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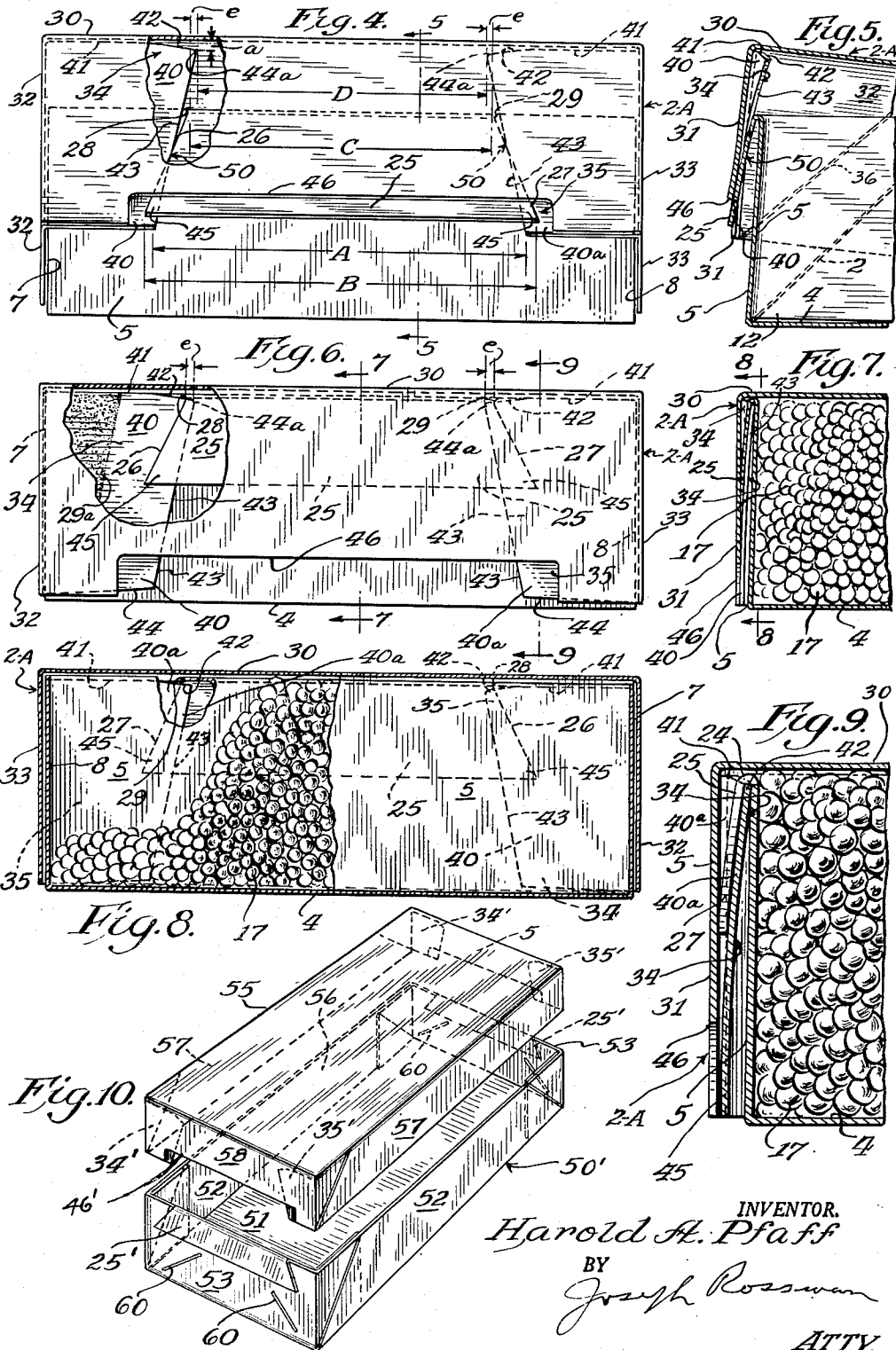
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CARTON

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CARTON

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This invention relates to a carton construction and more particularly to a lock for the cover portion of a collapsible paperboard carton.

Collapsible cartons having a tray portion and a hinged cover portion generally made of paperboard have come into extensive use particularly in the packaging of frozen foods and bakery products. It is very desirable in such constructions that the cover portion of the carton should be automatically locked to the tray portion when the cover is closed. The lock serves to prevent accidental opening of the package and hence loss or damage to the contents. In packaging frozen foods it is very often the practice to overwrap the carton with a protective sheet which is sealed and in such packages the cover lock serves the very important function of holding the cover in closed position during the subsequent wrapping operation. It is therefore important in making such packages that the cover is held tightly closed so that there is a minimum tendency for the cover to open up during the wrapping operation because the automatic wrapping machines used for this overwrapping are frequently not capable of drawing the wrapper tight enough to overcome any spring back in the cover.

A number of locking means have been suggested previously for locking covers to trays in cartons. Patent 2,437,835, for example, discloses a swingable flap attached to the front wall of the tray of the carton which engages an abutment on the corresponding front wall of the cover when the cover is closed. I have found, however, that such lock has an inherent spring back. Many of the other locks that have been suggested in the prior art cannot be manufactured on conventional high production carton gluing equipment.

It is an object of this invention to provide collapsible cartons having cooperating portions which readily engage when the carton is closed to provide a lock without spring back. It is a further object of this invention to provide a locking carton which may readily be formed and glued on conventional high production equipment. Other objects and advantages will be apparent from the following description of my invention.

Referring to the drawings, forming a part hereof, wherein I have shown a preferred embodiment of my invention,

Figure 1 is a plan view of a blank of a carton having a tray portion and a hinged cover portion,

Figure 2 is a perspective view of the collapsed

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carton made from the folded and glued blank of Figure 1,

Figure 3 is a perspective view of the carton in set-up position,

Figure 4 is a front elevational view with parts broken away of the carton having the cover partially closed over the tray portion,

Figure 5 is a partial section taken along the line 5—5 of Figure 4,

Figure 6 is similar to Figure 4 showing the cover in fully closed position,

Figure 7 is a partial section taken along the line 7—7 of Figure 6,

Figure 8 is a sectional view taken along the line 8—8 of Figure 7, with a portion of the contents of the carton removed,

Figure 9 is an enlarged section taken along the line 9—9 of Figure 6, and

Figure 10 is a perspective of a two-piece carton embodying my cover lock.

The embodiment shown in the drawings is made from an integral blank of paperboard, cardboard and the like, suitably cut and scored as illustrated in Figure 1 to provide a foldable tray portion, indicated by numeral 1 in Figure 3, and a foldable cover portion, indicated generally by numeral 2-A in Figure 3, hinged to the tray portion. The tray consists of a bottom wall 4, front wall 5, rear wall 6 and side walls 7 and 8. Side walls 7 and 8 are provided with rear flaps 9 and 10, respectively, which are glued to the rear wall 6, as shown in Figure 3. Side walls 7 and 8 are provided also with diagonal intersecting score lines 2 to permit collapsing of the tray portion in the flat folded position shown in Figure 2. Front wall 5 is provided with flaps 12 and 13 having triangular glue areas 14 adapted to be glued to the triangular segments 15 formed in the side walls by score lines 2. When the tray portion 1 is set up from its flat collapsed position, illustrated in Figure 2, the free portions 16 of flaps 12 and 13 will slide over the bottom panel 4, as shown in Figure 3, and will assume the final set-up position whereby the tray portion is prepared for receiving goods 17 to be packaged therein. Spaced ridges or abutments 18 in the bottom wall 4 serve to retain portions 16 in set-up position.

The front wall 5 of the tray portion is provided at its upper edge with an externally folded locking flap 25 integrally hinged to the front wall 5. A score line 24 positioned at the upper edge of the wall 5 preferably forms the hinge so that when the flap 25 is bent back it has a tendency to spring outwardly. Flap 25 is sub-

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stantially trapezoidal in shape having sloping side edges 26 and 27 and the hinge 24 forming the narrow side. The corners 28 and 29 at the end of the hinge may have a slight radius to prevent tearing when the carton locks as hereinafter described. The hinge 24 is set slightly above the upper edge of the front wall 5 so as to intersect the radius of the corners 28 and 29 at about their center. The locking flap 25 is adapted to engage the lock with coating portions on the hinged cover portion 2-A.

The hinged cover portion consists of a top wall 30, a front wall 31 and side walls 32 and 33. Side walls 32 and 33 are provided with flaps 34 and 35 which are adhered to overlapping portions of the inner face of front wall 31 of the cover. Side walls 32 and 33 are provided with diagonal score lines 36 to permit collapsing of the cover, as shown in Figure 2.

The flaps 34 and 35 are the portions of the cover which coat with locking flap 25 to provide the cover lock. These flaps are glued to the front panel 31 only along a restricted area adjacent the edge connected to the side walls 32 and 33 and behind a glue line 29a extending from the bottom to the top edges of the flaps so as to provide free unadhered portions 40 and 40a which extend the full height of the flaps, as clearly shown in Figure 6. The top edge 41 of the flaps is slightly recessed so that when the flaps are glued these top edges are positioned below the top wall 30. The top edge further slopes downwardly near its outer end providing an inclined portion 42 which extends below the top wall a distance a , as shown in Figure 6. Distance a is at least as great as the thickness of the material from which the carton is constructed. If desired instead of providing an inclined portion 42 the flaps 34 and 35 may be provided with a recessed or cut out portion for distance a . The front edges 43 of the flaps slope rearwardly from the vertical and the limiting glue line 29a parallels edge 43.

Coaction between the locking flap 25 and the unadhered portion 40 of glue flaps 34 and 35 permits locking of the cover. To obtain this coaction, however, the glue flaps and the locking flap are dimensioned with respect to each other so as to provide an overlapping relationship between these flaps when the box is closed. These dimensions are such that the distance between corners of the glue flaps formed by the intersection of the bottom edges 44 and the front edges 43 of flaps 34 and 35, indicated as distance A in Figure 4, is less than the maximum length of the locking flap indicated as distance B and greater than the length of the hinge 24, indicated as distance C thereof. Furthermore, the distance between the innermost points or shoulders 44a on the front edge 43, indicated as distance D, is less than the length of the hinge 24 of the locking flap 25, that is, less than distance C. The slope of the edges 26 and 27 of the locking flap is preferably slightly greater than the slope of the edges 43 of the glue flaps 34 and 35.

Because of these dimensions, as the cover of the carton is closed over the tray portion the outer corners of the locking flap tend to catch and slide behind the unadhered portions 40 of the glue flaps. To facilitate this engagement I prefer to cut out a portion of the front wall 31, as indicated at 46. Cut out portion 46 may be of any length greater than the length of the locking flap 25 and merely facilitates the entrance of that portion of the locking flap having length less than the distance A between the flaps 34

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and 35. The relative position of the coating parts when they first engage upon closing the cover is shown clearly in Figures 4 and 5. Portions 45 of the locking flap are in the cut out 46 behind portions 40 of the glue flaps. Edges 43 of the glue flaps 40 and 26 of the locking flap 25 cross at 50 forming an angle of about 14° . As the cover is further moved downwardly to closed position, the corners 28 and 29 of locking flap 25 will eventually slide along the edges 43 of the glue flaps until the point is reached where the distance between the edges 43 just equals the distance C. During this movement the corners 45 have moved between the portions 40 of the glue flap and the front wall. At this point further pressure on the cover will cause a distortion in the portions 40 of the glue flaps as well as in the front wall 5 of the tray and the front wall 31 of the cover. The combined distortion of these parts permits the corners 28 and 29 of the locking flap to pass over the shoulders 44a (see Figure 6) until the inclined portion 42 of edge 41 is reached. At this point the distortion is relieved by the fact that the distance between the glue flaps becomes greater than distance C and the distorted portions of the carton return to normal position.

As seen in Figure 6 when this occurs the locking flap 25 overlaps or overlies the glue flaps by distance e on each edge. In order, therefore, for the cover to be opened a sufficient pressure must be applied to again distort the carton to overcome this overlapping relationship. By controlling the dimension a the spring back can be substantially eliminated. The total amount of the overlap, that is, $2e$, is equal to distance C minus distance D. The overlapping relationship of the locking flaps and the glue flaps is more clearly shown in Figure 9 wherein it is seen that the locking flap 25 actually overlies the inclined portion of the top edge of the glue flap. I prefer to have the top edge 41 inclined so that the pressure set up by the distortion of the carton operates to draw the corners 28 and 29 of the locking flap up the inclined edge which in turn draws the cover more tightly down over the tray. In addition to the described lock an effective sliding friction lock is obtained by having portions of the locking flap 25 lying between flaps 40 and the front wall.

Numerous modifications may be made in the carton construction previously described and as stated above it constitutes a preferred embodiment. One such modification is the provision of my cover lock on a two-piece carton which may or may not be of the collapsible type. In Figure 10 is shown such a two-piece carton. The tray portion 50' includes a bottom wall 51, side walls 52, and end walls 53. Hinged to the top edge of the end walls is the locking flap 25'. The cover portion 55 consists of a top wall 56, side walls 57 and end walls 58. Glue flaps 34' and 35' are connected to the side walls 57 and glued to the end walls 58 in an identical manner as that shown with respect to the hinged cover carton. Cut out portions 46' permit entry of the locking flap 25' behind the glue flaps 34' and 35' and the flaps are dimensioned and designed all in the manner previously described.

The present invention may be embodied in other specific forms as for example in Figure 10, score lines 60 may be placed in the front wall of the tray portion, as shown, or the cover portion to facilitate flexing or distorting in order to bring about engagement of the locking elements. Fur-

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thermore, in place of the cut out portion 46' the wall 31 may be relieved with slits to provide a flap to facilitate entry of the locking flap 25 behind the glue flaps 34. My lock is readily formed on commercial gluing equipment suitable for making the carton in U. S. Patent 2,437,835 referred to above.

It is desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the description to indicate the scope of the invention.

I claim:

1. A carton of flexible material comprising a tray having a bottom wall, front and rear walls, and side walls, a cover having a top wall, side walls and a front wall, said cover walls being adapted to overlie snugly said tray walls when the carton is closed, a locking flap extending externally from and connected by a hinge to the top edge of said tray front wall, said flap having a portion thereof wider than said hinge, a pair of glue flaps, one connected to each of said side walls of the cover and partially adhered to the inside face of the cover front wall, said flaps being unadhered to said front wall at their outer ends from the top edge to the bottom edge of said flaps, the end edge of each of said glue flaps having an upwardly inward inclination, the lower portions of said glue flaps measured along a line parallel to the hinge of said locking flap being spaced apart a distance less than the maximum width of said locking flap and greater than the length of said hinge to contact the side edges of said locking flap as said cover is closed, and the upper portions of said glue flaps being spaced apart a distance less than the length of said hinge to engage the locking flap below and adjacent said hinge to lock the cover in closed position.

2. A paperboard carton comprising a tray having a bottom wall, front and rear walls, and side walls, a cover having a top wall, side walls and a front wall, said cover walls being adapted to overlie snugly said tray walls when the carton is closed, a locking flap extending externally from and connected by a hinge to the top edge of said tray front wall, said flap having a portion thereof wider than said hinge, a pair of glue flaps, one connected to each of said side walls of the cover and partially adhered to the inside face of the cover front wall, said flaps being unadhered to said front wall at their ends beyond a glue line extending inwardly from the top edge to the bottom edge of said flaps substantially parallel to the outer edge of each of said flaps, the lower portions of said glue flaps measured along a line parallel to the hinge of said locking flap being spaced apart a distance less than the maximum width of said locking flap and greater than the length of said hinge, and the upper portions of said glue flaps being spaced apart a distance less than the length of said hinge, the outer end edge of said glue flaps being inclined outwardly downwardly, and said front cover wall being cut out along its bottom edge to form an elongated opening wider than said locking flap and positioned to expose a lower portion of the inner face of each of said glue flaps, whereby the unadhered edges of said glue flaps will engage the side edges of the locking flap as the cover is closed to guide the locking flap between said glue flaps and the cover front wall, and the upper portions of said glue flaps will engage the locking flap below and adjacent the

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hinge line to retain the cover in closed position.

3. A paperboard carton comprising a tray having a bottom wall, end walls, and side walls, a cover having a top wall, end and side walls, said cover walls being adapted to overlie snugly said tray walls when the carton is closed, a locking flap extending externally from and connected by a hinge to the top edge of a tray end wall, said flap having portions wider than said hinge, a pair of glue flaps connected to adjacent ends of said side walls of the cover and partially adhered to the inside face of an intermediate cover end wall, said flaps being unadhered to said intermediate end wall at their outer ends from the top edge to the bottom edge of said flaps, the outer end edge of said glue flaps being inclined outwardly downwardly, the lower portions of said glue flaps measured along a line parallel to the hinge of said locking flap being spaced apart a distance less than the maximum width of said locking flap and greater than the length of said hinge, and the upper portions of said glue flaps being spaced apart a distance less than the length of said hinge, whereby the unadhered edges of said glue flaps will engage the side edges of said locking flap as the cover is closed to guide the locking flap between said glue flaps and said cover intermediate end wall, and the upper portions of said glue flaps will engage the locking flap below and adjacent the hinge line to retain the cover in closed position.

4. A paperboard carton comprising a tray having a bottom wall, front and rear walls, and side walls, a cover having a top wall, side walls and a front wall, said cover walls being adapted to overlie snugly said tray walls when the carton is closed, a trapezoidal shaped locking flap extending externally from and connected by a hinge along the shorter of the parallel sides to the top edge of said tray front wall, a pair of glue flaps, one connected to each of said side walls of the cover and partially adhered to the inside face of the cover front wall, said flaps being unadhered to said front wall at their ends beyond a glue line extending inwardly from the top edge of the bottom edge of said flaps substantially parallel to the outer edge of each of said flaps, the top edge of each flap being inclined downwardly at its outer end, the lower portions of said glue flaps measured along a line parallel to the hinge of said locking flap being spaced apart a distance less than the maximum width of said locking flap and greater than the length of said hinge, and the upper portions of said glue flaps being spaced apart a distance less than the length of said hinge, the outer end edge of said glue flaps being inclined outwardly downwardly, and said front cover wall being cut out along its bottom edge to form an elongated opening wider than said locking flap and positioned to expose a lower portion of the inner face of each of said glue flaps, whereby the unadhered edges of said glue flaps will engage the side edges of the locking flap as the cover is closed to guide the locking flap between said glue flaps and the cover front wall, and the upper portions of said glue flaps will engage the locking flap below and adjacent the hinge line to retain the cover in closed position.

5. A carton of flexible material comprising a tray having a bottom wall, front and rear walls, and side walls, a cover having a top wall hinged to said rear wall, side walls and a front wall, said cover walls being adapted to overlie snugly said tray walls when the carton is closed, a locking flap extending externally from and connected

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by a hinge to the top edge of said tray front wall, said flap being wider along its outer edge than said hinge, a pair of glue flaps, one connected to each of said side walls of the cover and partially adhered to the inside face of the cover front wall, 5 said flaps being unadhered to said front wall at their ends beyond a glue line extending inwardly from the top edge to the bottom edge of said flaps substantially parallel to the outer edge of each of said flaps, the outer end edge of said 10 glue flaps being inclined outwardly downwardly, the lower portions of said glue flaps measured along the line parallel to the hinge of said locking flap being spaced apart a distance less than the maximum width of said locking flap and greater 15 than the length of said hinge, to contact the side edges of said locking flap as the cover is closed and guide said flap between the cover and said glue flaps, the upper portions of said flaps being spaced apart a distance less than the length of 20 said hinge, to engage said locking flap below and adjacent said hinge to lock the cover in closed position, and said front cover wall being cut out along its bottom edge to form an elongated opening wider than said locking flap and positioned 25 to expose a portion of the inner face of each of said flaps for engagement with said locking flap.

6. A paperboard carton comprising a tray having a bottom wall, front and rear walls, and side walls, a separate cover having a top wall, side walls, and a front and rear wall, said cover walls being adapted to overlie snugly said tray walls when the carton is closed, a pair of locking flaps each extending externally from and connected 35 by a hinge to the top edge of one of said tray front and rear walls, each of said flaps being wider along its outer edge than said hinge, glue flaps connected to the side edges of said cover side walls and partially adhered to the inside face of the cover front and rear walls, said flaps being unadhered to said front and rear walls at their ends beyond a glue line extending inwardly from the top edge to the bottom edge of said flaps substantially parallel to the outer edge of each of said 40 flaps, the lower portions of said glue flaps measured along a line parallel to the hinge of said locking flap being spaced apart a distance less than the maximum width of said locking flap and greater than the length of said hinge, the upper portions of said glue flaps being spaced 45 apart a distance less than the length of said hinge, and said front cover wall being cut out along

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its bottom edge to form an elongated opening wider than said locking tongue and positioned to expose a portion of the inner face of each of said glue flaps, whereby the unadhered edges of 5 said glue flaps will engage the side edges of the locking flaps as the cover is closed to guide the locking flaps between said glue flaps and the cover front and rear walls, and the upper portions of said glue flaps will engage the locking 10 flaps below and adjacent the hinge line to retain the cover in closed position.

7. A carton of flexible material comprising a tray having a bottom wall and an end wall, a cover having a top wall and an end wall, said cover end wall being adapted to closely overlie 15 said tray end wall when the carton is closed, a locking flap extending externally from and connected by a hinge to the top edge of said tray end wall, said flap having a portion thereof wider than said hinge, a pair of closure flaps each adhered to the inside face of said cover end wall adjacent an end thereof, said flaps being unadhered to said cover end wall at their inner ends 20 from their top edge to their bottom edge, the inner portion of the top edge of each of said closure flaps being separated from said cover top wall by a distance at least equal to the thickness of said flexible material, the lower portion 25 ness of said flexible material, the lower portions of said glue flaps measured along a line parallel to said hinge being spaced apart a distance less than the maximum width of said locking flap and greater than the length of said hinge to contact the side edges of said locking flap as said cover 30 is closed, and the upper portions of said closure flaps being spaced apart a distance less than the length of said hinge to engage the locking flap below and adjacent said hinge to lock the cover in closed position.

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References Cited in the file of this patent
UNITED STATES PATENTS

Number	Name	Date
1,551,268	Scott	Aug. 25, 1925
1,928,792	Ottinger	Oct. 3, 1933
2,306,328	Biberthaler	Dec. 22, 1942
2,505,442	Thomas	Apr. 25, 1950
2,527,167	Wauda	Oct. 24, 1950
2,545,802	Bergstein	Mar. 20, 1951