

[72] Inventors **Anthony M. Spinks;**
Michael H. Lethbridge, London, England
[21] Appl. No. **821,881**
[22] Filed **May 5, 1969**
[45] Patented **Feb. 9, 1971**
[73] Assignee **Tri-Wall Containers, Inc.**
Plainview, N.Y.
a corporation of New York

1,757,192	5/1930	Hothersall	220/97B
1,983,265	12/1934	Belsinger	229/23B
2,326,414	8/1943	Thompson	220/4
2,388,297	11/1945	Slaughter	220/4UX
2,665,047	1/1954	Belsinger	229/23B
2,534,010	12/1950	Frye	229/23B

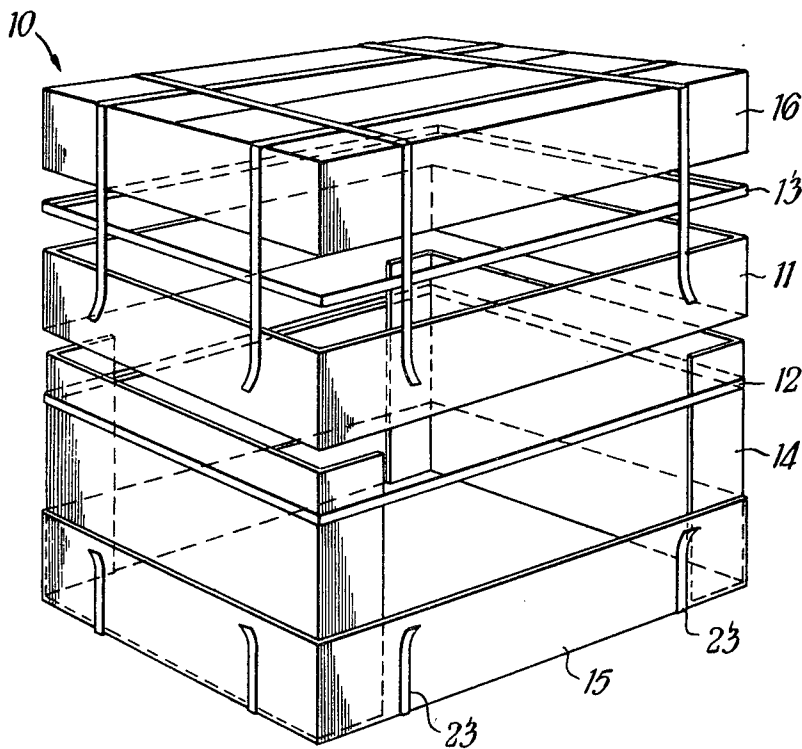
Primary Examiner—David M. Bockenek
Attorney—Kenyon & Kenyon Reilly Carr & Chapin

[54] **CONTAINER**
10 Claims, 8 Drawing Figs.

[52] **U.S. Cl.**..... **229/23,**
229/49; 220/4; 217/13
[51] **Int. Cl.**..... **B65d 13/00**
[50] **Field of Search**..... 229/49, 23,
S; 220/4, 97B; 217/13

[56] **References Cited**
UNITED STATES PATENTS
578,353 3/1897 Nelson 217/13

ABSTRACT: A container of boxlike construction which comprises at least two tubular sections and a rigid frame interposed between the or each pair of the adjacent sections each frame comprising a flange which is interposed between the adjacent faces of the sections to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container to retain the edges of the sections against outward expansion.



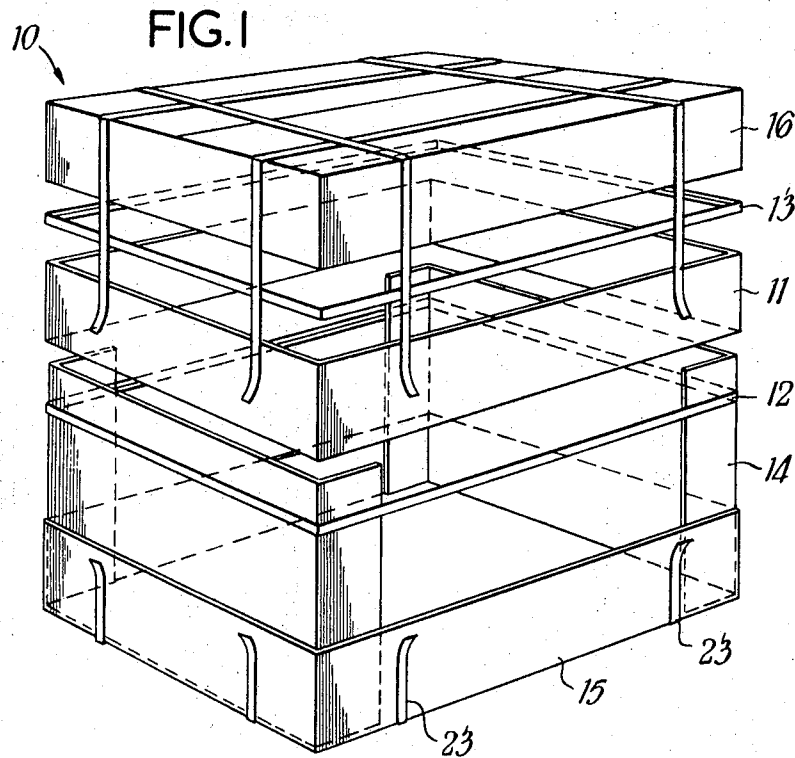


FIG. 2

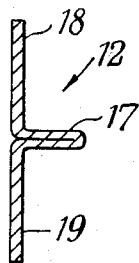


FIG. 4

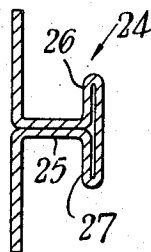
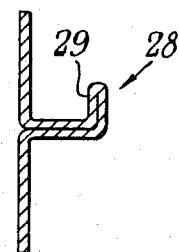


FIG. 5



INVENTORS
 Anthony Michael Spinks
 Michael Hugh Lethbridge
 by *Stanton & Stanton*
 Attorneys

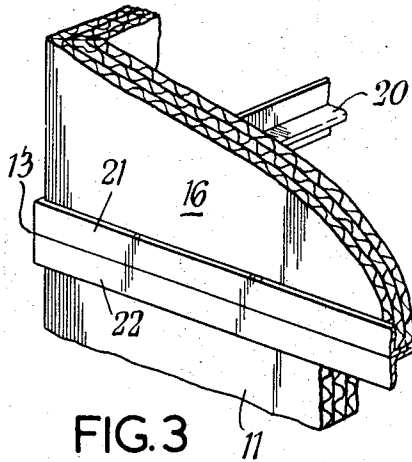


FIG. 3

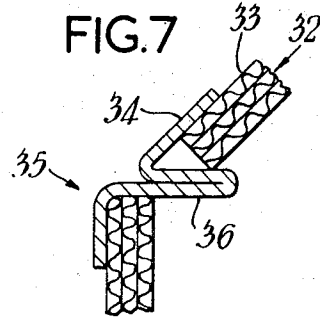


FIG. 7

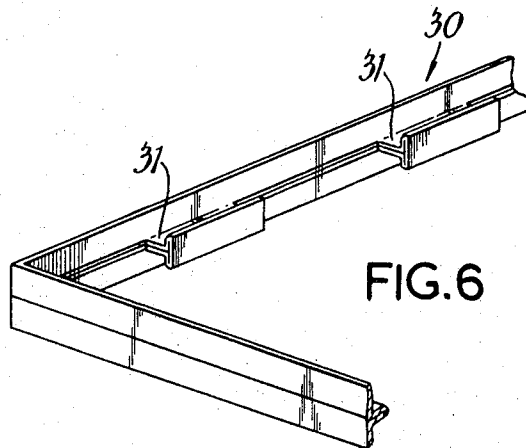


FIG. 6

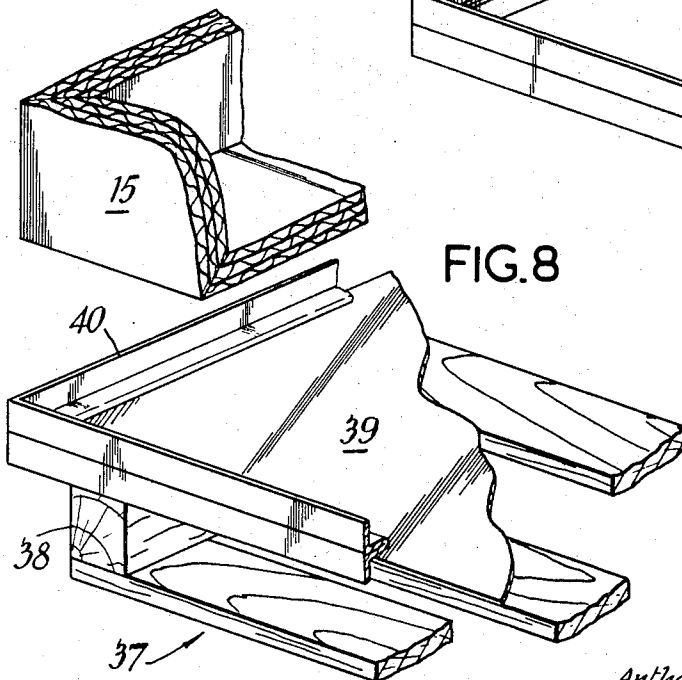


FIG. 8

INVENTORS
 Anthony Michael Spinks
 Michael Hugh Lethbridge
 by *Kenyon Kenyon*
 Attorneys

CONTAINER

BACKGROUND TO THE INVENTION

There are at present two general known types of container, firstly that in which a rigid framework is covered with or used to support a cladding and secondly that in which sheet material is folded and adhered together to form a boxlike container without any supporting structure. The latter method has the advantage over the use of a framework that it eliminates the problems which flow from uneven movement of the frame and the cladding under compression. However, if fiberboard or a similar material is used as the sheet material for large containers, for instance containers which stand some 4 or 5 feet or more in height, problems occur in manufacturing, firstly since there is a practical limit to the size to which carton size boxes can be made from the blanks available from conventional manufacturing and secondly since the compressive strength of a carton tends to fall off as the height increases.

Other conventional styles of container also have disadvantages, for instance, in a sleeve and overlapping cap style of container, the sleeve does not lie flush with the caps and the strapping therefor stands proud of the sleeve.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide a method of constructing a container which lends itself readily to the construction of large containers from readily available blanks and which results in a container having, for any given height, a high resistance to compression relative to the container of the same height but of conventional construction, without necessitating the use of any vertical support or vertical framework members. It is a further object of the invention to provide a container having approximately flush inner and outer walls.

STATEMENT OF THE INVENTION

According to the invention there is provided a container of boxlike construction comprising top and bottom caps, an intermediate open ended section between the top and bottom caps and two similar rigid frames interposed between each cap and the intermediate section, wherein each frame is T-shaped in cross section and comprises a flange interposed between adjacent end faces of a cap and the intermediate section to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container and retaining the respective edges of the caps and of the intermediate section against outward expansion.

According to a further aspect of the invention there is provided a container of boxlike construction comprising at least two tubular sections and a plurality of similar rigid supporting frames, each of which frames comprises a flange interposed between adjacent edges of a pair of sections to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container to retain the respective edges of the sections against outward expansion.

According to yet a further aspect of the invention there is also provided the combination of a boxlike container and a supporting pallet, the container comprising a plurality of tubular sections and a plurality of similar rigid supporting frames, each of which frames is T-shaped in cross section and comprises a flange interposed between adjacent edges of a pair of sections to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container to retain the respective edges of the sections against outward expansion, the plan outline of the pallet being similar to the plan outline of the container and the container being mounted on the pallet with one of the said frames interposed between the pallet and the container to locate the container on the pallet and resist lateral dislodgement of the container from the pallet.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a container according to the present invention showing the several parts in a partly exploded view;

FIG. 2 is a section through a frame forming a part of the container of FIG. 1;

FIG. 3 is a perspective view of a detail of the container of FIG. 1;

FIG. 4 is a section through a modification of the frame of FIG. 2;

FIG. 5 is a section through a modification of the frame of FIG. 4;

FIG. 6 is a perspective view of a part of a further frame;

FIG. 7 is a section through a detail of a modification of the container of FIG. 1; and

FIG. 8 is a detail of a part of the container of FIG. 1 mounted on a pallet.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1 a boxlike container is indicated generally at 10, which comprises an open ended, intermediate section 11, two similar rectangular frames 12 and 13, a liner 14, an end section forming a bottom cap 15 and an end section forming a top cap 16.

The liner, the two end caps and the intermediate section are formed from a multilayer, corrugated fiberboard, for instance the material sold under the Trade Mark "Tri-Wall Pak." The end caps and the intermediate section can be formed to the shape shown in any convenient manner and are preferably formed by slotting and bending a blank to the required shape and then adhering the edges with an adhesive or with staples. The liner is preferably formed in the same manner.

The two frames 12 and 13 are formed from galvanized steel to give structural strength and rigidity to the assembled container. A cross section through the frame 12 is shown in FIG. 2, from which it will be seen that the frame is T-shaped in section, comprising an inwardly directed, horizontal flange 17 and upper and lower retaining walls 18 and 19. The other frame 13 is similar to the frame 12 and comprises a flange 20 and upper and lower retaining walls 21 and 22.

The container 10 is assembled by placing the bottom cap 15 on the floor with its open end facing upwardly and inserting the liner 14 inside the cap. The liner 14 is a snug fit in the cap and serves as a guide for the other parts of the container. The frame 12 is next passed over the liner and seated on the upper edge of the cap 15, the dimensions of the frame 12 and cap 15 being such that the cap 15 fits snugly within the lower retaining wall 19 of the frame. The intermediate section 11 is then passed over the liner and seated on the flange 17 of the frame 12; the other frame 13 is seated on the upper edge of the section 11 and finally the top cap 16 is seated on the flange 20 of the frame 13. To complete the assembly straps 23 are wrapped and tied around the container to secure the assembled parts together for handling as a single unit.

The wall thickness of the sheet material from which the end caps and the intermediate section are formed is approximately equal to the width of the flanges on the two frames 12 and 13, as shown in FIG. 3, so that there are no projections or recesses in the inner surfaces of the container and the frames form a butt joint between the walls of the end cap and the wall of the section. Furthermore, the outer surfaces of the container are approximately flush, except for the retaining walls of the two frames, which are relatively thin.

It has been found that the compressive strength of a conventional container, that is the resistance of the sidewalls to collapse when a load is placed on top of the container, varies inversely with the height of the sidewalls. In other words, a container having a vertically continuous sidewall 7 feet high will have a much lower resistance to compression than a container having a vertically continuous sidewall 3 feet high.

In the container 10 the sidewalls are broken down into three components or sections each of which is equal in height to

one-third of the total weight of the container and the horizontal edges of which are constrained by relatively strong frames. The resistance of the container 10 to compression is thus much greater, by virtue of its modular structure than a conventional container of the same height but having sidewalls formed from single vertically continuous panels.

The height of the container 10 can be increased by adding a further intermediate section or sections without substantially reducing the resistance of the container to compression. Alternatively, the section 11 can be omitted and the container formed from the top and bottom caps and the frame 12. The modular structure of a container according to the present invention thus gives the user great flexibility, in that containers of any height can be erected from relatively few standard units, each of which is, in itself, relatively small and therefore easy to manufacture.

If the container has to withstand unusually high compressive forces, the frames used in the container can be modified as shown in FIGS. 4 and 5. In FIG. 4 a frame 24 is shown in cross section, which is similar to the frame 12 except that it has a flange 25 formed along its inner periphery with a vertical upper lip 26 and a vertical lower lip 27. The vertical lips 26 and 27 provide a support for the sidewall of the section fitted into the frame 24 and act as a restraint against inward collapse which increases the compressive strength of the container. In FIG. 5 a frame 28 is shown in section which is similar to the frame 24 except that it has only an upper vertical lip 29.

The frames are preferably formed from galvanized steel but can, alternatively be formed from any other material having the desired properties, for instance certain synthetic resins. They can be formed from four separate sections which are welded, riveted or bolted at the corners, or from a single section which is bent, on a sharp radius at three corners and welded or otherwise joined at the fourth corner. The flange which projects inwardly on each frame is normally continuous but in certain applications, particularly where the flange is formed with a lip it may be advantageous to provide a frame with an interrupted flange. A frame 30 having an interrupted flange 31 is shown in FIG. 6.

In the container 10 the frames are rectangular in shape, but nonrectangular polygonally shaped containers are envisaged in which the frames would also be polygonal. In certain circumstances, for instance where the sleeves and end caps are formed from a material which is easily flexible, at least about one axis, the container can be cylindrical and the frames would then be circular.

It is also envisaged, as shown in FIG. 7, that an end section or cap 32 can have inclined sidewalls 33, i.e. the section is shaped as a truncated pyramid, in which event a supporting wall 33 of frame 35 on which the section rests is inclined inwardly at an acute angle to flange 36 of the frame to correspond with the slope of the sidewalls of the section.

The end sections, the intermediate sections and the liner of the container 10 are preferably formed from multilayer corrugated fiberboard as this material has many advantageous characteristics. However, these units can, if required be formed from any other suitable material which meets structural and cost requirements, for instance other forms of fiberboard and multilayer sheet material can be used.

A further advantage of the container 10 is that it lends itself readily to mounting on a conventional type of pallet 37, as shown in FIG. 7. The pallet 37 comprises transverse slats 38 and a rectangular hardboard platform 39, the plan outline of which is the same as the plan outline of the container 10. In order to mount the container 10 on the pallet 37, a frame 40, similar to the frames 12 and 13 is placed on the pallet with the pallet a snug fit inside the lower vertical wall of the frame 40. The bottom cap 15 of the container 10 is then placed on the flange of the frame 40, a close fit within the upper vertical wall of the frame and the container is then assembled in the manner described above.

In order to secure the pallet to the container the straps 23 are preferably used and passed beneath the pallet. However,

the container can alternatively be secured to the pallet by any conventional means, for instance by nailing, stapling or glueing.

It is also envisaged that a container can be constructed of open ended sections only, for instance the container can be mounted on a pallet prior to loading and the pallet then forms the floor or base of the container. The closed sections or caps then become redundant.

Further minor modifications can be made to the above described embodiment without departing from the spirit and scope of the invention which is best described in the following claims.

We claim:

1. A container of boxlike construction comprising top and bottom caps, an intermediate open ended section between the top and bottom caps and two similar rigid annular frames interposed between each cap and the intermediate section, wherein each frame is T-shaped in cross section and comprises a flange interposed between adjacent end faces of a cap and the intermediate section to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container and retaining the respective edges of the caps and of the intermediate section against outward expansion. the inner edge portion of the flange being substantially adjacent the interior surface of the cap and intermediate section adjacent thereto.

2. A container is claimed in claim 1 wherein each rigid frame includes an upwardly extending lip and a downwardly extending lip on the radially inner edge of the flange, the lips being located on the inside of the container to retain the edges of the adjacent caps and section against inward collapse.

3. A container as claimed in claim 2, wherein the flange of each frame is interrupted.

4. A container of boxlike construction comprising at least two tubular sections and a plurality of similar rigid supporting frames, each one of which frames comprises a flange interposed between adjacent edges of a pair of sections to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container to retain the respective edges of the sections against outward expansion.

5. A container as claimed in claim 4, wherein the frame is T-shaped in cross section, the walls thereof being arranged at right angles to the flange.

6. A container as claimed in claim 4, wherein the top and bottom sections of the container are closed.

7. A container as claimed in claim 4, wherein each rigid frame includes an upwardly extending lip and a downwardly extending lip, the lips being located on the radially inner edge of the said flange to retain the edges of the adjacent section against inward collapse.

8. The combination of a boxlike container and a supporting pallet, the container comprising a plurality of tubular sections and a plurality of similar rigid supporting frames, each one of which frames is T-shaped in cross section and comprises a flange interposed between adjacent edges of a pair of sections to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container to retain the respective edges of the sections against outward expansion, the plan outline of the pallet being similar to the plan outline of the container and the container being mounted on the pallet with one of the said frames interposed between the pallet and the container to locate the container on the pallet and resist lateral dislodgement of the container from the pallet.

9. A container of boxlike construction comprising a cap portion, and an intermediate open ended section atop the cap and a rigid annular frame interposed between the cap and the open ended section, wherein the frame is T-shaped in cross section and comprises a flange interposed between adjacent end faces of the cap and the open ended section to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container and retaining the respective edges of the cap and of the open ended section

against outward expansion, the inner edge portion of the flange being substantially adjacent the interior surface of the cap and open ended section adjacent thereto.

10. A container construction comprising a pair of sections each having an open end and a rigid annular frame interposed between the sections, wherein the frame is T-shaped in cross section and comprises a flange interposed between the open

ends of the sections when disposed adjacent to one another to form a butt joint therebetween and upwardly and downwardly projecting walls located externally of the container and retaining the respective edges of the said pair of sections against outward expansion, the inner edge portion of the flange being substantially adjacent the interior surface of the sections.

10

15

20

25

30

35

40

45

50

55

60

65

70

75