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Sanders et al.

[11] **3,874,546**

[45] **Apr. 1, 1975**

[54] **CONVERTIBLE CONTAINER-PALLET**

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[52] **U.S. Cl.** **220/6**, 220/7

[51] **Int. Cl.** **B65d 7/24**

[58] **Field of Search** 220/6, 7, 62; 229/30

[56] **References Cited**

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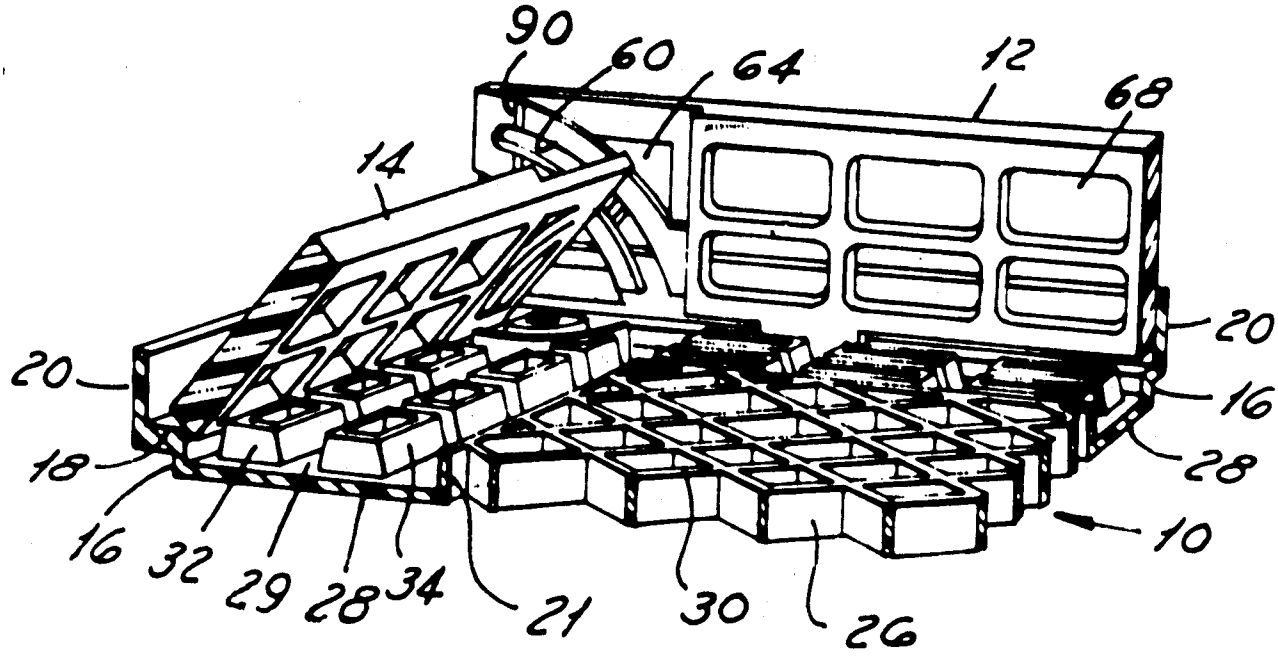
Attorney, Agent, or Firm—Whittemore, Hulbert & Belknap

[57] **ABSTRACT**

An article of manufacture which may be converted from a container to a pallet, and vice versa. The article comprises a bottom wall and side and end walls hinged to the bottom wall which when upright provide a stackable container. The container may be converted to a pallet by swinging the side and end walls inwardly so that they extend substantially flush with the top surface of the bottom wall.

16 Claims, 12 Drawing Figures



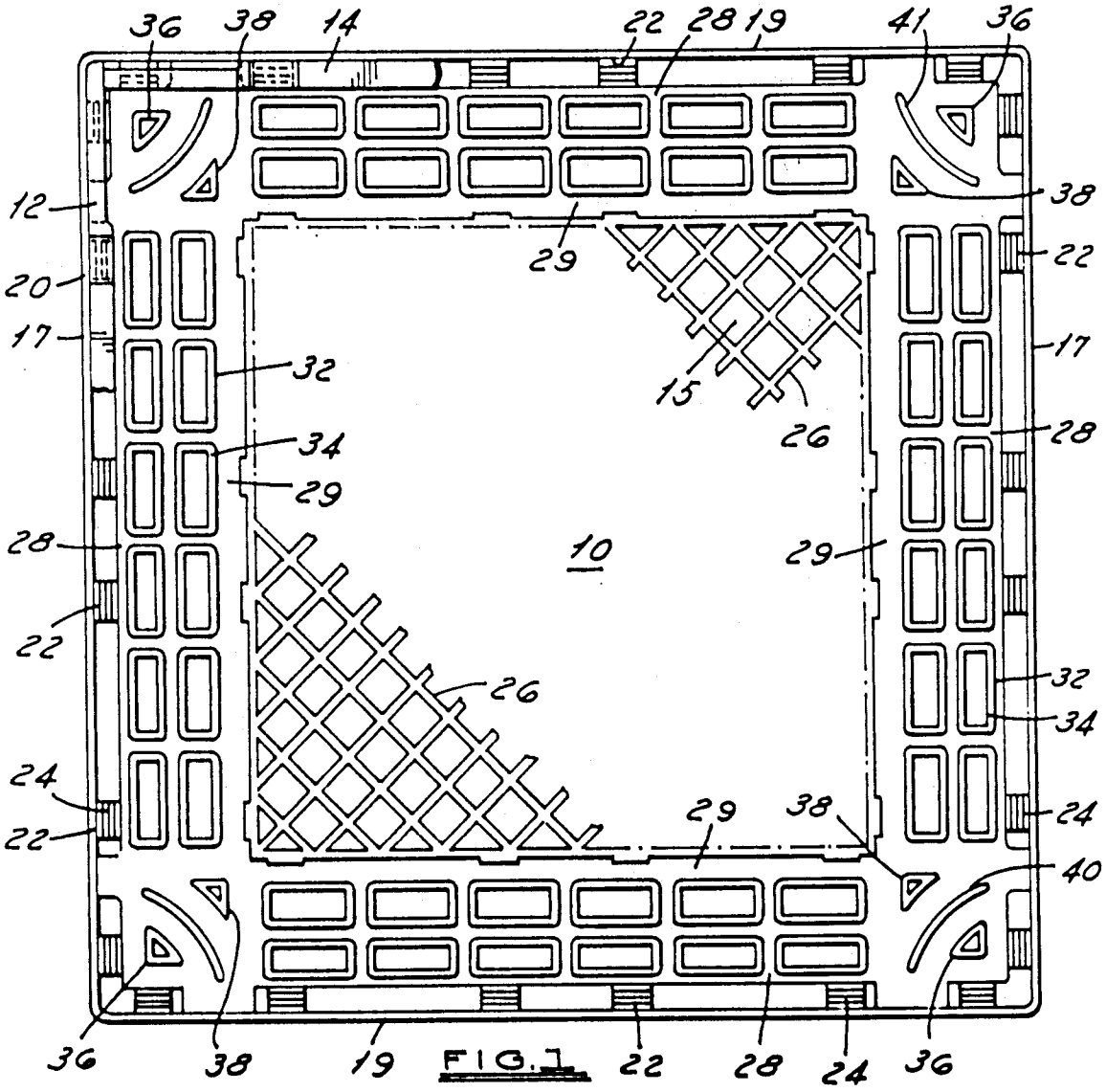

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FIG. 1

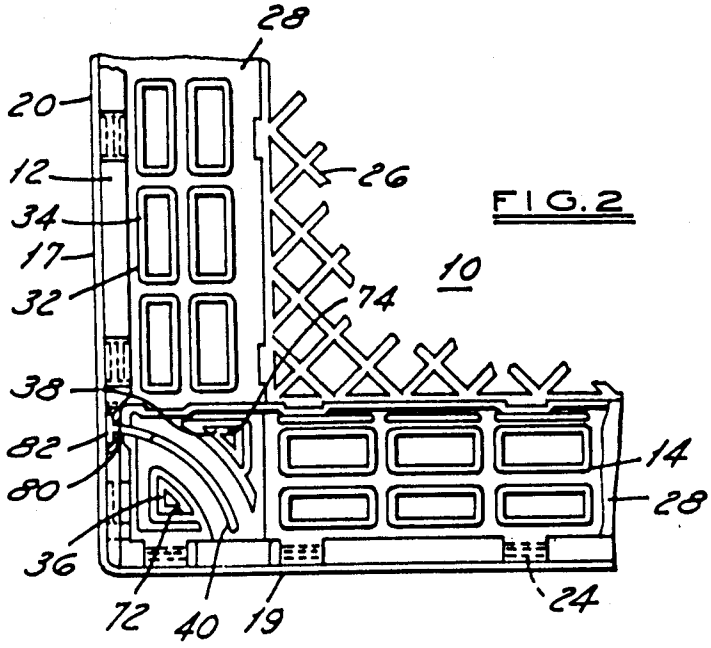
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FIG. 2

FIG. 3

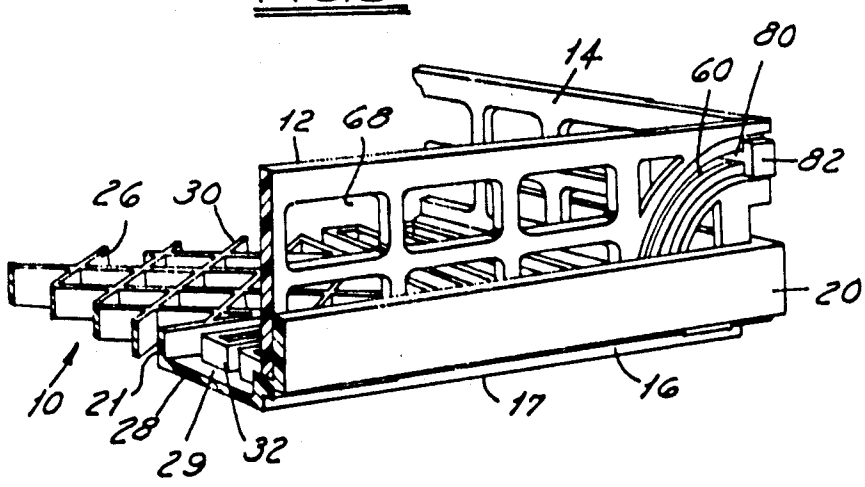


FIG. 4

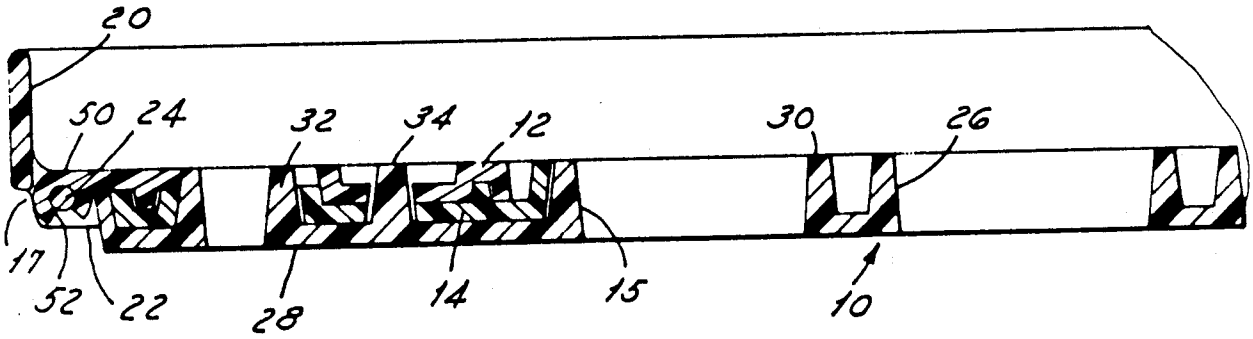


FIG. 5

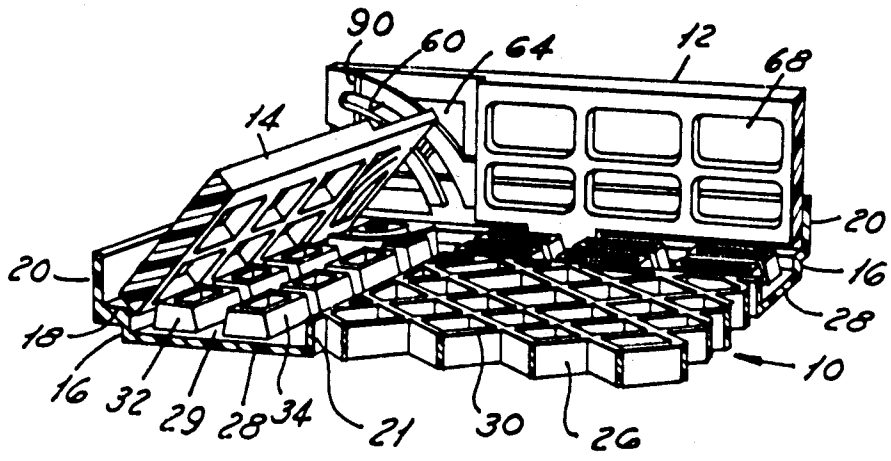


FIG. 6

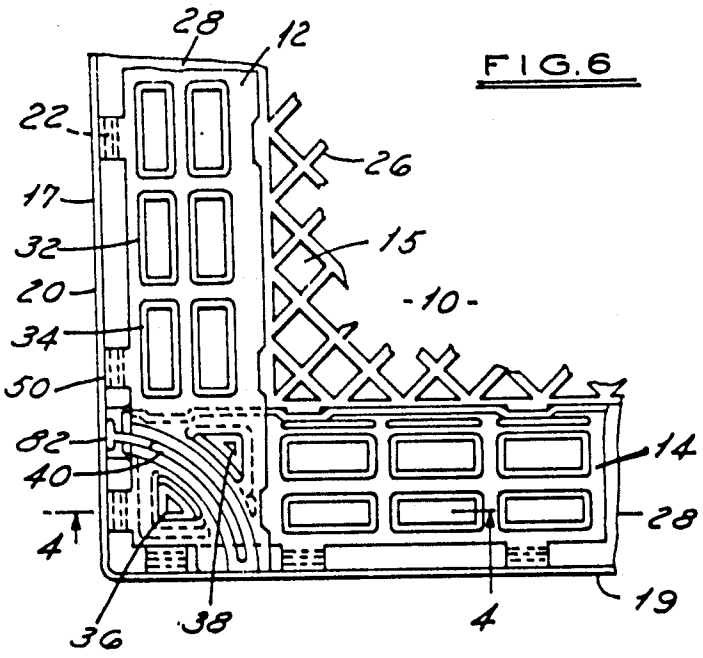


FIG. 7

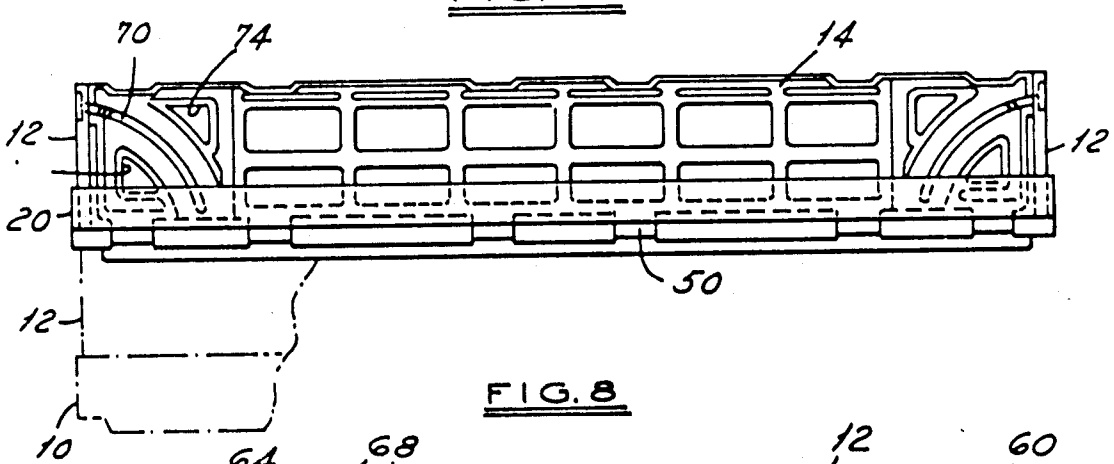
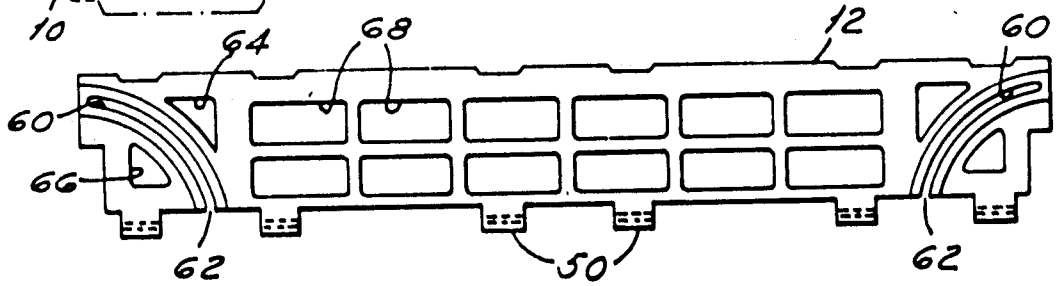


FIG. 8



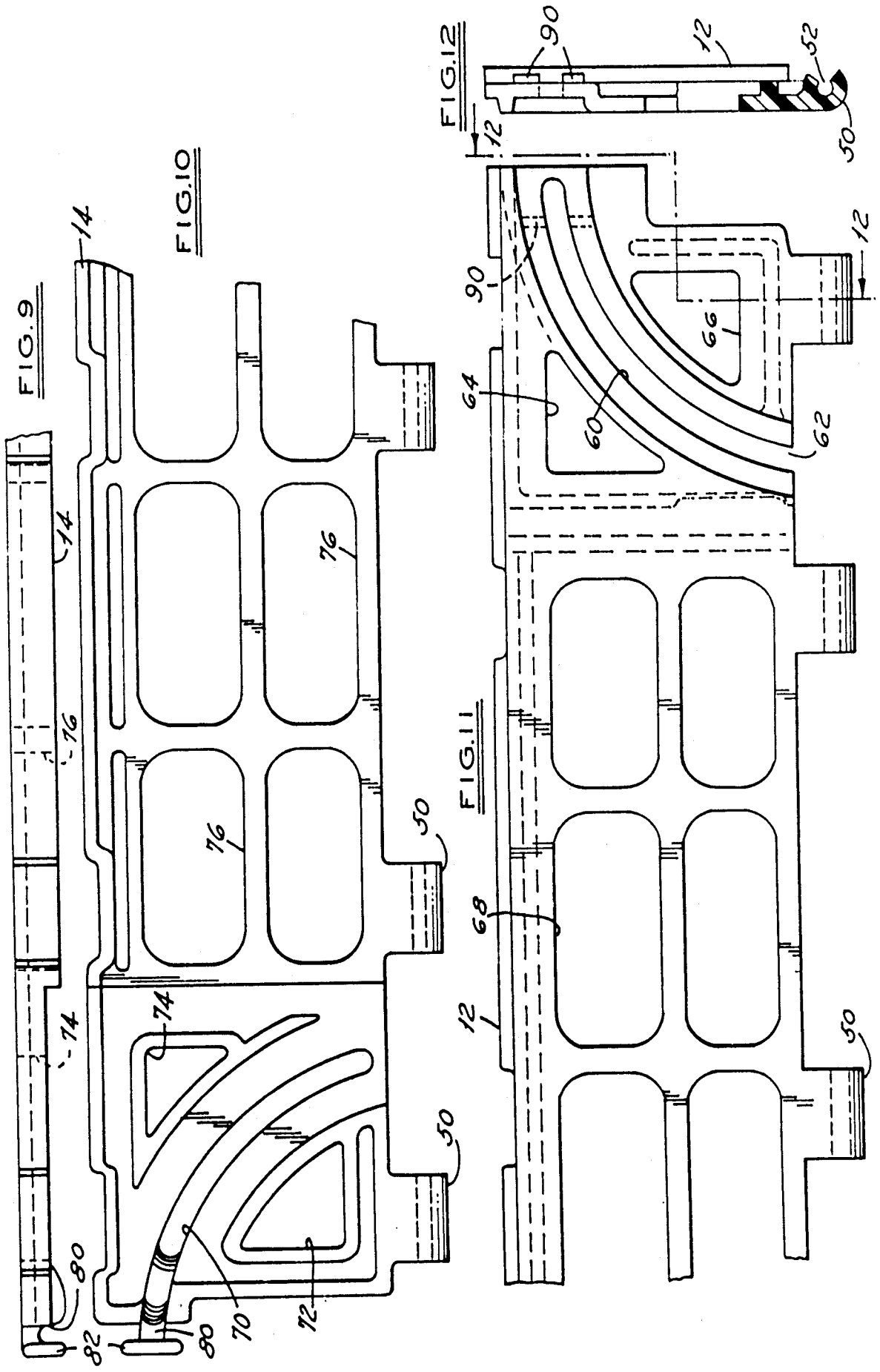


FIG.9
FIG.10
FIG.11
FIG.12
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CONVERTIBLE CONTAINER-PALLET

SUMMARY OF THE INVENTION

The container-pallet of this invention has many uses but is primarily intended for use in the bakery business. When the side walls are upright, a container is provided for carrying hamburger buns, for example. When the side walls are collapsed into the plane of the bottom wall, the container is converted to a pallet suitable for supporting bread loaves.

Bakery trucks often have rails spaced vertically to support pallets for carrying bread. These trucks can also be used to carry hamburger buns, but since hamburger buns are of substantially less vertical height than bread loaves, and since they cannot be stacked on top of one another, too much space is wasted when a single pallet supporting one layer of hamburger buns is supported on each rail.

This problem has been solved by providing a pallet for bread loaves which can be converted to a container for hamburger buns. The containers are stackable so that the weight of an upper container is not carried by the hamburger buns in the lower container.

IN THE DRAWINGS:

FIG. 1 is a top plan view of an article which may be converted from a container to a pallet and vice versa, in which the side and end walls are partly broken away but are shown upright to provide a container, in accordance with our invention.

FIG. 2 is a fragmentary top plan view of the article of FIG. 1 in which one side wall is shown upright and one end wall is shown collapsed or folded down.

FIG. 3 is a fragmentary perspective view of the article in which the side and end walls are upright to form a container.

FIG. 4 is a fragmentary sectional view taken on the line 4—4 of FIG. 6 showing the side and end walls folded down to provide a pallet.

FIG. 5 is a fragmentary perspective view showing one side wall upright and one end wall in an intermediate position between upright and collapsed positions.

FIG. 6 is a fragmentary top plan view showing the side and end walls folded down to provide a pallet.

FIG. 7 is an end elevational view showing the side and end walls upright to provide a container shown stacked upon a like container appearing fragmentarily in dot-dash lines.

FIG. 8 is a detail view in side elevation of one side wall.

FIG. 9 is a fragmentary top plan or edge view of one end wall.

FIG. 10 is a fragmentary view in side elevation of the end wall.

FIG. 11 is a fragmentary view in side elevation of one side wall.

FIG. 12 is an end view of the side wall, partly in section and partly in elevation, taken on the line 12—12 in FIG. 11.

Referring now more particularly to the drawings, the article of this invention is composed essentially of a bottom wall 10, side walls 12 pivoted to opposite sides of the bottom wall and end walls 14 pivoted to opposite ends of the bottom wall. The article serves as a container when the side and end walls are upright as shown in FIGS. 1, 3 and 7, and serves as a pallet when the side and end walls are folded inwardly into the plane of the bottom wall as shown in FIGS. 4 and 6.

The article may be made of any suitable material preferably plastic, such for example as molded polyethylene or polypropylene. Such materials are strong yet sufficiently flexible to permit the snap connections between the bottom wall and side and end walls to be put together. Such snap connections, described more fully hereinafter, when put together provide a virtually permanent assembly because after once assembled it is not intended that the article should be taken apart. It is possible, of course, to take apart the snap connections, although it is quite a difficult thing to do and usually requires a tool.

The bottom wall 10 of the container has a continuous marginal upturned flange 16 about the two sides 17 and two ends 19 of the bottom wall which is turned outwardly to provide a horizontal ledge 18 terminating in a vertical or upwardly extending rim or border frame 20. The ledge 18 has cutouts 22 formed at spaced points along the sides and ends of the bottom wall. In each cutout there is a horizontal hinge pin 24. The hinge pins 24 along each side 17 of the bottom wall are aligned with one another and parallel to such side 17, and the hinge pins 24 along each end of the bottom wall are aligned with one another and parallel to such end 19.

The central portion 26 of the bottom wall 10 is preferably of open cellular construction to provide openings 15 through the bottom wall so that the container can be washed and easily kept in a sanitary condition. This central cellular portion 26 is surrounded by a border frame 21 and is connected to the upturned flange 16 by a flat, horizontal peripheral bottom wall portion 28. The cellular portion 26 surrounded by the border frame 21 is square like the bottom wall but much smaller in size. The top edges 30 of the cellular portion 26 and surrounding border frame 21 lie in a common horizontal plane parallel to but spaced above the peripheral bottom wall portion 28 so that the latter provides a relieved area 29 for the folded side and end walls as hereinafter more fully described.

A plurality of generally upright hollow cellular members 32 are permanently molded to the peripheral bottom wall portion 28 in the relieved areas 29 along the sides and ends of the bottom wall, the top edges 34 of which lie in the same plane as the top edges 30 of the cells of the central cellular portion 26.

The peripheral portion 28 of the bottom wall has permanently molded to the top surface thereof in the relieved area 29 at each corner thereof the upright hollow cellular members 36 and 38 and the arcuate member 40 the top edges 41 of which lie in the common plane of the top surfaces 30 and 34 of the central cellular portion 26 and cellular members 32. The upper surfaces of these members 36, 38 and 40, together with the top surfaces of the cellular members 32 and cells of the cellular portion 26 comprise the top surface-forming members of the bottom wall 10.

The side walls 12 are in this instance identical, and referring to FIGS. 4, 8, 11 and 12, each such side wall will be seen to be in the form of an elongated generally rectangular member having longitudinally spaced hinge knuckles 50 along the lower edge. As seen, each hinge knuckle 50 is an open ended tubular member of generally cylindrical form but longitudinally slotted at 52 from end to end. The cylindrical inner surface wall of

the hinge knuckle from one edge of the slot to the other is slightly greater than 180° in extent. The slots 52 are wider than pins 24 at their outer ends but narrower than pins 24 at their inner ends. These cylindrical inner surfaces are of the same diameter as the hinge pins 24 carried by the bottom wall and are adapted to receive the hinge pins 24 to form snap hinge connections and pivotally mount the side wall on the bottom wall. The sides of the slot 52 in the hinge knuckles flare to pilot the hinge pin when it is pressed into the hinge knuckle. The material of which the hinge knuckle is made is sufficiently flexible to permit the hinge pin to enter when forced under sufficient pressure. These hinge knuckles 50 are of course spaced apart the same distance as the hinge pins 24 along the corresponding sides of the bottom wall.

The ends of the side walls 12 have the arcuate slots 60 which are open at their lower ends as seen at 62, and also have the openings 64 and 66. Intermediate the ends, the side walls have the openings 68. Thus the side walls consists essentially of frame members which define the openings or relieved areas 60–68.

when the side walls are hinged to the bottom wall 10 and the side walls folded inwardly, the openings 68 register with and will clear the cellular members 32, the openings 64 and 66 register with and will clear the cellular members 36 and 38, the slots 60 register with and will clear the arcuate members 40 on the bottom wall. Thus the side walls will when collapsed to the horizontal position shown in FIG. 4 have all portions thereof substantially flush with or at least not above the top surface of the bottom wall defined by the upper edges of the top surface-forming members described heretofore.

The end walls 16 are also in this instance identical and will be seen to be elongated generally rectangular members having hinge knuckles 50 along the lower edge which are spaced apart the same distance as the hinge pins 24 along each end of the bottom wall. These hinge knuckles may be exactly like the hinge knuckles on the side walls and accordingly the same reference numerals are applied. Such hinge knuckles receive the hinge pins 24 along the ends of the bottom wall to form snap hinge connections and pivotally mount the end walls.

The end walls at their ends are formed with arcuate slots 70 and with openings 72 and 74. Intermediate the ends the end walls are formed with openings 76. The end walls, like the side walls, are thus essentially made up of frame members defining the openings or relieved areas 70–76. When the end walls are hinged to the bottom wall 10 and folded inwardly to their horizontal positions, the arcuate slots 70 register with and clear ribs 40 on the bottom wall, the openings 72 and 74 register with and clear the cellular members 36 and 38, and the openings 76 register with and clear the cellular members 32. Thus as seen in FIG. 4, when in their inwardly folded horizontal positions, the end walls lie flat upon the bottom sheet 15 of the bottom wall with all portions thereof flush with or at least not above the height of the top surface-forming members of the bottom wall.

The end walls also have the pins 80 on each end which project beyond the end of the end walls in the plane thereof and which are adapted to fit in the slots 60 in the ends of the side walls 12 and move in such slots as the side and end walls are shifted between upright and collapsed positions. The pins 80 terminate in enlargement 82 which prevent the pins from becoming disengaged from the slots 60.

Each side wall 12 has the detents 90 on its inner surface adjacent the upper end of each slot 60 which cooperate with the adjacent ends of the end walls to releasably retain the end walls in upright position when the article is to be used as a container. The side walls are themselves held upright by the upright end walls due to the engagement of the ends of the end walls with the inner surfaces of the side walls.

The article is shown in the form of a container in FIGS. 1, 3 and 7. The side and end walls are upright, preferably forming right angles with the bottom wall. The side walls as previously stated are held upright by the ends of the end walls which engage the inner surfaces of the side walls. The pins 80 on the end walls engage the upper ends of the slots 60 in the side walls. The detents 90 on the inner surfaces of the side walls adjacent the upper ends of the slots engage the adjacent ends of the end walls to releasably hold the end walls in upright position.

FIG. 5 shows one of the side walls upright and one of the end walls in an intermediate position. The end wall 14 is moved from upright position to the intermediate position by applying inward pressure sufficient to cam the ends of the end wall past the detents 90 on the side walls.

To collapse the container to pallet form as shown in FIGS. 4 and 6, the end walls 14 are folded inwardly to positions resting upon the peripheral portion 28 of the bottom wall in the relieved areas 29 along the ends of the bottom wall. In this position the pins 80 on the end walls descend below the lower open ends of the slots 60 in the side walls. The end walls which have now been folded to horizontal position in the plane of the bottom wall are disposed so that their outer surfaces are substantially flush with or below the upper edges of the top surface-forming members 26, 32, 36, 38 and 40. (See FIG. 4). The side walls are then folded inwardly into the relieved areas 29 along the sides of the bottom wall so that their ends rest upon the end walls as in FIG. 4 so as to assume a substantially horizontal position in which their outer surfaces are substantially flush with or below the upper edges of the top surface-forming members of the bottom wall 10. In this folded position of the end and side walls, the article provides a pallet.

FIG. 7 shows that the article when used as a container is stackable with another similar article used as a container, the upper edges of the side and end walls of the lower container in a stack supporting the ledges 18 of the bottom wall of an upper container.

The snap connections pivotally connecting the side and end walls to the bottom wall are easily put together under a slight lateral pressure sufficient to expand the hinge knuckles 50 enough to receive the hinge pins. A virtually permanent assembly is thus provided, although with effort and possibly with the use of a tool the hinge pins may be pried out of the hinge knuckles.

In the foregoing description reference is made to "side" walls and "and" walls and to the "sides" and "ends" of the container or pallet. The use of the words "side" and "end" is solely for the purpose of distinguishing one set of opposite walls or one set of opposite container or pallet edges from the other and should not be taken as implying that one set of walls or edges is longer or shorter than the other.

What we claim as our invention is:

1. A container capable of being converted to a pallet, comprising a horizontal bottom wall, upright side walls pivoted to opposite sides of said bottom wall, upright end walls pivoted to opposite ends of said bottom wall, means releasably holding said side and end walls upright, the top surface of said bottom wall having relieved areas adjacent the sides and ends thereof, said container being converted to a pallet by swinging said side and end walls inwardly to positions in which they are received by said relieved areas.

2. The container defined in claim 1, wherein said side and end walls when said container is converted to a pallet are disposed in horizontal positions substantially flush with or below the top surface of said bottom wall.

3. The container defined in claim 2, wherein said side and end walls are formed with frame members defining relieved areas, and said side and end walls when swung inwardly to their horizontal positions have their frame members disposed in the relieved areas of said bottom wall, said top surface of said bottom wall having portions projecting into the relieved areas of said side and end walls.

4. The container defined in claim 2, including pins on the ends of said end walls and arcuate slots in the ends of said side walls, said pins slidably engaging said slots.

5. The container defined in claim 4, wherein said means releasably holding said side and end walls upright includes interengaging parts thereon.

6. The container defined in claim 5, wherein said means releasably holding said side and end walls upright includes detents adjacent said slots releasably retaining said pins near one end of said slots.

7. The container defined in claim 1, wherein said side walls and end walls are pivoted to said bottom wall by means providing snap hinge connections.

8. The container defined in claim 7, wherein each hinge connection comprises a hinge knuckle in the form of an elongated open ended tubular member of generally cylindrical form but longitudinally slotted from end to end, the inner surface of said tubular member being cylindrical and more than 180° in arcuate extent from one edge of the slot to the other, and a hinge pin of a diameter greater than the width of said slot received in said hinge knuckle and being insertable laterally through said slot, said tubular member being formed of sufficiently flexible material to yield when said pin is inserted therein as aforesaid.

9. The container defined in claim 8, including pins on the ends of said end walls and arcuate slots in the ends of said side walls, said pins slidably engaging said slots, means releasably holding said side and end walls upright, including detents on said side walls adjacent said slots releasably engageable with the ends of said end walls.

10. The container defined in claim 9, wherein the ends of said end walls when erect engage the inner surfaces of said side walls to hold the latter erect.

11. The container defined in claim 10, wherein said tubular member is formed of plastic.

12. The container defined in claim 11, wherein said slot provides a flaring entrance to pilot the insertion thereinto of said hinge pin.

13. A container capable of being converted to a pallet, comprising a horizontal wall, upright walls pivoted to opposite edges of said bottom wall, means releasably holding said upright walls upright, the top surface of said bottom wall having relieved areas adjacent said opposite edges thereof, said container being converted to a pallet by swinging said upright walls inwardly to positions in which they are received by said relieved areas.

14. The container defined in claim 13, wherein said upright walls when said container is converted to a pallet are disposed in horizontal positions substantially flush with or below the top surface of said bottom wall.

15. The container defined in claim 13, wherein said upright walls are pivoted to said bottom wall by means providing snap hinge connections.

16. The container defined in claim 15, wherein each hinge connection comprises a hinge knuckle in the form of an elongated open ended tubular member of generally cylindrical form but longitudinally slotted from end to end, the inner surface of said tubular member being cylindrical and more than 180° in arcuate extend from one edge of the slot to the other, and a hinge pin of a diameter greater than the width of said slot received in said hinge knuckle and being insertable laterally through said slot, said tubular member being formed of sufficiently flexible material to yield when said pin is inserted therein as aforesaid.

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