

Jan. 1, 1963

W. A. BRASTAD

3,071,304

COMBINATION LINER AND CARTON FLAP END CLOSURE

Filed Nov. 17, 1960

7 Sheets-Sheet 1

FIG. 1

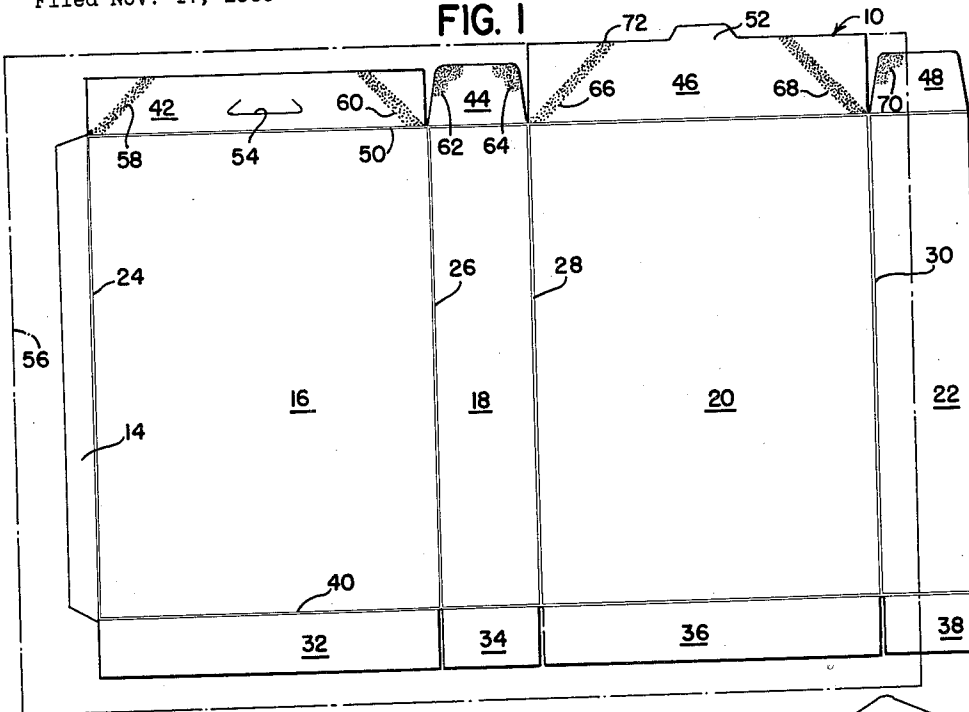


FIG. 2

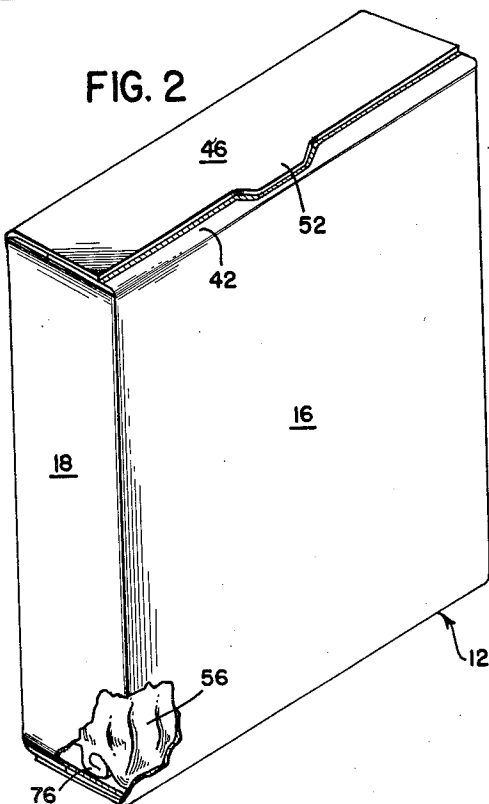
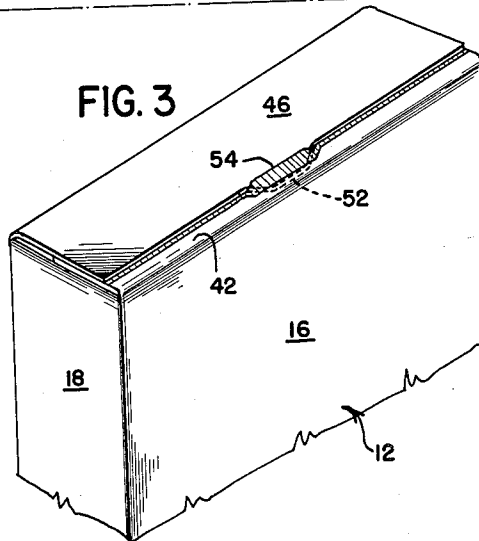


FIG. 3



INVENTOR.
WILLIAM A. BRASTAD
BY *Kenneth D. Ohm*

ATTORNEY

Jan. 1, 1963

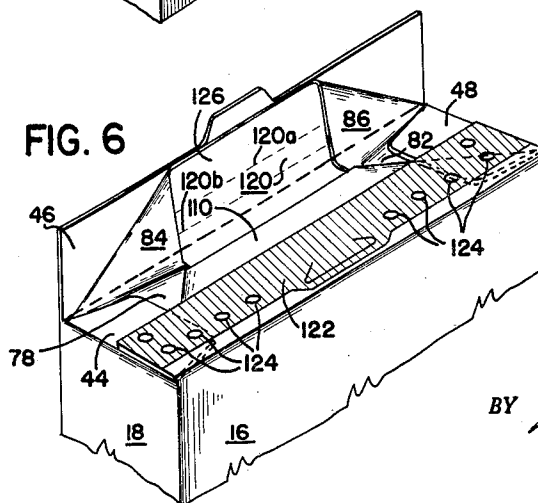
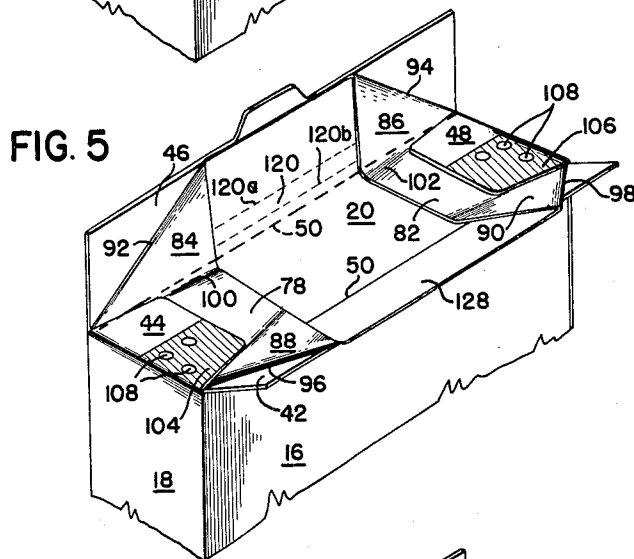
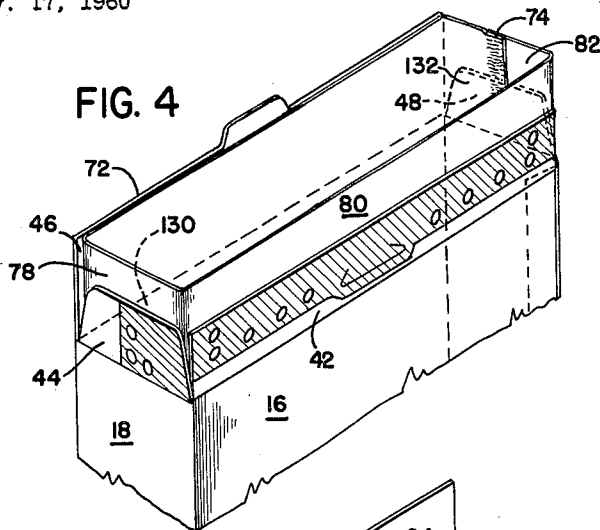
W. A. BRASTAD

3,071,304

COMBINATION LINER AND CARTON FLAP END CLOSURE

Filed Nov. 17, 1960

7 Sheets-Sheet 2



INVENTOR.
WILLIAM A. BRASTAD
BY *Kenneth D. Ohm*
ATTORNEY

Jan. 1, 1963

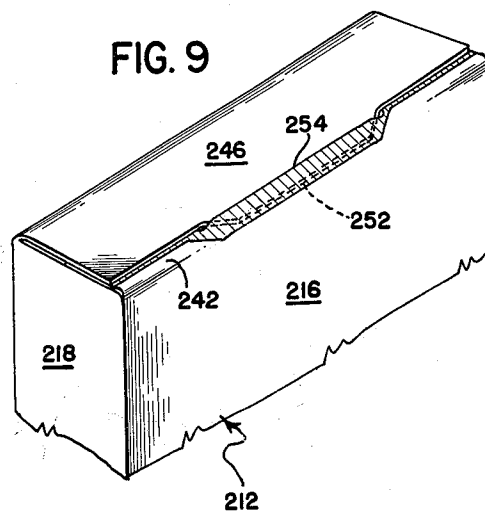
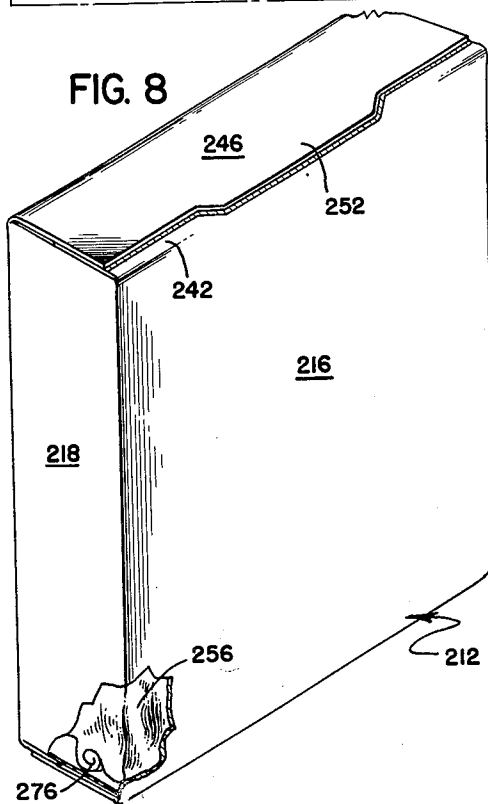
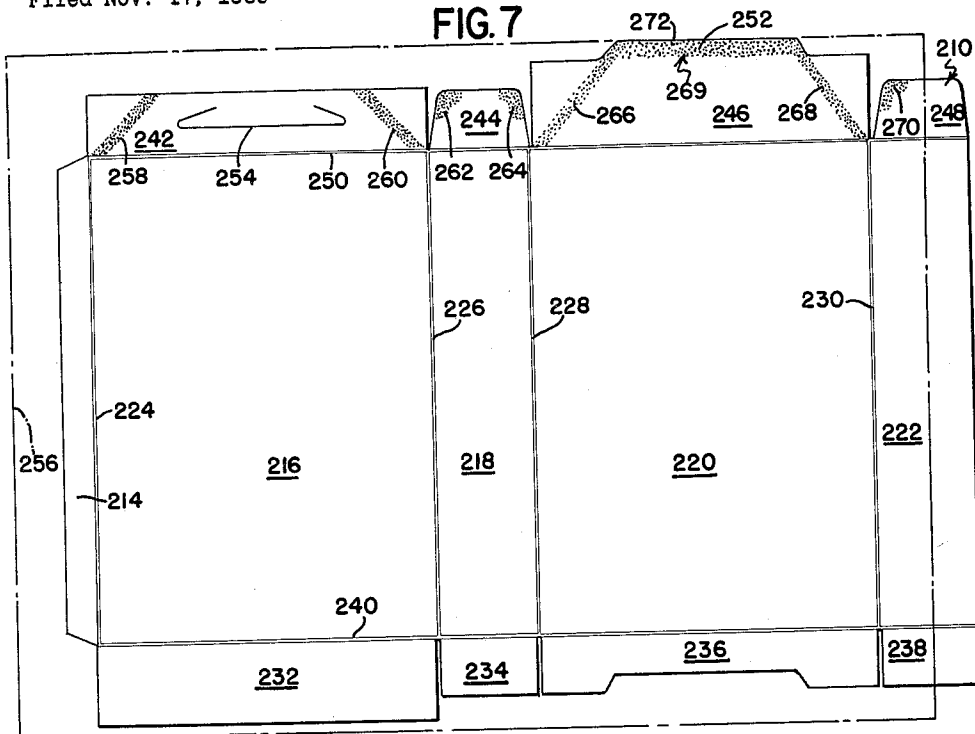
W. A. BRASTAD

3,071,304

COMBINATION LINER AND CARTON FLAP END CLOSURE

Filed Nov. 17, 1960

7 Sheets-Sheet 3



INVENTOR.
WILLIAM A. BRASTAD
BY *Kenneth D. Ohm*
ATTORNEY

Jan. 1, 1963

W. A. BRASTAD

3,071,304

COMBINATION LINER AND CARTON FLAP END CLOSURE

Filed Nov. 17, 1960

7 Sheets-Sheet 4

FIG. 10

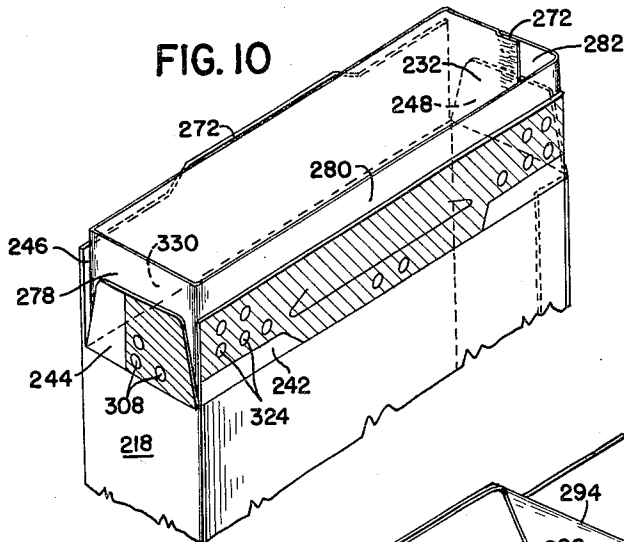


FIG. 11

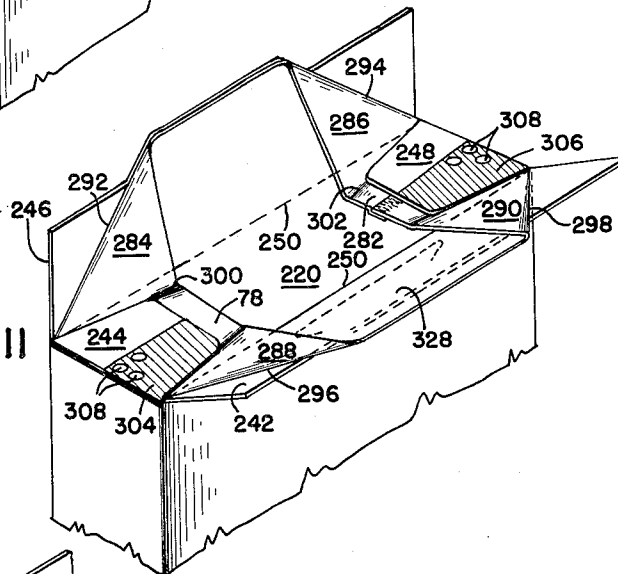
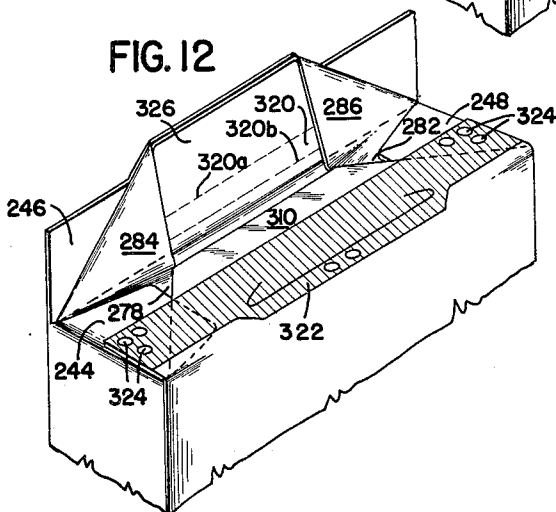


FIG. 12



INVENTOR.
WILLIAM A. BRASTAD
BY *Kenneth D. Ohm*
ATTORNEY

Jan. 1, 1963

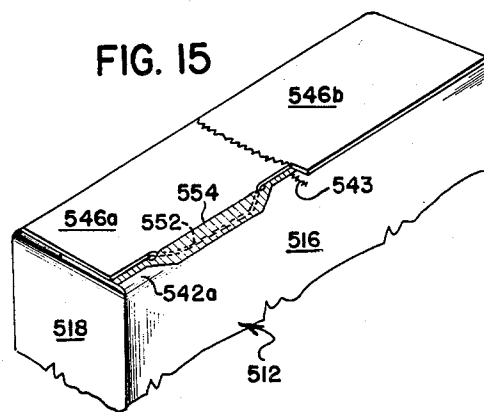
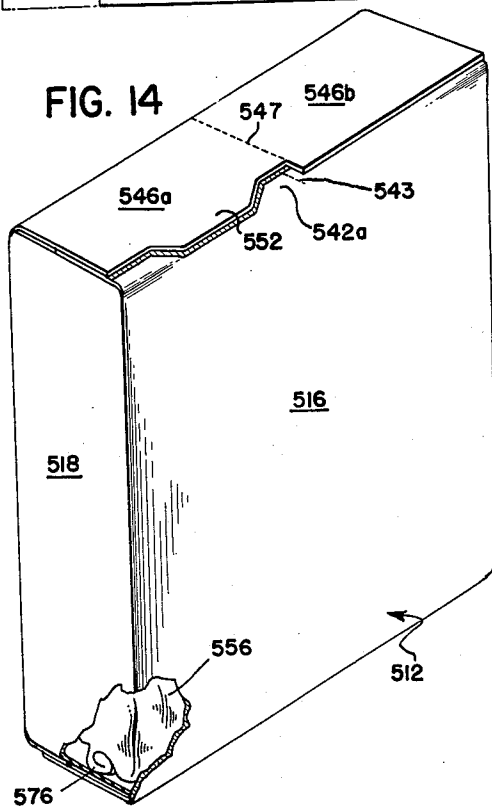
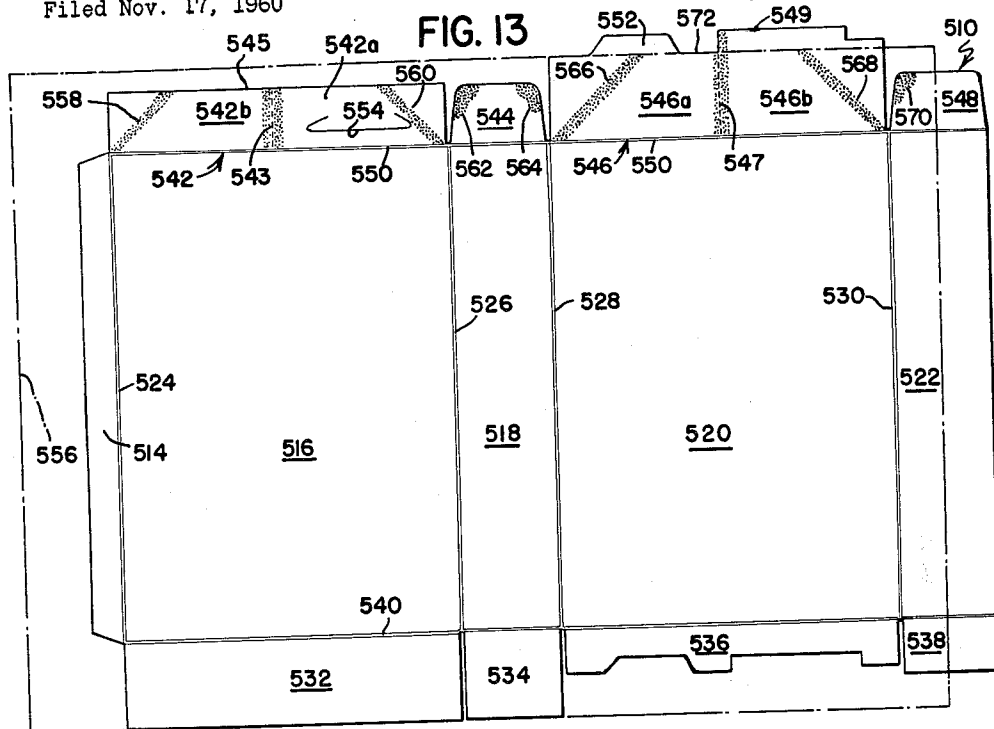
W. A. BRASTAD

3,071,304

COMBINATION LINER AND CARTON FLAP END CLOSURE

Filed Nov. 17, 1960

7 Sheets-Sheet 5



INVENTOR.
WILLIAM A. BRASTAD
BY *Kenneth D. Ohm*

ATTORNEY

Jan. 1, 1963

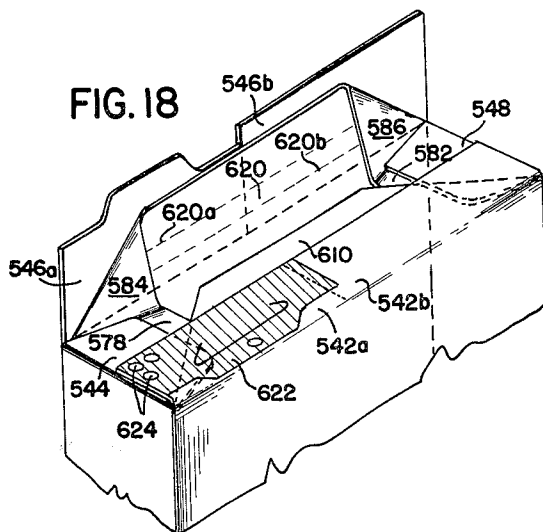
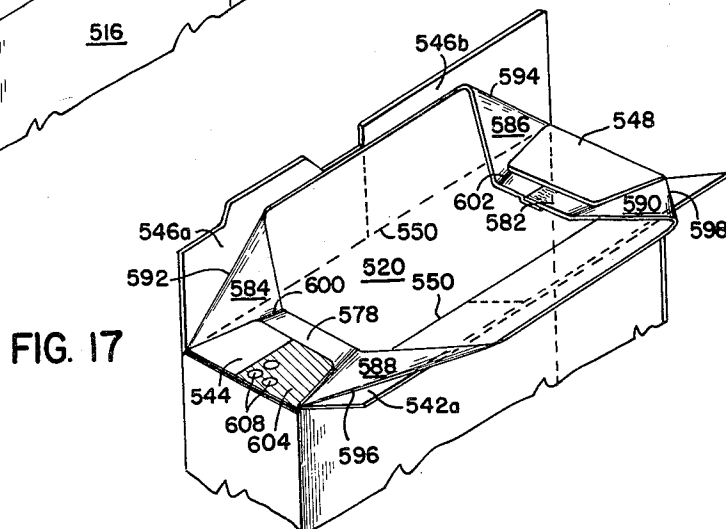
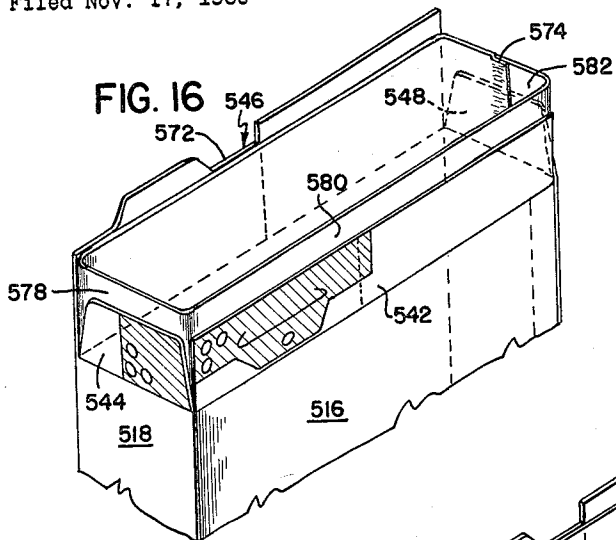
W. A. BRASTAD

3,071,304

COMBINATION LINER AND CARTON FLAP END CLOSURE

Filed Nov. 17, 1960

7 Sheets-Sheet 6



INVENTOR.
WILLIAM A. BRASTAD
BY *Kenneth D. Olson*

ATTORNEY

Jan. 1, 1963

W. A. BRASTAD

3,071,304

COMBINATION LINER AND CARTON FLAP END CLOSURE

Filed Nov. 17, 1960

7 Sheets-Sheet 7

FIG. 19

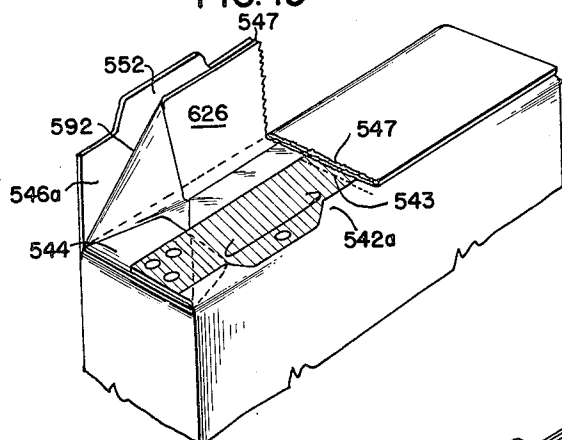


FIG. 20

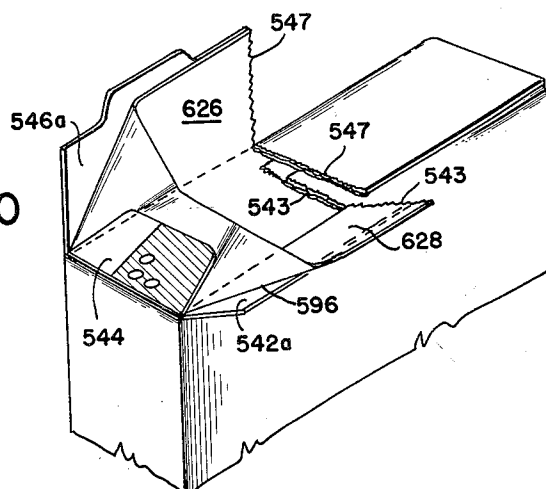
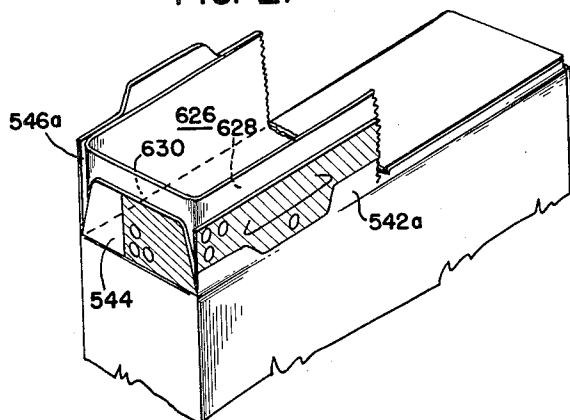


FIG. 21



INVENTOR.
WILLIAM A. BRASTAD
BY *Kenneth D. Olson*

ATTORNEY

1

3,071,304

COMBINATION LINER AND CARTON FLAP END CLOSURE

William A. Brastad, Minneapolis, Minn., assignor to
General Mills, Inc., a corporation of Delaware
Filed Nov. 17, 1959, Ser. No. 69,980
12 Claims. (Cl. 229-14)

The present invention relates to improvements in carton closures. More particularly, it pertains to a closure including a carton and a liner inserted therein where the end flaps of said carton and the liner are folded over the carton end during the same operation.

An object of the present invention is to provide a moisture impervious end closure comprised of carton end flaps and a liner wherein the liner is folded down by the flaps.

Another object of the present invention is to provide a moisture impervious end closure comprised of carton end flaps and a liner that may be heat and pressure sealed after the flaps and liner are folded across the end of the carton.

A further object of the present invention is to provide an end closure comprised of carton end flaps and a liner in which the liner opens simultaneously with the flaps.

A still further object of the present invention is to provide a moisture impervious end closure comprising carton end flaps and a liner in which said end flaps and liner are simultaneously folded down and in which just part of the end closure opens.

Another object of the present invention is to provide a moisture impervious end closure comprised of carton end flaps and a liner which when opened provides a smooth walled pouring spout.

Other objects and advantages of the invention will be apparent from the following description in which certain preferred embodiments of the invention are disclosed.

In the drawings which form a part of this application, FIGURE 1 is a plan view of a blank for forming one embodiment of the present invention;

FIGURE 2 is a perspective view of a carton formed from the blank of FIG. 1 in closed state;

FIGURE 3 is a perspective view of the carton of FIGURE 2 in a reclosed state;

FIGURE 4 is a perspective view of the end of the carton of FIGURE 2 in open state;

FIGURES 5 and 6 are perspective views of the end shown in FIGURE 4 in partially closed state;

FIGURE 7 is a plan view of a blank for forming another embodiment of the present invention;

FIGURE 8 is a perspective view of a carton formed from the blank of FIGURE 7 in closed state;

FIGURE 9 is a perspective view of the end of the carton of FIGURE 8 in a reclosed state;

FIGURE 10 is a perspective view of the end of the carton shown in FIGURE 8 in an open state;

FIGURES 11 and 12 are perspective views of the end of the carton shown in FIGURE 8 in a partially closed state;

FIGURE 13 is a plan view of a blank for forming another embodiment of the present invention;

FIGURE 14 is a perspective view of the carton formed from the blank of FIGURE 13 in closed state;

FIGURE 15 is a perspective view of the end of the carton of FIGURE 14 in a reclosed state;

FIGURE 16 is a perspective view of the end of the carton of FIGURE 14 in open state;

FIGURES 17 and 18 are perspective views of the end of the carton of FIGURE 14 in partially closed state;

FIGURES 19 and 20 are perspective views of the end of the carton of FIGURE 14 in partially opened states;

2

FIGURE 21 is a perspective view of the end of the carton of FIGURE 14 in open state.

With reference to FIGURE 1, the full lines represent a blank for forming one embodiment of a carton illustrating the present invention whereas the dash-dot lines indicate the liner for said carton. The blank 10 for forming the carton 12 (illustrated in FIG. 2) is paper board material such as chip board or white patent coated newsboard or other materials well known to the carton art.

The blank 10 is shown with the surface which later becomes the inside of the carton 12 being uppermost. The blank 10 comprises a glue panel 14, a front side panel 16, a first end side panel 18, a rear side panel 20, and a second end side panel 22. These side panels are hingedly connected at score lines 24, 26, 28, and 30 as shown in FIG. 1. Hingedly attached to the lower portions of the side panels 16, 18, 20, and 22 are bottom end flaps 32, 34, 36, and 38 respectively. Said bottom flap attachment is along a score line 40. Hingedly attached to the upper portions of the side panels 16, 18, 20, and 22 are top end flaps 42, 44, 46, and 48 respectively. The flaps 44 and 48 are sometimes hereinafter referred to as tabs. Said top flap attachment is along a score line 50.

The top end flap 46 has a tab 52 extending therefrom while the top end flap 42 has an inverted C type slit 54 therein. The tab 52 and the slit 54 are designed and positioned so that when the carton 12 (see FIG. 2) has been opened once and it is desired to reclose said carton, the tab 52 can be inserted into the slit 54 as shown in FIG. 3.

In the preferred embodiment of the carton 12 formed from the blank 10 a waxed paper liner 56 is adhesively bonded to the end flap 42 along darkened diagonal lines 58 and 60, to the end flap 44 in the darkened areas 62 and 64, to the end flap 46 along the darkened diagonal lines 66 and 68, and to the end flap 48 in the darkened area 70. The waxed paper liner 56 has its upper edge parallel to the upper edge 72 of the end flap 46. At least the surface of the liner 56 directly adjacent the blank 10 has a waxed layer thereon.

To secure the carton body in its tubular shape as is illustrated in FIG. 2, the glue panel 14 is adhesively bonded to the inner surface of the second side end panel 22, i.e., the surface of said panel 22 which can be seen in FIG. 1.

FIG. 4 is the top end of the carton of FIG. 2 before the top flaps are folded down. When the body of carton 12 is in its rectangular tubular shape as shown in FIG. 4, the upper edge of the liner 56 is parallel to or coincident with the upper edge 72 of the end flap 46 and said liner assumes the tubular shape of the carton 12. This structure provides a carton comprised of a tubular body with a tubular liner snugly inserted therein. The liner 56 has its vertical edges bonded together from the top to the bottom along a seam 74. The bottom edge of the liner 56 can also be bonded together and rolled as shown at 76 in FIG. 2.

It will be noted in FIGURE 4 that a selected portion 78 of the liner 56 projects above the upper edge of the tab 44, that a selected portion 80 of the liner 56 projects above the upper edge of the flap 42, and that a selected portion 82 of the liner 56 projects above the upper edge of the tab 48. It will also be noted that the tabs 44 and 48 are tapered with their upper edges narrower than their edges of hinged attachment to their respective side panels 18 and 22.

The sealing of the end closure of carton 10 is accomplished as follows. The end tabs 44 and 48 shown in FIG. 4 are folded down across the carton end as illustrated in FIG. 5. Portions of the liner 56 are folded

down with the tabs 44 and 48, for example, with the tabs 44 and 48 folded as shown in FIG. 5 the selected portions 78 and 82 of the liner 56 extend in their folded down state further across the carton end than their adjacent tabs 44 and 48. Also the liner 56 is caused to double fold in selected areas 84, 86, 88, and 90. The fold lines 92, 94, 96 and 98 of these areas 84, 86, 88, and 90 respectively form substantially an angle of 45 degrees with the hinge line 50 of the flaps 46 and 42. These diagonal fold lines 92, 94, 96 and 98 are directly adjacent to the adhesive areas which bound the previously mentioned glue lines 66, 68, 60 and 58 respectively of the end flaps 46 and 42. Because of the tapered nature of the tabs 44 and 48, fold lines 100 and 102 in the liner 56 extend or slant into the mouth or opening of the carton end rather than forming coincident with the side panel 29. Fold lines similar to 100 and 102 will form along the opposite edges of the tabs 44 and 48 which edges are close to the hinge line of flap 42.

Folding the flap 42 down to at least partially overlie the tabs 44 and 48 bring parts of the double fold areas 88 and 90 into direct overlying contact with the portions 78 and 82 of the liner which project beyond the upper edges of said tabs. Select areas 104 and 106 of the tabs 44 and 48 are provided with means to provide a limited readily releasable adhesive bond, for example by use of glue resistant material such as varnish. The areas 104 and 106 are provided with circular spots 108 which are free from adhesive resistant material. Thus when adhesive is applied to the spots 108 and the flap 42 is placed to overlie the tabs 44 and 48 a readily releasable adhesive bond will be formed between said tabs and said flap 42 in the areas of said spots 108.

When the flaps are as shown in FIG. 6 a selected portion 110 of the liner 56 projects beyond the upper edge of the flap 42. Folding down the flap 46 to at least partially overlie the flap 42 brings parts of double fold areas 84 and 86 into direct overlying contact with parts of portions 78 and 82 of the liner 56. The folding down of flap 46 also brings an area 120 (shown between dotted lines 120a and 120b) of the liner 56 which is close to the hinge line of the flap 46 into direct overlying contact with the portion 110 of the liner. A selected area 122 of the flap 42 is provided with glue resistant material such as varnish. The area 122 is provided with circular spots 124 which are free from adhesive resistant material. Thus, when adhesive is applied to the spots 124 and the flap 46 is placed to overlie the flap 42, a readily releasable adhesive bond will be formed between said flaps in the areas of said spots 124.

With the end flaps 42, 44, 46, and 48 and the liner portions adjacent thereto folded down by said end flaps as shown in FIGS. 5 and 6 to their closed positions as shown in FIG. 2 a continuous liner to liner end closure across the end of a carton is obtained. The overlying selected areas of said liner are sealed to the projecting portions of said liner by applying heat and pressure thereto. This is accomplished preferably by inserting a mandrel (not shown) in known manner inside the folded structure shown in FIG. 2 with the bottom end of said structure being open. The heat and pressure supplied by the mandrel and its associated equipment to said end closure seals the carton end by flattening the folds along lines like 100 and 102, by bonding the overlapping liner portions and areas together, and by setting the adhesive placed between the carton flaps. The bond of the liner to liner (e.g. wax seal) is more easily separated than the bond of the liner to flaps (e.g. glue). Because the folds along lines like 100 and 102 slant inward from the carton side panels, parts of the liner 56 therealong will not overhang the side edges of the mandrel and can be flattened by the mandrel. After the carton end is sealed then the merchandise or product is placed in the liner of the carton 12 from the bottom end thereof and the bottom end

of the liner and the carton are sealed individually in manners well known to the art.

The carton 12 of FIG. 2 is opened easily by grasping and lifting the tab 52 upwardly and away from the flap 42. This causes the flap 46 to be moved into the position shown in FIG. 6. Since the liner 56 is adhered to the flap 46 along lines 92 and 94, a region 126 of said liner will move simultaneously with said flap to the position shown in FIG. 6. The flap 42 is then lifted to the position shown in FIG. 4. Since the liner 56 is adhered to the flap 42 along lines 96 and 98, a region 128 (FIG. 5) of said liner will move simultaneously with said flap to the position shown in FIG. 4. The tabs 44 and 48 are then lifted to the positions shown in FIG. 4. Since the tab 44 is adhesively adhered to the liner 56 in areas 62 and 64 and since the tab 48 is adhesively adhered to said liner in area 70, selected regions 130 and 132 are lifted simultaneously with said tabs to the position shown in FIG. 4. In the open position shown in FIG. 4, the end flaps provide a pour spout through which the merchandise placed in the liner 56 of the carton 12 can be poured out of said carton.

Reclosure of the carton 12 shown in FIG. 4 is affected by moving tabs 44 and 48 back to the positions shown in FIG. 5, then moving flap 42 into the position shown in FIG. 6, and then folding flap 46 down upon flap 42 and tucking the tab 52 into the slit 54. This is shown in FIG. 3. Thus the operation of reclosing the flaps also recloses the liner and provides liner to liner contact for better preservation of the contents in the reclosed carton.

FIGURES 7 to 12 illustrate another embodiment of the present invention in which the opening tab member is reinforced. With reference to FIGURE 7, the full lines represent a blank for forming one embodiment of a carton illustrating the present invention whereas the dash-dot lines indicate the liner for said carton. The blank 210 for forming the carton 212 (illustrated in FIG. 8) is paper board material such as chipboard or white patent coated newsboard or other materials well known to the carton art.

The blank 210 is shown with the surface which later becomes the inside of the carton 212 being uppermost. The blank 210 comprises a glue panel 214, a front side panel 216, a first end side panel 218, a rear side panel 220, and a second end side panel 222. The side panels are hingedly connected at score lines 224, 226, 228, and 230 as shown in FIGURE 7. Hingedly attached to the lower portions of the side panels 216, 218, 220, and 222 are bottom end flaps 232, 234, 236, and 238 respectively. Said bottom end flap attachment is along a score line 240. Hingedly attached to the upper portions of the side panels 216, 218, 220, and 222 are top end flaps 242, 244, 246, and 248, respectively. The flaps 244 and 248 are sometimes hereinafter referred to as tabs. The attachment between the flaps 242, 244, 246 and 248 and the side panels 216, 218, 220, and 222 is along a score line 250.

The top end flap 246 has a tab 252 extending therefrom while the top end flap 242 has an inverted C type slit 254 therein. The tab 252 and the slit 254 are designed and positioned so that when the carton 212 (see FIGURE 8) has been opened once and it is desired to reclose said carton, the tab 252 can be inserted into the slit 254 as shown in FIGURE 9.

In the preferred embodiment of the carton formed from the blank 210 a waxed paper liner 256 is adhesively bonded to the end flap 242 along darkened diagonal lines 258 and 260, to the end flap 244 in the darkened areas 262 and 264, to the end flap 246 along the darkened diagonal lines 266 and 268 and in the darkened area 269, and to the end flap 248 in the darkened area 270. The waxed paper liner 256 has its upper edge parallel to the upper edge 272 of the tab 252. At least the surface of the liner 256 directly adjacent the blank 210 has a waxed layer thereon.

To secure the carton body in its tubular shape as illustrated in FIGURE 8, the glue panel 214 is adhesively

5

bonded to the inner surface of the second side end panel 222, i.e., the surface of the panel 222 which can be seen in FIGURE 7. FIGURE 10 is the top end of the carton of FIGURE 8 before the top flaps are folded down. When the body of carton 212 is in its rectangular tubular shape as shown in FIGURE 10, the upper edge of the liner 256 is parallel to or coincident with the upper edge 272 of the tab 252 and said liner assumes the tubular shape of the carton 212. This structure provides a carton comprised of a tubular body with a tubular liner snugly inserted therein. The liner 256 has its vertical edges bonded together from the top to the bottom along a seam 274. The bottom edge of the liner 256 can also be bonded together and rolled as shown at 276 in FIGURE 8.

It will be noted in FIGURE 10 that a selected portion 273 of the liner 256 projects above the upper edge of the tab 244, that a selected portion 280 of the liner 256 projects above the upper edge of the flap 242, and that a selected portion 282 of the liner 256 projects above the upper edge of the tab 248. It will also be noted that the tabs 244 and 248 are tapered with their upper edges narrower than their edges of hinged attachment to their respective side panels 218 and 222.

The sealing of the end closure of the carton 210 is accomplished as follows. The end tabs 244 and 248 shown in FIGURE 10 are folded down across the carton end as illustrated in FIGURE 11. Portions of the liner are folded down with the tabs 244 and 248. For example, with the tabs 244 and 248 folded down as shown in FIGURE 11 the selected portions 278 and 282 of the liner 256 extend in their folded down state further across the carton end than their adjacent tabs 244 and 248. Also the liner 256 is caused to double fold in selected areas 284, 286, 288, and 290. The fold lines 292, 294, 296, and 298 of these areas 284, 286, 288, and 290 respectively form substantially an angle of 45° with the hinge lines of attachment of the flaps 246 and 242. These diagonal fold lines 292, 294, 296, and 298 are directly adjacent to the adhesive areas which bound the previously mentioned glue lines 266, 268, 260 and 258, respectively, of the end flaps 246 and 242. Because of the tapered nature of the tabs 244 and 248, fold lines 300 and 302 in the liner 256 extend or slant into the mouth or opening of the carton end rather than forming coincident with the side panel 220. Fold lines similar to fold lines 300 and 302 will form along the opposite edges of the tabs 244 and 248 which edges are close to the hinge line of flap 242.

Folding the flap 242 down to at least partially overlie the tabs 244 and 248 bring parts of the double fold areas 288 and 290 in the direct overlying contact with the portions 278 and 282 of the liner which project beyond the upper edges of said tabs. Select areas 304 and 306 of the tabs 244 and 248 are provided with means to provide a limited readily releasable bond, for example by use of glue resistant material such as varnish. The areas 304 and 306 are provided with circular spots 308 which are free from adhesive resistant material. Thus when adhesive is applied to the spots 308 and the flap 242 is placed to overlie the tabs 244 and 248 a readily releasable adhesive bond will be formed between said tabs and said flap 242 in the areas of said spots 308.

When the flaps are as shown in FIG. 12 a selected portion 310 of the liner 256 projects beyond the upper edge of the flap 242. Folding down the flap 246 to at least partially overlie the flap 242 bring parts of double fold areas 284 and 286 into direct overlying contact with parts of portions 278 and 282 of the liner 256. The folding down of flap 246 also brings an area (as shown between dotted lines 320a and 320b) of the liner 256 which is close to the hinge line of the flap 246 into direct overlying contact with the portion 310 of the liner. A selected area 322 of the flap 242 is provided with glue resistant material such as varnish. The area 322 is provided with circular spots 324 which are free from adhesive resistant material. Thus, when adhesive is applied to the spots

6

324 and the flap 246 is placed to overlie the flap 242 readily releasable adhesive bond will be formed between said flaps in the areas of said spots 324.

With the end flaps 242, 244, 246, and 248 and the liner portions adjacent thereto folded down as shown in FIGS. 11 and 12 to their closed positions as shown in FIG. 8 a continuous liner to liner end closure across the end of the carton 210 is obtained. The overlying selected areas of said liner are sealed to the projecting portions of said liner by applying heat and pressure thereto. This is accomplished preferably by inserting a mandrel (not shown) in known manner inside the folded structure shown in FIGURE 8 with the bottom end of said structure being open. The heat and pressure supplied by the mandrel and its associated equipment to said end closure seals the carton end by flattening the folds along lines like 300 and 302, by bonding the overlapping liner portions and areas together, and by setting the adhesive placed between the carton end flaps. The bond of the liner to liner (e.g. wax seal) is more easily separated than the bond of the liner to the flaps (e.g. glue). The bonding of the liner 256 to the tab 252 in the area 269 provides reinforcement for the tab and makes it more resistant to inadvertent tearing when a force is exerted thereon. Because the folds along lines like 300 and 302 slant inward from the carton side panels like 220, parts of the liner therealong will not overhang the side edges of the mandrel and said lines can be flattened by the mandrel. After the carton end is sealed then the merchandise is placed in the liner of the carton 212 from the bottom end thereof and the bottom end of the liner and the carton are sealed individually in manners well known to the art.

The carton 212 of FIGURE 8 is opened easily by grasping and lifting the tab 252 upwardly and away from the flap 242. This causes the flap 246 to be moved into the position shown in FIGURE 12. Since the liner 256 is adhered to the flap 246 along lines 292 and 294, a region 326 of the liner will move simultaneously with said flap to the position shown in FIG. 12. The flap 242 is then lifted to the position shown in FIGURE 10. Since the liner 256 is adhered to the flap 242 along lines 296 and 298, a region 328 (see FIG. 11) of the liner will move simultaneously with said flap to the position shown in FIG. 10. The tabs 244 and 248 are then lifted to the positions shown in FIGURE 10. Since the tab 244 is adhered to the liner 256 in the areas 262 and 264, and since the tab 248 is adhered to said liner in area 270, selected regions 330 and 332 of the liner are lifted simultaneously with said tabs to the positions shown in FIG. 10. In the open position shown in FIG. 10, the flaps provide a pour spout through which the merchandise placed in the liner 256 of the carton 212 can be poured out of said carton.

Reclosure of the carton 212 shown in FIGURE 10 is effected by moving tabs 244 and 248 back to the position shown in FIGURE 11, then moving the flap 242 into the position shown in FIGURE 11, and then folding the flap 246 down upon the flap 242 and tucking the tab 252 into the slit 254. This is shown in FIGURE 9. Thus the operation of reclosing the flaps also recloses the liner and provides liner to liner contact for better preservation of the contents in the reclosed carton.

FIGURES 13 to 21 illustrate a unique liner and carton structure which permits opening part of the carton end and the liner inserted therein simultaneously. With this structure approximately half of the carton end is opened. This smaller opening limits accidental spilling of the contents of said carton. In addition with this structure the original protective seal of the carton and the liner inserted therein is broken only on half of the carton end. This makes more areas of the carton end flaps available for secure adhesive closing during machine operation because one half of the end closure need not be opened. Since half of the carton end is not opened the carton shown in FIGS. 13-21 is more capable of re-

taining its rectangular shape even when the carton is opened to permit access to the merchandise contained therein.

With reference to FIGURE 13, the full lines represent a blank for forming one embodiment of a carton illustrating the half open top feature of the present invention whereas the dash-dot lines indicate the liner for said carton. The blank 510 for forming the carton 512 (illustrated in FIG. 14) is paper board material such as chipboard or white patent coated newsboard or other materials well known to the carton art.

The blank 510 is shown with the surface which later becomes the inside of the carton 512 uppermost. The blank 510 comprises a glue panel 514, a front side panel 516, a first end side panel 518, a rear side panel 520, and a second side panel 522. These side panels are hingedly connected at score lines 524, 526, 528, and 530 as shown in FIGURE 13. Hingedly attached to the lower portions of the side panels 516, 518, 520, and 522 are bottom end flaps 532, 534, 536, and 538 respectively. The attachment of said side panels and said end flaps is along a score line 540.

Hingedly attached to the upper portions of the side panels 516, 518, 520, and 522 are top end flaps 542, 544, 546, and 548, respectively. The end flaps 544 and 548 are sometimes hereinafter referred to as tabs. The attachment of said end flaps and said side panels is along a score line 550.

The top end flap 546 has a weakened perforated tear line 547 therein which extends transversely across from the upper edge 572 of said flap toward the hinge line 550 of said flap. The transverse line 547 divides the flap 546 into an opening portion 546a and a normally unopened portion 546b. The opening portion 546a has a tab 552 extending therefrom.

The top end flap 542 has a weakened perforated tear line 543 therein which extends transversely thereacross from the upper edge 545 of the flap 542 toward the hinge line 550 of said flap. The transverse line 543 divides the flap 542 into an opening portion 542a and a normally unopened portion 542b. The opening portion 542a has an inverted C type slit 554 therein. The tab 552 and the slit 554 are designed and positioned so that when the carton 512 (see FIG. 14) has been once opened as illustrated in FIGURE 21 and it is desired to reclose said carton, the tab 552 can be inserted into the slit 554 as shown in FIGURE 15.

In the preferred embodiment of the carton formed from the blank 510, a waxed paper liner 556 is adhesively bonded to the end flap 542 along darkened diagonal lines 558 and 560 and along both sides of weakened line 543, to the end flap 544 in the darkened areas 562 and 564, to the end flap 546 along the darkened diagonal lines 566 and 568 and along both sides of weakened line 547, and to the end flap 548 in the darkened area 570. The waxed paper liner 556 has its upper edge parallel to or coincident with the upper edge 572 of the opening portion 546a of the end flap 546. At least the surface of the liner 556 directly adjacent the blank 510 has a waxed layer thereon.

To secure the carton body in its rectangular tubular shape as is illustrated in FIGURE 14, the glue panel 514 is adhesively bonded to the inner surface of the second side end panel 522, i.e., the surface of said panel 522 which can be seen in FIGURE 13. FIGURE 16 is the top end of the carton of FIGURE 14 before the top flaps are folded down. When the body of carton 512 is in its rectangular tubular shape as shown in FIGURE 16, the upper edge of the liner 556 is parallel to the upper edge 572 of the opening portion 546a of the end flap 546 and the liner assumes the rectangular tubular shape of the carton 512. This structure provides a carton comprised of a tubular body with a tubular liner snugly inserted therein. The liner 556 has its vertical edges bonded together from the top to the bottom along a seam 574. The bottom edge of the liner 556

can also be bonded together and rolled as shown as 576 in FIGURE 14.

It will be noted in FIGURE 16 that a selected portion 578 of the liner 556 projects above the upper edge of the tab 544, that a selected portion 580 of the liner 556 projects above the upper edge of the flap 542, and that a selected portion 582 of the liner 556 projects above the upper edge of the tab 548. It will also be noted that the tabs 544 and 548 are tapered with their upper edges narrower than their edges of hinged attachment to their respective side panels 518 and 522.

The sealing of the end closure of carton 512 is accomplished as follows. The end tabs 544 and 548 shown in FIGURE 16 are folded down across the carton end as illustrated in FIGURE 17. Portions of the liner 556 are folded down with the tabs 544 and 548. For example, with the tabs 544 and 548 folded as shown in FIGURE 17 the selected portions 578 and 582 of the liner 556 extend in their folded down state further across the carton end than their adjacent tabs 544 and 548. Also the liner 556 is caused to double fold in selected areas 584, 586, 588, and 590. The fold lines 592, 594, 596, and 598 of these areas 584, 586, 588 and 590, respectively, form substantially an angle of 45° with the hinge line 550 of the flaps 546 and 542. These diagonal fold lines 592, 594, 596, and 598 are directly adjacent to the adhesive areas which bound the previously mentioned glue lines 566, 568, 560, and 558 respectively, of the end flaps 546 and 542. Because of the tapered nature of the tab 544 and 548, the fold lines 600 and 602 in the liner 556 extend or slant into the mouth or opening of the carton end rather than forming coincident with the side panel 520. Fold lines similar to fold lines 600 and 602 will form along the opposite edges of the tabs 544 and 548, which edges are close to the hinge line of flap 542.

Folding the flap 542 down to at least partially overlie the tabs 544 and 548 bring parts of the double fold areas 588 and 590 into direct overlying contact with the portions 578 and 582 of the liner which project beyond the upper edges of said tabs. A select area 604 of the tab 544 is provided with means to provide a limited readily releasable adhesive bond, for example by use of glue resistant material such as varnish. The area 604 is provided with circular spots 608 which are free from adhesive resistant material. Thus, when adhesive is applied to the tabs 544 and 548, and the flap 542 is placed to overlie said tabs, the spots 608 will provide readily releasable adhesion between the tab 544 and the opening portion 542a of the flap 542.

When the flaps are as shown in FIGURE 18 a selected portion 610 of the liner 556 projects beyond the upper edge of the flap 542. Folding down the flap 546 to at least partially overlie the flap 542 brings parts of double fold areas 584 and 586 into direct overlying contact with parts of the portions 578 and 582 of the liner 556. The folding down of flap 546 also brings an area 620 (shown between dotted line 620a and 620b) of the liner 556 which is close to the hinge line of the flap 546 into direct overlying contact with the portion 610 of the liner. A selected area 622 of the opening portion 542a of the flap 542 is provided with glue resistant material such as varnish. The area 622 is provided with circular spots 624 which are free from adhesive resistant material. Thus, when adhesive is applied to the spots 624 and the flap 546 is placed to overlie the flap 542, readily releasable adhesive bond will be formed between the opening portion 542a of the flap 542 and the opening portion 546a of the flap 546 in the areas of said spots 624.

With the end flaps 542, 544, 546, and 548 and the liner portions adjacent thereto folded down as shown in FIGURES 17 and 18 to their closed positions as shown in FIGURE 14 a continuous liner to liner end closure across the end of a carton is obtained. The overlying

selected areas of the liner are sealed to the projecting portions of said liner by applying heat and pressure thereto. This is accomplished preferably by inserting a mandrel (not shown) in known manner inside the folded structure shown in FIGURE 14, while the bottom end of said structure is open. The heat and pressure supplied by the mandrel and its associated equipment to the top end closure seals the carton end by flattening the folds along lines like 600 and 602, by bonding the overlapping liner portions and areas together, and by setting the adhesive placed between the carton flaps. The bond of the liner to liner (e.g. wax seal) is more easily separated than the bond of the liner to the flaps (e.g. glue). Because the folds along lines 600 and 602 slant inward from the carton side panels like 520, parts of the liner 556 therealong will not overhang the side edges of the mandrel and can be flattened by the mandrel. After the carton end is thus sealed then the merchandise is placed in the liner of the carton 512 from the bottom end thereof and the bottom end of the liner and the carton are sealed individually in manners well known to the art.

The carton 512 of FIGURE 14 is opened easily by grasping and lifting the tab 552 upwardly and away from the flap 542. This causes the flap 546 and the liner 556 to tear simultaneously along the weakened perforated tear line 547 since the liner 556 is adhered to the opening portion 546a along lines 566 and 547, a region 626 of said liner 556 will move simultaneously with said opening portion 546a to the position shown in FIG. 19. The opening portion 542a of the flap 542 is then lifted and moved to the position shown in FIGURE 21. This causes the flap 542 and the liner 556 to tear simultaneously along the weakened perforated tear line 543. Because the liner 556 is adhesively attached to the opening portion 542a along lines 560 and 543, a selected region 628 of said liner is lifted simultaneously with said opening portion 542a to the position shown in FIG. 20. The tab 544 is then lifted to the position shown in FIGURE 21. Because the tab 544 is adhesively attached to the liner 556 in areas 562 and 564, a selected region 630 of said liner is lifted to the position shown in FIG. 21 simultaneously with the tab 544. In the open position shown in FIGURE 21, the opening portions 542a and 546a and the tab 544 along with the selected regions 626, 628, and 630 provide a pour spout through which the merchandise placed in the liner 556 of the carton 512 can be poured out of said carton.

The fact that the liner 556 is adhered to the flaps 542 and 546 along weakened tear lines 543 and 547 respectively facilitates the tearing of said liner when the opening portions 546a and 542a are moved into their positions shown in FIGURE 21. FIGURE 20 shows that the tear line 543 of flap 542 is positioned closer to the side panel 518 than is the tear line 547 of the flap 546 when the carton 512 is in its assembled condition. Such an orientation of the weakened tear lines 543 and 547 provides an arrangement whereby the line 543 can be torn after the opening portion 546a of the flap 546 has been separated from the opening portion 542a of the flap 542. This arrangement also prevents a crack entering directly into the package.

Reclosure of the carton 512 shown in FIG. 21 is affected by moving the tab 544 back to the position shown in FIGURE 19, then moving the flap 542a into the position shown in FIGURE 19, and then folding flap 546a down upon flap 542a and tucking the tab 552 into the slit 554. This is shown in FIGURE 15. Thus the operation of reclosing the flaps also recloses the liner and provides liner to liner contact for better preservation of the contents in the reclosed carton.

In view of the principles set forth herein, I have shown some of the ways of carrying out the present invention and some of the equivalents which are suggested by these disclosures.

What is claimed is:

1. A carton comprising a body formed of side panels and a liner inserted therein, said carton at least at one end having end flaps hingedly connected with respective side panels for closing the end of said carton, said end flaps including a first tab hinged to a first panel of the carton, first and second flaps hinged at first and second hinge lines respectively to second and third panels at opposite sides of said first panel, a second tab hinged to a fourth panel connected between said second and third panels, said liner being long enough so selected portions thereof project beyond the upper edges of at least said first and second tabs and said first flap, said first and second tabs being folded down to extend across said carton end and to double fold the liner in selected areas, the fold line of one of said double fold areas extending diagonally along said second flap from substantially one end of the hinge line of said second flap, the fold line of one other of said double fold areas extending diagonally along said first flap from substantially one end of the hinge line of the first flap, said liner being attached to said first and second flaps to permit said liner to form said diagonal fold lines, said first flap being folded down to at least partially overlie said tabs and to bring said other double fold area into direct contact with the portion of the liner which projects beyond the upper edges of one of said tabs, said second flap being folded down to at least partially overlie said first flap and to bring said one double fold area into direct contact with said other double fold area and to bring the inner surface of at least a part of the area of said liner which is close to and projects above the hinge line of said second flap into direct contact with the outer surface of the portion of the liner which projects beyond the upper edge of said first flap, and means providing limited readily releasable adhesive attachment between said tabs and said first flap and said first and second flaps for ready separation thereof, while at the same time bonding said flaps against premature accidental separation.
2. A carton comprising a tubular body formed of side panels and a tubular liner inserted therein, said carton at least at one end having end flaps hingedly connected with respective side panels for closing the end of said carton, said end flaps including a first tab hinged to a first panel of the carton, first and second flaps hinged at first and second hinge lines respectively to second and third panels at opposite sides of said first panel, a second tab hinged to a fourth panel connected between said second and third panels, said liner being long enough so selected portions thereof project beyond the upper edges of at least said first and second tabs and said first flap, said liner being attached to said second flap, said first and second tabs being folded down to extend across said carton end and to double fold the liner in selected areas, the fold line of one of said double fold areas extending diagonally along said second flap from substantially one end of the hinge line of said second flap, the fold line of one other of said double fold areas extending diagonally along said first flap from substantially one end of the hinge line of the first flap, said first flap being folded down to at least partially overlie said tabs and to bring at least one of said double fold areas into direct contact with the portions of the liner which project beyond the upper edges of said tabs, said second flap being folded down to at least partially overlie said first flap and to bring the inner surface of at least a part of the area of said liner which is close to and projects above the hinge line of said second flap into direct contact with the outer surface of the portion of the liner which projects beyond the upper edge of said first flap, said liner being releasably sealed together in said overlying direct contact areas and portions, and means providing limited readily releasable adhesive attachment between said tabs and said first flap and said first and second flaps for ready separation

thereof, while at the same time bonding said flaps against premature accidental separation.

3. A carton comprising a tubular body formed of side panels and a tubular liner inserted therein, said carton at least at one end having end flaps hingedly connected with respective side panels for closing the end of said carton, said end flaps including a first tab hinged to a first panel of the carton, first and second flaps hinged at first and second hinge lines respectively to second and third panels at opposite sides of said first panel, a second tab hinged to a fourth panel connected between said second and third panels, said liner being long enough so selected portions thereof project beyond the upper edges of at least said first and second tabs and said first flap, said liner being adhesively attached to said second flap along at least a first line extending diagonally from one end of said second flap hinge line, said diagonal line forming substantially a 45° angle with said second flap hinge line, said first and second tabs being folded down to extend across said carton end, a first selected outer surface portion of the liner which projects beyond the upper edge of said first tab extending in its folded down state further across said carton end than said first inner tab, a second selected outer surface portion of the liner which projects beyond the upper edge of said second tab extending in its folded down state further across said carton end than said second tab, said first flap being folded down to extend across said carton end and to at least partially overlie said tabs, a third selected outer surface portion of the liner which projects beyond the upper edge of said first flap extending in its folded down state somewhere between further across said carton end than said first flap and said second hinge line, selected outer surface areas of the liner adjacent said first flap directly overlying said first and second selected outer surface portions of said liner when said first flap is in said folded down state, said second flap being folded down to extend across said carton end and to at least partially overlie said first flap, a selected inner surface area of the liner close to said second flap hinge line directly overlying said third selected outer surface portion of the liner which projects beyond the upper edge of said first flap, said liner being releasably sealed together where said selected areas overlie said selected portions, and means providing limited readily releasable adhesive attachment between said tabs and said first flap and said first and second flaps for ready separation of said tabs and flaps, while at the same time bonding said flaps against premature accidental separation.

4. A carton comprising a tubular body formed of side panels and a tubular liner inserted therein, said carton at least at one end having end flaps hingedly connected with respective side panels for closing the end of said carton, said end flaps including a first tab hinged to a first panel of the carton, first and second flaps hinged at first and second hinge lines respectively to second and third panels at opposite sides of said first panel, a second tab hinged to a fourth panel connected between said second and third panels, said liner being long enough so selected portions thereof project beyond the upper edges of at least said first and second tabs and said first flap, said liner being adhesively attached to said second flap along first and second lines extending diagonally from substantially the opposite ends of the hinge line of said second flap, said first and second lines forming substantially 45° angles with said second flap hinge line, said liner being adhesively attached to said first flap along third and fourth lines extending diagonally from substantially the opposite ends of the hinge line of said first flap, said third and fourth lines forming substantially 45° angles with said first flap hinge line, said first and second tabs being folded down across said end, first selected outer surface portions of the liner which project beyond the upper edges of said tabs projecting further across said end than said tabs project, said first flap being folded down across said end and at least

partially overlying said tabs, selected outer surface areas of the liner adjacent said first flap directly overlying said first selected portions of the liner, a second selected outer surface portion of the liner which projects beyond the upper edge of said first flap projecting somewhere between further across said end than the first flap and said second hinge line, said second flap being folded down across said end and at least partially overlying said first flap, a selected inner surface area of the liner adjacent said second flap directly overlying said second selected outer surface portion of the liner, said liner being releasably sealed together where said selected areas overlie said selected portions, and means providing limited readily releasable adhesive attachment between said tabs and said first flap and said first and second flaps for ready separation of said flaps, while bonding said flaps against premature accidental separation.

5. A carton as set forth in claim 4 in which said tabs are slightly narrower in width at their upper edges than the width of the side panels to which said tabs are hingedly attached.

6. A carton as set forth in claim 4 in which said first and second tabs are tapered to be slightly narrower at their upper edges than at their edges of attachment to their respective side panels.

7. A carton comprising a body formed of side panels and a liner inserted therein, said carton at least at one end having end flaps hingedly connected with respective side panels for closing the end of said carton, said end flaps including a first tab hinged to a first panel of the carton, first and second flaps hinged at first and second hinge lines respectively to second and third panels at opposite sides of said first panel, a second tab hinged to a fourth panel connected between said second and third panels, said first flap having a weakened tear line therein which extends transversely thereacross from the upper edge of said first flap toward the hinge line of said flap, said transverse line dividing said first flap into an opening portion and a normally unopened portion, said second flap having a weakened tear line therein which extends transversely thereacross from the upper edge of said second flap toward the hinge line of said flap, said transverse line dividing said second flap into an opening portion and a normally unopened portion, said liner being long enough so selected portions thereof project beyond the upper edges of at least said first and second tabs and said first flap, said liner being adhesively attached to said second flap along both sides of said second flap transverse line, said liner also being adhesively attached to said first flap along both sides of said first flap transverse line, said first and second tabs being folded down and across said end, a first selected outer surface portion of the liner which projects beyond the upper edge of said first tab projecting in its folded down state further across said carton end than said first tab, a second selected outer surface portion of the liner which projects beyond the upper edge of said second tab extending in its folded down state further across said carton end than said second tab, said first flap being folded down to extend across said carton end and to at least partially overlie said tabs, a third selected outer surface portion of the liner which projects beyond the upper edge of the first flap extending in its folded down state somewhere between further across said carton end than said first flap and said second hinge line, selected outer surface areas of the liner adjacent said first flap directly overlying said first and second selected outer surface portions of the liner when said first flap is in said folded down state, said second flap being folded down to extend across said carton end and to at least partially overlie said first flap with the opening portion of said second flap overlying the opening portion of said first flap so the weakened tear line of said first flap can be torn after the opening portion of said second flap has been separated from the opening portion of said first flap, a selected inner surface area of the liner adjacent said second flap directly overlying said third

selected outer surface portion of the liner, said liner being releasably sealed together where said selected liner areas overlie said selected liner portions, means providing adhesive attachment between said overlying flaps, said last mentioned means including limited readily releasable adhesive attachment between said overlying opening portions of said flaps for ready separation of said opening portions, while bonding said opening portions against premature accidental separation.

8. A carton as set forth in claim 7 in which the liner is short of extending up to the upper edge of the unopened portion of the second flap, thereby providing an area between the upper edge of the liner and the upper edge of said normally unopened portion of said second flap which is free from having any liner portions directly adjacent thereto, said free area being adhesively bonded to an area of the normally unopened portion of the first flap.

9. A carton as set forth in claim 8 in which the liner is adhesively attached to said second flap to permit said liner to fold along a first line extending diagonally from substantially the free end of the hinge line of the opening portion of the second flap, and said liner is adhesively attached to said first flap to permit said liner to fold along a line extending diagonally from substantially the free end of the hinge line of the opening portion of the first flap.

10. A carton comprising a rectangular tubular body formed of side panels and a tubular liner inserted therein, said carton at least at one end having flaps hingedly connected with respective side panels for closing the end of said carton, said end flaps including first and second tabs hinged to opposite panels of said carton and first and second outer flaps hinged to the other opposite panels of said carton, said first flap having a weakened tear line therein which extends transversely thereacross from the upper edge of the first flap towards the hinge line of said flap, said transverse line dividing said first flap into an opening portion and a normally unopened portion, said second flap having a weakened tear line therein which extends transversely thereacross from the upper edge of said second flap towards the hinge line of said flap, said transverse line dividing said second flap into an opening portion and a normally unopened portion, said liner being long enough so selected portions thereof project beyond the upper edges of the tabs and the first flap, said liner being adhesively attached to said second flap along a first line extending diagonally from substantially the free end of the hinge line of the opening portion of the second flap and along both sides of said second flap transverse line, said diagonal line forming substantially a 45° angle with said second flap hinge line, said liner also being adhesively attached to said first flap along both sides of said first transverse line, said first and second tabs being folded down across said end, a first selected outer surface portion of the liner which projects beyond the upper edge of said first tab extending in its folded down state further across said carton end than said first tab, a second selected outer surface portion of the liner which projects beyond the upper edge of said second tab extending in its folded down state further across said carton end than said second tab, said first flap being folded down to extend across said carton end and to at least partially overlie the tabs, a third selected outer surface portion of the liner which projects beyond the upper edge of the first flap extending in its folded down state somewhere between further across said carton end than said first flap and the hinge line of said second flap, selected outer surface areas of the liner adjacent said first flap directly overlying said first and second selected outer surface portions of said liner when said first flap is in said folded down state, said second flap being folded down to extend across said carton end and to at least partially overlie said first flap with the opening portion of the second flap overlying the opening portion

of the first flap so that the weakened tear line of said first flap can be torn after the opening portion of the second flap has been separated from the opening portion of the first flap, said liner being short of extending up to the upper edge of said unopened portion of said second flap, thereby providing an area between the upper edge of the liner and the upper edge of said normally unopened portion of said second flap which is free from having any liner portions directly adjacent thereto, said free area being adhesively bonded to an area of the normally unopened portion of the first flap, a selected inner surface area of the liner adjacent the second flap directly overlying said third selected outer surface portion of the liner, said liner being releasably sealed together where said selected liner areas overlie said selected liner portions, and means providing limited readily releasable adhesive attachment between said overlying opening portions of said flaps for ready separation of said opening portions, while bonding said opening portions against premature accidental separation.

11. A carton as set forth in claim 10 in which the tabs are tapered to be slightly narrower at their free edges than at their edges of attachment to their respective side panels.

12. A carton comprising a tubular body formed of side panels and a liner inserted therein, said carton having end flaps for closing the end of said carton, said end flaps including first and second flaps hinged at first and second hinge lines respectively to first and second panels located at opposite sides of said body, said liner being long enough so a first selected portion thereof projects beyond the upper edge of one of the side panels which connects said first and second panels, said liner also being long enough so a second selected portion thereof projects beyond the upper edge of said first flap, one of said selected projecting portions being folded down to extend across the carton end and to double fold the liner in at least one selected area, the fold line of said one double fold area extending diagonally from substantially one end of the hinge line of said first flap, another double fold area in the liner with the fold line of this other double fold area extending diagonally from substantially one end of the hinge line of said second flap, said liner being attached to at least one of said flaps to permit said liner to form said diagonal lines and to cause said liner to be raised when said flap is raised, said first flap being folded down to at least partially overlie the carton opening so that at least a portion of one of said double fold areas is brought into direct contact with the outer surface of one of said selected projecting portions of the liner, said second flap being folded down to at least partially overlie said first flap and to bring said other double fold area into direct contact with a portion of the outer surface area of at least one of said one double fold area and of said first selected projecting portion of the liner, said folding down of said second flap to also bring the inner surface of at least a part of the area of said liner which is close to and projects above the hinge line of said second flap into direct contact with the outer surface of the portion of the liner which projects beyond the upper edge of said first flap, and means providing a limited readily releasable adhesive attachment between said first and second flaps for ready separation thereof, while at the same time bonding said flaps against premature accidental separation.

References Cited in the file of this patent

UNITED STATES PATENTS

2,151,202	Guyer	Mar. 21, 1939
2,351,812	Guyer	June 20, 1944
2,363,425	Klein	Nov. 21, 1944
2,979,247	Pellaton et al.	Apr. 11, 1961