United States Patent [19]

Vickers

[11] **3,817,018**

[45] **June 18, 1974**

[54] **METHOD FOR FORMING A PACKAGE**

[75] Inventor: **James L. Vickers,** Harbert, Mich.

[73] Assignee: **Stone Container Corporation,** Chicago, Ill.

[22] Filed: **Aug. 31, 1972**

[21] Appl. No.: **285,211**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 57,945, July 24, 1970, abandoned.

[52] **U.S. Cl.** **53/32,** 53/207

[51] **Int. Cl.** **B65b 11/18**

[58] **Field of Search** ..... 53/26, 24, 194, 207, 209, 53/29, 32, 288; 93/55, 55.1 R

[56] **References Cited**

UNITED STATES PATENTS

3,138,905	6/1964	Ellinger	53/207
3,530,640	9/1970	Hoffmann	53/209

FOREIGN PATENTS OR APPLICATIONS

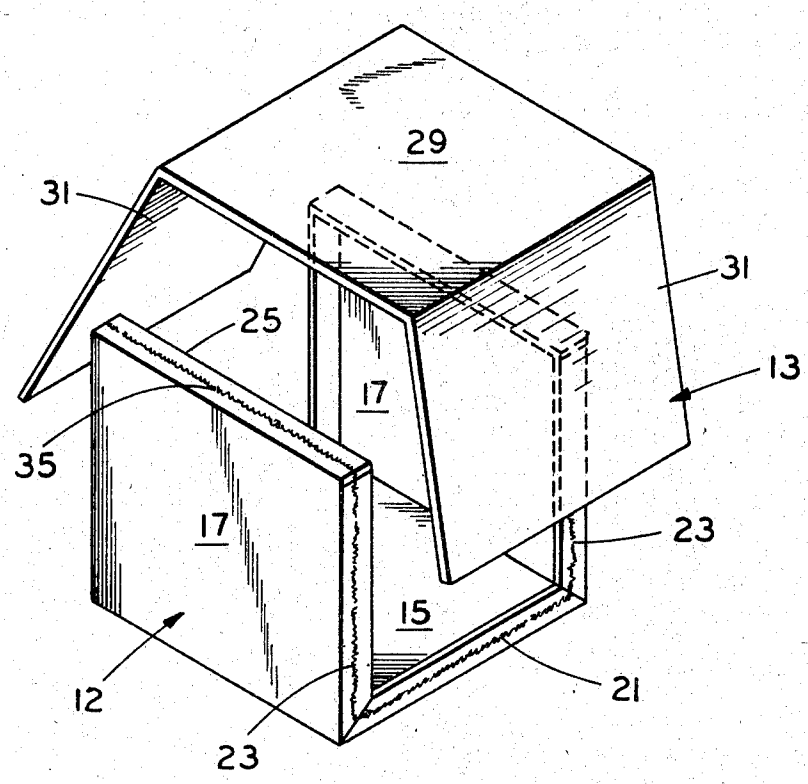
796,155	10/1968	Canada	229/23
9,560	12/1905	Great Britain	220/DIG. 25

Primary Examiner—Travis S. McGehee
Assistant Examiner—John Sipos
Attorney, Agent, or Firm—Silverman & Cass

[57] **ABSTRACT**

A method for forming a package containing a quantity of lading wherein the container for the lading is formed from two blanks made of rigid foldable material, each including an end wall and alternate side wall forming panels, one being unflanged and one including peripheral flanges along each longitudinal edge. The method includes the steps of: forming one of the blanks into a generally U-shape while concurrently partially surrounding the lading, forming the second blank into a generally U-shape concurrently partially surrounding the first blank and its lading with the end wall forming panels in opposed facing relation, and securing each alternate side wall forming panel of the unflanged blank to the peripheral flanges along one longitudinal edge of the flanged blank to form the package. The blanks are not attached together during the folding operations.

34 Claims, 11 Drawing Figures



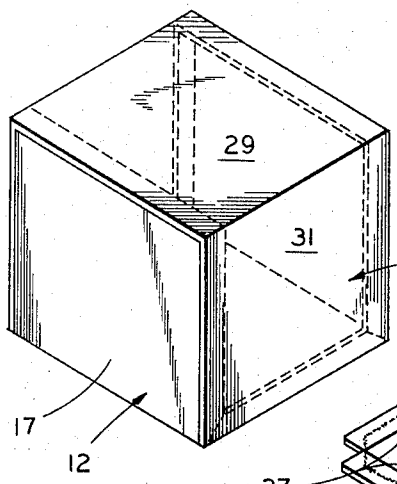


FIG.1

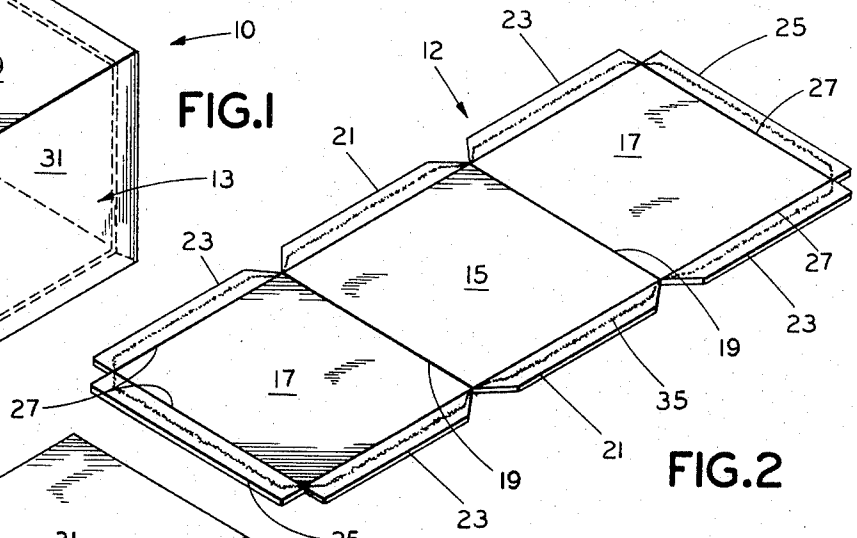


FIG.2

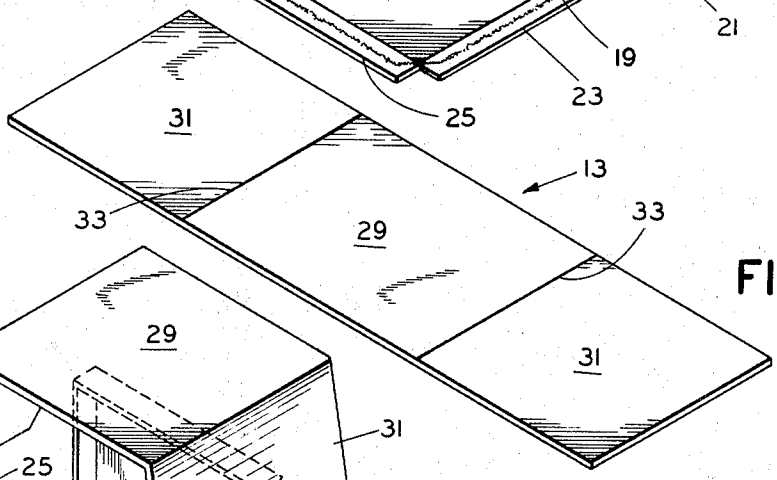


FIG.3

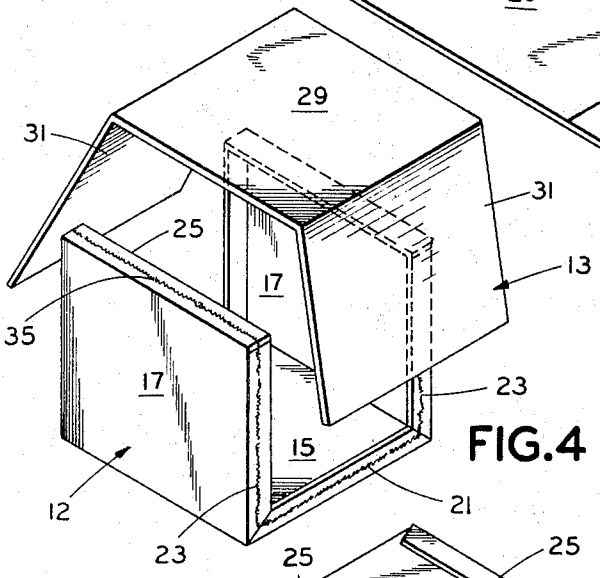


FIG.4

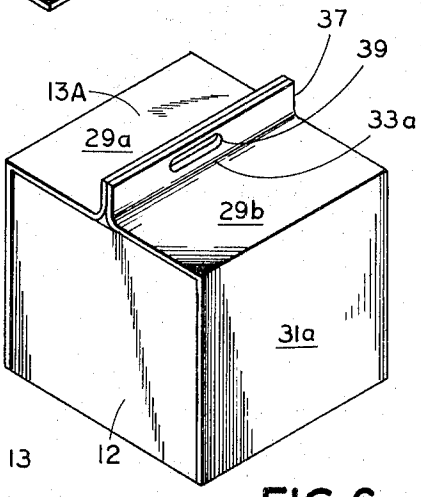


FIG.6

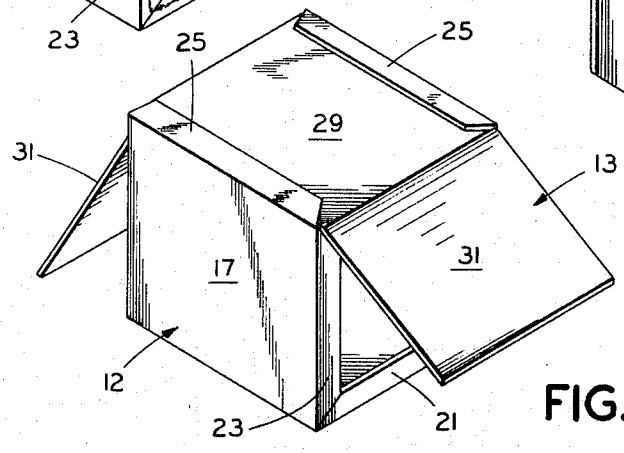


FIG.5

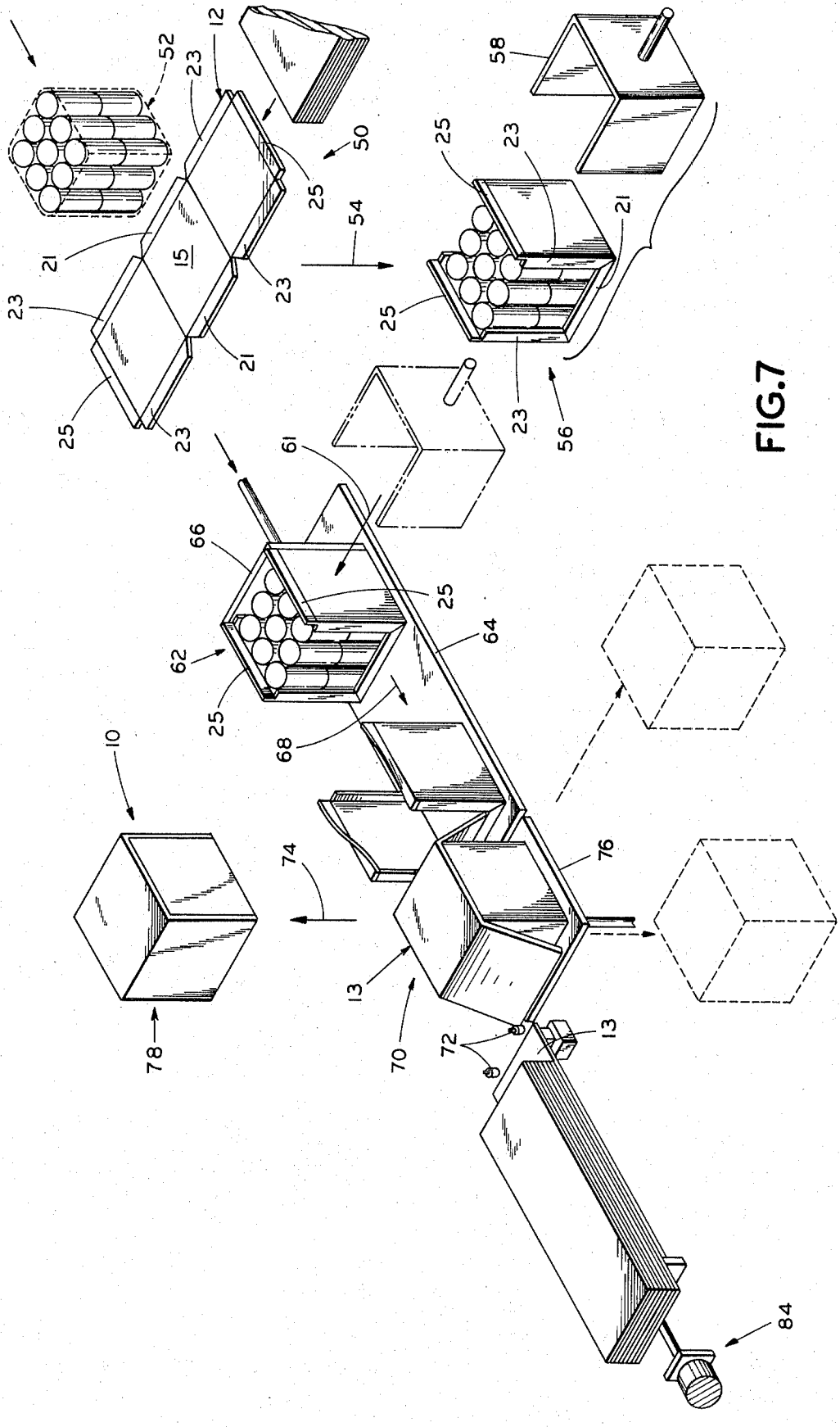

52
12
23
50
25
58
54
21
15
23
25
56
61
66
62
64
68
10
74
76
13
70
72
78
84

FIG.7

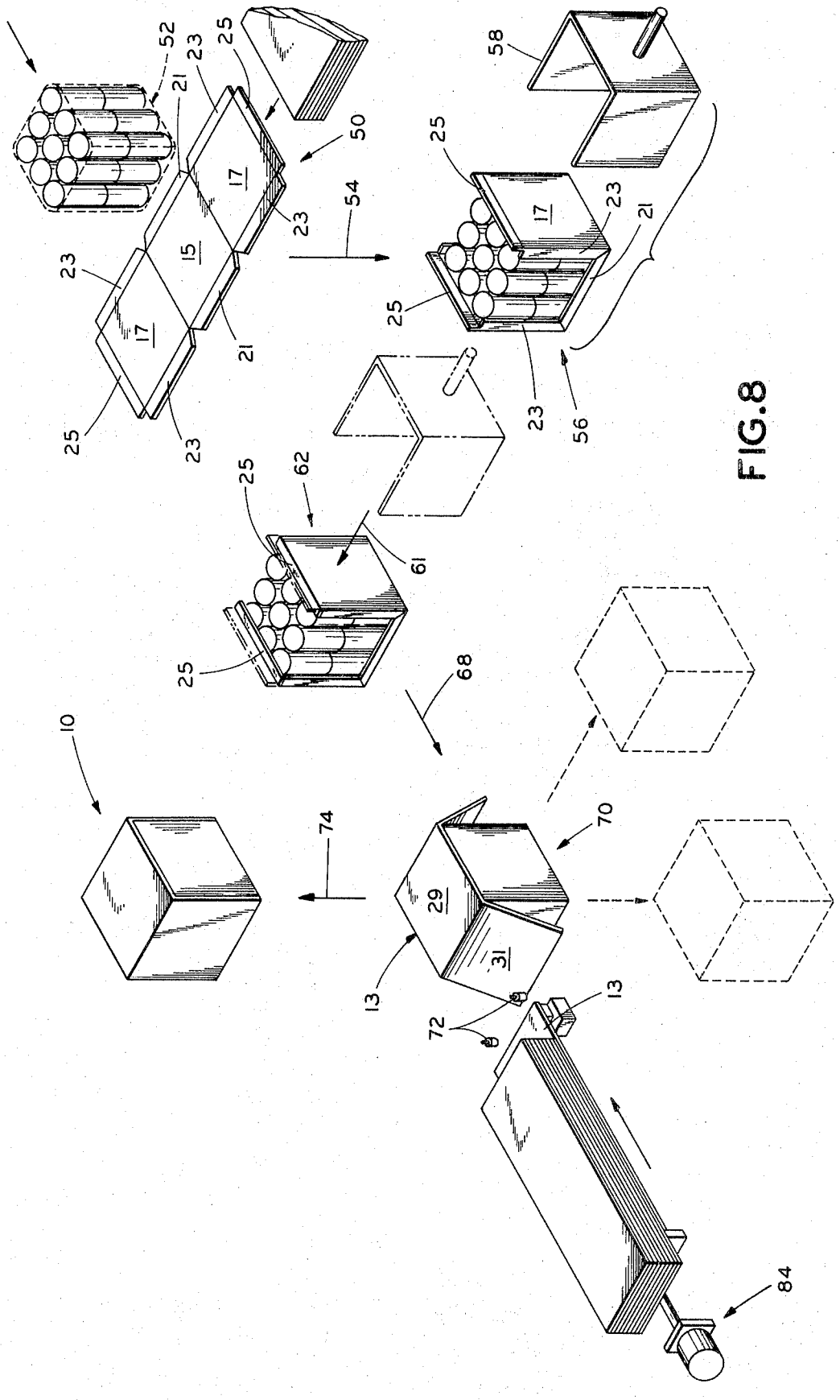


FIG.8

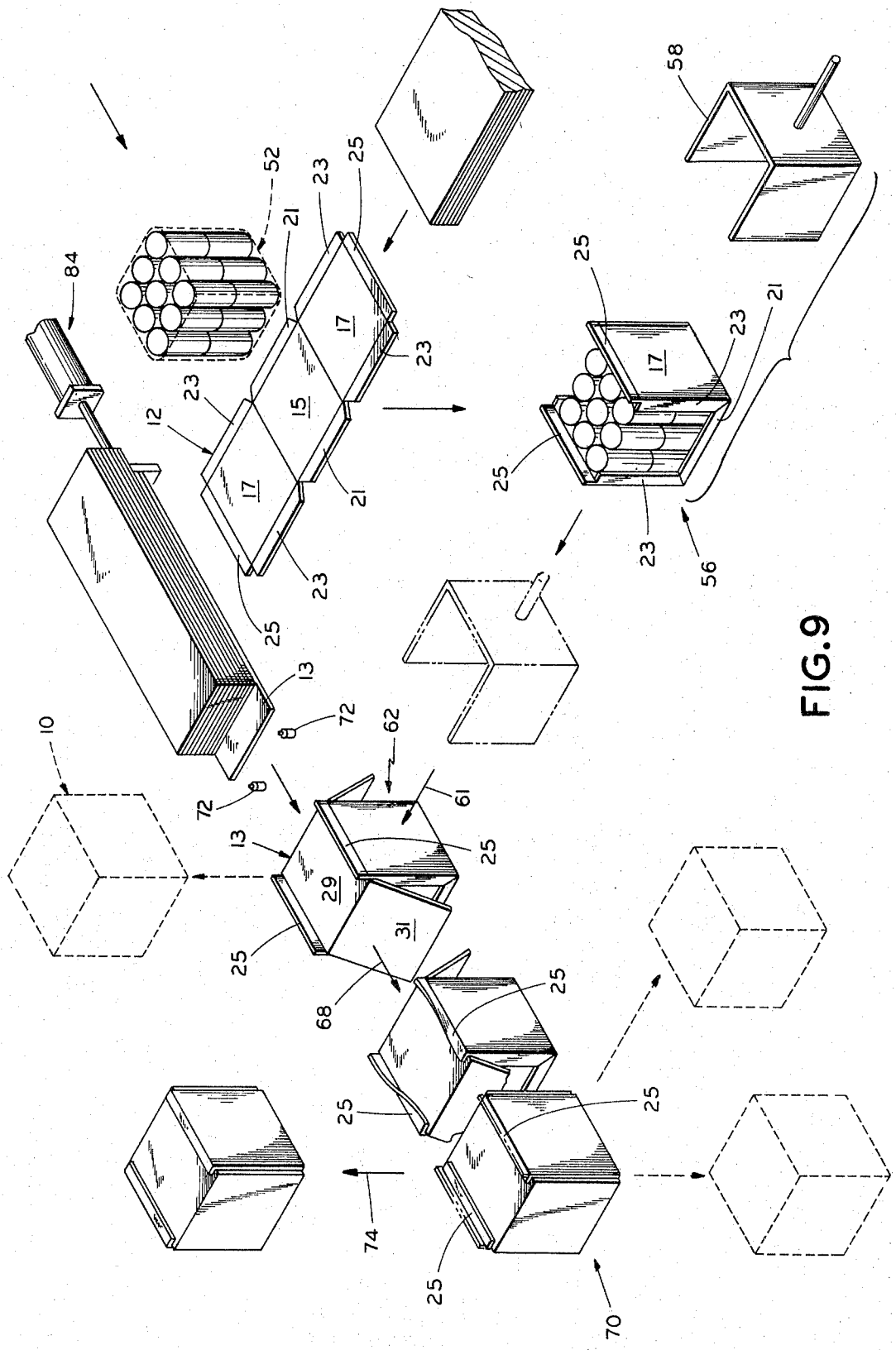


FIG.9

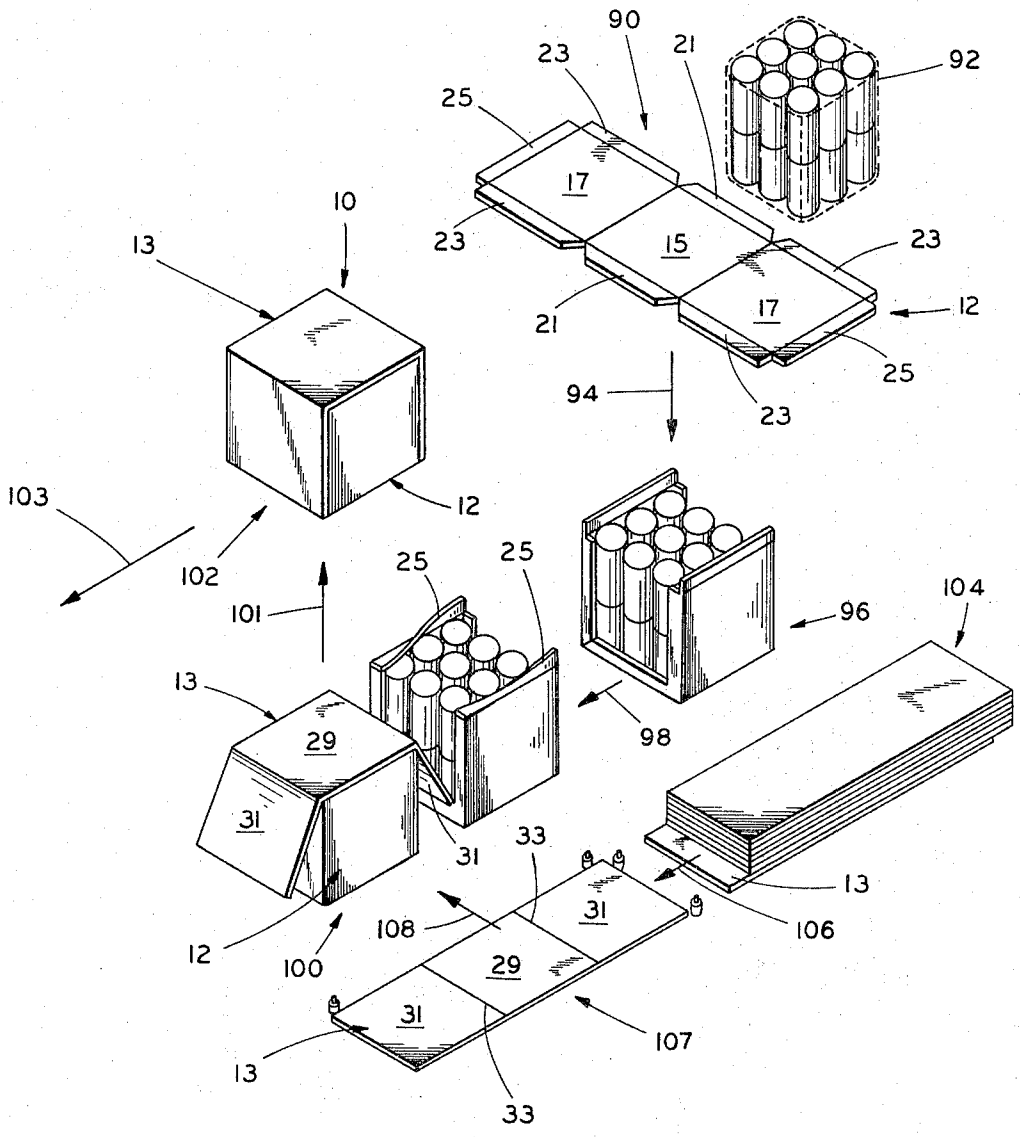

90
23
21
92
25
17
10
13
23
15
23
21
17
12
25
94
23
103
12
102
101
25
25
96
104
13
29
98
31
31
33
13
108
106
12
100
29
31
107
13
33

FIG.10

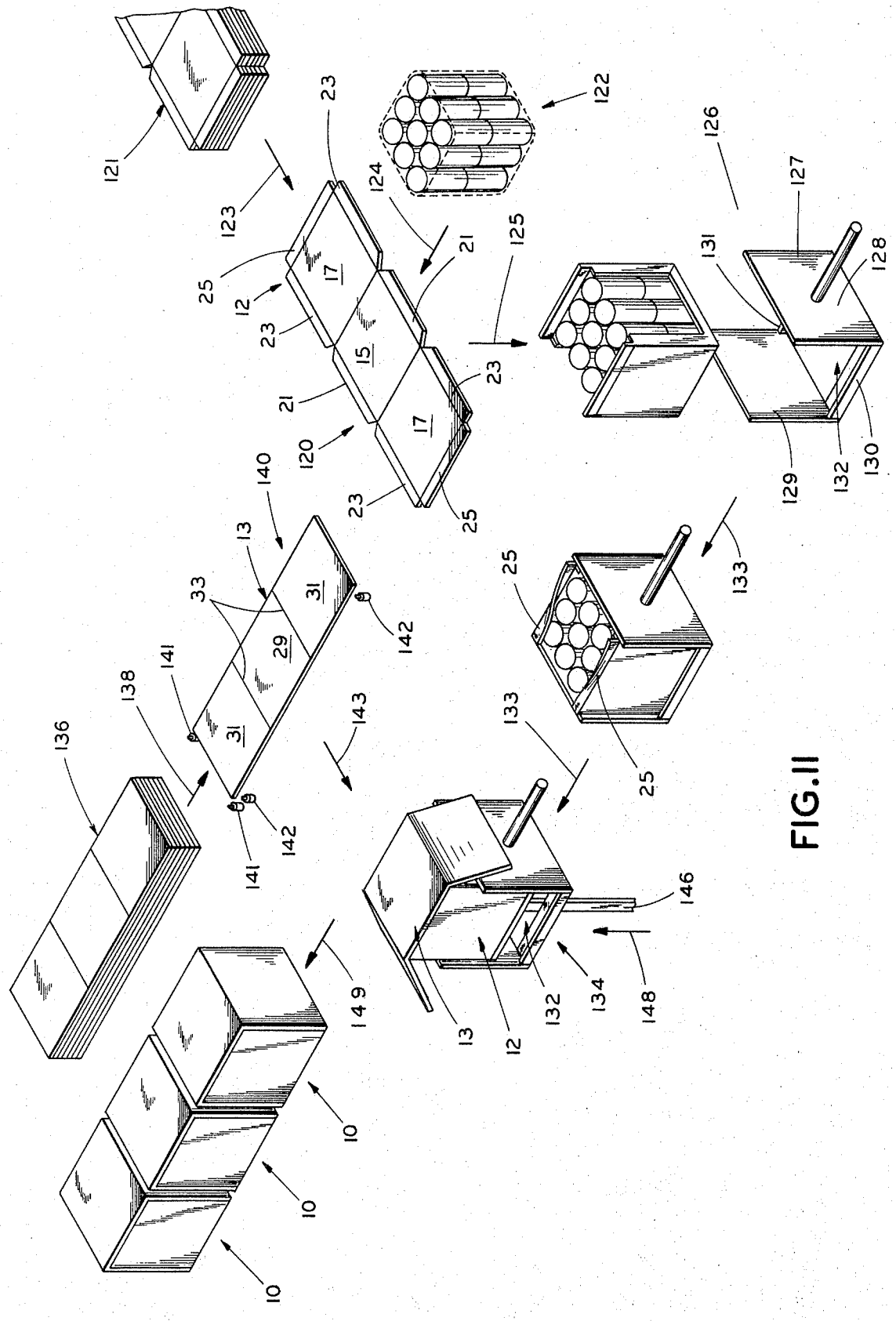

121
123
23
122
124
126
127
125
21
131
128
25
12
23
15
17
23
21
120
23
25
129
132
130
140
13
33
31
29
142
133
25
141
138
136
143
133
25
141
142
146
149
13
12
132
134
148
10
10
10

FIG. II

METHOD FOR FORMING A PACKAGE

RELATED APPLICATION

This application is a continuation-in-part of my co-pending application Ser. No. 57,945 filed on July 24, 1970 now abandoned.

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to a method for forming a package. More particularly it relates to a method for packaging a quantity of lading where the container for the lading is formed from two separate blanks made of rigid foldable material.

Packaging containers currently in use conventionally include relatively large flaps or flanges overlapped to form one or more walls, usually the top and bottom of the container. Use of overlapped flanges in this manner results in a significant waste of raw material, a major factor in container cost.

In addition, containers or cartons formed of cardboard, corrugated board, folding carton box board, fiberboard, and the like are conventionally made using a single blank stamped from a sheet or roll of material. Provision of a blank including the various flaps and flanges necessary to the final container shape requires that the blank be substantially larger than the final container dimensions. This results in further waste of raw material because of the quantities of offal produced.

In many instances these types of containers require secondary operations to provide partial assembly prior to filling. For example, one common type of corrugated container is made of a single blank defining four side walls each provided with outward extending flaps at opposite ends which define the top and bottom walls. Three of the four corners between adjacent side walls are defined by fold lines or creases provided in the blank. The fourth is provided by connection between the opposite transverse edges of the blank. This is done either by gluing a flap formed at one transverse edge to the opposite side wall or by taping.

The blank, when pre-assembled as described, may be delivered to the user in a knocked down flat condition. When used, the side walls are merely positioned such that adjacent walls are mutually perpendicular and the flaps folded and fastened together to form the top and bottom walls. The utilization of a partially pre-assembled blank simplifies to some extent the actual packaging operation. However, the necessity of performing secondary operations upon the blank contributes to the overall cost of the container.

Other problems, such as hermetic sealing of the container, cannot be readily accomplished unless separate insert panels are incorporated in the container construction. This results in further material cost and increased complexity of assembly procedures.

Containers of the general type having overlapped flanges forming one or more of the walls cannot be conveniently adapted to provide a reclosable lid, nor is it practical, without substantial increase in complexity and material cost, to provide means for carrying the resulting package.

In the package formed by the method of the present invention these deficiencies are overcome by utilization of two separate blanks, interconnected for form the container of the package. Maximum utilization of

materials is accomplished and a versatile container readily adaptable to a variety of specific applications is provided. The method of the invention is primarily applicable to the formation of master shipping containers for quantities of pre-packaged canned or boxed goods.

Containers formed of two separate blanks have been devised in the past. However, the method of interconnection used and the complicated assembly procedures required have detracted from their adaptability as a commercially acceptable arrangement for packaging.

Example of such prior art containers and packages, and methods and apparatus for assembling same, are disclosed in the following patents: U.S. Pat. No. 3,272,419; U.S. Pat. No. 3,500,609; U.S. Pat. No. 3,622,063; U.S. Pat. No. 3,654,745; Canadian Pat. No. 796,155.

The present invention differs from the inventions disclosed in the above listed patents in that there is provided a method for forming a package containing a quantity of lading wherein the container for the lading is formed from two blanks made of rigid foldable material, each blank including an end wall and alternate side wall forming panels, one being unflanged and one including peripheral flanges along each longitudinal and transverse edge, the method including the steps of forming one of the blanks into a generally U-shape concurrently in partially surrounding relation to the lading, forming the other of the blanks into a generally U-shape concurrently in partially surrounding relation to the first blank and its lading with the end wall forming panels in opposed facing relation, and securing each alternate side wall forming panel of the unflanged blank to the peripheral flanges along one longitudinal edge of the flanged blank to form the package. The blanks are not attached to each other during the folding thereof.

The individual steps of the method can be accomplished in several different ways and in different sequence as will be disclosed hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a package formed by the method of the present invention;

FIG. **2** is a perspective view of a blank utilized in forming a part of the package shown in FIG. **1**;

FIG. **3** is a perspective view of another blank utilized in forming a part of the package shown in FIG. **1**;

FIG. **4** is an exploded perspective view of the container of the package shown in FIG. **1**;

FIG. **5** is a perspective view of another package formed by the method of the present invention;

FIG. **6** is a perspective view of another package which may be formed with the method of the invention;

FIG. **7** is a flow diagram illustrating various successive steps that can be followed in practicing several specific packaging methods of the invention;

FIG. **8** is a flow diagram illustrating various successive steps that can be followed in practicing further specific packaging methods of the invention;

FIG. **9** is a flow diagram illustrating various successive steps that can be followed in practicing additional specific packaging methods of the invention;

FIG. **10** is a flow diagram illustrating successive steps that can be followed in practicing another specific packaging method of the invention;

FIG. 11 is a flow diagram illustrating successive steps that can be followed in practicing still another specific packaging method of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, there is shown in FIGS. 1 to 4 a packaging container generally designated 10 which is formed by the method of the invention.

The container 10 is made of any suitable material which is rigid and foldable such as cardboard, fiberboard, corrugated board, folding carton box board and the like. The container size and shape may vary as desired. Also the steps of the method can be utilized in forming master shipping containers usually made of corrugated board and smaller cartons or boxes made of folding carton box board.

The container 10 is formed of two separate blanks, 12 and 13, one flanged and one unflanged, each formed to a generally U-shape and fastened together to form the completed shape. The blanks 12 and 13 are shown in FIGS. 2 and 3 respectively. Each blank includes a center panel which forms an end wall and alternate side panels which form side walls of the container 10. In the Figures the blanks are positioned to show the surfaces of the panels that define the exterior of the container walls in order that the manner of interconnection of the blanks be best understood.

The flanged blank 12 is divided into a center, end wall forming panel 15 and alternate side wall forming panels 17 by score lines or fold lines 19. The end wall forming panel 15 is provided with a pair of peripheral flanges 21 along the longitudinal edge of the blank. The alternate side wall forming panels include peripheral flanges 23 along each longitudinal edge and a peripheral flange 25 along the transverse edge of the blank. The blank is provided with fold lines or creases 27 which separate the flanges from the adjacent wall forming panels.

The flanges 21 and 23 along each longitudinal edge are separated by a generally V-shaped notch formed at each fold line or crease 19. The notches of course can also be rectangular or square resulting in overlapping or separated corners of the flanges 21 and 23. The flanges 23 and 25 are in turn separated by a generally right angle notch formed at each corner of the blank. It is readily apparent therefore that the blank 12 may be formed from a sheet or roll of material with only a minimum of waste, namely, that amount of material removed to form the notches.

The unflanged blank 13 includes an end wall forming portion 29 and alternate side wall forming panels 31 separated by creases or fold lines 33. This blank is void of any notches or slits and can be readily formed from sheet stock with negligible waste of material.

As seen in FIGS. 1 and 4, the assembled container is defined by interconnection of the blanks 12 and 13. The alternate side wall forming panels of each blank are generally perpendicular to the end wall forming panels along creases 19 and 33 and are interposed between the side wall forming panels of the other blank. The flanges 21 and 23 along opposite longitudinal edges of the blank 12 are disposed generally perpendicularly to their adjacent wall forming panels as are the flanges 25 along the transverse edges of the blank 12. They extend inwardly with respect to or generally away from the surface of the blank defining the exterior surface of the container 10. The notches provided in the flanged blank accommodate the positioning of the flanges without overlap of material.

In the embodiment of FIGS. 1 to 4 the unflanged blank is disposed such that each opposing side wall forming panel 31 is in overlying relation to and connected to the flanges formed on one longitudinal edge of the flanged blank 12. The end wall forming panel 29 of the unflanged blank is in turn positioned in overlying relation and connected to the flanges 25 along the transverse edges of the flanged blank 12. In this way a completely enclosed container is provided free of any open slots which would allow entry of contaminants. Also of significant importance is the fact that the external surface of the container is completely free of exposed flaps or flanges which would be accidentally engaged upon other objects during use. This precludes to a significant degree accidental damage that might be occasioned by the pressure of such flaps or flanges on the exterior surface of the container and presents a neat appearance.

The method for forming the container 10 by connecting the unflanged blank 13 to the flanges of the flanged blank 12 may vary widely depending upon the specific application. Solid thermoplastics material or other adhesive may be applied to the flanges of the flanged blank 12 or to the contacting surface of the unflanged blank 13. The adhesive pattern may be intermittent providing only sufficient bonding to prevent inadvertent opening or, when complete hermetic sealing is required, the adhesive may be applied as in a continuous strip extending around the notches formed in the blank as shown by the pattern 35 in FIG. 2. With this latter arrangement the adhesive completely seals the container without the necessity of inserted panels within the container as is required in conventional containers.

Adhesives such as glues or tapes are suitable for interconnection of the blanks 12 and 13. Another highly suitable adhesive is a thermoplastic solid material that is liquid at elevated temperature and solid at normal room temperature. Such a product is commonly known as hot melt adhesive. Also, staples, brads, or other mechanical fasteners could be used with effectiveness.

Assembly of the container 10 is accomplished as illustrated in FIG. 4. Typically, the flanged blank 12 is first formed into a generally U-shape along fold lines 19 around lading to be packaged. The peripheral flanges 21 and 23, along each longitudinal edge, are then folded generally perpendicularly to their respective wall defining positions along fold lines 27 to form a generally U-shaped planar surface along each longitudinal edge and partially about a quantity of lading.

In the embodiment illustrated, the flanges 25 along the transverse edges of the blank 12 are also folded generally perpendicularly to the adjacent wall defining panels. All flanges are folded away from the surface of the blank which defines the exterior of the container.

The unflanged blank 13 is positioned with the center, end wall forming panel 29 in overlying relation to the flanges 25 of the flanged blank 12, and each side wall forming panel 31 is folded along scores 33 to respectively overlie the flanges 21, 23 along one longitudinal edge of the blank 12. The end wall 29 and side walls 31

are connected to the flanges as by the adhesive strip **35.**

The lading is placed upon the flanged blank **12** prior to folding of any part thereof or can be placed upon the partially formed flanged blank prior to folding of the flanges **25** and connection of the unflanged blank **13** to the flanges **21, 23** and **25.**

It must be appreciated that the precise sequence of steps in assembling the container **10** may vary somewhat depending upon the specific application. For example, in a high-speed continuous flow packaging operation, the flanges **21, 23** might first be folded perpendicularly to the panels **15** and **17** of the blank prior to forming the blank into a generally U-shape. Also, the forming of the unflanged blank **13** into a generally U-shape and disposition of the end wall forming panel **29** and side wall forming panels **31** in overlying relation to the associated flanges of the flanged blank may be accomplished in a variety of ways. The entire procedure could be accomplished simultaneously, or the end wall forming panel could be disposed in overlying relation to the flanges **25,** and the side wall panel **31** then folded into position.

It should be noted that disposition of the unflanged blank **13** in overlying relation to the flanges of the flanged blank **12** not only achieves the important advantages of providing a container having a smooth outer surface free of exposed flanges or flaps but in addition contributes to effective sealing of the container when the connection between blanks is made with adhesive. The normal tendency of the flanges is to return to their initial planar position and thus they will urge outwardly against the interior surface of the unflanged blank **13.** By resisting outward movement of the unflanged blank during the fastening stage of assembly, the outward spring action of the flanges causes compression of the adhesive between the flanges and the inner surface of the unflanged blank insuring a complete bond.

In FIG. **5,** there is illustrated a slightly modified form of container which is made by the method of the invention. This container is formed of blanks essentially identical to the blanks **12** and **13** illustrated in FIGS. **2** and **3.** However, the interconnection between blanks is somewhat altered to provide certain specific advantages.

Here each side wall panel **31** of the unflanged blank **13** is disposed in overlying relation to and is connected to the flanges **21** and **23** along one longitudinal edge of the flanged blank **12** as in the previous embodiment. However, the flanges **25** along the transverse edges of the flanged blank overlie and are affixed to the outer surface of the end wall forming panel **29** of the unflanged blank. It is believed that this arrangement provides increased resistance to longitudinal separation of the blanks by virtue of the overlap of the flange **25** upon the end wall defining portion **29.**

FIG. **5** illustrates another modification in the formation of the container. One of the alternate side walls **31** of the unflanged blank **13** is affixed to the flanges **21, 23** of one longitudinal edge by a pattern of adhesive such as the pattern **35.** The adhesive pattern provides sufficient strength to seal the container during shipping but the bond may be broken when desired to open the container without damage to the side wall or flanges. The side wall **31** thus defines a reclosable lid which may be resealed to the flanges with additional adhesive or tape. As an alternative, to the adhesive pattern **35** a tear strip type tape may be used between the flanges **21, 23** and side wall **31.**

In FIG. **6** is shown a further modified form of container formed by the method of the invention. Here the container **10** is formed of a flanged blank **12** identical to the flanged blank of previous embodiments. An unflanged blank **13***a* is provided which is somewhat larger than the unflanged blank **13,** previously described.

The unflanged blank **13***a* includes side wall forming panels **31***a,* and two end wall forming panel portions **29***a* and **29***b* separated by handle defining portions **37.** These various portions are separated by creases or fold lines **33***a.* The handle defining portions **37** include apertures **39** to form a handle opening.

At assembly the handle defining portions are folded upon one another as shown in FIG. **6** to form an upstanding handle. The end wall forming panel portions **29***a* and **29***b* are connected to the flanges **25** and the side wall forming panels are connected to the flanges **21, 23** along each longitudinal edge of the flanged blank **12** to complete the container shape.

In FIG. **7** there is illustrated a flow diagram of a series of successive steps and variations thereof which can be utilized in the packaging method of the invention for forming the package shown in FIG. **1.** In this respect, one of the blanks **12** is first positioned at a first station **50** and lading **52** is positioned on the center panel **15** of the blank **12.** The lading **52** is shown as comprising a plurality of cans and it is to be understood that the packaging methods of the invention can be utilized for packaging other types of lading. The blanks **12** are preferably fed sequentially from a stack thereof located adjacent the first station **50.** After the lading **52** has been positioned on the center panel **15,** the lading and first blank **12** are moved downwardly in a first direction indicated by the arrow **54** to a second station **56.** During the movement from the first station to the second station, the alternate side wall forming panels **17** of the first blank **12** are folded upwardly into a generally U-shape partially about the lading **52.** At the same time the flanges **21** and **23** along each longitudinal edge of the blank **12** are folded inwardly to the desired position perpendicular to the end and side wall forming panels **15** and **17.** Preferably and as exploded in FIG. **7,** the folded first blank **12** and lading **52** are received within a U-shaped pusher member **58** located at the second station **56.** The side panels of the pusher member **58** serve to retain the lading within the folded first blank **12** after the first blank **12** embodying thereon have been moved to the second station **56.**

Next a suitable operating mechanism is actuated to move the pusher member **58** thereby to move the first blank **12** and lading thereon from the second station **56** in a second direction indicated by the arrow **61** to a third station **62.** At the third station **62,** the folded first blank **12** and lading thereon are received on a slide plate **64.** After the U-shaped member has been retracted to a position shown in phantom lines, another pusher member **66** is operated to move the folded first blank and lading thereon from the third station in a third direction indicated by the arrow **68** to a fourth station **70.** As shown, the transverse flanges **25** are folded during the movement of the folded first blank and lading from the third station **62** to the fourth station **70.** Typically, this is done by moving the transverse flanges **25** past stationary plow or folding members. Of

course, it is also to be understood that the transverse flanges **25** can be folded downwardly while the folded first blank is at the third station.

At the fourth station **70**, a second blank **13** is moved to a location over the folded first blank with lading thereon. If an adhesive has not been previously applied to the exterior facing surfaces of the flanges **21** and **23**, each second blank **13**, as it is moved from a magazine adjacent the station **70** to a position over a folded first blank with lading thereon, can be moved past adhesive applicators such as the applicators **72**.

In FIG. **7** the blank is shown in a partially folded position as it is being folded into a generally U-shape about the lading positioned on the folded first blank **12**. Initially the blank is positioned, unfolded, over the folded first blank. In accordance with one packaging method, the folded first blank **12** with lading thereon is moved upwardly in a fourth direction indicated by the arrow **74** to engage the unfolded second blank **13** at the fourth station **70**. Typically this is accomplished by a vertically movable pusher member **76**. Folding members are positioned above the fourth station **70** adjacent the path of movement of the blanks **12** and **13** such that after the folded first blank engages the second blank **13** continued upward movement of the blanks **12** and **13** will cause the second blank **13** to engage the folding members which will then fold the alternate side panels **31** downwardly into the general shape of a "U" about the lading on the folded first blank **12**. In this way a complete package **10** is formed after the blanks **13** and **12** have completed their upward movement from the fourth station **70** to a fifth station **78**. If desired, the fifth station **78** can include a compression chamber of known type wherein pressure is applied to the side walls of the package for the purpose of maintaining the side wall forming panels **31** of said second blank **13** in engagement with the flanges **21** and **23** of the first blank while the adhesive therebetween sets. The pressure on the side walls of the package **10** will impede upward movement of each package **10** through the compression chamber such that the bottom wall **15** of a first formed package **10** will bear against the top wall panel **29** of a subsequent package **10**. As a result, in the compression chamber, pressure is also applied against the top wall **29** thereby to press the top wall panel **29** against the transverse flanges **25** to assist the setting of the adhesive therebetween.

A variation of the packaging method just described could be to fold the blank **13** partially about the lading as it is resting on the folded first blank **12** at the fourth station **70**. This can be accomplished by a vertically reciprocable U-shaped forming device (not shown) which would move downwardly after the blank **13** has been moved to the station **70**, and then retracted upwardly to allow movement of the completed package from the fourth station **70**. As shown in phantom lines, the package completed in this manner at the fourth station **70** can be moved by a suitable pusher member either downwardly or laterally and in either case to a compression chamber of the type just described.

The method steps and the variations thereto just described above can be accomplished with suitable mechanisms some of which are partially shown in FIG. **7**. Other mechanisms for performing the methods, such as for example stationary folding members adjacent the path of movement of the blank **12** from the first station **50** to the second station **56**, carriages and pusher members for moving the first folded blank with lading thereon in the various directions illustrated and compression chambers of the type described above can be found in U.S. Pats. Nos. 3,531,914 and 3,665,675, the disclosures of which are incorporated herein by reference.

The method steps shown in FIG. **8** are substantially the same as those shown in FIG. **7** except that the modification of folding the transverse flaps **25** downwardly at the third station **62** is shown in FIG. **8**. Also, and as better shown in FIG. **9**, after folding the transverse flaps **25** downwardly at the third station **62** or while the folded first blank **12** is being moved from the second station **56** to the third station **62**, a second blank **13** can be moved over the folded first blank **12** at the third station **62** and then the folded first blank can be moved upwardly to engage the second blank **13** and to move the second blank **13** past stationary folding members which fold the alternate side wall panels thereof downwardly into engagement with the flanges **21** and **23** of the first blank **12** to complete the formation of a package **10** shown in FIG. **8** with flanges **25** underneath center panel **29**. This completed package can be moved into a compression chamber from which it can be moved laterally. Of course, the package could be completed at the third station **62** by folding the blank **13** downwardly into a generally U-shape about the lading on the folded first blank situated at the third station **62**. Subsequently, the completed package could be moved laterally or downwardly into a compression chamber.

It is to be appreciated that the transverse flanges **25** can be omitted from the first blank **12**, in which case the folding operation of the transverse flanges shown in FIG. **8** could be omitted and a second blank **13** can be moved over the folded first blank at the third station **62** as shown in FIG. **9**. In this variation of the packaging method of the invention, the step of moving the folded first blank **12** from the third station **62** to the fourth station **70** can be omitted.

Other than folding the transverse flanges **25** at the third station **62** instead of folding them while moving the folded first blank from the third station **62** to the fourth station **70**, the method steps shown in FIG. **8** are identical with the method steps shown in FIG. **7**.

In FIG. **9** there is illustrated variations in the steps of the method illustrated in FIGS. **7** and **8**. The packaging method illustrated in FIG. **9** is particularly adapted for forming the packaging container shown in FIG. **5** where the transverse flanges **25** are folded over the top wall panel **29** of the second blank **13**. The method steps illustrated in FIG. **9** are for the most part identical to the method steps shown in FIGS. **7** and **8**. An important difference however is the position of a magazine for the second blank **13** adjacent the third station **62**. With this modification, the blank **13** can be positioned over a first blank **12** at the third station **62** and if desired the package can be completed at the third station **62** with the flanges **25** folded beneath or above the top wall panel **29** of the blank **13**. The resulting package can then be moved upwardly, laterally or downwardly into a compression chamber as previously described. Another variation, dependent upon the desired infeed direction of the second blank **13** and the desired arrangement of the various mechanisms is to have a rotatable platform at station **62** for rotating the first blank and

lading 90° before the second blank **13** is positioned thereover.

Of course, and as shown in FIG. **9**, the partially formed package with the transverse flanges **25** unfolded and with the alternate side wall defining panels partially folded downwardly or completely folded downwardly, can be moved in the fourth direction **68** to the fourth station **70.** The transverse flanges **25** can be folded downwardly by plow members during this movement or can be folded downwardly at the fourth station **70.** Again from the fourth station **70,** the completed package can be moved upwardly, downwardly or laterally into a compression chamber. Also it is to be understood that the folding over of the transverse flanges **25** to complete the package can be accomplished while moving the folded blanks **12** and **13** upwardly in the direction indicated by the arrow **74** to a fifth station.

Any suitable means can be utilized for moving blanks **12** and **13** from their respective magazines into the desired position at the heretofore indicated stations. Such a feeder or pusher mechanism is generally shown in FIGS. **7–9** and identified with the reference numeral **84.**

In FIG. **10** there is illustrated another sequence of steps that can be followed in practicing the method of the invention. In this specific packaging method, a first station **90** similar to the first station **50** shown in FIG. **7,** receives an unfolded first blank **12** and then a quantity of lading or product **92,** which product or lading **92** is positioned on the center panel **15** of the first blank **12.** Then the lading and first blank **12** are moved downwardly in a first direction **94** past stationary folding members which fold the panels **17** upwardly and inwardly to form the blank **12** into the general shape of a "U." Also during this downward movement the flanges **21** and **23** are folded inwardly to a position perpendicular to the respective panels **15** and **17** to which they are attached. At the end of the downward movement in the first direction **94,** the folded first blank **12** with the lading **92** thereon is located at a second station **96** from which it is pushed in a second direction indicated by arrow **98** to a third station **100.** At the third station **100** a second blank **13** is positioned over the folded first blank **12** and then the folded first blank **12** with lading thereon and with the second blank **13** positioned thereover is moved upwardly in a third direction **101** to a fourth station **102.** During this movement in the third direction **101,** the blanks **12** and **13** are moved past stationary folding members which fold the panels **31** downwardly to fold the second blank **13** into the general shape of a "U" about the folded first blank **12** and lading **92** thereon.

At the fourth station **102,** further pressure can be applied to the panels **31** and **29** to assist in the adhering of the second blank **13** to the first blank **12.** Also or in addition the completed package **10** can be moved laterally in a fourth direction **103** into a compression chamber of the type previously described.

In the method steps illustrated in FIG. **10,** the second blanks **13** are not fed directly from a magazine to a position over the folded first blank **12** at the third station **100.** Instead, the magazine or stack of blanks **104** is positioned adjacent the second station **96** with the longitudinal axis of the blanks **13** extending generally parallel to the second direction indicated by the arrow **98.** Then the lowermost blank **13** in the stack of blanks **104** is moved from the stack **104** in a direction generally parallel to the second direction indicated by the arrow **98.** This movement of the lowermost blank **13** is indicated by the arrow **106.** At the completion of the movement of the lowermost blank **13** from the stack **104,** it is located at an adhesive applying station **107** where adhesive is applied to the underside of the blank **13** along the marginal areas thereof. Alternatively, the adhesive could be applied at selective locations along the margin of the blank **13,** such as at the corners of the blank **13** and at positions adjacent the fold lines **33.** After adhesive has been applied to the underside of the blank **13** at the adhesive applying station **107,** the blank **13** is moved in the direction indicated by the arrow **108** to a position over the folded first blank **12** at the third station **100.** Then the blanks are moved as previously described to form the package **10.**

In FIG. **11** there is illustrated another series of steps which can be followed in carrying out the packaging method of the invention. In the method steps shown in FIG. **11,** a first blank **12** is moved to a first station **120** from a stack or magazine of first blanks **121,** subsequently a quantity of lading **122** is moved onto the center panel **15** of the first blank **12** at the first station **120.** It will be noted that in the arrangement shown in FIG. **11,** the positions of the lading and stack of the first blanks is reversed from the position of the lading and stack of first blanks shown in FIGS. **7–9.** As shown the first blanks **12** are moved from the magazine **121** in a direction indicated by the arrow **123** and the quantity of lading **122** is moved in another direction indicated by the arrow **124** onto the first blank **12** at the first station **120,** which direction is 90° to the direction indicated by the arrow **123.** As in the other specific methods previously described, the first blank **12** with a quantity of the lading **122** thereon is moved downwardly in a first direction **125** to a second station **126.** During this downward movement the side panels **17** are folded upwardly to form the first blank into the general shape of a "U" about the lading **122.** Also at the same time the flanges **21** and **23** are folded inwardly to a position generally perpendicular to the panels **15** and **17** to which they are attached.

The apparatus utilized in forming the package **10** with the method steps shown in FIG. **11** differs from the apparatus shown in the previous figures, in that, at the second station **126,** there is located a generally upright U-shaped blank and lading receiving framework **127.** This framework includes two upright plates **128** and **129** interconnected at their lower corners by frame members **130** and **131.** In this way the framework **127** has an open bottom indicated by the arrow **132.** When the folded first blank **12** and lading **122** thereon are received between the plates **128** and **129,** the plates **128** and **129** face the open sides of the U-shaped folded first blank **12** and thereby serve to retain the lading within the folded first blank **12.** The bottom corners of the folded first blank **12** are then supported on the frame members **130** and **131.**

After the folded first blank **12** and lading **122** are received within the framework **127,** the framework **127** is moved in the direction indicated by the arrow **133** to a third station **134.** As shown, during this movement between the second station **126** and the third station **134,** the transverse flanges **25** are folded over such as by moving them past stationary plow members.

Located catty-corner to the third station **134** is a stack or magazine of second blanks **136.** In this respect the stack **136** is located downstream of the direction indicated by the arrow **133** and laterally of this direction of movement. A suitable pusher mechanism is located beneath the stack **136** for moving the lowermost second blank **13** thereof in a direction indicated by the arrow **138** (which is parallel but opposite to the direction indicated by the arrow **133**) to an intermediate station **140.** During this movement adhesive is applied to the longitudinal marginal areas on the underside of the blank **13** by moving the blank **13** past two spaced apart adhesive applicators **141.** After the blank **13** has been received at the station **140,** it is moved in a transverse direction indicated by the arrow **143** (which is 90° to the direction indicated by the arrow **138**) to the third station **134** and to a position over the folded first blank **12** and lading **122** thereon located at the third station **134.** During this movement adhesive is applied to the transverse marginal areas of the second blank **13** by moving the blank **13** past two spaced apart adhesive applicators **142.**

After the second blank **13** has been positioned over the foled first blank and lading at the third station **134,** a pusher member **146,** which is sized to fit through the opening **132,** is moved upwardly in a third direction **148** to move the blanks and lading to a fourth station (not shown). During this movement from the third station **134** to the fourth station the second blank **13** is moved past stationary folding members which fold the side panels **31** downwardly into engagement with the flanges **21** and **23** on the first blank **12.** After the blanks and lading have been moved to the fourth station and folded to complete the formation of a package **10,** the completed packages **10** are moved in a fourth direction indicated by the arrow **149** into a compression chamber.

The method steps illustrated in FIG. **11** are preferred for many applications in that there is an inline movement of the quantity of lading **122** through an apparatus which is utilized in carrying out the method steps. Thus, as is readily apparent from FIG. **11,** the completed packages **10** exiting from a packaging machine utilized in carrying out the method steps shown in FIG. **11** will be moving in the same direction and in line with the direction of incoming lading **122.** In other words, the direction of the completed packages **10** indicated by the arrow **149** is the same as and inline with the direction of movement of the lading **122** as indicated by the arrow **124.** Another advantage to the method steps shown in FIG. **11** is the U-shaped framework which serves to maintain the quantity of lading in the folded first blank **12.** Also the opening **132** in the bottom of the framework permits the use of the pusher member **146** to move the folded first blank **12** with lading thereon upwardly out of the framework **127** at the third station **134.**

With reference to the directions indicated by the arrows **138** and **143** respectively, it is to be understood that the applicators **141** can be positioned forwardly of the position indicated and that the adhesive applicators **142** can be positioned rearwardly of the position shown. Thus the applicators **141** and **142** adjacent one corner of the blank **13** can be replaced by a single applicator positioned beneath that corner of the blank **13.** Also it is to be understood that the adhesive applied at the adhesive applying station **107** in FIG. **10** can be applied with applicators of the type shown in FIG. **11** and arranged as shown in FIG. **11.** In this respect there can be four or three applicators as described above with four being shown in FIG. **10.**

As can be appreciated the method of the present invention and the container formed thereby are suitable to a variety of packaging applications and provide for efficient utilization of raw materials and eliminate the need for secondary operations. Various features of the present invention have been particularly shown and described. However, it should be obvious that various modifications may be made without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. A method for forming a package containing a quantity of lading wherein the container for the lading is formed from two blanks made of rigid foldable paperboard material, each blank including an end wall and alternate side wall forming panels, one blank being unflanged and one blank including peripheral flanges along the sides of the end wall forming panel thereof and peripheral flanges along the sides and ends of the side wall forming panels thereof, said method including the steps of placing said lading on the end wall of said flanged blank, forming the flanged blank into a generally U-shape and concurrently partially surrounding said lading, infolding said flanges located on the sides of said panels of the flanged blank, subsequently infolding the flanges on the ends of the side wall forming panels of the flanged blank, forming the second said blank into a generally U-shape and concurrently partially surrounding said lading with said end wall forming panels in opposed facing relation, and with the side wall forming panels of one blank being disposed at 90° to the side wall forming panels of the other blank, and securing each said alternate side wall forming panel of said unflanged blank to said peripheral flanges along one longitudinal edge of said flanged blank to form the package, the flanged blank being formed into said U-shape while physically separated from the other blank.

2. The method according to claim **1** wherein said flanged blank is first formed into a generally U-shape in partially surrounding relation to said lading, and wherein said flanges along the sides of said alternate side wall forming panels are thereafter formed generally perpendicular to said side wall forming panels and said unflanged blank is next formed into a generally U-shape in partially surrounding relation to said lading with said end wall forming panels in opposed facing relation, and each said alternate side wall forming panel thereof is connected to said peripheral flanges of said flanged blank to form the package.

3. A method for forming a package using first and second generally rectangular blanks of paperboard material, each including a center panel and alternate side panels, and said first blank including flanges along the longitudinal edges of the center and side panels and flanges along the ends of the side panels, said method comprising the steps of: positioning said first blank unfolded in a desired position; arranging lading to be packaged on the center panel of said first blank; folding said first blank into a generally U-shape partially about the lading with said center panel forming a bottom wall and said side panels forming two side walls; folding said flanges along each longitudinal edge and along the ends of each side panel to a position generally perpendicular

to said associated side walls and bottom wall; positioning said second blank over said lading and said folded first blank; folding said second blank into a generally U-shape partially about said lading with said center panel forming a top wall and with each alternate side panel positioned in overlying relation to the flanges along one longitudinal edge of said first blank with the side panels of one blank being disposed at 90° to the side panels of the other blank; and securing said flanges of said first blank to said top and side wall forming panels of said second blank.

4. The method according to claim **3** wherein said first blank is folded into a generally U-shape partially about the lading prior to the folding of said flanges of said first blank.

5. The method according to claim **3** wherein flanges of said first blank are folded prior to the folding of said first blank into a generally U-shape partially about the lading.

6. The method according to claim **3** wherein said flanges of said first blank are folded simultaneously with the folding of said first blank into a generally U-shape partially about the lading.

7. The method according to claim **3** wherein said method includes the steps of folding the flanges located along the ends of said side panels to a position generally perpendicular to said associated side wall forming panels prior to positioning said second blank over said lading and said folded first blank, positioning said center panel of said second blank in overlying relation to said end flanges, and securing said top wall forming center panel of said second blank to said end flanges of said first blank, said flanges having a tendency to spring back to their original position and in so doing bear against said second blank and thereby assist in the securing of said first blank to said second blank.

8. The method according to claim **3** wherein said lading is arranged on said center panel of said first blank at a first station after which said lading and said first blank are moved downwardly in a first direction to a second station and said folding of said first blank into a generally U-shape and the folding of flanges is accomplished by moving said first blank downwardly in said first direction past a stationary folding means.

9. The method according to claim **8** including the step of moving the folded first blank in a second direction, laterally of said first direction, to a third station.

10. The method according to claim **9** wherein said second blank is positioned over said folded first blank and lading thereon at said third station and is then folded into a generally U-shape partially about said lading.

11. The method according to claim **9** wherein said second blank is positioned over said folded first blank and lading thereon at said third station after which said first and second blanks are moved upwardly in a third direction past a stationary folding means which engages said second blank and folds said second blank into said generally U-shape about said lading.

12. The method according to claim **9** wherein said folded first blank and lading thereon are moved laterally in a third direction to a fourth station, said second blank is positioned over said folded first blank and lading thereon at said fourth station and is then folded into said generally U-shape about said lading.

13. The method according to claim **10** wherein said panels of said second blank are secured to said flanges of said first blank by an adhesive applied to either the marginal area of said second blank or to the outer facing sides of said flanges and, after said alternate side panels of said second blank are folded against said flanges, said completed package is moved into a compression chamber where pressure is applied to said side walls of said package to maintain the side wall forming panels in place while the adhesive sets.

14. The method according to claim **11** wherein said panels of said second blank are secured to said flanges of said first blank by an adhesive applied to either the marginal area of said second blank or to the outer facing sides of said flanges and, after said alternate side panels of said second blank are folded against said side flanges, said completed package is moved into a compression chamber where pressure is applied to said side walls of said package to maintain the side wall forming panels in place while the adhesive sets.

15. The method according to claim **12** wherein said panels of said second blank are secured to said flanges of said first blank by an adhesive applied to either the marginal area of said second blank or to the outer facing sides of said flanges and, after said alternate side panels of said second blank are folded against said flanges, said completed package is moved into a compression chamber where pressure is applied to said side walls of said package to maintain the side wall forming panels in place while the adhesive sets.

16. The method according to claim **3** wherein said panels of said second blank are secured to said flanges of said first blank by an adhesive applied to either the marginal area of said second blank or to the outer facing sides of said flanges and, after said alternate side panels of said second blank are folded against said flanges, said completed package is moved into a compression chamber where pressure is applied to said side walls of said package to maintain the side wall forming panels in place while the adhesive sets.

17. The method according to claim **9** wherein said method includes the step of folding said flanges along the ends of the side panels over to a position perpendicular to said alternate side panels attached thereto at said third station.

18. The method according to claim **17** including the step of positioning said second blank over said folded first blank and lading thereon after said flanges have been folded.

19. The method according to claim **18** wherein said alternate side panels of said second blank are folded downwardly to fold said second blank into a generally U-shape about the lading at the third station after said second blank has been positioned over said folded first blank and lading thereon.

20. The method according to claim **19** wherein said panels of said second blank are secured to said flanges of said first blank with an adhesive and wherein said method includes the step of moving said completed package laterally in a third direction into a compression chamber where pressure is applied to the walls of said package to maintain the wall forming panels in place while the adhesive sets.

21. The method according to claim **18** including the step of moving said folded first blank with said lading thereon upwardly into engagement with said second blank and past a folding means which engages and folds

over said alternate side panels of said second blank and into engagement with the folded longitudinal flanges on each side of said first blank.

22. The method according to claim **21** wherein said first and second blanks are moved upwardly in said third direction past said folding means and into a compression chamber where pressure is applied to the walls of said package to maintain the wall forming panels in place while adhesive which has been previously applied to either the flanges of the first blank or longitudinal marginal areas of said second blank is allowed to set for the purpose of securing the second blank to said flanges of said first blank.

23. The method according to claim **9** wherein said method includes the step of moving said folded first blank with lading therein in a third direction laterally of said second direction to a fourth station and said flanges on the ends of the side panels being folded over to a position perpendicular to the side wall panels attached thereto during the movement of said folded first blank with lading thereon from said third station to said fourth station.

24. The method according to claim **23** wherein said second blank is positioned over said folded first blank with lading thereon at said fourth station.

25. The method according to claim **24** wherein said folded first blank with lading thereon and with said second blank thereover is moved upwardly in a fourth direction past a stationary folding means which engages and folds said alternate side panels of said second blank downwardly into engagement with the respective flanges of said first blank, the flanges on the ends of the side panels being brought into contact with the underside of the center panel of said second blank during said upward movement.

26. The method according to claim **25** wherein said first and second blanks are moved upwardly past the stationary folding means into a compression chamber where pressure is applied to the walls of the package to maintain the wall forming panels of the second blank in engagement with the flanges of the first blank while adhesive which has been previously applied to either the flanges or to the longitudinal and transverse marginal areas of the second blank sets.

27. The method according to claim **24** wherein said alternate side panels of said second blank are folded downwardly to fold said second blank into the general shape of a "U" about the lading positioned on said first blank thereby to bring the panels of said second blank into engagement with the flanges of said first blank.

28. The method according to claim **27** wherein said panels of said second blank are secured to the flanges of said first blank with an adhesive which has been previously applied to either the longitudinal and transverse marginal areas of the second blank or to the flanges and wherein said method includes the step of moving said folded first and second blanks with lading therebetween laterally in a fourth direction into a compression chamber where pressure is applied to the walls of the package to maintain the wall forming panels of the second blank in engagement with the flanges of said first blank while the adhesive sets.

29. The method according to claim **9** wherein said second blank is positioned over said folded first blank with lading thereon at said third station and said folded first blank and lading are moved upwardly into engagement with said second blank and past a stationary folding means which engages and then folds said alternate side panels of said second blank downwardly into engagement with said flanges of said first blank.

30. The method according to claim **29** wherein said first and second blanks are moved upwardly in said third direction past said stationary folding means and into a compression chamber where pressure is applied to the walls of the package to maintain the side wall forming panels of said second blank in engagement with the flanges of the first blank while an adhesive therebetween, which has been previously applied to either the flanges of the first blank or to the longitudinal and transverse marginal areas of said second blank, sets.

31. The method according to claim **9** wherein said second blank is positioned over said folded first blank and lading thereon at said third station and is then folded about the lading into the general shape of a "U."

32. The method according to claim **31** wherein said flanges are secured to the alternate side panels of said second blank with an adhesive which has been previously applied to either the flanges or to longitudinal and transverse marginal areas of the second blank, and wherein said method includes the step of moving the completed package from the third station laterally in a third direction into a compression chamber where pressure is applied to the side walls of the package to maintain the side wall forming panels of the package in engagement with the flanges while the adhesive therebetween sets.

33. The method according to claim **2** wherein said peripheral flanges along the ends of said side wall forming panels are infolded after said second blank is formed into U-shape partially surrounding said lading, and said infolded flanges being secured to the outer surface of the end wall panel of said second blank.

34. The method according to claim **9** including the step of folding the flanges located along the ends of said side panels to a position generally perpendicular to said associated side wall forming panels while moving said folded first blank in said second direction between said second and third stations.

* * * * *