Oct. 29, 1963 A. K. SCHLEICHER ETAL 3,108,414

MULTI-CONTAINER PACKAGING APPARATUS AND METHOD

Filed March 23, 1961 4 Sheets-Sheet 1

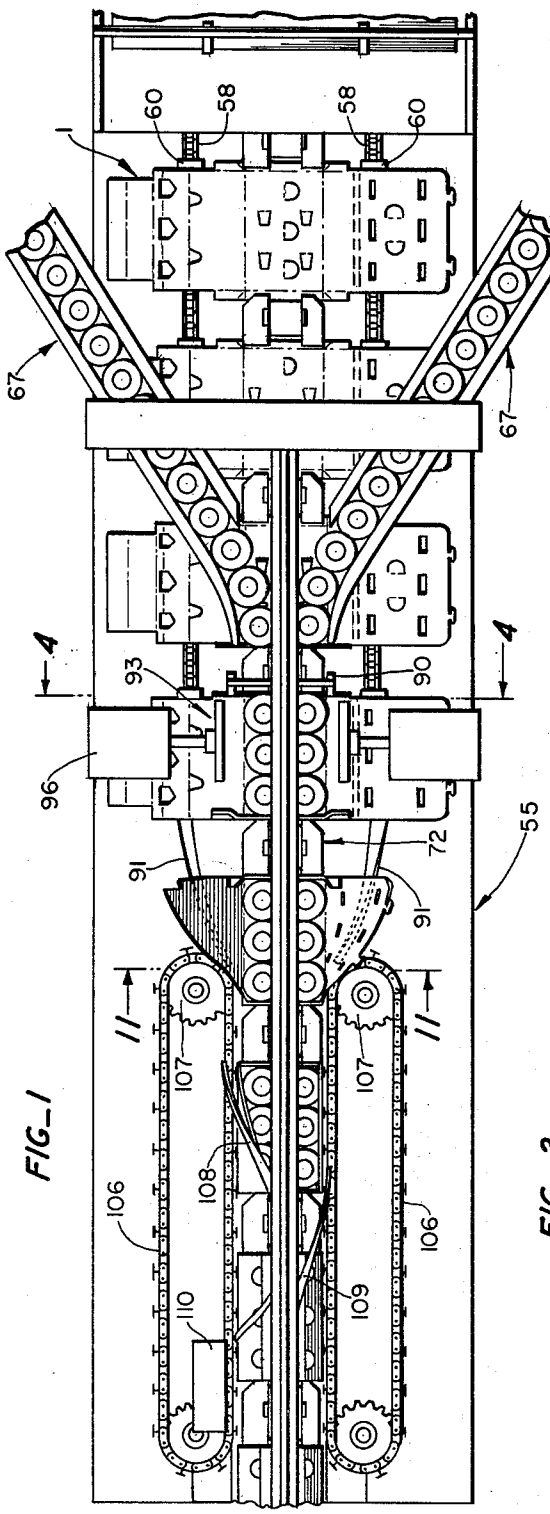



FIG_1

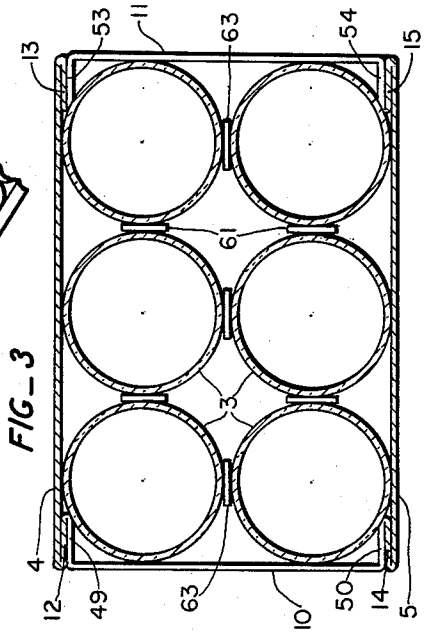



FIG_3

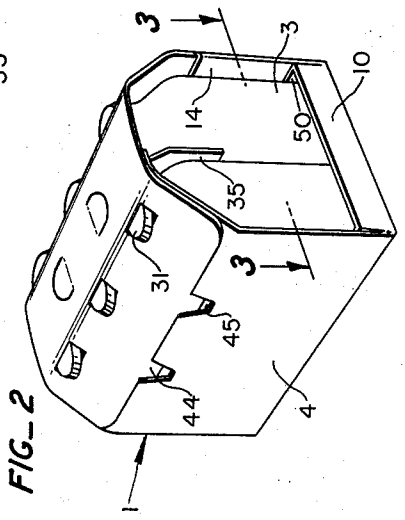



FIG_2

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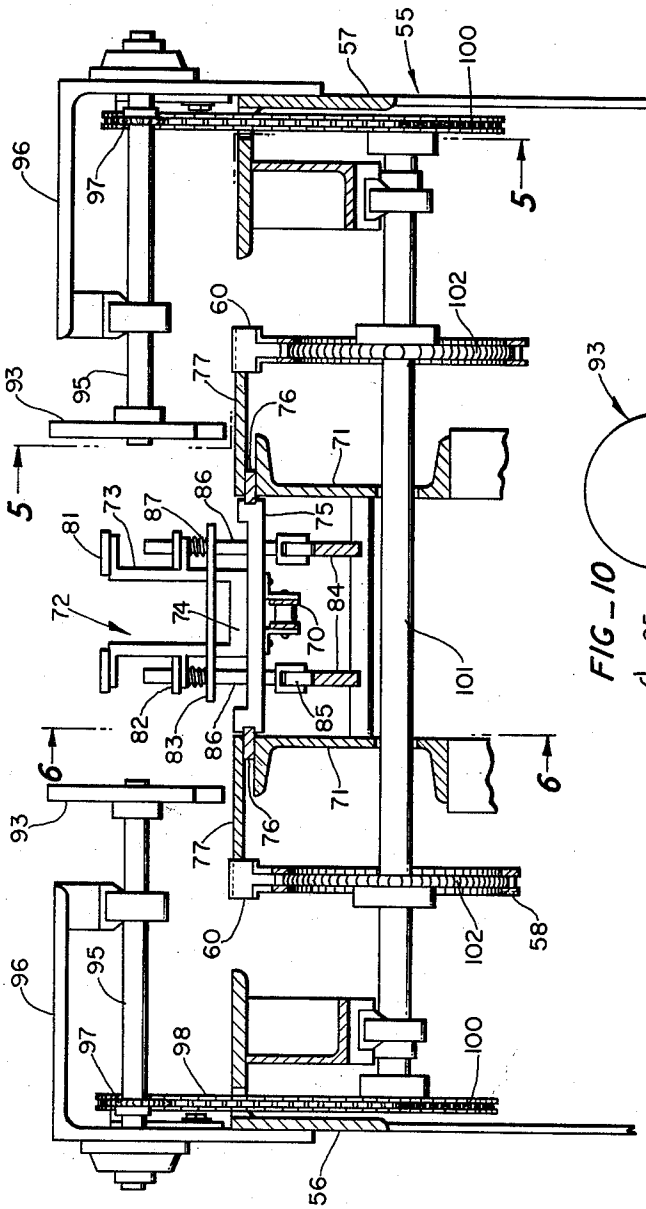



FIG_4

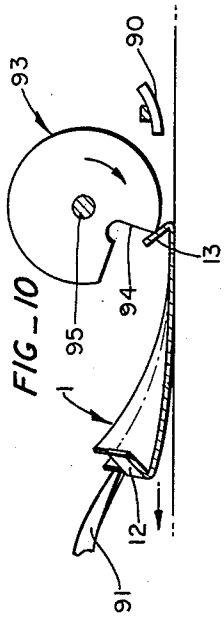



FIG_10

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MULTI-CONTAINER PACKAGING APPARATUS AND METHOD

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FIG_5

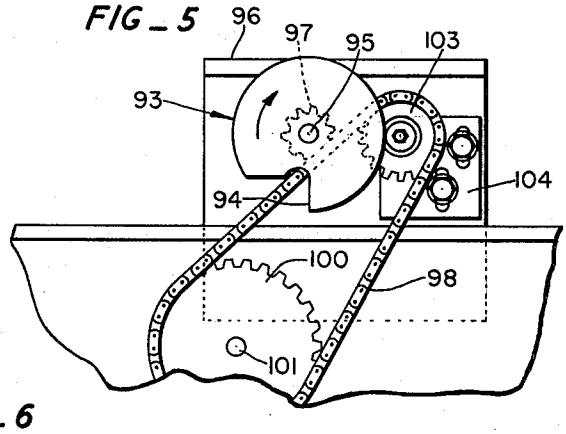



FIG_6

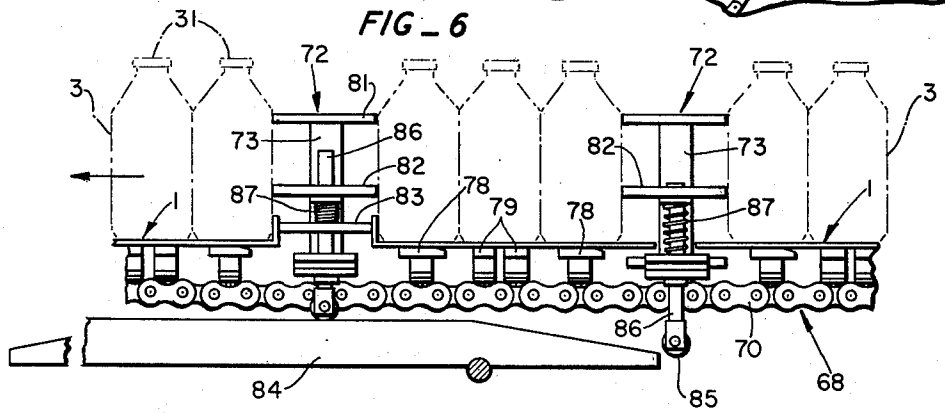
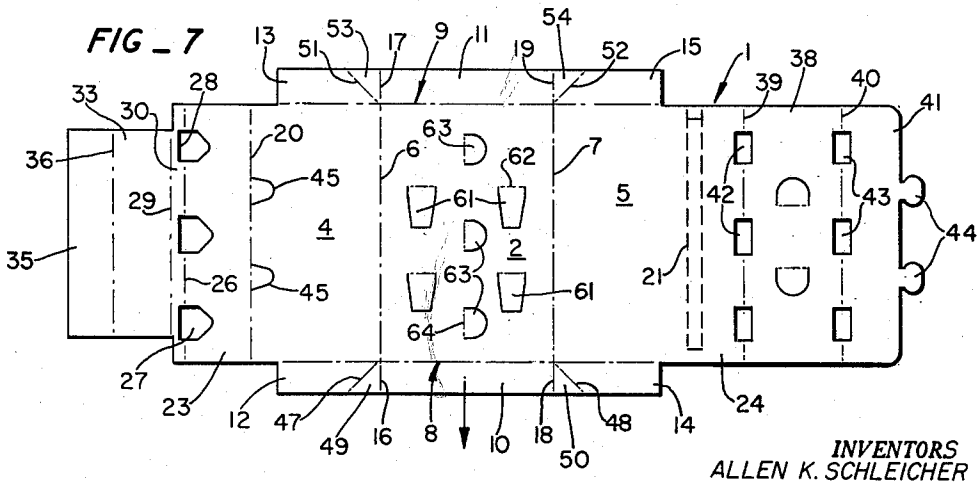



FIG_7




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MULTI-CONTAINER PACKAGING APPARATUS AND METHOD

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FIG_ 8

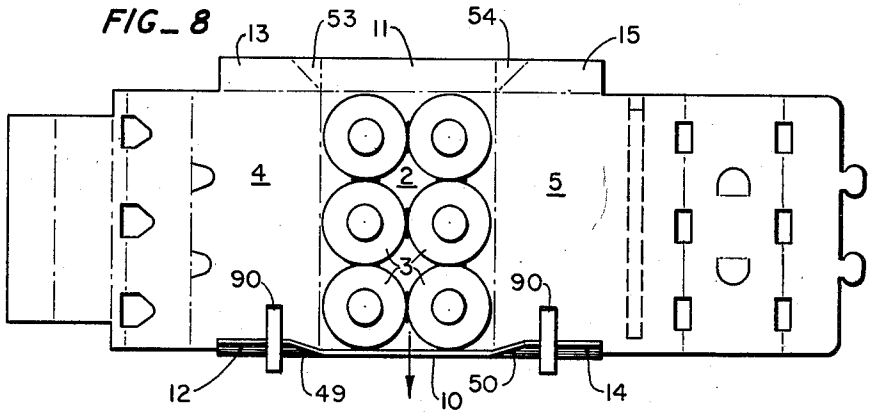



FIG_ 9

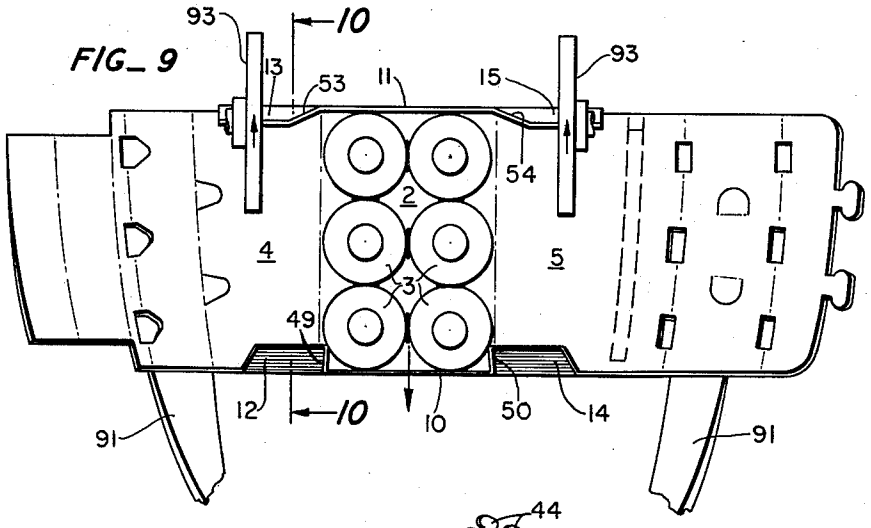
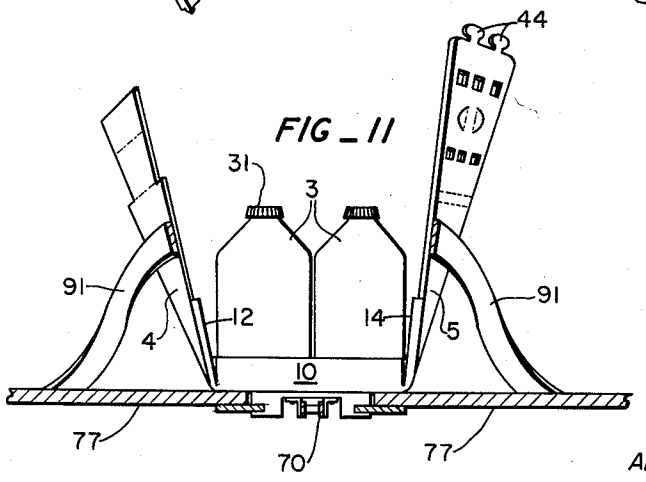



FIG_ 11




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United States Patent Office 3,108,414 Patented Oct. 29, 1963



# 3,108,414
# MULTI-CONTAINER PACKAGING APPARATUS AND METHOD

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Filed Mar. 23, 1961, Ser. No. 97,860
13 Claims. (Cl. 53—48)

This invention relates to packaging apparatus and method that are similar in some respects to the can packaging apparatus and method disclosed in copending application for United States Letters Patent Serial No. 573,196 filed March 22, 1956, now U.S. Patent No. 2,974,454, and has for one of its objects the provision of an apparatus and a method for efficiently packaging containers, such as used for beer and soft drinks in what are generally known as multi-bottle or multi-can packages. One example of such package is disclosed in copending application for United States Letters Patent Serial No. 862,908 filed December 30, 1959.

Heretofore, as shown in said application Serial No. 573,196 provision for the forming of open-ended packages or carriers for a plurality of cylindrical articles such as cans, has been made.

In the present instance, the carrier blank, wrapper or carton that is employed, includes a main body portion that is wrapped about several parallel rows of containers such as bottles or cans and secured therearound, but instead of the carrier being open ended, as heretofore, the carrier blank has portions that are folded to extend partially over the end containers of the rows thereof that form the package. Also the present apparatus is adapted to package bottles, or containers that have restricted necks at their upper ends and closure caps therefor. In packages of this type, the portions of the carrier blank that extend partially over the end bottles or containers function to hold the bottles in the carrier, although the design is such that the caps may cooperate with the carrier to assist in performing said function.

It is an object of this invention to provide means for expeditiously folding portions of the carrier blank of each package to extend partially over the end bottles or containers that are enclosed within the blank, and to be held against unfolding without the use of glue, staples, or means other than the means that holds the main body of the carrier blank about the two rows of containers.

An additional object of the invention is the provision of a method of enclosing the containers in a carrier blank whereby the portions of each blank that extend over the end cans of the rows enclosed therein will automatically fold to container-retaining position subsequently to an initial movement of the carrier about the rows of cans.

Other objects and advantages will appear in the description and in the claims.

In the drawings, FIG. 1 is a fragmentary top plan view of the apparatus, showing only the portions thereof that relate to the folding of the carrier blank about the bottles.

FIG. 2 is an isometric view of a finished package formed by use of the apparatus and by the method.

FIG. 3 is an enlarged cross sectional view of the carrier of FIG. 2 taken along line 3—3 of FIG. 2.

FIG. 4 is an enlarged cross sectional view taken along line 4—4 of FIG. 1.

FIG. 5 is a fragmentary cross sectional view taken along line 5—5 of FIG. 4.

FIG. 6 is a fragmentary cross sectional view taken along line 6—6 of FIG. 4.

FIG. 7 is a top plan view of the carrier blank before folding, as it would appear at the start of its movement, transversely of its length, through the apparatus in the direction of the arrow indicated thereon.



FIG. 8 is a view similar to that of FIG. 7 but showing the initial folding operation, and part of the folding means.

FIG. 9 is a view similar to that of FIG. 8 showing another folding step subsequently to that shown in FIG. 8 and part of the folding means.

FIG. 10 is a fragmentary side elevation view of part of the folding apparatus shown in FIG. 9, as seen from line 10—10 of FIG. 9.

FIG. 11 is a fragmentary cross sectional view taken along line 11—11 of FIG. 1, showing a folding operation subsequently to that shown in FIG. 9.

Referring to FIG. 7, the blank, generally designated 1, is similar to the blank disclosed in said application Serial No. 862,908. Said blank is elongated, having a central rectangular panel 2 on which the lower ends of the bottles 3 (FIG. 2) are adapted to be supported.

In the package that is formed by use of blank 1, there are two parallel rows of bottles 3, said rows being in side by side relation so that each bottle in one row is directly opposed to a bottle in the other row, thus there are three pairs of adjacent bottles in a "six-pack" carton or package, such as is shown for purpose of illustration.

Referring back to FIG. 7 side panels 4, 5 connect with two of the opposite edges of bottom panel 2 that are parallel with the longitudinal axis of the blank, along parallel folding creases 6, 7. The two opposite edges of bottom panel 2 and of side panels 4, 5 are defined by continuous parallel folding creases generally designated 8, 9. End flaps 10, 11 are integrally connected with the bottom panel 2 along creases 8, 9 respectively, while flaps 12, 13 and 14, 15 are integrally connected with side panels 4, 5 respectively, along said creases 8, 9. These flaps 13, 15 are extensions of the flap 11, and flaps 12, 14 are extensions of flap 10. Extensions 16, 17 of crease 6 continue across the creases 8, 9 to define the junctures between end flaps 10, 12 and 11, 13, while extensions 18, 19 of crease 7 also continue across creases 8, 9 to define the junctures between flaps 10, 14 and 11, 15.

Transverse folding creases 20, 21 extend across the blank 1 equal distances from, and parallel with, folding creases 6, 7 and respectively define the juncture between the side panel 4 and an inner panel 23, and between an outer gable panel 24 and side panel 5. The panel 23 is similar to outer panel 24 but another panel will extend over it in the completed package, hence the reason for the designation "inner" panel.

The edge of the inner panel 23 that is opposite to crease 20, is defined by a folding crease 26. Crease 26 is parallel with crease 20 and when the package is formed and the sidewall 4 is alongside and substantially in engagement with one row of the bottles that is adjacent thereto, the inner panel 23 will extend slantingly upwardly toward the upper restricted diameter ends or necks of the bottles 3 that have the closure caps thereon.

Openings 27 are formed in said inner panel 23 in spaced relation along crease 26. One edge of each opening is a straight cut 28 and may be between creases 26, 29 in panel 30. Shorter parallel cuts extend at right angles from the end of each cut 28 into panel 23 and then extend convergently toward each other to connect at their ends along a shorter cut parallel with cut 28. Thus each opening 27 is generally triangular with cut 28 forming the base edge thereof.

The blank 1 extends, full width, past crease 26 outwardly of inner panel 23 to a folding crease 29 that is relatively close to crease 26 and parallel with the latter. Crease 26 defines the juncture between inner panel 23 and a narrow cap-engaging panel 30.

When the package is formed, and inner panel 23 extends slantingly upwardly toward the upper ends of the bottles, approximately one-half of the caps 31 on the

bottles will extend through opening 27 with the straight edges 28 of the opening extending across the upper sides of the caps, as indicated in said copending application Serial No. 862,908. The blank will then be bent along crease 29 so that a panel 33 in extension of panel 30 along crease 29 will be folded to a downwardly inclined position over the upper sides of the one row of bottles engaged by panel 30. Thus the panel 33 will have approximately the same inclination relative to vertical as inner panel 23, except that the inclination is opposite to that of panel 23.

Panel 33 is of less width than panel 23, and it terminates in an inner end panel 35 that is connected with panel 33 along a crease 36. Said crease 36 is parallel with crease 29, and panel 35 is adapted to extend downwardly between the rows of bottles 3 of the package.

At the other end of the blank 1, opposite to panels 4, 23, 25, 33 and 35, the gable panel 24 joins a top panel 38 along a folding crease 39 that is parallel with folding crease 21. This top panel 38 is adapted to extend over both rows of bottles.

A folding crease 40 parallel with folding crease 39 connects a second, and outer gable panel 41 with top panel 38, the other outer gable panel being the panel 24, thus second outer gable panel 41 is adapted to overlie the inner panel 23 when the package is formed.

Along crease 39 is a row of openings 42, which openings may extend across the crease into both panels 24 and 38 and a similar row of openings 43 is formed along crease 40 and the openings 43 may extend into both panels 38 and 41. When the package is formed, the caps in one row of bottles will extend partially into openings 42 and the caps on the other row of bottles will extend partially into the openings 43.

Along the terminating end edge of the blank 1 which is along panel 41 are a pair of locking tabs 44, each of which is formed to provide a pair of oppositely outwardly projecting ears or lobes.

In the final step of forming the package, when gable panels 24, 41 and top panel 38 are over the bottles and over the inner panel 23, the locking tabs 44 will be aligned over openings 45 that are formed along crease 20 and that extend into panel 4, and by pressing these tabs inwardly or toward the bottles, the ears or lobes of the tabs will spring past the edges of openings 45 to the inner side of panel 4, thus locking the blank about the bottles.

The present invention deals particularly with the folding of the flaps 10 to 15 inclusive, so that the end flaps 10, 11 on the bottom panel 2 will extend upwardly perpendicular to the bottom panel 2 and over the lower end portions of the end bottles that face oppositely outwardly of the carton or carrier, and so that the end flaps 12–15 will hold the end flaps 10, 11 in said upwardly extending positions.

As seen in FIG. 7, folding creases 47, 48 extend diagonally from corresponding ends of creases 6, 7 across the ends of flaps 12, 14 to define, together with crease extensions 16, 18 adjacent thereto, what may be called guessets 49, 50.

The same construction is in the flaps at the opposite edges of the panels 2, 4 and 5 where diagonal creases 51, 52 extend from the terminating ends of creases 6, 7 diagonally across the adjacent ends of flaps 13, 15 to form gussets 49, 50.

In closing the carrier blank 1 about the bottles by bending the flaps 10, 12, 14 and 11, 13, 15 upwardly when the bottles are on the bottom panel 2, by application of force against the flaps 12, 14 and 13, 15 the end flaps 10, 11 will be engaged by the bottles when they are in positions extending substantially perpendicularly upwardly from the panel 2, but continued force against the flaps 12, 14 and 13, 15 will cause them to move past vertical planes toward each other as seen in FIG. 9 and as the side panels 4, 5 are swung upwardly, as seen in FIG. 11



the gussets 49, 50, 53 and 54 will automatically fold toward each other at opposite ends of the panel 2 to positions between the end bottles of the carrier and the sides 4, 5. When locking tabs 44 are locked to panel 4 through openings 45 the end flaps 10, 11 will be held in upright positions against the lower ends of the end bottles in the rows so that the bottles will be held against being withdrawn from the partially open ends of the carrier or from accidentally falling out of the latter. The partial projection of the caps through openings 42, 43 and 45 will, of course, hold the upper ends of the bottles in proper positions within the carrier.

The method having been described, the apparatus for carrying out the method will be described. A substantial portion of this apparatus is shown in said application Serial No. 573,196 filed March 26, 1956, hence the present disclosure and description is substantially restricted to the portion of the apparatus for carrying out the method of folding the end flaps 10–15 at the open ends of the carrier, except for such description as is necessary for a clear understanding of the invention.

The apparatus for carrying out the method is horizontally elongated and comprises a frame, generally designated 55 that includes vertically disposed, spaced opposed side plates 56, 57 (FIG. 4). At one end of the frame a magazine may be provided for supporting a vertical stack of the blanks 1, disposed horizontally, and extending transversely of the apparatus for delivery of the blanks in succession from the bottom of the stack positioned over the upper parallel runs of endless chains 58. These chains have flights 60 thereon spaced to receive the blanks between the spaced flights on each chain to effect movement of the blanks to the left, as seen in FIG. 1, with one of the longitudinally extending edges of each blank in a leading position.

Each blank has similar pairs of tabs 61 formed in bottom panel 2 that are partially struck from the bottom panel for folding upwardly along creases 62 that extend longitudinally of the blank.

Also formed in bottom panel 2 are three tabs 63 that are in a row approximately centrally of panel 2, extending transversely of the blank 1, and these are foldable upwardly along creases 64 that extend at right angles to creases 62.

Any suitable means, such as shown in said application Serial No. 573,196 may be provided for pushing these tabs upwardly from below as the conveyor chains 58 move the blank to the left, as seen in FIG. 1, so that tabs 61 will be positioned between the bottles in each row thereof, and tabs 63 will be between the rows of bottles when the bottles are positioned on bottom panel 4 (FIG. 3).

Bottle feeding conveyors 67 at opposite sides of the apparatus extend convergently relative to each other in the direction of the path of travel of the blanks so their convergent ends will be above said path at points adjacent creases 6, 7 of the blank 1 for depositing the bottles, in succession, onto bottom panel 2 at opposite sides of tabs 63.

Approximately centrally between the chains 58 is a package conveyor generally designated 68 (FIG. 6) in the form of an endless chain 70 that extends longitudinally of the apparatus over sprocket wheels at its ends that are secured on transverse shafts journaled for rotation in bearings carried by the frame of the apparatus.

Up to this point it should be noted that the structure as described is clearly shown and described in copending application Serial No. 573,196, and it should be understood that the blank and package conveyors as well as other moving parts described for performing folding apparatus on the blank are operatively connected with a source of power for synchronous operation.

Connected with chain 70 (FIG. 4) of the package conveyor 68 are flight mechanisms 72 each of which will be called a spacer. Each spacer 72 comprises a generally U-

shaped member the legs 73 of which are in a vertical plane at right angles to the path of travel of the blanks, and the closed ends 74 of which are each secured to a supporting member 75 that is formed with laterally opening edge grooves in which stationary parallel, horizontally disposed guide supports 76 are slidably received. Said supports extend longitudinally of the apparatus at opposite sides of the upper run of chain 70 and they are secured to coplanar horizontally disposed blank supporting plates 77 on which the blanks are slidable during movement thereof longitudinally of the apparatus. Plates 77 are elongated longitudinally of the apparatus and in the space between them are transverse can supporting flights 78, 79 (FIG. 6) secured to and spaced longitudinally of the chain 70 between adjacent pairs of said U-shaped members. On these flights are pairs of bottles 3 making up the two rows of six bottles for each package. It is understood that the invention is not restricted to a six-bottle package.

Flights 78, as seen in FIG. 6, are relatively narrow compared with flights 72, and their trailing upper surfaces slant slightly downwardly to facilitate receiving blanks 1 from the flights of chains 58. The combined width of the two slightly spaced flights 79 disposed between the flights 78 is approximately the same as the width of each flight 78.

The space between each adjacent pair of U-shaped members 72 is adapted to receive a blank 1 therebetween from chains 58, and each of said U-shaped members 72 is provided with horizontally disposed, vertically spaced spacer plates 81, 82, rigid with and projecting laterally outwardly of the pair of legs 73 of each member 72. These plates 81, 82 function to space each group of bottles on one blank from the group of bottles on the next blank so that the blanks and the groups of bottles thereon will be equally spaced along chain 70. Said plates 81, 82 also function to hold back the bottles on conveyor 67 as the plates pass the discharge ends of the conveyors so the bottles on the conveyors 67 will be discharged therefrom only when a blank is in position to receive them in proper positions on the blank.

Spacer plates 81 are at the upper ends of legs 73 while spacer plates 82 are spaced therebelow, and below the lower spacer plates 82 of each spacer 72 is a flap folding plate 83.

Each flap folding plate 83 is preferably rectangular and is centrallly apertured to slidably pass the legs 73 of the U-shaped member therethrough so the plate 83 may have a vertical movement relative to the legs 73 of the spacer.

The width of each flap folding plate 83 in the direction of travel of blanks 1 is substantially the same as that of upper and lower spacer plates 81, 82 in the same dimension although it may be slightly less

The supporting member 75 that is slidably guided and supported on guide strips 76 (FIG. 4) is centrally recessed in its upper side to receive the flap folding plate 83 when the latter is at the lowest end of its vertical movement so that the upper surface of said plate will be below the level of the flaps 10–15 of blank 1, and the spacing between the leading and trailing edges of the flap folders 83 and each of the legs 73 of each U-shaped members 72 in the direction of movement thereof is substantially equal to the width of each flap 10–15.

From this it will be apparent that blanks positioned on the plates 77 and on the support flights 78, 79 at opposite sides of the spacers 72 will have said flaps 10–15 bent upwardly across the leading and trailing ends of each group of six bottles upon the flap folders 83 being moved upwardly past the plane on which the blanks are positioned, while the blanks are held down by the bottles thereon. The bottles will engage the up-folded flaps 10, 11 to prevent the flaps from moving past vertical planes coincidental therewith.

A pair of parallel cam tracks 84 is disposed at a level



below the upper run of chains 70 (FIG. 6). Cam followers 85 carried on the lower ends of a pair of vertical rods 86 are adapted to roll on said cam tracks, and these rods slidably extend through bearings in the blank supporting member 75 and through bearings in the lower spacer plates 82. These rods are respectively at the oppositely outwardly facing sides of each pair of legs 73 (FIGS. 4, 6).

The flap folder 83 of each spacer 72 is secured to the pair of rods 86 in a horizontal position, and a helical expansion spring 87 is disposed between the lower plates 82 of each spacer and the flap folder to yieldably hold the cam followers against the track 84 when the cam followers ride onto one of the ends of said cam tracks for movement along the latter.

Cam tracks 84 have their upper surfaces inclined upwardly in the direction of travel of the upper run of chain 70 at the ends of the cam tracks onto which the followers will be carried as the chain is actuated. The low end of the cam track is substantially at the point where bottles have just been positioned on a blank, and as the chain 70 is moved to the left, as seen in FIG. 6, the flap folders will move upwardly to bend the flaps 10–15 upwardly and over the lower oppositely outwardly facing ends of the end bottles of the two rows thereof.

After upward movement of the flaps 10–15 a pair of stationary plows 90 (FIGS. 8, 10) will engage the leading flaps 12, 14 causing rearward bending thereof relative to the direction of travel of the blanks, and as each blank continues in its said path of travel a pair of rotary flap folders 93 will engage the trailing flaps 13, 15 to bend them forwardly (FIGS. 9, 10).

A pair of conventional folding plows 91 (FIGS. 1, 11) rigid with the frame of the apparatus will engage the side panels 4, 5 to move them upwardly after the end flaps 12, 14 and 13, 15 have been bent rearwardly and forwardly to positions past the vertical planes in which the flaps 10, 11 are positioned, and as these side panels are moved upward the gussets 49, 50, 53, 54 will automatically fold to positions alongside the side panels 4, 5 and between the end bottles of the package and sidewalls 4, 5 where said flaps 12, 14, 13, 15 will be held by the end bottles to hold flaps 10, 11 vertical in bottle remaining positions.

Assuming the blanks are moving to the left as seen in the drawings, the rotary folding devices 93 (FIGS. 5, 9, 10) will move clockwise, and each of these devices has a radial surface 94 that will engage trailing flaps 13, 15 to fold them forwardly and downwardly as seen in FIG. 10, so that the inward folding of the gussets 53, 54 toward their bottle holding positions will occur substantially simultaneously with the folding of the sides 4, 5 upwardly by plows 91.

Each of the devices 93 may be a wheel centrally secured on a shaft 95 that is supported for rotation in a support 96 (FIGS. 4, 5, 10) carried by the frame of the apparatus. A sprocket wheel 97 is secured on each shaft 95 which wheel is in engagement with an endless sprocket chain 98 that extends at one end over a sprocket wheel 100 on the shaft 101 that, in turn carries the sprocket wheels 102 over which one of the ends of chains 58 extend. The other end of each chain 98 extends over a sprocket wheel 103 (FIG. 5) adjustably mounted on a shaft carried on an adjustable bracket 104 secured to support 96.

Each wheel 93 has a segment cut away at one side to provide the radial surface 94 that engages the trailing flaps, and the space from which the segment is removed receives the trailing flap during rotation of the wheel. The wheels 93 are connected with a shaft 101 for synchronous movement with the blank.

After each of the blanks has passed the plows 91 (FIG. 1), the side panels 4, 5 will be against the oppositely outwardly facing sides of the pair of rows of bottles, and the package will then pass between a pair of horizontally disposed endless chains 106 that are movable about vertical axes on sprocket wheels 107 at opposite ends of the pair

of chains. The adjacent parallel, horizontally spaced runs of these chains have plate flights that tightly press against the side panels 4, 5 to hold said panels tightly against the bottles, all as above described and also described in copending application Serial No. 573,196. Sprocket wheels 107 at one of the ends of each endless chain are driven, as described in said copending application to cooperate with chain 70 for moving the packages longitudinally of the apparatus.

After leaving the plows 91 the panels 23, 33, 35 will be engaged by a plow 108 that will fold said panels so that the panel 35 will be tucked between the row of bottles while panel 30 will extend over and in engagement with the caps, and slightly following this folding of panels 23, 33 and 35, a second plow 109 will engage panels 24, 34 and 41 to fold these panels over the panels 23, 30 to a position in which locking tabs 44 are aligned over openings 45, after which tab locking device 110, which is similar to the tab locking device in copending application Serial No. 573,196, will function to force the enlarged outer ends of the tabs 44 through said openings 45 to lock the tabs against withdrawal. It should be noted that the tab locking device 110 is at an angle relative to horizontal so as to engage the tabs.

Briefly, in operation, horizontally disposed blanks 1 are successively fed from the bottom of a stack at the right-hand end of the apparatus shown in FIG. 1 and are carried to the left on conveyor chains 58 with the blanks extending transversely of the path of travel thereof so that the folding flaps 10, 12, 14 are leading while flaps 11, 13, 15 are trailing.

The blanks pass onto a package conveyor 68 in the same position as when on the chains 58 and the desired number of bottles are deposited onto the blank in two rows that extend parallel with the path of travel of the blank. The blanks with the bottles thereon are spaced on conveyor 68 and at the feed end of the conveyor 68, as soon as the bottles are on each blank, the leading and trailing flaps are bent upwardly to positions perpendicular to the bottom panel 2, and panels 4, 5, and while flaps 10, 11 on the bottom panel 2 are held perpendicular to the bottom panel by the bottles, the flaps 12, 14 and 13, 15 continue toward each other past perpendicular planes in which the flaps 10, 11 are held and at the same time the side flaps 4, 5 are bent upwardly whereby the gussets 49, 50, 53, 54 will automatically move to positions between the end bottles of the rows and the sidewalls adjacent thereto.

The panels at one side of the bottom panel are then swung against and over the bottles of one row with the terminating panel positioned between the rows, and then the panels at the other side of the bottom panel are swung against the bottles of the other row and over the two rows of bottles and the terminating panel is locked to one of the panels at the other side of panel 1 thereby completing the package.

It is pertinent to note that the present method avoids springing the gussets and flaps 12, 14, 13 and 15 past the bottles and the apparatus does not require any tucking means for moving said gussets and flaps past the end bottles, which step and apparatus have heretofore required such an operation and tucking device.

Whether the end flaps 10, 11 extend fully across the ends of the bottom panel 2, or partially across, is not important in some instances, although it is preferable that they extend fully across the lower ends of said bottles.

From the foregoing description, the method of folding an adjoining pair of panels of the carton blank, such as panels 2, 4 for example that have flaps 10, 11 and 12, 13 integral therewith and with each other, so that each gusset portion 49, 53 and flap 12, 13 will automatically be folded between the sides of the bottle and panel 4 may best be described with respect to one of the gussets, such as gusset 49 as an example, since the same method will apply to each.

The steps of such method, as seen in FIGS. 8, 9, 10 comprise simultaneously folding flaps 10, 12 to the side of the blank on which the bottle 3 that is adjacent to the juncture between flaps 10, 12 is supported and to a position in which flap 10 on panel 2 is perpendicular to the plane of said panel and against one side of said bottle (FIG. 8). Then folding of flap 12 continues past a position perpendicular to the plane of panel 2 and at the same time folding the other panel 4 to a position against the side of said bottle 3 that faces at right angles to the side engaged by flap 10 while flap 10 is held against said last mentioned side whereby said flap 12 and the gusset portion 49 adjoining and integral with flap 12 will automatically be folded along diagonally extending lines, such as creases 16, 47 to a position between panel 4 and the bottle, and in which position the bottle will hold flap 12 and gusset portion 49 between said bottle and panel 4.

Attention is also called to the fact that, in the present invention, the adjacent leading and trailing flaps on an adjacent pair of blanks are simultaneously folded upwardly against the opposed leading and trailing faces of the end bottles of adjacent groups of bottles as the groups are moved in one direction along a horizontally extending path of travel. Of course, at the commencement of an operation the leading flaps only of the first blank carried along conveyor 68 will be moved upwardly, and the trailing flaps only of the last blank are moved upwardly, but otherwise the simultaneous folding of the adjacent leading and trailing flaps occurs.

The above detailed description is not to be construed as a limitation on the appended claims, as modifications may be apparent to one skilled in the art which would not depart from the spirit and scope of the invention. For example, as seen in FIG. 7, diagonal crease lines 47, 48 on flaps 12, 14, respectively may alternatively be struck at corresponding angles across flap 10 converging inwardly of creases 16, 18 outwardly of the blank. Gussets 49, 50 would then be formed from flap 10, so that as it was folded into overlying engagement with panel 2, and as side panels 4, 5 were folded to the vertical in the folding operation, gussets 49, 50 would assume a horizontal disposition overlying flap 10 and beneath the lower end surfaces of containers 3 where said gussets would be held by said containers. In such modification, flaps 12, 14 assume vertical positions at right angles to vertical side panels 4, 5, respectively and extending oppositely inwardly thereof over the outwardly directed surfaces of the end bottles in the rows.

In this modification the construction of blank 1 remains substantially the same as in the preferred form of the invention with the exception of the change of the positions of crease lines 46, 48, 51, 52. It is obvious that flap 10 may be discontinuous.

As a further modification, the folding operation may be started with containers 3 in horizontal positions, rather than upright, bringing said containers to the upright position as side panels 4, 5 are folded toward vertical positions. As three containers, horizontally positioned parallel to each other over each of side panels 4, 5 are brought to upright positions with said side panels, gussets 49, 50, formed as above, and flap 10 will be automatically folded and securely held thereunder between the containers and panel 2. The same modification would obviously produce the same result when applied to panels 13, 11, 15 on the trailing end of blank 1.

Another such modification would be the provision of flaps similar to flaps 10, 11 at the top of the open ends of the finished package to retain the upper ends of the containers within said package in much the same manner as flaps 10, 11 retain the lower ends of said containers therein. Said additional flaps may be used in place of or in conjunction with slots 42, 43 (FIG. 7),

which serve to retain the upper ends of containers 3 within the package unit as seen in FIG. 2.

It is also clear that, instead of depositing the containers, such as bottles or cans, on the blank, the latter may be superposed over the group of containers to be wrapped. Essentially the same method of simultaneously folding flaps 10–15 and the side panels 4, 5 into container engaging positions may be employed where the blank is wrapped downwardly over the containers and its ends are secured at the bottom of the package.

In any of the modifications herein disclosed, it will be understood that the flaps 10, 11 may perform both a function of holding the containers in the wrapper and provide a display area at the open end thereof. In the event other means are provided for holding the containers in the wrapper, flaps 10, 11 may be used solely for additional printing surface or to more fully enclose the package.

We claim:

1. In packaging apparatus for folding a blank of cardboard about a group of containers and which blank is of the type that has a panel intermediate a pair of folding flaps and on which panel a group of containers is to be supported for folding said folding flaps upwardly to two opposite sides of said group; a blank support movable in one direction adapted to support such blank horizontally thereon for movement in one direction in a horizontally extending path of travel with the said folding flaps on said blank extending transversely of said path, flap folding means connected with said blank support for movement therewith in a position below one of said flaps when said blank is on said blank support, supporting means supporting said flap folding means for upward movement from said position, means connected with said flap folding means actuatable for moving said flap folding means upwardly during movement of said flap folding means and said blank support in said path for folding said one flap upwardly.

2. In packaging apparatus for folding a blank of cardboard about a group of containers and which blank is of the type that has a panel intermediate a pair of folding flaps and on which panel a group of containers is to be supported for folding said folding flaps upwardly to two opposite sides of said group; a blank support movable in one direction adapted to support such blank horizontally thereon for movement in one direction in a horizontally extending path of travel with the said folding flaps on said blank extending transversely of said path, flap folding means connected with said blank support for movement therewith in a position below one of said flaps when said blank is on said blank support, supporting means supporting said flap folding means for upward movement from said position, means connected with said flap folding means actuatable for moving said flap folding means upwardly during movement of said flap folding means and said blank support in said path for folding said one flap upwardly, said supporting means including container positioning means adapted to engage containers to be positioned on said intermediate panel for positioning containers of said group adjacent to said one flap when said blank is on said blank support.

3. In packaging apparatus for folding a blank of cardboard about a group of containers and which blank is of the type that has a panel intermediate a pair of folding flaps and on which panel a group of containers is to be supported for folding said folding flaps upwardly to two opposite sides of said group; a blank support movable in one direction adapted to support such blank horizontally thereon for movement in one direction in a horizontally extending path of travel with the said folding flaps on said blank extending transversely of said path, flap folding means connected with said blank support for movement therewith in a position below one of said flaps when said blank is on said blank support, supporting means supporting said flap folding means for upward movement from said position means connected with said flap folding means actuatable for moving said flap folding means upwardly during movement of said flap folding means and said blank support in said path for folding said one flap upwardly, said supporting means including blank positioning means adapted to engage said blank when the latter is positioned on said blank support for positioning said one flap over said flap folding means.

4. In packaging apparatus for folding a blank of cardboard about a group of containers and which blank is of the type that has a panel intermediate a pair of folding flaps and on which panel a group of containers is to be supported for folding said folding flaps upwardly to two opposite sides of said group; a blank support movable in one direction adapted to support such blank horizontally thereon for movement in one direction in a horizontally extending path of travel with the said folding flaps on said blank extending transversely of said path, flap folding means connected with said blank support for movement therewith in a position below one of said flaps when said blank is on said blank support, supporting means supporting said flap folding means for upward movement from said position; means connected with said flap folding means actuatable for moving said flap folding means upwardly during movement of said flap folding means and said blank support in said path for folding said one flap upwardly, said blank folding means comprising a horizontally elongated element extending transversely of said path of travel, and said supporting means including a vertically extending member on which said flap folding means is vertically reciprocable.

5. In packaging apparatus for folding blanks of cardboard about uniform groups of containers each of which blanks is of the type that has a panel intermediate a pair of folding flaps and on which panel each of such groups of containers is to be supported for folding said folding flaps upwardly at two opposite sides of said group; conveyor means including a horizontally extending row of blank supporting means each adapted to support one of said blanks thereon for movement therewith in a position in which said flaps extend transversely of said row of blank supporting means; means connected with said conveyor means for moving said blank supporting means longitudinally of said row thereof in one direction whereby one of said flaps on each blank of said supporting means will be a leading flap and the other flap will be a trailing flap; flap folding means between each adjacent pair of blank supporting means in said row connected with the latter for movement therewith in said one direction; means movable with said blank supporting means for positioning each of said blanks on each of said blank supporting means in a position with the leading and trailing flaps of the blank extending over the flap folding means between each blank supporting means and the one thereof adjacent thereto at the leading and trailing sides thereof; and means connected with each of said flap folding means for moving each such folding means upwardly at a point along said path to simultaneously fold the adjacent trailing and leading flaps on the blanks on each adjacent pair of blank supporting means upwardly against the groups of containers on the intermediate portions of each adjacent pair of blanks at said point along said path.

6. In packaging apparatus for folding blanks of cardboard about uniform groups of containers each of which blanks is of the type that has a panel intermediate a pair of folding flaps and on which panel each of such groups of containers is to be supported for folding said folding flaps upwardly at two opposite sides of said group; conveyor means including a horizontally extending row of blank supporting means each adapted to support one of said blanks thereon for movement therewith in a position in which said flaps extend transversely of said row of blank supporting means; means connected with said con-

veyor means for moving said blank supporting means longitudinally of said row thereof in one direction whereby one of said flaps on each blank on each of said supporting means will be a leading flap and the other flap will be a trailing flap; flap folding means between each adjacent pair of blank supporting means in said row connected with the latter for movement therewith in said one direction; means movable with said blank supporting means for positioning each of said blanks on each of said blank supporting means in a position with the leading and trailing flaps of the blank extending over the flap folding means between each blank supporting means and the one thereof adjacent thereto at the leading and trailing sides thereof; and means connected with each of said flap folding means for moving each such folding means upwardly at a point along said path to simultaneously fold the adjacent trailing and leading flaps on the blanks on each adjacent pair of blank supporting means upwardly against the groups of containers on the intermediate portions of each adjacent pair of blanks at said point along said path; loading means along said path for depositing one of such groups of containers on each intermediate portion of blanks on said blank supporting means at a point before each of said flap folding means is actuated for said upward movement.

7. Packaging apparatus for folding a carrier blank about a group of containers and which blank comprises an intermediate panel on which such group is adapted to be positioned, a pair of side panels integral with and extending oppositely outwardly of said intermediate panel and a pair of continuous elongated parallel flaps extending along and integral with two opposite edges of said intermediate panel and said side panels, said apparatus comprising; conveyor means actuatable for supporting and moving a row of said blanks in a substantially horizontal position longitudinally of said row in one direction along a substantially horizontally extending path of travel with the said flaps on said blank extending transversely of said direction of movement whereby each such blank will have a leading flap and a trailing flap; means connected with said conveyor means for actuating the latter for effecting said movement; loading means at a point along said path for depositing a uniform group of containers on the intermediate panel of such blank supporting on said conveyor means as each blank is moved past said point in said one direction; blank folding means along said path for folding each blank on said conveyor means about the group of containers deposited thereon by said loading means, including a plurality of flap folding means movable with said conveyor means each positioned below the adjacent trailing and leading flaps of each adjacent pair of blanks supported on said conveyor means and movable upwardly for simultaneously folding the trailing and leading flaps of each such adjacent pair of blanks upwardly; and actuating means for so moving each of said flap folding means upwardly following the deposit of each such group of containers on each blank by said loading means and during said movement of said conveyor means in said one direction.

8. Packaging apparatus for folding a carrier blank about a group of containers and which blank comprises an intermediate panel on which such group is adapted to be positioned, a pair of side panels integral with and extending oppositely outwardly of said intermediate panel and a pair of continuous elongated parallel flaps extending along and integral with two opposite edges of said intermediate panel and said side panels, said apparatus comprising; conveyor means actuatable for supporting and moving a row of said blanks in a substantially horizontal position longitudinally of said row in one direction along a substantially horizontally extending path of travel with the said flaps on said blank extending transversely of said direction of movement whereby each such blank will have a leading flap and a trailing flap; means connected with said conveyor means for actuating the latter for effecting said movement; loading means at a point along said path for depositing a uniform group of containers on the intermediate panel of each such blank supported on said conveyor means as each blank is moved past said point in said one direction; blank folding means along said path for folding each blank on said conveyor means about the group of containers deposited thereon by said loading means, including a plurality of flap folding means movable with said conveyor means each positioned below the adjacent trailing and leading flaps of each adjacent pair of blanks supported on said conveyor means and movable upwardly for simultaneously folding the trailing and leading flaps of each such adjacent pair of blanks upwardly; actuating means for so moving each of said flap folding means upwardly following the deposit of each such group of containers on each blank by said loading means and during said movement of said conveyor means in said one direction, and means mounting said flap folding means for upward movement thereof including spacing means for uniformly spacing apart blanks on conveyor means and groups of containers on said blanks.

9. In packaging apparatus for folding a planar blank of cardboard about a group of containers and which blank is of the type having a panel intermediate a pair of side panels and intermediate a pair of folding flaps that are integral with each other and with said intermediate panel and said side panels; a blank support for supporting such blank horizontal with a group of upstanding, cylindrical containers on said intermediate portion only with the outer sides of said group closely adjacent to said side panels and the flaps on said intermediate panel; flap folding elements adjacent to said blank support below said flaps on a blank positioned on said blank support mounted for upward movement to fold said folding flaps upwardly to a position thereof in which the flaps on said intermediate panel are against the oppositely outwardly facing surfaces of a group of containers on said intermediate panel; flap engageable means for engaging and continuing the folding of the flaps on said side panels upon said flap folding means moving said flaps to positions engaging the oppositely outwardly facing surfaces of said group, and panel folding means engageable with said side panels and actuatable upon said flap engageable means continuing the folding of flaps on said side panel for moving said side panels to positions against two oppositely outwardly facing surfaces of said group when the latter is on said intermediate panel, whereby a section of each of the flaps on said side panels adjoining the junctures between said flaps on said side and intermediate panels will automatically be folded on themselves and to positions between said side panels and said group.

10. Apparatus for folding planar blanks of cardboard about groups of containers each blank being of the type having an intermediate panel between and integral with a pair of side panels and which intermediate and side panels are between and integral with a pair of folding flaps adjoining said intermediate panel and said side panels; conveyor means including a horizontally extending row of blank supports connected for movement along a horizontally extending path in one direction longitudinally of said row; means for positioning a blank of said type on each support with the pair of flaps on each blank in leading and trailing position relative to said direction of movement; loading means at a loading station along said path for loading a group of containers on the intermediate portion of each blank that is on one of said blank supports; folding means engageable with said flaps and said side portions along said path beyond said loading station in said direction of movement adapted to successively fold the flaps on said intermediate portion to vertical positions at opposite sides of a group of containers on said blank and to fold the flaps on said side portions through and past said vertical positions and simultaneously with folding said last mentioned flaps past said vertical positions to

fold said side panels to positions against two opposite sides of each group.

11. Apparatus for folding planar blanks of cardboard about groups of containers each blank being of the type having an intermediate panel between and integral with a pair of side panels and which intermediate and side panels are between and integral with a pair of folding flaps adjoining said intermediate panel and said side panels; conveyor means including a horizontally extending row of blank supports connected for movement along a horizontally extending path in one direction longitudinally of said row; means for positioning a blank of said type on each support with the pair of flaps on each blank in leading and trailing position relative to said direction of movement; loading means at a loading station along said path for loading a group of containers on the intermediate portion of each blank that is on one of said blank supports; folding means engageable with said flaps and said side portions along said path beyond said loading station in said direction of movement adapted to successively fold the flaps on said intermediate portion to vertical positions at opposite sides of a group of containers on said blank and to fold the flaps on said side portions through and past said vertical positions and simultaneously with folding said last mentioned flaps past said vertical positions to fold said side panels to positions against two opposite sides of each group; each of said folding means including flap engaging members connected with and movable with said blank supports along said path of travel.

12. Apparatus for folding planar blanks of cardboard about groups of containers each blank being of the type having an intermediate panel between and integral with a pair of side panels and which intermediate and side panels are between and integral with a pair of folding flaps adjoining said intermediate panel and said side panels; conveyor means including a horizontally extending row of blank supports connected for movement along a horizontally extending path in one direction longitudinally of said row; means for positioning a blank of said type on each support with the pair of flaps on each blank in leading and trailing position relative to said direction of movement; loading means at a loading station along said path for loading a group of containers on the intermediate portion of each blank that is on one of said blank supports; folding means engageable with said flaps and said side portions along said path beyond said loading station in said direction of movement adapted to successively fold the flaps on said intermediate portion to vertical positions at opposite sides of a group of containers on said blank and to fold the flaps on said side portions through and past said vertical positions and simultaneously with folding said last mentioned flaps past said vertical positions to fold said side panels to positions against two opposite sides of each group; blank supports including flap folding members positioned below the leading and trailing flaps of each blank and movable with said blank supports along said path of travel.

13. In a method of forming a package of a group of cylindrical containers and a planar blank having an adjoining pair of panels and an adjoining pair of flaps integral therewith and with each other, the steps of: placing one of the surfaces of such container against one panel of said pair adjacent to the juncture between said panels with said panels and said flaps in flat, unfolded condition, simultaneously folding said pair of flaps to the side of said blank against which said container is so placed and to a position in which the one flap on said one panel is in a plane substantially perpendicular to the plane of said one panel and against one of said surfaces of said container, continuing folding the other flap of said pair past a position in a plane perpendicular to the plane of said one panel and at the same time folding the other panel of said pair thereof to a position against another surface of said container while said one flap is held against said one surface whereby a section of said other flap adjoining and integral with said pair of flaps at their juncture will automatically be folded along divergently extending lines to a position between said other panel and said other surface for holding by said container in said last mentioned position with said other flap against said other panel.

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