July 12, 1960 F. M. LEFIEF ET AL 2,944,724

HINGE COVER FOLDING BOXES

Filed May 8, 1958 2 Sheets-Sheet 1

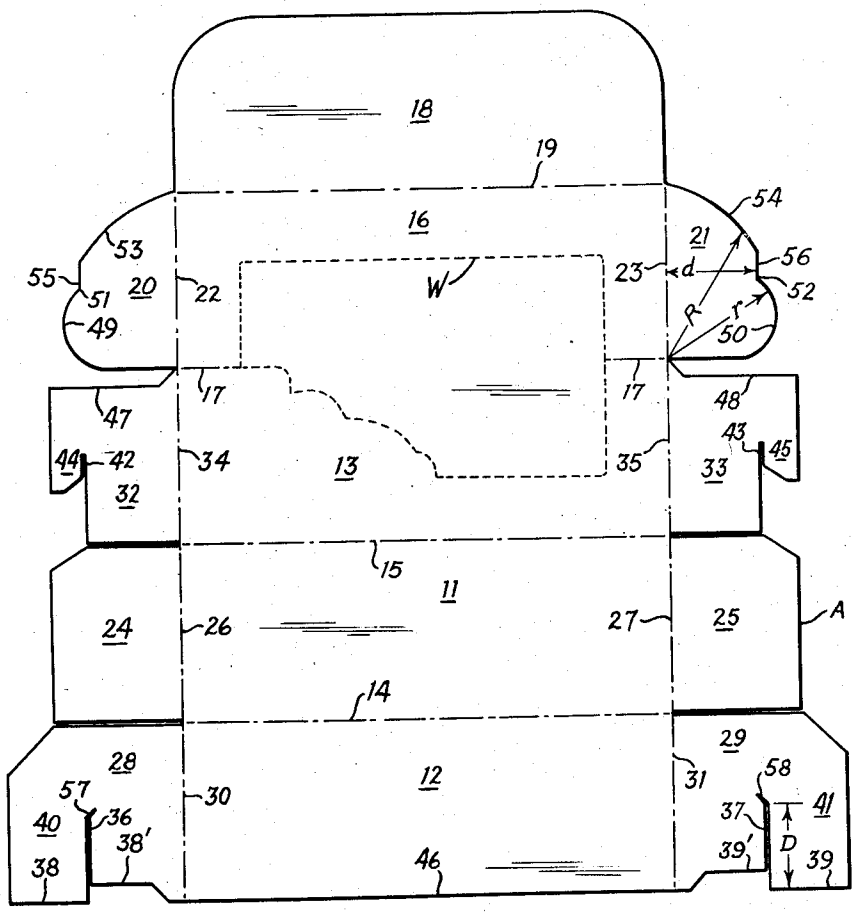

Fig 1

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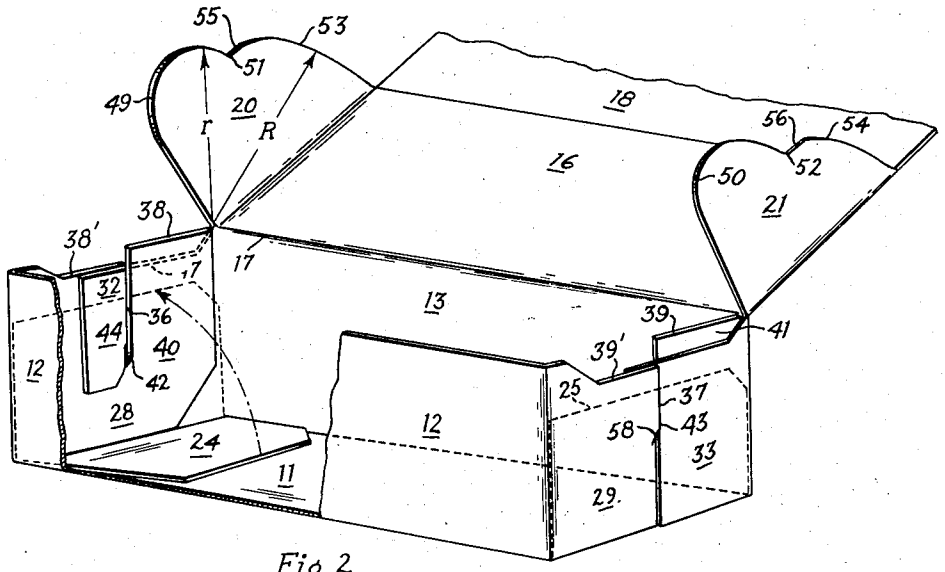

Fig 2

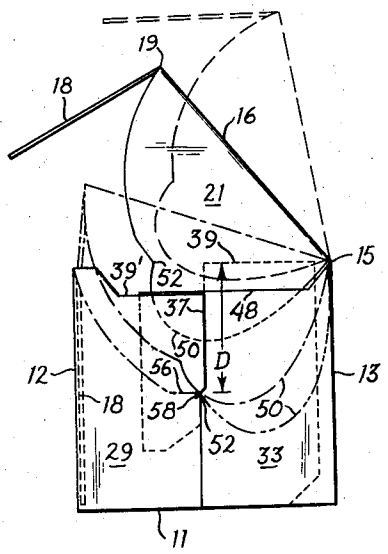

Fig 3

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HINGE COVER FOLDING BOXES

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4 Claims. (Cl. 229—36)

This invention relates to improvements in gluelessly assembled hinge-cover folding boxes of the style in which each end structure of the box comprises an inner end flap articulated to the ends of the bottom panel and a pair of end panels articulated to the front panel and the back panel of the box, respectively. One of the end panels has an upwardly extending cut therein forming a downwardly extending lock tab on the panel and the other end panel has a downwardly extending cut therein forming an upwardly extending tab thereon. Both cuts are in substantial coincidence in the assembled box and permit the end panels to be locked together in hook fashion in such a way that both lock tabs lie on the inside of the resulting end wall and are covered interiorly by the aforementioned end flap.

Boxes of this type are widely used for the packaging of bakery products such as cookies and doughnuts. For sanitary reasons the hinge-cover of the box is provided with side flaps, commonly called "charlottes" in the box art. The cover side flaps lie between the end flaps and the interlocked end panels and prevent entry of dust into the box.

Considerable difficulties are experienced in the closing of the filled box by automatic machinery. Closing machines comprise elements for engaging the cover side flaps and directing them into the proper space within the box when the cover panel is being folded into closing position. Even relatively slight deviations in the position of the box passing through the closing machine on a conveyor is likely to result in improper seating of the cover side flaps. If the cover side flaps accidentally pass inside the end flaps, they dig into the box contents, for example the packaged doughnuts, and damage them. Moreover, dust may enter between the cover end flaps and the end panels. Boxes in which the cover side flaps pass inside the end flaps must be spotted and removed from the production line.

The cover side flaps may also accidentally bear down upon the cut end edge of the inner end flaps wtih the result that the cover end flaps buckle and crease when the box passes through the closing machine. This generally also leads to damage of the box contents so that the entire box must be rejected and removed from the production line.

Damage also results if the edge of the cover side flap strikes the upwardly extending lock tab or passes between the upwardly extending lock tab and the interlock end panels. In the first instance buckling of the lock tab occurs and in the latter instance the box cannot be closed since the conventionally shaped cover side flaps finally seats at the end of the downwardly extending locking cut before the cover panel is closed.

The invention provides a structural modification of the aforementioned general box construction as a result of which accidental engagement between the cover side flaps and the inner end flaps is positively prevented and the cover side flaps are positively guided into a position in which the box contents are protected against entry of dust. According to the invention the upwardly extending lock tab is formed as a stop preventing entry of the cover side flap behind it, and further, as a guide to lead the cover side flap into a position in which it seats between the upwardly etxending lock tab and the remainder of the end panels. This is advantageous in more than one respect. A friction fit results tending to hold the cover closed in the event the cover front flap is not glued down. It also aids in the sealing of the box by gluing down the cover front flap, in that no stress is exerted on the glue bond by a tendency of the cover to spring open before the adhesive sets. Thirdly, the end structure of the box becomes neater in appearance since the ends are drawn in by the cover side panels which also facilitates mechanical loading of filled boxes end to end in shipping cases.

The cover side flaps may be of full width and considerable length by employing a particular scalloped outline, as will later appear.

The various features and advantages of this invention will appear more fully from the detailed description which follows accompanied by drawings showing, for the purpose of illustration, a preferred embodiment of the invention. The invention also resides in certain new and original features of construction and combination of elements hereinafter set forth and claimed.

Although the characteristic features of this invention which are believed to be novel will be particularly pointed out in the claims appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part of it, in which:

Figure 1 is a plan view of a preferred form of blank embodying the invention;

Figure 2 is a perspective view of the open box, a portion of the front panel benig broken away and one inner end flap folded down to show details; and

Figure 3 is an end view of the box illustrating the seating of the scalloped cover side flaps.

In the following description and in the claims various details will be identified by specific names for convenience. The names, however, are intended to be generic in their application. Corresponding reference characters refer to corresponding parts in the several figures of the drawings.

The drawings accompanying, and forming part of, this specification, disclose certain specific details of the invention for the purpose of explanation of its broader aspects, but it is understood that the details may be modified in various respects without departure from the principles of the invention and that the invention may be applied to other structures than the one shown.

The blank A shown in Figure 1 comprises a bottom panel **11** to which a front panel **12** and a rear panel **13** are articulated along a bottom front fold line **14** and a bottom rear fold line **15**, respectively.

A cover panel **16** is articulated to the rear panel **13** along a cover hinge fold line **17**. A front flap **18** is articulated to the cover panel **16** along a front flap fold line **19**. Cover side flaps **20** and **21** extend hingedly from the sides of the cover panel **16** along side flap fold lines **22** and **23**. In a similar manner inner end flaps **24** and **25** are articulated to the sides of the bottom panel **11** along end flap fold lines **26** and **27**.

Front end panels **28** and **29** are articulated to the ends of the front panel **12** along fold lines **30** and **31** and rear end panels **32** and **33** are articulated to the rear panel **13** along fold lines **34** and **35**.

The front end panels **28** and **29** comprise locking cuts

36 and 37 which extend downwardly from the upper edges 38 and 39 and form upwardly extending lock tabs 40 and 41.

The rear end panels comprise upwardly extending locking cuts 42 and 43 forming downwardly extending lock tabs 44 and 45.

The upper edges of the front end panels are recessed at 38' and 39' with respect to the top edge 46 of the front panel for reasons which will later become apparent. In a similar manner the top edges 47 and 48 of the rear end panels 32 and 33 are recessed with respect to the cover hinge fold line 17.

The outer edges of the cover side flaps 20 and 21 are of generally scalloped outline including first edge portions 49 and 50 extending from the end of the cover hinge line 17 to central points 51 and 52 and second portions 53 and 54 extending from the central points 51 and 52 to the ends of the front flap hinge line 19. The radii *r* within the first portion are smaller and the radii R within the second portion are greater than the distance of the respective central point 52 from the ends of the cover fold line 17. Flat portions 55 and 56 may be provided adjacent the central points 51 and 52. The distance *d* of the flat portion 55 and 56 from the respective side flap fold line 22 and 23 is approximately equal to the depth D of the locking cuts 36, 37 measured from the top edge 38 and 39, respectively. Beyond the depth D the cuts 36 and 37 may be slightly angled as shown at 57, 58.

The assembly of the box proceeds in a conventional manner. The inner end flaps 24 and 25 are folded into upright position with respect to the bottom panel 11, the front and rear panels 12 and 13 are folded upright and, during the latter operation, the front and rear end panels 28, 32 and 29, 33 are interlocked by bringing the locking edges 36, 42, and 37, 43 into engagement.

Figure 2 shows the box in set-up condition, except for the position of the inner end flap 24 which is shown downfolded in order to show the interlock of the panels 32 and 40 more clearly.

It is apparent that the protruding top edges 38 and 39 of the lock tabs 40 and 41 form a stop preventing insertion of the cover side flaps 20 and 21 inside the lock tabs.

Figure 3 shows in a progressive manner the positions of the cover side flap 21 during the closing of the box. The cover side flap 21 is inserted in front of the lock tab 41 and behind the rear end panel 33. The scalloped outline of the edge of the cover side flap provides adequate clearance with respect to the end of the cut 37. At no point does the lower edge of the cover side flap extend deeper than the depth D of the cut 37. As the cover approaches its closed position, the cover side flaps pull in the end panels of the box, thereby counteracting the tendency of the end walls to bow out. Also, the cover end flaps meet with increasing frictional resistance between the end panels during the closing, which resistance is sufficient to prevent the box cover from springing open. In the closed position the flat portion 56 rests at the bottom of the cut 37, thereby increasing the stacking strength of the closed box.

In Figure 3 the front flap is shown tucked inside the box, but it is obvious that it may also overlie the outside of the front panel and be adhesively secured thereto.

In the blank A a window opening W is shown in dotted lines. This window, closed by a sheet of transparent material, is normally provided in boxes designed for bakery products such as doughnuts, but the window is not shown in Figure 2 in order to keep the figure simple and not to detract from the essential structural details of the box.

The features of the box permit the box to be closed successfully by automatic machinery at rates of in excess of 60 boxes per minute without danger of damaging either box ends or contents.

What is claimed is:

1. A folding box comprising, a bottom panel; a front panel articulated to the bottom panel along a bottom front fold line; a rear panel articulated to the bottom panel along a bottom rear fold line; a cover panel articulated to the rear panel along a cover hinge fold line; a front flap articulated to the cover panel along a front flap fold line; cover side flaps articulated to the sides of the cover panel along side flap fold lines; inner end flaps articulated to the bottom panel along end flap fold lines; front and rear end panels articulated to the sides of the front and rear panels, one of said end panels having an upwardly extending cut therein forming a downwardly extending lock tab, the other end panel having a downwardly extending cut therein forming an upwardly extending lock tab thereon adapted to be interlocked in hook fashion with said downwardly extending lock tab, the top edge of said end panels being recessed with respect to the top edge of the front panel to lie at a lower level than the top edge of the front panel except for the upwardly extending lock tab which extends above the recessed top edge portion of the end panels to provide an inwardly disposed stop against which the side flap may be swung in closing the cover, said upwardly extending lock tab guiding the cover side flap into the space between the upwardly extending lock tab on the inside and the remainder of said end panels on the outside.

2. A folding box comprising, a bottom panel; a front panel articulated to the bottom panel along a bottom front fold line; a rear panel articulated to the bottom panel along a bottom rear fold line; a cover panel articulated to the rear panel along a cover hinge fold line; a front flap articulated to the cover panel along a front flap fold line; cover side flaps articulated to the sides of the cover panel along side flap fold lines; inner end flaps articulated to the bottom panel along end flap fold lines; front and rear end panels articulated to the sides of the front and rear panels, said rear end panel having an upwardly extending cut therein forming a downwardly extending lock tab, said front end panel having a downwardly extending cut therein forming an upwardly extending lock tab thereon adapted to be interlocked in hook fashion with said downwardly extending lock tab, the top edge of said end panels being recessed with respect to the top edge of the front panel to lie at a lower level than the top edge of the front panel except for the upwardly extending lock tab which extends above the recessed top edge portion of the end panels to provide an inwardly disposed stop against which the side flap may be swung in closing the cover, said upwardly extending lock tab guiding the cover side flap into the space between the upwardly extending lock tab on the inside and the remainder of said end panels on the outside.

3. A folding box comprising, a bottom panel; a front panel articulated to the bottom panel along a bottom front fold line; a rear panel articulated to the bottom panel along a bottom rear fold line; a cover panel articulated to the rear panel along a cover hinge fold line; a front flap articulated to the cover panel along a front flap fold line; cover side flaps articulated to the sides of the cover panel along side flap fold lines; inner end flaps articulated to the bottom panel along end flap fold lines; front and rear end panels articulated to the sides of the front and rear panels, said rear end panel having an upwardly extending cut therein forming a downwardly extending lock tab, said front end panel having a downward cut therein extending to an end point substantially in the center of the end panel area, said downward cut forming an upwardly extending lock tab on said front end panel adapted to be interlocked in hook fashion with said downwardly extending lock tab, the top edge of said end panels being recessed with respect to the top edge of the front panel to lie at a lower level than the top edge of the front panel except for the upwardly extending lock tab which extends above the recessed top edge portion

of the end panels to provide an inwardly disposed stop against which the side flap may be swung in closing the cover, said upwardly extending lock tab guiding the cover side flap into the space between the upwardly extending lock tab on the inside and the remainder of said end panels on the outside, the outer edge of the said cover side flaps being of generally scalloped outline, including a first portion extending substantially from said cover hinge line to a central point immediately above said end point in the closed box, the radii from the cover hinge line to said outer edge within said first portion being less than the distance from said cover hinge line to said end point, and a second portion extending from said

central point to said front flap hinge line, the radii from the cover hinge line to said outer edge within the second portion being greater than the distance from said cover hinge line to said end point.

4. A folding box as claimed in claim 3 in which the length of the front end panel is substantially equal to the width of the inner end flap.

References Cited in the file of this patent

UNITED STATES PATENTS

153,281	Ritter	July 21, 1874
2,492,454	Anderson	Dec. 27, 1949