United States Patent [19]

Blatt

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[45] **Mar. 25, 1975**

[54] **CORRUGATED POLYGONAL CONTAINER**

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[73] Assignee: **Franklin Container Corporation,** Philadelphia, Pa.

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[21] Appl. No.: **348,660**

[52] **U.S. Cl.** ..... **229/41 C,** 229/14 BL

[51] **Int. Cl.** **B65d 5/36**

[58] **Field of Search** .... 229/41 C, 41 D, 41 R, 14 R, 229/14 C, 14 BE, 14 BW, 14 BL, 43 R, 7

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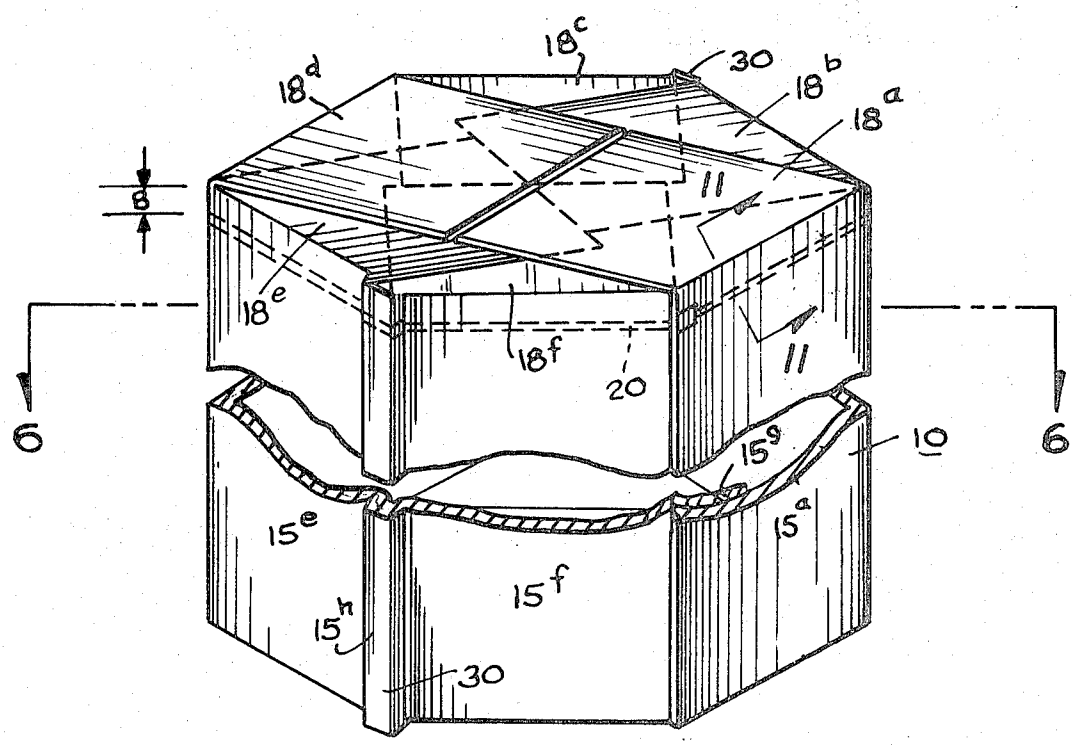
Primary Examiner—George F. Mautz

Attorney, Agent, or Firm—Edelson and Udell

[57] **ABSTRACT**

A polygonal shipping container, preferably hexagonal, formed of die cut blanks of corrugated paper board superposed and glued one upon another to provide a tubular type container having a side wall of triple ply thickness, the several plies of corrugated board being so respectively transversely scored and assembled as to permit the container to be knocked down into a flattened condition from which it may be easily erected into its expanded form for receiving and shipping goods. The outer ply of the container is provided at its opposite ends with end closure flaps which are designed to be infolded from each of the side wall panels of the container to provide a plurality of layered coplanar pairs of said flaps having their meeting edges disposed in abutting relation. Diametrically opposed corners of the container are fluted to permit stress-free folding of the container into flattened condition and provide hand hold ribs for rolling the container about its central axis and for otherwise conveniently handling the container. The corrugations of the inner plies extend orthogonally with respect to those of the outer ply of the container to strengthen and rigidify its side walls, the latter being internally shouldered at opposite ends thereof to receive removable end pads which each underlie the multi-layered end closure flaps. The container is provided with a tear tape for partially or completely detaching one end closure from its main body portion.

6 Claims, 11 Drawing Figures



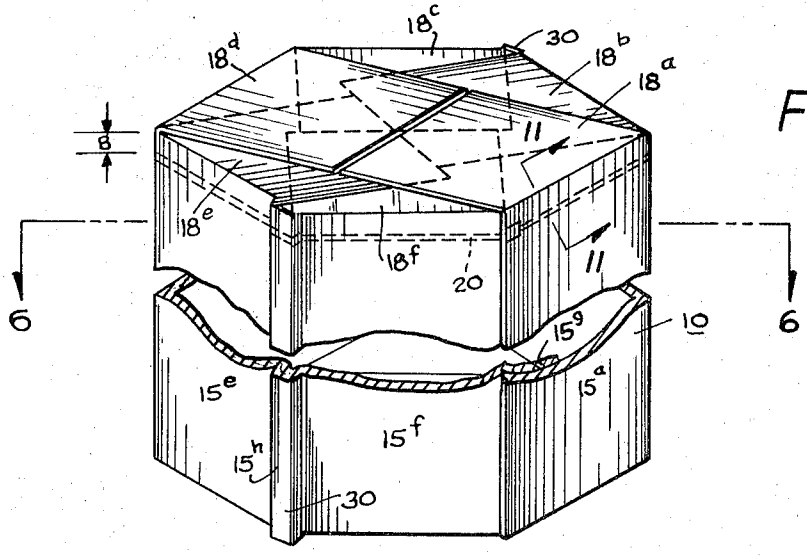


FIG. 1

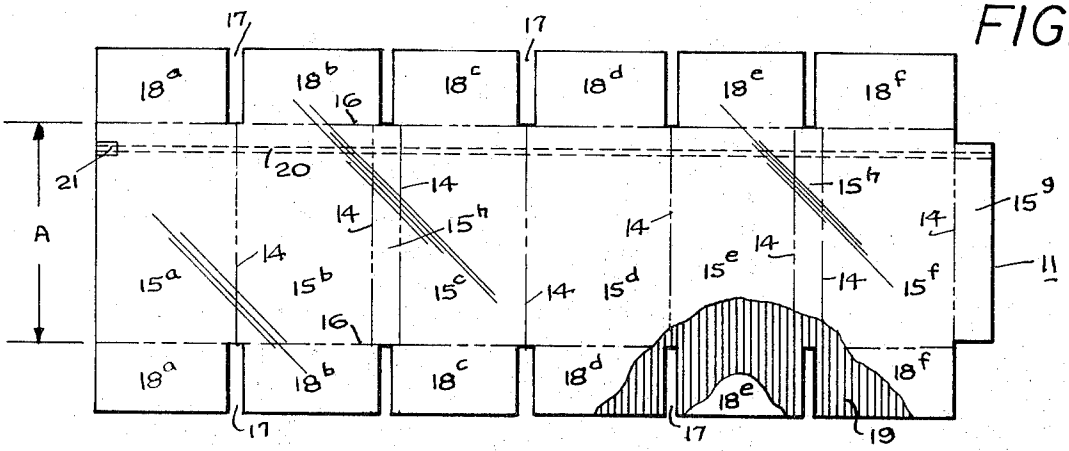


FIG. 2

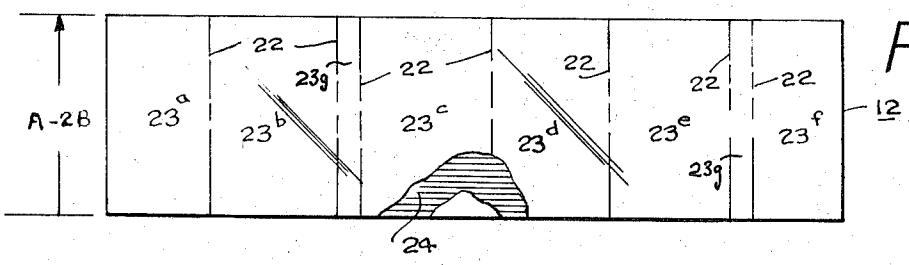


FIG. 3

FIG. 5

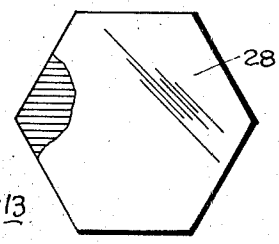


FIG. 4

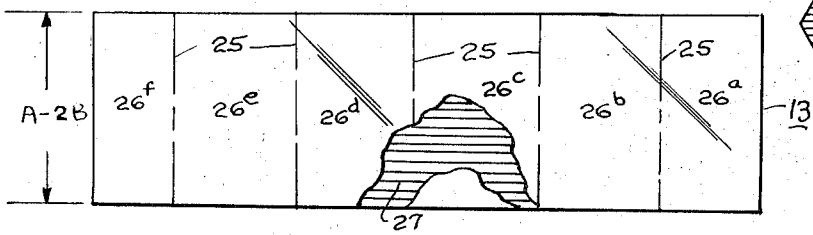
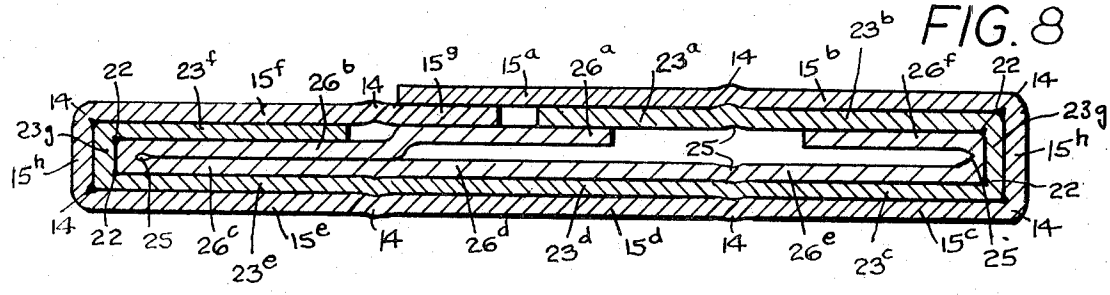


FIG. 8



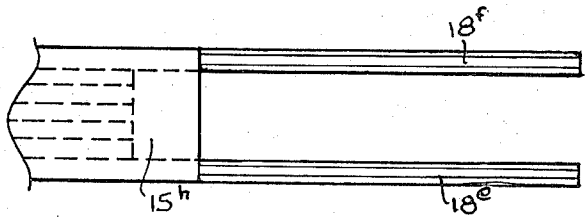
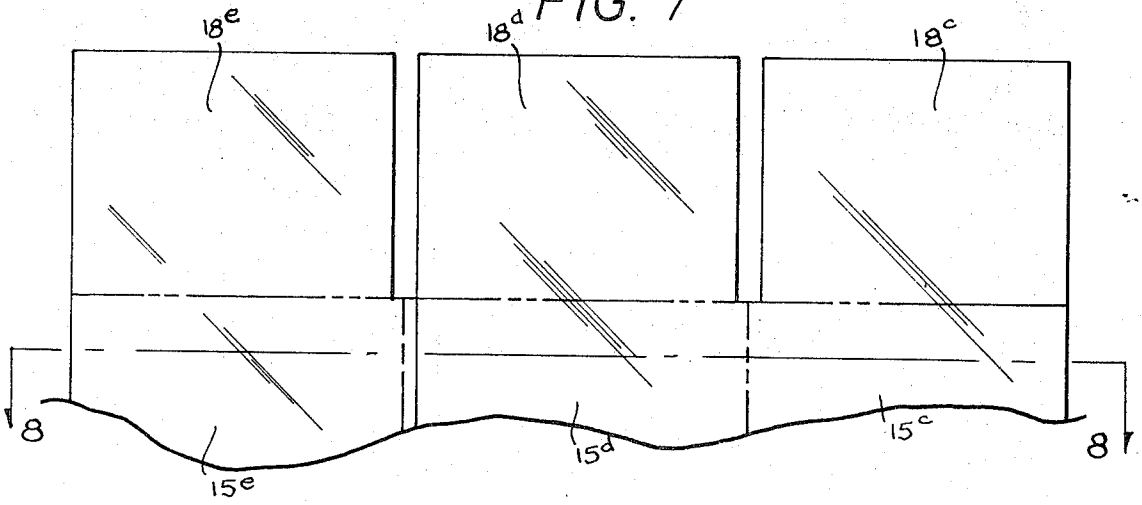


FIG. 9

FIG. 7



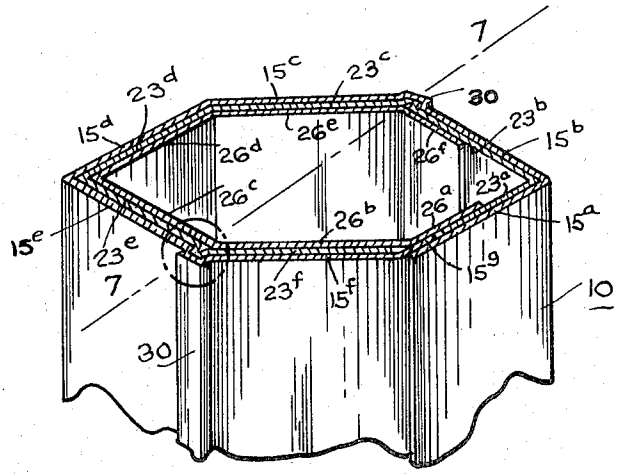


FIG. 6

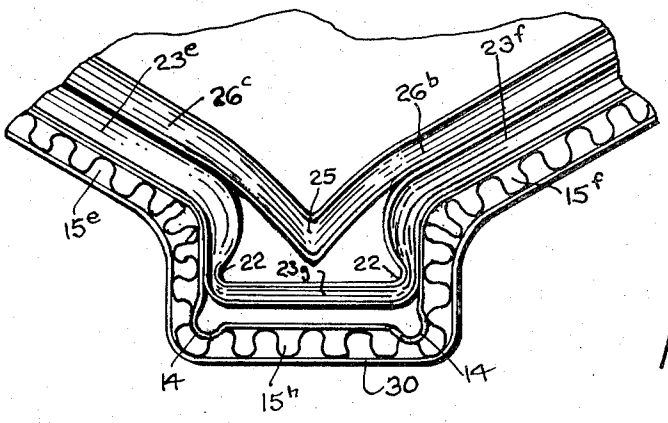

23e
26c
26b
23f
25
15e
15f
22
23g
22
14
15h
30
14

FIG. 10

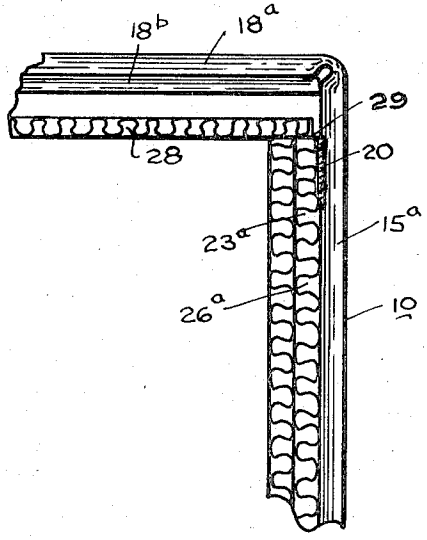

18b
18a
29
28
20
23a
15a
26a
10

FIG. 11

CORRUGATED POLYGONAL CONTAINER

This invention relates generally to shipping containers made of corrugated paper board and more particularly to a knockdown construction of a polygonally shaped container having its multiple side walls formed of three laminated die cut blanks of the corrugated board which are respectively so die cut and scored as to permit the container to be folded into flattened condition and yet be adapted to be instantly set up and erected as a shipping container for relatively heavy articles.

Among the principal objects of the present invention is to provide an exceedingly rigid corrugated board shipping container which may be rolled about its central axis in its fully loaded condition, which may be stacked upon its side and which may withstand rough handling thereof in both its knocked-down and erected condition.

A further object is to provide the container, preferably of hexagonal shape, wherein its side walls are formed of triple ply corrugated board with the outer ply having integrally formed end closure flaps at opposite ends thereof which serve not only to seal the ends of the erected container closed but also to rigidify the same as a whole.

Still another object of the invention is to provide an hexagonally shaped shipping container having its side walls formed of three laminated blanks of corrugated board which are each so die cut and relatively scored as to provide the container at diametrically opposite corners thereof with outwardly projecting vertically extending flutes or ribs which serve as hand-holds for effectively rolling the container about its central axis as aforesaid and which permit compact creasing of said opposite corners of the container for folding the same into a knocked-down condition for space-saving shipment and storage of the containers in the form of easily erectable substantially flat units.

A still further object is to provide shoulders or seats for reception of reinforcing end pads at opposite ends of the container, which pads are removably disposed interiorly of the aforesaid layered end closure flaps and act in concert with said end flaps to rigidify, strengthen and hold the container in its erected hexagonal shape.

Still another object of the present invention is to die cut the blanks which form the side walls of the carton so that certain of the same, preferably those forming a two-ply inner-core thereof, have their corrugationss running orthogonally with respect to the corrugations of the third or outermost ply to thereby further strengthen and rigidify the laminated side walls of the container against any tendency to be distorted when the containers are rolled about their central axes or are stacked on their sides one upon another.

Other objects and advantages of the present invention will appear more fully hereinafter, it being understood that the invention consists in the combination, construction, location and relative arrangement of parts as described more particularly in the following specification, as shown in the accompanying drawings and as finally pointed out in the appended claims.

In the accompanying drawings:

FIG. **1** is a perspective view showing a completed and closed form of the triple-ply carton as constructed in accordance with the principles of the present invention, the outer ply only of the carton being shown in section;

FIG. **2** is a plan view showing in expanded flattened form the die-cut blank of corrugated board which constitutes the outerply of the carton and the end flaps for closing the top and bottom ends of the carton;

FIG. **3** is a plan view of the intermediate die-cut corrugated blank of the triple-ply carton of the present invention;

FIG. **4** is a plan view of the innermost die-cut corrugated blank of the carton;

FIG. **5** is a plan view of one of the hexagonal die cut end pads which are respectively disposed at opposite ends of the carton to rigidify and hold the same in its expanded form as shown in FIG. **1**;

FIG. **6** is a perspective view of an intermediate portion of the expanded carton as viewed from the line **6—6** of FIG. **1**, the several laminated plies thereof being sectioned as shown;

FIG. **7** is an elevational view of one end portion of the carton as it appears when it is folded from its expanded condition shown in FIG. **6** about the line **7—7** of FIG. **6** into a flattened compact unit to facilitate shipment and storage of the containers;

FIG. **8** is a horizontal cross-sectional view of the flat-folded unit as taken along the line **8—8** of FIG. **7**;

FIG. **9** is an end elevational view of an end portion of the flattened carton when the same is viewed in its horizontally disposed section with its end flaps extending to the right;

FIG. **10** is an enlarged horizontal cross-sectional view of one of the diametrically opposed pair of the corners of the carton inscribed within the dotted circle of FIG. **6**;

FIG. **11** is a vertical cross-sectional view through a portion of the top and one side wall portion of the expanded and closed carton as taken along the line **11—11** of FIG. **1** showing the closure flaps sealed over the end pad seated upon the shoulder formed between the outer side wall ply and the two inner side wall plies of the carton.

Referring now more particularly to the drawings, it will be observed that the carton **10** of the present invention, in its fully expanded and erected form as shown in FIG. **1**, is of hexagonal shape having its opposite ends adapted to be closed by end flaps which respectively extend from and are folded inwardly from the top and bottom ends of each side of the carton. These side walls of the carton are formed of three double-faced corrugated paper board blanks which are die-cut, slit and scored as separate units and assembled to provide the carton with a triple ply, laminated side wall construction as hereinafter described.

The three blanks of which the side walls and ends of the carton are formed are respectively shown in FIGS. **2, 3** and **4**. Thus, the blank **11** forming the outermost side wall ply is die cut and scored as in FIG. **2**; the blank **12** forming the intermediate ply is die cut and scored as in FIG. **3**; and the blank **13** forming the innermost ply is die cut and scored as in FIG. **4**. Since it is an important desideratum that the carton of the present invention is adapted to be flat-folded into a knocked-down condition from which it may be instantly erected into its expanded form as shown in FIG. **1**, the several blanks which form the side walls of the carton are of different dimensions and respectively have their scorings differently spaced for reasons which will be appar-

ent hereinafter. In this connection, it will be noted also that the end closure flaps of the carton are formed as integral extensions of only that blank which forms the outermost side wall ply of the carton and that the blanks which form the two inner side wall plies of the carton each have their corrugations extending orthogonally with respect to those of the outermost ply. Preferably, the outer ply corrugations extend vertically of the carton, i.e., in parallel relation to the central axis thereof.

The blank **11** (FIG. **2**) is transversely scored along the longitudinally spaced, parallel score lines **14** to provide six panels **15***a* to **15***f*, one relatively narrow end flap **15***g*, and a pair of intermediate longitudinally spaced relatively narrow panels designated **15***h* each bounded by a pair of closely adjoining score lines **14.** In addition, the blank is longitudinally scored along the parallel lines **16** and slitted, as at **17,** to respectively provide the panels **15***a* to **15***f* with oppositely projecting end flaps **18***a* to **18***f*. It will be noted that the closely adjoining score lines **14** which define therebetween the narrow panels **15***h* are disposed in spaced relation beyond the side edges of the slits **17** which separate the end flaps **18***b* and **18***e* from their adjoining end flaps **18***c* and **18***f*, while the remaining score lines **14** are respectively centered between the remaining slits **17.** It will be noted further that the blank **11** is so die cut that the corrugations **19** of the corrugated board extend parallel to the score lines **14,** i.e., vertically of the carbon when it is erected into its expanded condition shown in FIG. **1.** The blank **11** is completed by adhesively securing to its inner face a tear tape **20** of adequate tensile strength to tear through the blank, which tape extends along the full length of the blank along a line spaced within and paralleling either one of the longitudinally extending score lines **16,** said tape being provided at one end thereof with a freely accessible tab **21** for tearing out the tape to thus partially or completely separate the end flap portion of the blank **11** from its main body portion.

FIG. **3** shows the blank **12** which forms the central or intermediate side wall ply of the carton, which blank is transversely scored along the vertically extending, parallel lines **22** to provide six panels **23***a* to **23***f* and a pair of longitudinally spaced narrow panels **23***g* similar to those of the blank **11.** However, the blank **12** is of shorter length than that of the blank **11** to provide a series of panels which are respectively somewhat narrower than their corresponding panels of the blank **11** and is of a width equal to the dimension A–2B wherein A is the dimension indicated in FIG. **2** and B is the dimension indicated in FIG. **1,** which latter dimension is just slightly greater than the thickness of the corrugated board of which the carton is formed. It will be noted that the blank **12** is free of end flaps and that its corrugations, designated **24,** extend lengthwise of the blank, i.e., horizontally of the carton when it is erected into its expanded form shown in FIG. **1.**

The innermost side wall ply or lamination of the carton is formed of the blank **13** shown in FIG. **4,** which blank **13** is of further reduced length relatively to that of the blanks **11** and **12** and is transversely scored, as along the lines **25,** to provide a series of six panels **26***a* to **26***f*. This blank **13,** the corrugations **27** of which run in the same direction as those of the blank **12,** is of exactly the same width as that of the blank **12,** namely, the dimension A–2B as above set forth.

The carton of the present invention is formed in its entirety of the three blanks **11, 12** and **13** above described and a pair of hexagonally shaped end pads, one of which designated **28** is shown in FIG. **5.** These end pads **28** are die cut out of the same stock as that of the side wall blanks.

It will be noted that when the three blanks **11, 12** and **13** are superimposed one upon the other in their flat conditions, the corresponding score lines **12** of the blank **11, 22** of the blank **12** and **25** of the blank **13** are so relatively offset that when the blanks are adhesively secured to one another in angularly oriented relation as hereinafter described to form the triple ply laminated side walls of the container, their said corresponding side wall panels are brought into substantial registry, thereby permitting the laminated assembly to be folded into a compact, flattened condition for shipment and storage thereof as substantially flat units adapted respectively to be readily set up or erected into their expanded polygonal shape as shown in FIGS. **1** and **6** for use as shipping containers.

The carton of the present invention is preferably made up in the following manner. First, the upper face of the blank **12** as viewed in FIG. **3** and the bottom face of the blank **13** as viewed in FIG. **4** are each coated with glue, following which the glue face of the panel **26***a* of the blank **13** is laid onto the glue face of the panel **23***a* of the blank **12** with the opposite longitudinal edges of the two blanks being respectively in rectilinear alinement so that the blank **13** constitutes an extension of the blank **12.** Thereafter the several panels **26***a* to **26***f* are angularly related into hexagonal shape, following which the blank **12** is wrapped around the hexagonally shaped blank **13** to form a two-ply hollow body of hexagonal shape with the fold lines of the two blanks in substantial coincidence and the panel **23***f* of the blank **12** overlapping the panel **26***b* of the blank **13,** as see FIGS. **6** and **8.**

Having so formed the two-ply hexagonal-shaped two-ply inner core of the carton, there is now adhesively secured thereto the third ply formed of the blank **11,** which step consists in first glueing the flap **15***g* of the blank **11** to the exposed outer face of the innermost panels **26***a* and then consecutively glueing the panels **15***f*, **15***e*, **15***d*, **15***c*, **15***b* and **15***a* to the panels **23***f*, **23***e*, **23***d*, **23***c*, **23***b* and **23***a* respectively. In this last-mentioned step, the two-ply inner core of the assembly is so centrally disposed between the two longitudinally extending score lines **16—16** of the external side wall ply or lamination formed by the blank **11** as to provide a shoulder **29,** as see FIG. **11,** at opposite ends of the carton upon each of which is adapted to be seated one of the end pads **28** shown in FIG. **5.**

The closely spaced pairs of score lines forming the narrow panels **15***h* of the blank **11** and the narrow panels **23***g* of the blank **12** constitute an important feature of the present invention. These paired score lines provide channeled ribs or flutes **30** at diagonally opposite corners of the carton of sufficient capacity to embrace and permit flat folding of the inner two-ply core of the carton in the regions of such corners when the opposite laminated side wall portions of the carton are pressed together about the line **7—7** of FIG. **6** to flat-fold the carton into its condition as shown in FIGS. **7** to **9,** all without imposing any such undue strains or stresses therein as might tend to break or otherwise destroy the integrity of the carton side walls.

The end flaps **18***a* to **18***f* of the blank **11** serve to close off the opposite ends of the carton when it is erected and expanded into shape as shown in FIG. **1.** It will be noted that the carton includes at each end thereof three pairs of these flaps, each pair of which is adapted to be infolded into coplanar relation with their free ends in abutting engagement. The several pairs of the end flaps are disposed in layered relation at each end of the carton and when stitched, taped or otherwise secured in their closed position as shown, they mutually act to reinforce and strengthen the ends of the carton against buckling and collapse thereof.

The hexagonal end pads **28** which are inserted into opposite ends of the carton as above described and as shown in FIG. **11,** in underlying relation to the infolded pairs of end closure flaps, add strength and rigidity to the loaded carton. Also, the reversal in direction of run of the corrugations as between those of the outer lamination and those of the inner laminations so further strengthens and reinforces the carton that it may be rolled and, if desired, stacked on its side without any appreciable distortion and buckling of the carton side walls. In this connection, the diagonally opposed corner ribs or flutes **30** effectively serve as hand holds for rolling the filled carton about its central axis.

When it is desired to unload the filled carton, it is only necessary to pull the tear tape **20** through the outer wall of the carton in the region just above the top edge of its inner two-ply core, thereby severing the sealed top from the carton to permit removal of the end pad **28** and instantly render accessible the carton contents. By so severing the carton top from all but one of the side walls of the carton, the top may be held hinged to one wall of the carton and thus be available to repeatedly open and close the carton as frequently as may be required.

It will be understood of course that the procedure for assembly of the three blanks to produce the triple-walled carton of the present invention may be varied as desired. As an example of one such other procedure, the several blanks **11, 12** and **13** may be superimposed one upon the other in that order with wet glue coatings applied to their contacting surfaces and then, while the glue is still wet, flat fold three of the side wall panels of the assembly against the remaining opposite three panels so that the folds which form the aforesaid diametrically opposed corner flutes **30** of the carton are at opposite ends of the flattened assembly and all of the score lines which form the remaining corners of the carton are in substantial registry. Upon setting of the glue, the carton is complete in its flattened form for shipment and storage as flat, compact units ready to be expanded into hexagonal shape for use as shipping containers. It will be further understood that the present invention is susceptible of various changes and modifications which may be made from time to time without departing from the general principles or real spirit thereof and that it is accordingly intended to claims the same broadly, as well as specifically, as indicated by the appended claims.

What is claimed as new and useful is:

1. A polygonal shipping container having a tubular main body portion and integral top and bottom end closure flaps formed of three die-cut blanks of corrugated paper board stock, said blanks being respectively transversely scored along perimetrally spaced parallel score lines and adhesively secured together in laminated relation to provide said main body portion with a triple layered substantially continuous polygonally shaped side wall opposite halves of which each include at least three side wall panels, said panels being relatively foldable in the regions of all of said score lines for erecting said main body portion into polygonal shape, the two outermost laminations of said sidewall each having a single pair of diametrically spaced sets of closely adjoining score lines for flat folding said opposite halves of the tubular main body portion one against the other at two diametrically opposed corners of said container, said diametrically spaced sets of score lines in said two outermost laminations being respectively disposed in nested relation about a fold line of the innermost lamination to form at said diametrically opposed corners of said container outwardly projecting triple-layered ribs or flutes which permit unstressed flat folding of the opposite halves of the container as aforesaid and serve as hand holds to facilitate rolling of the containers about their central axes and vertical side-wise stacking of the containers when erected into polygonal shape, the outermost lamination of said side wall being perimetrally scored and vertically slit to integrally provide the same with a plurality of inwardly foldable end closure flaps respectively hinged to the top and bottom edges of each of said side wall panels, said closure flaps being each of a length substantially equal to one half the distance between opposite side wall panels of the erected container, the said pairs of said flaps being respectively adapted to be inturned from opposite side wall panels of the erected container toward the central axis thereof for coplanar disposition with their free edges in abutting relation along angularly related lines commonly intersecting said central axis of the container whereby said inturned pairs of the end closure flaps conjointly form a multi-layered closure at each end of the container.

2. A shipping container as defined in claim **1** wherein the two innermost laminations of said side wall have their top and bottom edges equally spaced inwardly of said end flap hinge lines to provide said side wall of said container at each end thereof with a continuously extending shoulder or seat for a removable rigid end pad having a perimetral outline corresponding to the polygonal shape of the erected container.

3. A shipping container as defined in claim **2** wherein a rigidifying end pad is seated in said shoulder formed at each end of the container in close underlying relation to the multilayered assembly of said end closure flaps.

4. A shipping container as defined in claim **1** wherein the two inner blanks of corrugated board constitute a laminated inner core of the container side wall about which the outermost lamination is wrapped and wherein the corrugations of said inner core laminations extend orthogonally with respect to the corrugations of the outermost laminations.

5. A shipping container as defined in claim **4** wherein the corrugations of the inner core laminations extend along lines normal to the central axis of the container while those of the outermost lamination extend along lines parallel to said central axis.

6. A shipping container as defined in claim **1** wherein the container is provided with a tear tape extending continuously about the perimeter of the tubular body portion of the container along a line spaced inwardly from and in parallel relation to at least one of said hinge lines for said end closure flaps.

* * * * *