly, a good adhesive bond must be established between the overlying flap and the plug to insure that the plug will be torn out when the flap is raised by the consumer.

Another and continuing problem in the manufacture of containers is one of cost. As containers of this type are normally suitable for packaging a single product, and are produced and consumed on a high volume basis, each savings of cost, either by way of savings of material or of labor involved, is important.

Accordingly, it is an object of this invention to overcome the difficulties outlined above.

It is an object of this invention to provide improved carton blanks for constructing boxes of the type described and which insure the obtaining of a good bond between the overlying flap and the tear-out plug when the box is erected, but wherein the plug may be lightly attached and easily removed in opening the box.

It is another object of this invention to provide an improved carton construction including a readily removable plug for forming an opening therein and an overlying ear flap wherein the ear flap may be simply but firmly adhered to the plug, but wherein the plug may be easily torn from its carton closing position.

It is another object of this invention to provide an economical, improved carton blank construction with a minimum amount of stock material and in accordance with the foregoing objects.

Further and additional objects will become apparent to those skilled in this art in light of the embodiments illustrated in the attached drawings, the following description, and the appended claims.

In carrying out this invention in one illustrative form, a foldable blank of semi-flexible sheet material is provided comprising a series of joined side wall panels, a plurality of end closure flaps extending from the top and bottom edges of the side wall panels, and a glue flap which is integral with the free edge of the panel at one end of the series and adapted to be adhered to the concealed surface of a portion of the panel at the opposite end of the series to complete the basic tubular form of a box. The panel at said opposite end of the series is formed with a weakened line delimiting a plug for forming an opening therethrough, and the glue flap is of a length and configuration to extend into the projected area of the plug along the weakened line when the blank is folded. The glue flap does not cover the opening defined by the plug but provides support for the plug, along its peripheral edge, against inward pressure such as is applied when the overlying flap is pressed against the plug to obtain a good adhesive bond therewith. A hinged flap extends from a side edge of one end flap to overlie and be adhered to the plug when the box is erected.

By way of illustration and example, one embodiment of this invention is disclosed in the drawings, wherein:

FIG. 1 is a plan view of an improved box blank employing teachings of this invention;

FIG. 2 is an enlarged partially broken away perspective view of an improved box formed from the blank of FIG. 1 and employing teachings of this invention;

FIG. 3 is a perspective view illustrating a blank as in FIG. 1 as partially assembled for forming a box as in FIG. 2;

3

FIG. 4 is an enlarged partially broken away elevational view of a portion of the box of FIG. 2;

FIG. 5 is a cross-sectional view taken along line 5—5 of FIG. 4 and looking in the direction of the arrows;

FIG. 6 is a cross-sectional view taken along line 6—6 of FIG. 4 and looking in the direction of the arrows; and

FIG. 7 is an enlarged perspective view of a portion of a box as in FIG. 2 subsequent to opening of the pouring outlet of the box.

Referring now to the drawings, the illustrated box 10 is of generally rectangular shape and is formed from blank 11 which includes four integrally joined side wall panels 12, 13, 14 and 15, side forming panels 13 and 15 being of somewhat greater lateral dimension than the end forming panels 12 and 14. These panels are integrally joined along scored fold lines 16, 17 and 18. End flaps 19, 20, 21 and 22 are integrally joined to wall panels 12, 13, 14 and 15, respectively, along a scored fold line 23, as shown. End flaps 19, 20, 21 and 22 cooperate to form the bottom wall of box 10. End flaps 24, 25, 26 and 27 are integrally joined to the opposite marginal portions of panels 12, 13, 14 and 15, respectively, along the scored fold line 28 and cooperate to form a top wall 29.

The end forming panel 12, at one end of blank 11, is formed with a weakened line, such as a line of cuts or perforations 30, delimiting a lightly attached tear-out plug. The illustrated plug 31 is defined along three sides by an interrupted-cut line 30a and along its fourth side by a cut line 28a corresponding to a portion of fold line 28 between panel 12 and end flap 24.

At the edge of the blank opposite from panel 12, a glue flap 32 is integrally joined to panel 15 along fold line 33 and extends outwardly therefrom. A further ear or flap 34 of a Van Buren type or the like is joined to end flap 27, also along edge or fold line 33, at 33a, and extends outwardly in the same direction as glue flap 32. The ear flap 34 includes an integral tab portion 35 joined to the remainder of the ear flap along a scored fold line 36.

As indicated in FIG. 3, when blank 11 is formed into a generally tubular shape preliminary to forming box 10, the glue flap 32 is positioned in underlying relation to the adjacent portion of panel 12 and is firmly adhered thereto by a suitable adhesive without being secured to plug 31. The glue flap 32 is of sufficient lateral dimension so as to extend over at least a part of plug 31, as illustrated in FIGS. 2, 4, 5 and 6. However, the flap 32 is formed with a notch or cut-out portion as at 37 whereby the flap 32 projects into only a portion of the projected area delimited by the weakened line 30, as at 32a. It will be noted that the flap 32 thus extends behind a portion of the periphery of plug 31 to lend substantial peripheral support to the plug against inward pressure but at the same time does not block off a major portion of the opening 38 left in side 12 when plug 31 is removed.

When blank 11 is further erected into a box as illustrated in FIGS. 2 and 4, the portion 33a of fold line 33 is disposed over the edge of plug 31 along cut line 28a, and the flap 34 extends over the exposed surface of plug 31. In the illustrated embodiment flap 32 extends behind one side edge of the plug and also behind a portion of the edge of the plug furthest removed from fold line 28 and hence furthest removed from hinge line 33a of flap 34. This is an important feature, since it provides substantial support along a peripheral portion of the plug furthest from the hinge axis.

Flap 34 overlies plug 31 and extends beyond weakened line 30 thereby concealing such line and preventing ingress or egress of particles through the perforations or slits of such line. The main body portion of flap 34, between fold lines 33 and 36, is normally lightly adhered to panel 12, as by small patches of adhesive 39 at each side of plug 31, see FIG. 6, and is firmly adhered to plug

4

31 by the use of a large area of adhesive 40. With the adhesive in place, firm pressure is brought to bear on flap 34 over plug 31, to insure the formation of a strong bond therebetween. Tab 35 is left free from wall 12 whereby it may be easily turned outward as a grip for raising flap 34 and tearing out plug 31 when the box is to be opened, or may be very lightly adhered to side 12 to maintain it in an out-of-the-way position.

As flap 32 is firmly adhered to side panel 12, the portion 32a of the flap which is exposed in opening 38 will lend firm support against inward movement of plug 31, thus permitting the application of adequate pressure against flap 30 to insure a good adhesive bond between flap 34 and plug 31. At the same time, portion 32a is sufficiently narrow to prevent substantial blockage or closing off of the opening 38 whereby the contents of the box may be readily poured through opening 38 when the box is opened, as illustrated in FIG. 7. Portion 32a may be printed, both to insure that the plug 31 does not adhere to this area and to enhance the appearance of the package when opened.

Formation of glue flap 32 and ear flap 34 along the same side of the blank makes efficient utilization of the material from which blank 11 is formed. Flap 32 is formed from a portion of the material which would be cut away and disposed of from beneath flap 34 if flap 32 were formed at the opposite side of the blank. The construction of this invention also facilitates economical production of the improved box as the plug reinforcing member is an element already present and necessary in the box construction, thus not requiring the presence of a separate special reinforcing member.

Ear flap 34 and glue flap 32, in the illustrated embodiment, are of different lengths, as measured transversely to fold line 33, whereby these two flaps may be selectively engaged by appropriate folding apparatus in assembling this box, such as to separately apply glue to flap 32 and to form the blank into its basic tubular box form without also applying glue to and inadvertently adhering flap 34 at the same time. For instance, in one type of assembly apparatus, the carton is passed into a folding device in a flat position generally as shown in FIG. 3. A stationary folding rod then catches the ear flap and bends it upward to an out-of-the-way position without engaging or raising the glue flap 32. The carton then travels over a glue wheel which applies glue to flap 32 without also applying glue to flap 34. Subsequently, suitable rods or belts fold the remaining portions of the carton into gluing position and apply pressure to secure glue flap 32 to the concealed surface of the adjacent portion of wall 12, thereby forming the basic tubular carton form.

It will be obvious that other modifications of the specific embodiment shown may be made in light of this disclosure without departing from the spirit and scope of this invention. For example, depending somewhat upon the shape and positioning of plug 31, and thus of opening 38, glue flap 32 may extend beyond flap 34 and extend around a greater portion of the peripheral edge of plug 31.

It will thus be seen that improved carton blank and box constructions have been provided which are simple and economical but which meet the objects of this invention in providing for firm adhesive engagement, under applied pressure, between the overlying flap and the tear-out plug, but which also provide for a lightly engaged plug that can be easily removed to provide a pour-out opening in the box. This has been accomplished in a simple and economical construction by utilizing the glue flap as a "backup" or reinforcing member and by forming the glue flap and overlying flap on the same side of the blank.

While particular embodiments of this invention have been shown above, it will be understood of course that the invention is not to be limited thereto, since many modifications may be made by those skilled in this art in light of the disclosure herein. It is contemplated, therefore,

5

by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

I claim:

1. A foldable carton blank of sheet material comprising a wall section provided, adjacent a first marginal portion thereof, with a plug substantially delimited by a weakened line to effect an opening through said section, a glue flap foldably connected to a second marginal portion of said section for adherence to the concealed surface of said first marginal portion when said carton is in folded condition, said glue flap having a peripheral segment thereof of predetermined configuration for extending into the projected area delimited by said weakened line when said glue flap is adhered to said concealed surface, and an ear flap foldably connected to a third marginal portion of said section for registration with and adherence to the exposed surface of said plug.

2. The foldable carton blank as recited in claim 1 wherein the configuration of said ear flap is such that no portion of the weakened line delimiting said plug is exposed when said ear flap is adhered to the exposed surface of said first marginal portion.

3. The foldable carton blank recited in claim 1 wherein a portion of the peripheral segment of said glue flap is extendable into said projected area at the portion of the weakened line furthest removed from the fold line of said ear flap when said ear flap is in position for adherence to the exposed surface of said plug.

4. The foldable carton blank recited in claim 1 wherein the fold line between said third marginal portion and ear flap is in substantial alignment with the fold line between said glue flap and said second marginal portion when said blank is unfolded.

5. A foldable carton blank as in claim 1 and wherein the fold lines of said ear flap and glue flap are in substantial alignment when said blank is flat, and wherein one of said flaps extends a greater distance from the fold line thereof than said other flap.

6. A foldable carton blank of sheet material comprising a side wall section having oppositely disposed mar-

6

ginal portions, a plug disposed adjacent one of said marginal portions and substantially delimited by a weakened line to effect an opening through said section, a glue flap foldably connected to the second of said marginal portions for adherence to the concealed surface of said one marginal portion when said carton is in folded condition, said glue flap having a peripheral segment thereof of predetermined configuration for extending into the projected area delimited by said weakened line when said glue flap is adhered to said concealed surface, an end flap foldably connected to a third marginal portion intermediate said oppositely disposed marginal portions, and an ear flap foldably connected to said end flap for registration with and adherence to the exposed surface of said plug.

7. A carton having a side wall and including a glue flap adhered to a portion of the concealed surface of said side wall, said portion of said side wall formed with a plug substantially delimited by a weakened line for forming an opening therethrough, and a hinged flap adhered to the exposed surface of said plug, a peripheral segment of said glue flap extending into the projected area delimited by said weakened line.

8. The carton as recited in claim 7 and wherein said hinged flap covers said weakened line and includes a tab extending from its distal end.

9. The carton as recited in claim 7 and wherein a portion of the peripheral segment of said glue flap extends into said projected area at the portion of said weakened line furthest removed from the hinge line of said hinged flap.

References Cited in the file of this patent

UNITED STATES PATENTS

35	2,689,643	Willits	Sept. 21, 1954
	2,735,605	Read	Feb. 21, 1956
	2,819,831	Polarek et al.	Jan. 14, 1958

FOREIGN PATENTS

40	233,475	Australia	Mar. 10, 1960
----	---------	-----------	---------------