United States Patent [19]

Wies et al.

[11] **3,915,099**

[45] **Oct. 28, 1975**

[54] **SUPPORT COLUMN AND DISPOSABLE PALLET STRUCTURE**

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[73] Assignee: **Wonder Industries Inc.**, Forest Lake, Minn.

[22] Filed: **June 21, 1974**

[21] Appl. No.: **481,634**

Related U.S. Application Data

[63] Continuation of Ser. No. 292,112, Oct. 2, 1972, abandoned.

[52] **U.S. Cl.** **108/56**; 108/53

[51] **Int. Cl.²** **B65D 19/26**

[58] **Field of Search** 108/51–58; 206/386

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Assistant Examiner—William E. Lyddane
Attorney, Agent, or Firm—John C. Barnes

[57] **ABSTRACT**

A support column for disposable pallet or unitized container construction utilizing molded legs which cooperate with deck members to support said deck and materials placed thereon. The legs are frustums which have flanges positioned below the material support deck of the pallet or container and about the larger end of the frustum. The larger end of each leg extends upwardly into an opening in the material deck, and tabs are formed on the leg for securing the leg to the deck such that upon movement of the deck by a fork lift the leg will stay firmly attached. The pallet construction may utilize a second deck similar to the material support deck which is secured to the smaller end of the pallet leg by a support ring. The similar structure of the second deck avoids the number of different pieces necessary in constructing a pallet and the support ring supports the smaller end of the pallet leg to avoid pivoting of the larger end of the leg in the opening of the support deck.

9 Claims, 9 Drawing Figures

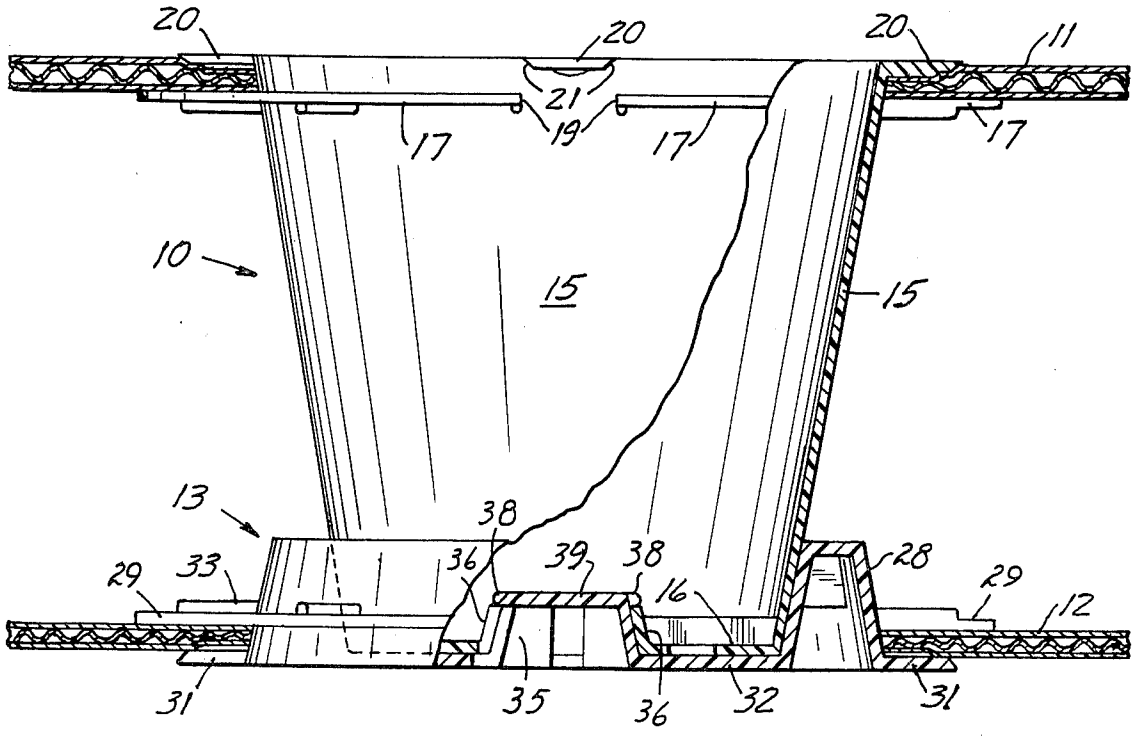


FIG. 1

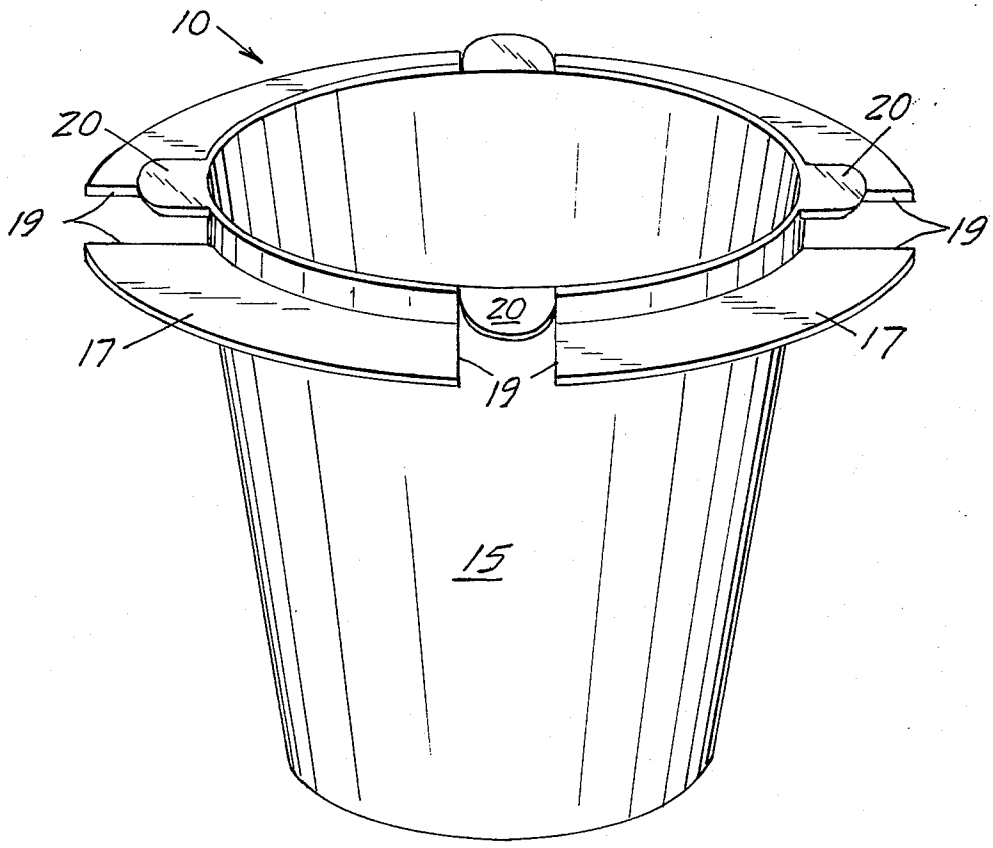

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FIG. 2

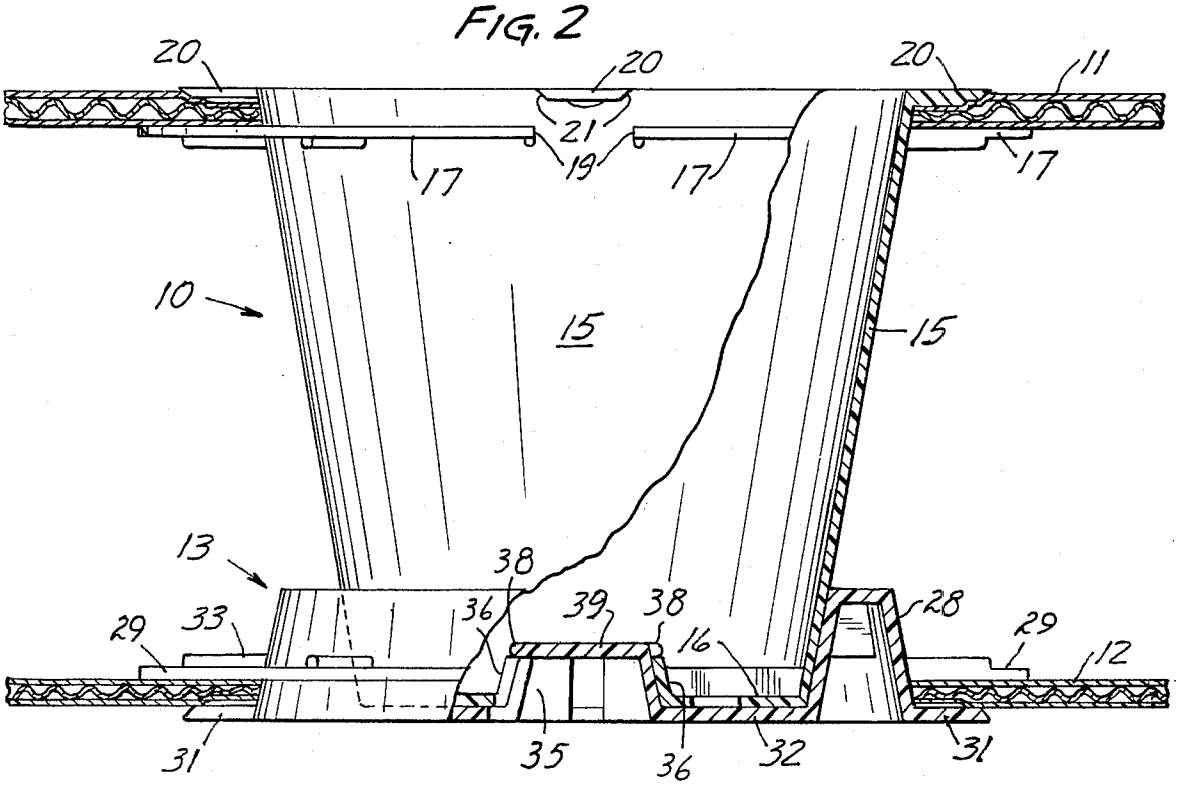

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FIG. 3

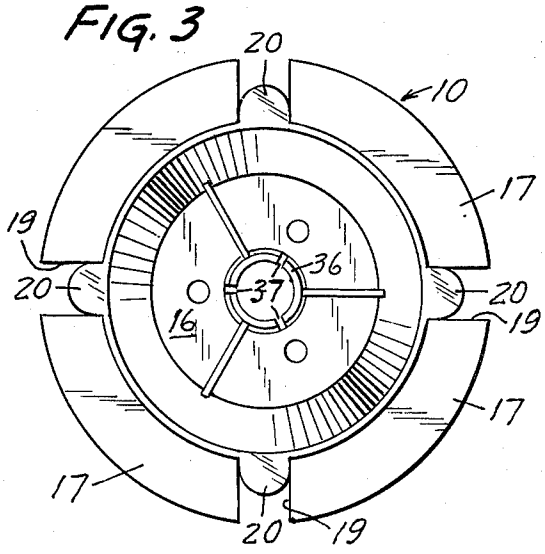


FIG. 4

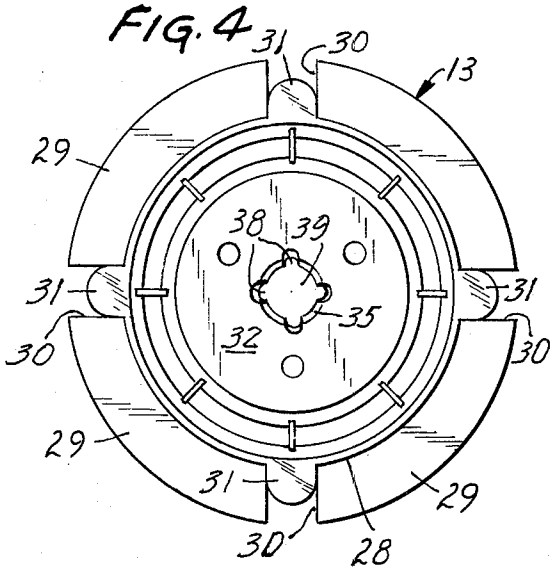


FIG. 5

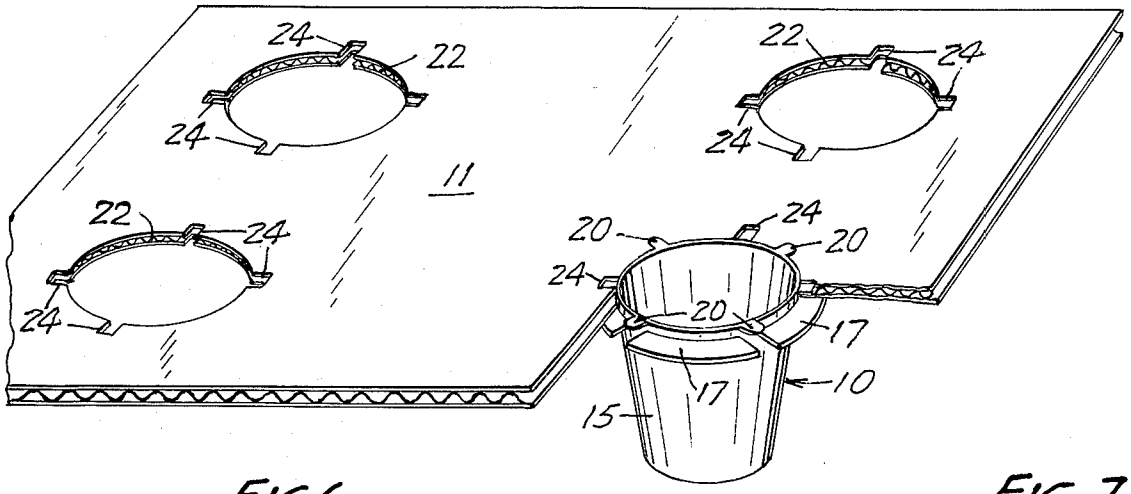


FIG. 6

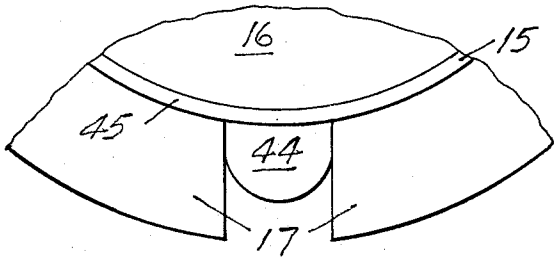


FIG. 7

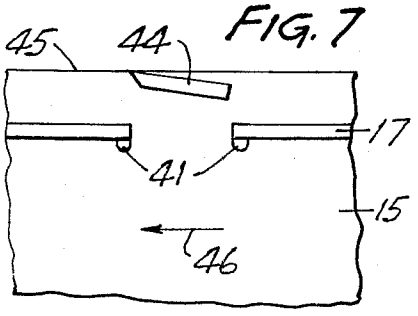


FIG. 8

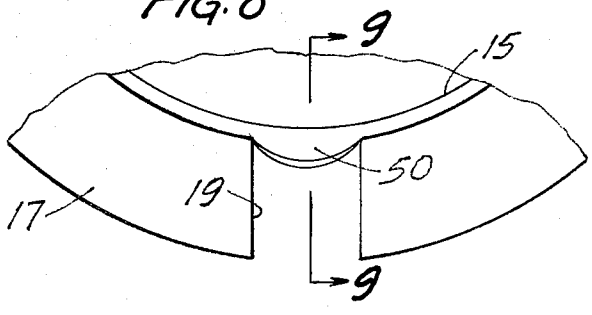
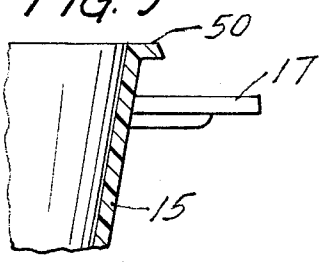


FIG. 9



SUPPORT COLUMN AND DISPOSABLE PALLET STRUCTURE

RELATED APPLICATIONS

This is a continuation application of application Ser. No. **292,112**, filed Oct. **2, 1972**, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to an improvement in support columns for pallet or unitized container constructions and particularly with respect to disposable constructions. A pallet constructed in accordance with the present invention comprises spaced decks and molded or die cast legs. The legs are formed such that they may be readily inserted through openings in the decks and secured thereto. The legs have integral load-bearing flanges to carry the material support deck and integral tabs for securing the legs to the deck such that when the deck is lifted the leg is securely attached. In a preferred embodiment, a locking ring is constructed to lock a second similar deck to the leg if desired to prevent the leg from pivoting in the openings of the material support deck.

The prior art possesses several teachings of pallets which are readily constructed and are formed to be disposable structures because of the economics of the material support decks and the legs therefor. Most of these devices, however, have features which diminish their industry acceptance. Some of the prior art devices, considered relevant to the present invention include U.S. Pat. Nos. **3,123,020; 3,141,422; 3,598,065;** and **3,610,172.**

The first and last patent on this list of patents relates to disposable pallets formed such that the support leg is fastened to the load support deck by a locking ring. These locking rings readily become displaced when the pallet leg is subjected to a radially directed force. As this happens the receptacle for the locking ring is sprung and the ring pops lose.

U.S. Pat. Nos. **3,141,422** and **3,598,065** relate to pallet support legs which are preferably shaped like a frustum as is the leg of the present invention, and each of which is formed with a large flange area surrounding the large open end of the frustum. The legs are positioned in the respective support decks by forcing the same down through openings in the support deck and a locking member **12***a* or the locking slot **17** retains the legs in place. These locking slots retain the support deck on the legs and spaced from the support for the legs so the support deck can be lifted by the fork arms of a lift truck extending under the platform. Legs of this construction however provide very little support for the deck per se when any load is placed thereon. The only support offered for the deck is the locking member and a wide flange, as disclosed in the other two patents, beneath the support deck are not present. If one of the support legs of either of these structures is struck by the fork arm of the lift truck the same may be easily popped through the opening and upwardly against the load.

BRIEF SUMMARY OF THE PRESENT INVENTION

The disposable pallet of the present invention is usable like other disposable pallets. There are very few parts to provide a complete pallet. The decks constituting two of the parts of the pallet are identical and are die cut by the same machine. The plurality of legs will

nest such that the same may be shipped and occupy less storage space and less return shipping volume than the old permanent pallet construction. No fastening elements are needed in securing the legs to the support decks nor are tools or equipment required to disassemble the pallets. Support rings secure the support deck to the lower end of the leg.

An objective of the present invention is to provide a pallet design where the legs actually lend support to a load platform. The leg is secured against tipping relative to the load platform by a locking ring supporting a second deck at a parallel spaced position to the load platform. The locking ring is easily locked to the first leg without the use of tools.

The various parts of this pallet may thus be shipped separately to the point of use for construction at that area. Likewise, the pallet legs and locking rings, if desired, may be preserved and returned, again occupying less space than the return of the conventional pallet designed such as the old wood pallet.

A leg for making a disposable pallet according to the present invention comprises a hollow frustum having an open larger end and an end wall substantially closing the smaller end. A flange having circumferentially spaced notches is disposed about the frustum at a position spaced from the upper end of the frustum a distance not significantly greater than the thickness of the material for the support deck or load platform. The material for the load platform may be wood, i.e., plywood; plastic, paper, or any combination thereof. The leg in turn may be formed of a polymeric material such as thermoplastic or thermosetting. Tabs are positioned about the larger end of the frustum at circumferential positions corresponding to the positions of said notches in the flange. This combination will ease the cost of manufacturing. The tabs may be flexible to be flexed as the leg is positioned upwardly through an opening in the load supporting deck of the pallet or the tab may be rigid and even stiffened by a rib to fit into notches formed in the opening in the pallet platform. Then upon rotation of the leg in relation to the platform, the tabs will lock the leg in place such that upon lifting the platform with the fork arm of a lift truck the leg will be lifted with the platform without danger of a leg becoming loose.

In the preferred construction of the pallet the pallet comprises a pair of decks. One deck, the load platform, is positioned with the leg extending into an opening to receive the portion of the leg above the flange and is retained therein by the locking tab. The second deck is held in spaced relation to the load deck by a support ring which is positioned through an opening in the second deck and is then placed against the smaller end of the frustum and is snap-fitted to lock onto the smaller end of the pallet leg.

The construction of a pallet according to the present invention comprises the method of taking a planar platform having at least four spaced leg receiving openings or holes formed therein and a plurality of legs, at least four, each leg comprising a hollow frustum with the smaller end thereof substantially closed by an end wall and open larger end and placing the larger end of the leg into the opening to engage a flange which surrounds the frustum adjacent said larger end against the under surface of the platform. The flange is spaced from the large end a distance equal to the thickness of said platform or depth of the hole forming the opening. The leg

has tabs extending radially outwardly from the end of the frustum at said larger end at circumferentially spaced positions, and the method comprises the further step of rotating said legs to move said tabs relative to said platform to position the same in firm engagement with a portion of the platform adjacent said opening.

DESCRIPTION OF THE DRAWINGS

The present invention will be more fully described with reference to the accompanying drawing wherein:

FIG. 1 is a perspective view of a pallet leg formed in accordance with the present invention;

FIG. 2 is a fragmentary vertical sectional view of a pallet construction according to the present invention taken through one of the leg members of the pallet;

FIG. 3 is a top view of the leg member of FIG. 1.

FIG. 4 is a bottom view of the support ring constructed according to the present invention;

FIG. 5 is a fragmentary perspective view of a bottom deck on a unitized container or a platform used in construction of the pallet of the present invention showin one leg in place;

FIG. 6 is a fragmentary plan view of a second embodiment of the locking tab for the leg and support ring;

FIG. 7 is a fragmentary elevational view of the locking tab of FIG. 6;

FIG. 8 is a fragmentary plan view of a third embodiment of a locking tab made in accordance with the present invention; and

FIG. 9 is a sectional view taken along the lines 9—9 of FIG. 8.

Referring now to the drawing, which discloses a preferred embodiment and several modifications of the structure, the support column of the present invention is designed to be disposable such that it and the various other elements forming a pallet or unitized shipping container may be sent to the site of use and assembled there with a minimum of effort and skill. The pallets or containers may then be destroyed or they may be disassembled and the molded support columns thereof returned again to the site of use. A support column according to the present invention comprises a leg **10** molded from a metal or alloy for die casting, or a thermoplastic or thermosetting material, for example, high impact styrene, polypropylene, polyethylene, ABS plastic or equivalent material. Other elements of a pallet constructed according to the present invention is a pair of similar planar platform or deck members **11** and **12**; and a support ring **13** which supports the bottom of the leg in the support deck **12**. The ring **13** may be formed of material similar to the leg.

The leg **10** of the present invention is a hollow frustum **15** having a large open end and a wall **16** substantially enclosing the smaller end of the frustum **15**. A flange **17** projecting radially outward from the frustum **11** and surrounding the frustum at a position adjacent the larger end of the frustum defines a support for the deck **11**. The flange **17** is spaced uniformly from the end of the frustum a distance related to the thickness of the material forming the deck or load platform **11**. The flange **17**, as shown in FIG. **1** has circumferentially-spaced notches **19** formed therein for convenience in molding a plurality of circumferentially-spaced tabs **20** about the larger upper open end of the frustum **15**. The tabs **20** are spaced circumferentially in positions corresponding to those of the notches **19**. The tabs **20** are preferably formed with beveled circumferentially-spaced edges **21** as shown most clearly in FIG. **2**, to permit the same to engage and slide up onto the top surface of the load platform or to cut their way into the material forming the support deck **11**. For example, the deck **11** should be formed of material having a thickness corresponding to the distance from the top edge of the frustum **15** to the top surface of the flange **17**. This deck **11** is formed with an opening **22** corresponding to the shape of the upper edge of the frustum **15**, i.e., it has a generally circular configuration with circumferentially spaced notches **24** corresponding to the shape of the tabs **20**. The leg **10** may easily be inserted from the undersurface of the load platform **11** with the tabs **20** aligned with the notches **24**. The leg **10** is then rotated upon its axis such that the tabs are moved from a position aligned with the openings **24** to a position above the top surface of the platform **11**. In a unitized container or pallet, should the material of the bottom or platform **11** be slightly thicker than the distance from the top edge of the leg **10** to the upper surface of the flange **17**, the edge **21** of the tabs **20** may cut into the material surrounding the opening to secure the leg in position.

In a preferred form of the pallet the leg **10** is positioned in the platform as above-described, and a second support deck **12** is secured to a support ring **13**. The support deck **12** will generally correspond identically to the platform **11** and be formed with corresponding openings **22**.

The support ring **13** comprises an annulus which in cross-section is similar to that of a hollow frustum and which has an outer wall **28** corresponding in diameter to the outer surface of the leg **10** adjacent the larger end of the frustum **15**. A flange **29** extends outwardly and surrounds the outer surface of the annulus at a position spaced from one axial end thereof. The flange **29** is formed with notches or discontinuities **30**, and tabs **31** similar to tabs **20** are formed at said one axial end of the annulus. The tabs **31** are spaced around the circumference of the annulus and are axially aligned with the notches **30**. A web **32** forms a center for the annulus and is positioned adjacent the end of the annulus formed with the tabs **31**. An axially extending truncated hollow conically-shaped wall **35** is formed at the center of the ring **13**. The wall **35** cooperates with a hollow conical flange **36** on the wall **16** of the leg **10** enclosing the smaller end of the leg **10**. Ribs **33** support the flange **36** from the frustum side wall and slits **37** in the flange **36** let it flex to receive the wall **35**. The wall **35** of the support ring **13** is formed with an end wall **39** having tabs **38** which will flex the members of the flange **36** sufficiently to permit insertion and which will elastically return to catch the small end of the flange **36** of the leg **10** upon insertion of these two members in axially aligned engaging position as shown in FIG. **2** to hold the same and the decks together.

Small ribs **41** are preferably formed at circumferentially spaced positions below the flange **17** and between the flange **29** and the annulus of the support ring **13**. These ribs **41** may be enlarged to have the shape of gusset platesiif added support is desired.

Referring now to FIG. **7** there is shown a first modification of the leg **10** and support ring wherein the tab **44** illustrated is positioned with its upper surface inclined to the axially upper end **45** of the frustum **15**. This permits the tab **44** to have a wedging engagement

with the platform upon rotation of the leg or support ring about its axis in the direction of the arrow **46** upon insertion of the leg into the hole **22** of the deck **11** or **12**.

FIGS. **8** and **9** disclose a third embodiment of the tab on the support column leg or support ring. This tab **50** is provided with a small radial dimension such that if the opening **22** in the deck or unitized container bottom is not provided with notches **24** to accommodate the tabs and the deck is formed of wood, plastic, or other rigid material, including some papers, the tab **50** will flex in an axial direction upon insertion into the opening and will elastically return to hold the leg or ring in the opening **22** of the deck due to its resiliency. In this instance the opening in the deck would be slightly larger than the outer diameter of the leg or ring.

Having thus described the invention with reference to several embodiments thereof, it is to be understood that the scope of the invention is defined by the following appended claims.

What is claimed is:

1. A support column for use with a pallet deck having a predetermined thickness and a load supporting upper surface and a lower surface for making a disposable pallet comprising:

a leg, said leg comprising a one piece hollow frustum having an open larger end and an end wall substantially closing a smaller end, said end wall having a central opening and a hollow truncated conical flange surrounding the opening and disposed within said frustum, an arcuate flange extending outwardly of and about said frustum at a position uniformly spaced from said larger end of said frustum by a distance substantially equal to the thickness of a said pallet deck for engaging the lower surface of said pallet deck, and tabs spaced from said flange and extending outwardly from the frustum at said larger end from circumferentially spaced positions, said tabs being insertable together with said larger end of said frustum into an opening in a said pallet deck to place said lower surface of said deck against said flange and to place said tabs against the upper surface of a said pallet deck to retain said leg to said pallet deck; and

a one-piece support ring for locking a second deck to said smaller end, said support ring comprising an annulus having an outer wall corresponding in diameter to the outer surface of the frustum at the larger end, a flange extending outwardly of said outer wall of said annulus at a position spaced from one axial end thereof for engaging the upper side of a said second deck, tabs extending outwardly from said outer wall at said one end to engage the lower side of a said second deck, and a boss supported at the center of said annulus and extending axially of said annulus and formed with tabs to cooperate with said opening and conical flange to secure said support ring to said frustum.

2. A support column according to claim **1** wherein said tabs have circumferentially spaced edges which are beveled to engage the deck.

3. A support column according to claim **1** wherein said flanges has a plurality of circumferentially spaced notches and wherein said tabs are placed in spaced relationship corresponding to that of said notches and wherein said tabs have less arcuate extent about said frustum than said flanges.

4. A pallet comprising a combination of a pair of decks and a plurality of spaced support columns, said decks each comprising

A generally planar sheet of material having a predetermined thickness between an upper and lower surface thereof, a plurality of openings corresponding to the number of said support columns desired, said openings being generally circular and having circumferentially spaced notches, and said support columns each comprising

a leg, each leg comprising, a hollow frustum having an open large end corresponding to the dimension of said openings and an end wall substantially closing a smaller end, said end wall having an opening and a hollow truncated conical flange surrounding said opening and disposed within said frustum,

a flange extending outwardly from said frustum and around said large end at a position uniformly spaced from said large end by a distance substantially equal to the thickness of said sheet of material for engaging the lower surface of and supporting said sheet of material around a said opening, and tabs extending outwardly from the frustum at said large end from circumferentially spaced positions corresponding to the spacing of said notches to fit therein, and said large end of each said frustum being inserted into one of said openings in a said sheet to place said sheet against said flange with said tabs positioned to engage the upper surface of said sheet of material and secure said legs to said sheet, and

a support ring for locking the second sheet of material to said smaller end of each said leg, said support ring comprising an annulus having an outer wall corresponding in diameter to the outer surface of the frustum at the large end, a flange extending outwardly of and around said outer wall of said annulus at a position spaced from one axial end thereof, tabs extending outwardly from said outer wall at said one end, and a boss supported at the center of said annulus and extending into said conical flange and having tabs cooperating with said opening and conical flange to secure said support ring to said leg.

5. A pallet according to claim **4** wherein said openings in said deck include circumferentially spaced notches corresponding generally to the shape of said tabs to permit said larger end of said leg to be placed through said opening.

6. A pallet according to claim **4** wherein each of said tabs has circumferentially spaced edges which are beveled.

7. A pallet comprising in combination

a first deck, said first deck comprising a generally planar sheet of material having a predetermined thickness between an upper and lower surface thereof, a plurality of openings, said openings being generally circular, and

a plurality of support columns each comprising a leg, each leg comprising a hollow frustum having an open large end corresponding to the dimension of said openings and an end wall substantially closing a smaller end,

a flange extending outwardly from said frustum and around said large end at a position uniformly spaced from said large end by a distance substan-

tially equal to the thickness of said sheet of material for engaging the lower surface of and supporting said sheet of material around a said opening, and

tabs extending outwardly from the frustum at said large end from circumferentially spaced positions,

and said large end of each said frustum being inserted into one of said openings in said first deck to place said first deck against said flanges with said tabs position to engage the upper surface of said sheet of material and secure said legs to said first deck, said end wall having a central opening and a truncated hollow conical flange surrounding said opening and extending axially into said frustum toward said large end,

a second deck similar to the first deck, and

a plurality of support rings locked to said second deck and adapted for locking said second deck to said smaller end of said frustums of each leg, each said support ring comprising an annulus having an outer wall similar in diameter to the outer surface of the frustum at said large end, a flange extending outwardly of and around said outer wall of said annulus at a position spaced from one axial end thereof and engaging the upper side of said second deck, tabs extending outwardly from said outer wall at said one end and engaging the underside of said second deck, a web in the center of said annulus at said one end and a boss supported at the center of said web and extending axially toward the other axial end thereof and extending through said opening and said conical flange and secured to said frustum.

8. A pallet according to claim **7** wherein said first deck and said second deck have corresponding die cut openings to receive said leg and support ring.

9. A support for a sheet of material for a disposable pallet comprising

a hollow frustum having a larger end and a smaller end, said smaller end having an end wall and a web joined to said end wall and positioned adjacent said larger end to partially close the same,

an arcuate flange extending outwardly of and around said frustum at a position uniformly spaced from said larger end of said frustum to engage one surface of a said sheet of material, and

tabs extending outwardly from the frustum at said larger end from circumferentially spaced positions, said tabs being insertable together with said larger end of said frustum into an opening in said sheet of material to engage the opposite surface of said sheet of material and place said one surface of said sheet of material against said flange and retain said frustum to said sheet of material.

* * * * *