United States Patent

Wiley, Jr. et al.

[15] **3,642,168**

[45] **Feb. 15, 1972**

[54] NONTILT STACKING AND NESTING CONTAINER

[72] Inventors: **Nathaniel C. Wiley, Jr.**, Weston; **Joseph R. Kazakavage**, Ansonia, both of Conn.

[73] Assignee: **Rudkin-Wiley Corporation**, Seymour, Conn.

[22] Filed: **Oct. 27, 1969**

[21] Appl. No.: **869,706**

[52] **U.S. Cl.** ..... **220/97 D**

[51] **Int. Cl.** **B65d 21/04**

[58] **Field of Search** ..... 220/97 D

[56] **References Cited**

UNITED STATES PATENTS

2,655,283	10/1953	Moldt	220/97 D X
3,013,692	12/1961	Chesley	220/97 D
3,219,232	11/1965	Wilson	220/97 D
3,270,913	9/1966	Bridenstine	220/97 D
3,443,722	5/1969	Cloyd	220/97 D

FOREIGN PATENTS OR APPLICATIONS

107,733	10/1967	Denmark	220/97 D

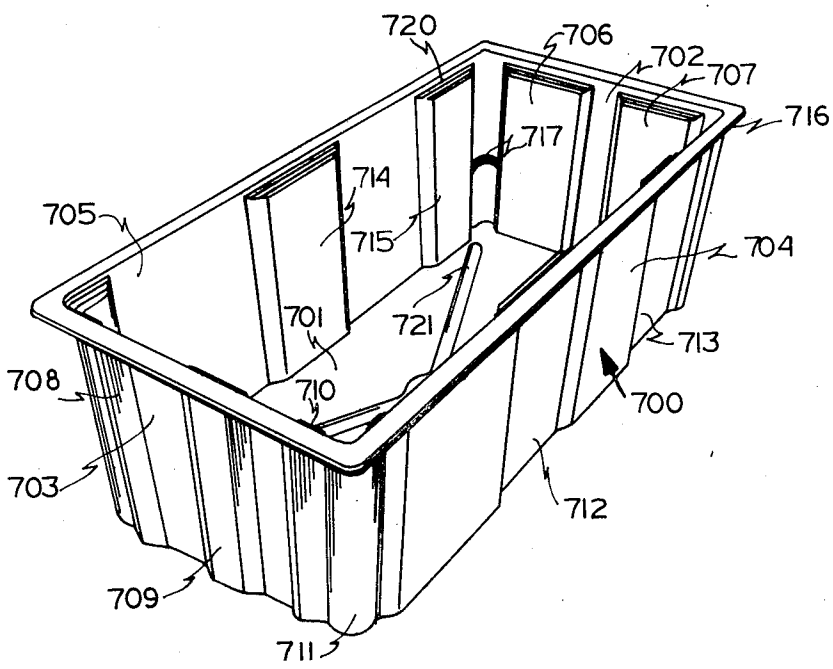
Primary Examiner—George E. Lowrance

Attorney—Mattern, Ware and Davis

[57] **ABSTRACT**

Stacking and nesting containers are prevented from tilting into each other when in superposed stacking position by providing: (a) differing numbers of a plurality of tapered ribs vertically positioned and inwardly extending from top to bottom of at least one opposite pair of sidewalls; or, (b) same numbers of a plurality of tapered ribs vertically positioned and inwardly extending from top to bottom of at least one opposite pair of sidewalls, these ribs being unequally spaced one from the other and being of unequal width, but the ribs on the opposing walls forming mirror images of one another; or, (c) the combination of one pair of opposing walls conforming to arrangement (a) and the second pair of opposing sidewalls conforming to arrangement (b).

11 Claims, 12 Drawing Figures



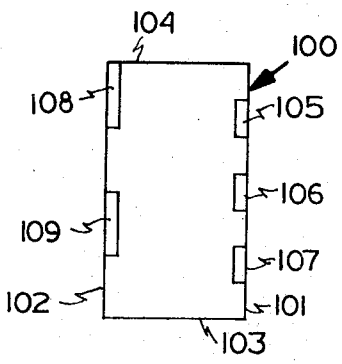


FIG. 1

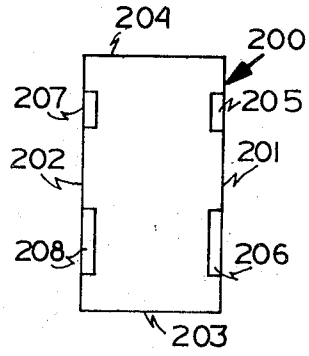


FIG. 2

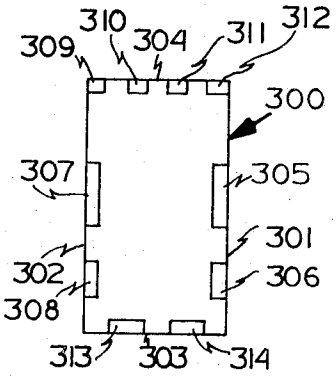


FIG. 3

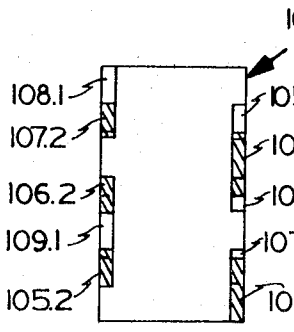


FIG. 4

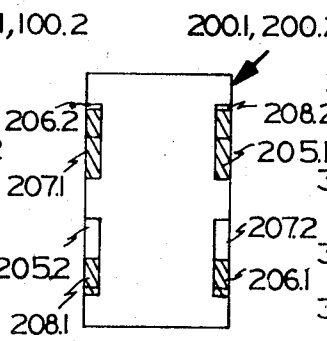


FIG. 5

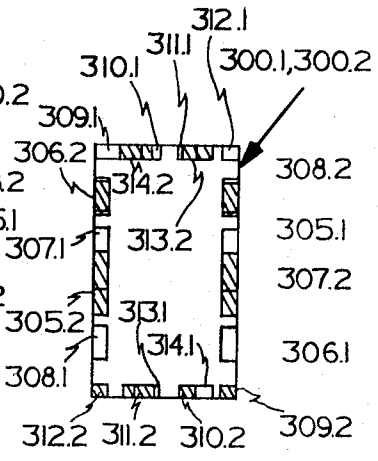
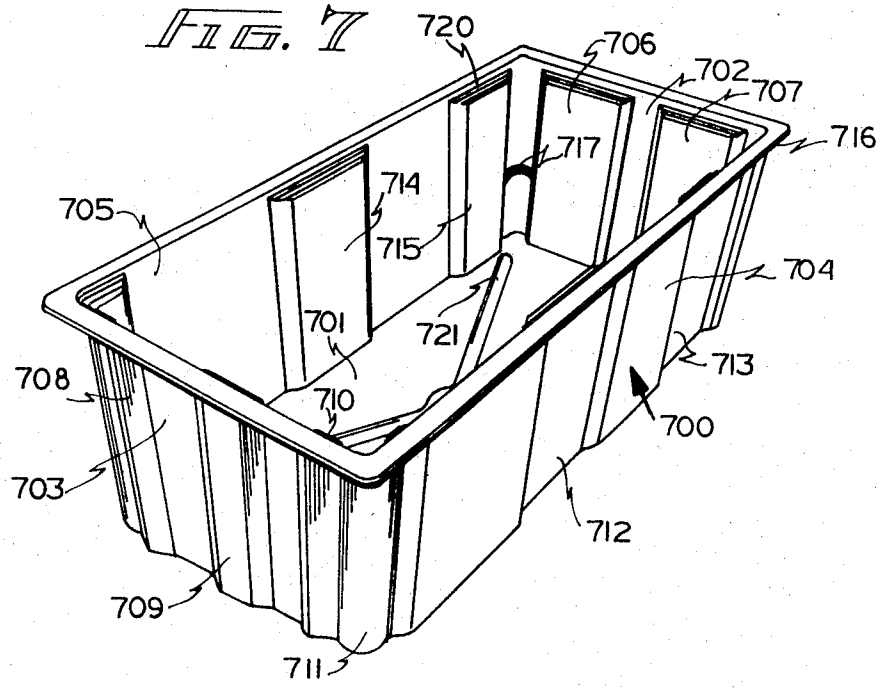


FIG. 6

INVENTORS
NATHANIEL C. WILEY, JR
BY JOSEPH R. KAZAKAVAGE

MATTERN WARE & DAVIS
ATTORNEYS

FIG. 7


720
706
702
707
716
717
714
705
715
704
701
721
713
708
710
700
703
712
709
711

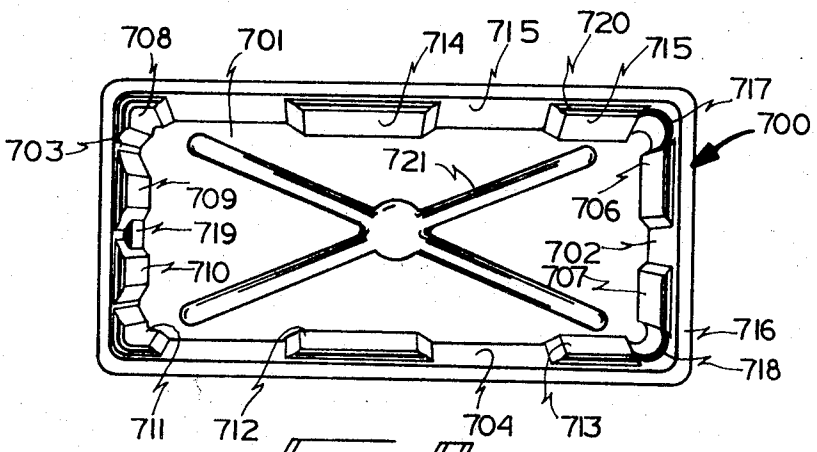

708
701
714
715
720
715
717
700
703
721
709
706
719
702
710
707
716
718
711
712
704
713

FIG. 8

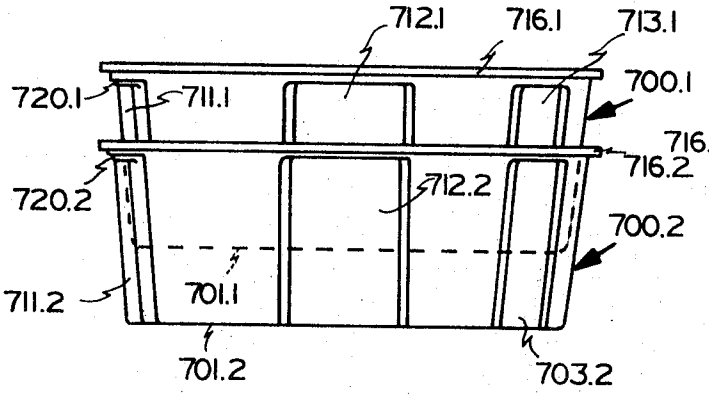


FIG. 9

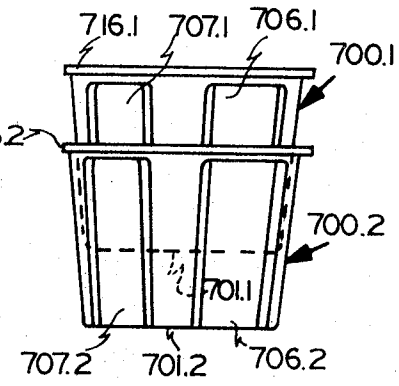


FIG. 10

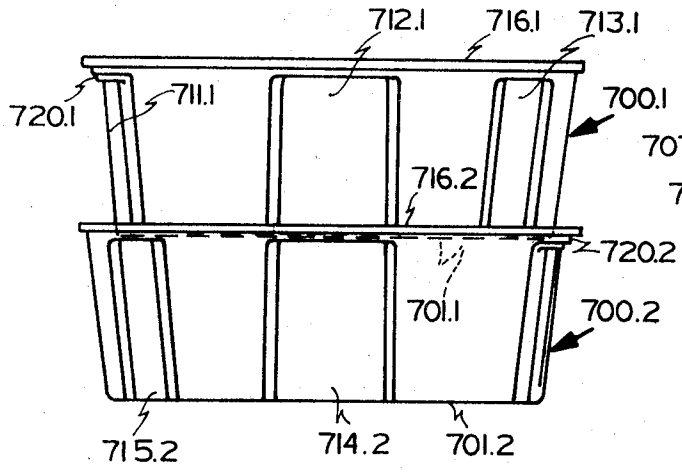


FIG. 11

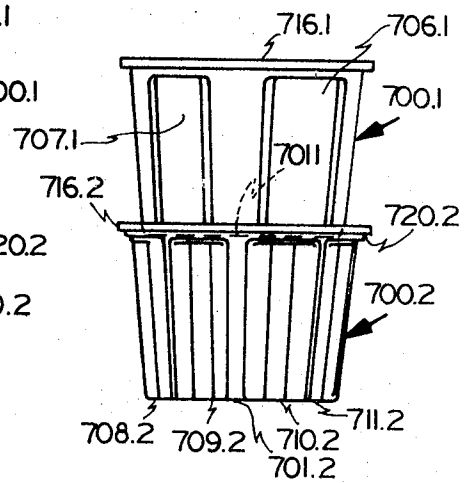


FIG. 12

NONTILT STACKING AND NESTING CONTAINER

This invention concerns stacking and nesting containers, more particularly thin walled, unitary boxes which not only nest and stack but also do not tilt one into the other when in superposed stacking relationship.

In recent years plastic or metal containers have largely displaced wooden containers or "tote boxes" for many reasons including the flammability, bulk and weight of wooden containers. The wooden box has also presented difficulties in nesting designs because such boxes must be excessively tapered on the sides in order to maintain the thickness required for strength. Excessive tapering, while permitting nesting to the smallest possible storage space, reduces the cavity size of the containers and therefore their shipping capacity.

For these and other reasons the container industry has substituted compression- or injection-molded plastic, heat-formed plastic, or welded and/or formed sheet metal, one piece, generally rectangular containers which do not require the excessive tapering for nesting but provide sufficient strength and capacity to compete successfully with wooden containers. These plastic or metal boxes have been provided in a great variety of designs, generally permitting nesting when in a first relative position, "cross stacking" when turned 90° in a second relative position (oblong shapes), or superposed tacking after one container has been turned 90° (square shapes) or 180° (oblong shapes) relative to another. By "superposed" is meant that stacking relationship in which the bottom of one container fits on or within the top of another container with each container oriented in the same direction. With respect to oblong containers, the superposed position would be 90° from the "cross stacking" position and all containers would be oriented longitudinally.

The known designs, however, whether square or oblong, have the fault of tilting or tending to fall one into the other when the containers are placed in superposed stacking relationship. When many of such containers are so stacked, particularly when filled with goods in transport, there is serious danger of damage to the merchandise being transported within the container, and actual damage often does result, due to tilting of one container into the other.

Accordingly, an object of this invention is to provide thin walled, stacking and nesting containers having structural characteristics which prevent the containers from shifting, tilting or falling one into the other when the containers are in superposed stacking relationship. These and other objects, features and advantages will be detailed in the description which follows.

In summary, the nontilt feature of the containers of this invention results from providing: (a) different numbers of vertically positioned ribs in at least one pair of opposing sidewalls; or (b) the same numbers of a plurality of vertically positioned ribs in at least one pair of opposing walls, said ribs being of unequal width and having unequal space between them but the ribs on opposite walls forming mirror images; or, (c) combining the foregoing arrangements (a) and (b) in the same container. This third arrangement is the preferred embodiment, and more particularly preferred is the same embodiment in which the ribs of those opposing walls having the same number of ribs are of unequal width and have unequal spacing therebetween, although the ribs on such opposing walls form mirror images. The nonuniformity of the foregoing structures necessarily causes misalignment or overlapping of the bottom of the ribs of one container relative to the top of the ribs of a second container when said containers are in superposed stacking relationship, thus preventing tilting of one container into another stacked in superposition immediately below the first container.

The invention is more particularly described in conjunction with the attached drawings, in which:

FIGS. **1**, **2** and **3** are schematic top plan views illustrating the three primary geometrical configurations of containers of the invention;

FIGS. **4**, **5** and **6** are also schematic top plan views showing the rib relationship of two containers each of FIGS. **1**, **2** and **3** in superposed stacking position;

FIG. **7** is a perspective view of a preferred embodiment of a container of the invention;

FIG. **8** is a top perspective view of the container of FIG. **7**; and

FIGS. **9** and **10** are elevational side and end views, respectively, of containers generally of the configuration of FIG. **7**, in nesting relationship;

FIGS. **11** and **12** are elevational side and end views, respectively, of containers generally of the configuration of FIG. **7**, in superposed stacking relationship.

With reference to FIGS. **1–3**, FIG. **1** shows a container **100** of the invention, generally of rectangular, here oblong, configuration, having sidewalls **101**, **102**, **103** and **104**. Vertically and inwardly extending within these sidewalls are ribs, corrugations, convolutions or similar projections **105**, **106**, **107**, **108** and **109**. These ribs generally are tapered from top to bottom of the container and on the same wall may have equal or unequal widths and may be spaced equally or unequally. Similarly, FIG. **2** shows container **200** generally of rectangular, here oblong, configuration and comprising sidewalls **203**, **204**, **205** and **206**. Also extending inwardly and vertically of said walls are ribs **205**, **206**, **207** and **208**. As compared with the container of FIG. **1**, however, opposing walls **201** and **202** are provided with the same number of ribs, but these ribs are of unequal dimensions and have unequal spacing between them. However, the ribs on wall **201** are mirror images of the ribs on wall **202**. In FIG. **3**, the basic rib configurations of FIGS. **1** and **2** are combined. FIG. **3** shows a container **300** of generally rectangular, oblong, configuration, comprising sidewalls **301**, **302**, **303** and **304**. Extending inwardly and vertically of said walls are an unequal number of ribs in walls **303**, **304**, that is, ribs **309**, **310**, **311** and **312** on wall **304**, and ribs **313** and **314** on wall **303**. Opposing walls **301** and **302** are provided with the same number of ribs but these ribs (**305** and **306** on wall **301**, **307** and **308** on wall **302**) are of unequal width and have unequal spacing between them.

FIGS. **4**, **5** and **6** illustrate misalignment or overlapping of the ribs of two structures each of FIGS. **1**, **2** and **3**, when said structures are placed in superposed stacking relationship, that is, when one structure is turned 180° and placed over an identical structure. It will be seen in FIG. **4** that when so stacked, the ribs of lower container **100.1** are misaligned with the ribs of upper container **100.2** such that container **100.2** will not tilt or fall into container **100.1**. Similarly, in FIG. **5**, the ribs of containers **200.1** and **200.2** are misaligned, preventing tilting of upper container **200.2** into lower container **200.1**. In the preferred embodiment of the invention, represented by the stacking of the two containers **300.1** and **300.2** in FIG. **6**, the same nontilt feature is evident, that is, the ribs of upper container **300.2** are misaligned with the ribs of lower container **300.1** such that the former will not tilt or fall into the latter.

In another preferred embodiment of the invention, as represented by FIG. **7**, a container **700** of generally oblong, rectangular, configuration, having bottom wall **701** and side walls **702**, **703**, **704** and **705**, is provided on wall **702** with ribs **706** and **707**, on wall **703** with ribs **708**, **709** and **710**, on wall **704** with ribs **712** and **713**, and on wall **705** with ribs **714** and **715**. All of said ribs extend inwardly and upwardly, from top to bottom of the container, and are tapered from top to bottom. It will be noted that all of said ribs are of unequal width and the space between all of said ribs is unequal. It will also be evident that walls **702** and **703** have unequal numbers of ribs whereas walls **704** and **705** are mirror images of one another.

Also in FIG. **7**, rib **710** extends interiorly as well as exteriorly around corner **711**. The same is true of rib **708**, although not illustrated. Container **700** also is provided with partially shown rib **721** which projects upwardly from bottom wall **701** and cooperates with projecting edge or lug **717** as resting ledges to prevent jamming of containers in nesting position.

Rib 721 to achieve this purpose may be positioned lengthwise, crosswise, or may be X- or Y-shaped as desired.

FIG. 7 also displays, in part, indentations, on the upper edges of the sidewall ribs, which form saddles or shelves, as shelf 720 on rib 715. These shelves form resting ledges for the bottom walls of identical containers when in superposed stacking position thereon, thereby assisting the stability of the containers when so stacked.

FIG. 8 is a top view of FIG. 7 and illustrates some features of the invention with greater particularity. These features are the aforementioned shelves, such as shelf 720 on rib 715, rib 721 projecting upwardly from bottom wall 701, and inwardly projecting lugs or edges 717, 718 and 719 which provide resting ledges to prevent jamming of containers of the invention when in nesting relationship.

FIGS. 9 and 10 illustrate partial nesting positions of containers 700.1 and 700.2 similar to those of FIGS. 7 and 8. In each of FIGS. 9 and 10 it will be noted that corresponding ribs, such as side wall ribs 712.1, 712.2, 713.1 and 713.2, and end wall ribs 706.1, 706.2, 707.1 and 707.2, and shelves 720.1 and 720.2, likewise fit one into the other so as to facilitate stable nesting of the containers. The ultimate nesting positions are governed by the position of projections 717, 718 and 719 of FIG. 8 (not shown in FIGS. 9–12) and horizontally extending flanges 716 (FIGS. 7 and 8), 716.1 and 716.2 (FIGS. 9–12).

FIG. 10 provides an end view of the same containers as in FIG. 9, again showing the nesting relationship of corresponding ribs 706.1, 706.2, 707.1 and 707.2, and corresponding flanges 716.1 and 716.2. The same relationship regarding ultimate nesting positions are observable here.

When containers of the invention are turned 90° or 180°, the latter as illustrated with reference to containers 700.1 and 700.2 of FIGS. 11 and 12, the containers stack neatly one over the other by virtue of the misalignment of ribs on opposing sides of the containers. This is evident in FIGS. 11 and 12, whether the view be longitudinal as in FIG. 11, or whether it be an end view, as in FIG. 12. With reference to FIGS. 11 and 12, it will be noted that at least ribs 713.1 and 715.2 are misaligned. Similarly, in FIG. 12, ribs 706.1 and 707.1 are misaligned with ribs 708.2, 709.2, 710.2 and 711.2. In conjunction with said misalignment, there is also misalignment of shelves 720.1 and 720.2, thus enabling top container 700.1 to rest securely and stably within the rim and flange 716.2 of container 700.2.

It thus becomes evident that, in consequence of the misalignment of ribs of opposing walls when containers of the invention are in superposed stacking position as in FIGS. 4–6, 11 and 12, a top container will not tilt or fall into a lower container. Moreover, bottom walls 701.1 and 702.2 remain separated and will not jam, partly by virtue of flanges 716.1 and 716.2, but also as a consequence of bottom rib 721 and resting edges 717, 718 and 719 (not shown).

The principles of the invention are applicable to any generally rectangular container configuration whether such be square or oblong. Likewise, the containers of the invention need not be manufactured from a single molded piece, but may be bolted or welded together and the material may be plastic, metal, or any desirable combinations of such materials. Furthermore, the extent of taper and thickness of the walls and ribs is not critical and will depend upon the material of construction.

While the invention has been illustrated and described in what are considered to be the most practical and preferred embodiments, it will be recognized that many variations are possible and come within the scope thereof, the appended claims therefore being entitled to a full range of equivalents.

I claim:

1. A generally rectangular stacking and nesting container comprising:

a bottom wall bounded by upstanding, upwardly divergent sidewalls;

said sidewalls defining an integral upper rim of dimensions such that the bottom wall of an identical container fits within said rim in both a nesting position and a superposed stacking position;

at least a first opposite pair of said sidewalls having the same numbers of a plurality of tapered ribs vertically positioned and inwardly extending from top to bottom of said sidewalls, said ribs on one of said sidewalls being unequally spaced one from the other and being of unequal width, the ribs on said first opposite pair of sidewalls forming mirror images of one another, and one of said inwardly extending ribs extending for a substantial distance across the center line between a second pair of opposite sidewalls whereby when two of said containers are stacked and are slid along relative to each other on said inwardly depending ribs the upper container is supported on said ribs and prevented from tilting until the center of gravity of the upper container is outside the rim of the lower container.

2. A generally rectangular stacking and nesting container as defined in claim 1 wherein said second opposite pair of said sidewalls have differing numbers of a plurality of tapered ribs vertically positioned and inwardly extending from top to bottom of said sidewalls.

3. A container as in claim 2 wherein said rim is horizontally flanged.

4. A container as in claim 2 wherein the upper ends of said ribs are indented to form a shelf such that the bottom wall of an identical container when placed in superposed stacking position rests on said shelf.

5. A container as in claim 2 also provided with at least one projecting edge on each of two opposing sidewalls, said edges being positioned in spaces between adjacent ribs such that a corresponding projecting edge of an identical container in nesting position abuts said edge, thereby preventing jamming of said containers.

6. A container as in claim 5 also provided with upwardly projecting ribs positioned transversely of said bottom wall.

7. A container as in claim 1 wherein the ribs of said second pair of opposite sidewalls are formed in the same manner as the ribs or said first pair of opposite sidewalls.

8. A generally rectangular stacking and nesting container as defined in claim 2 wherein each of said second pair of opposite sidewalls comprise at least a pair of ribs on opposite sides of the centerline between said first pair of sidewalls, each rib of said pair of ribs being of unequal width.

9. A generally rectangular stacking and nesting container as defined in claim 1 wherein said rib extending across the centerline is the largest of said ribs.

10. A generally rectangular stacking and nesting container as defined in claim 9 wherein the space between said centerline rib and the next to it ribs on said sidewall is greater to one side of said centerline rib than on the other.

11. A generally rectangular stacking and nesting container as defined in claim 10 wherein the smaller space next to said centerline rib is on the side towards the next smaller rib.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,642,168 Dated February 15, 1972

Inventor(s) Nathaniel C. Wiley, Jr. and Joseph R. Kazakavage

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, Line 49, "or" should be --of--

Signed and sealed this 13th day of June 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
☆ U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334