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TITLE OF INVENTION

54	COLLAPSIBLE CRATE AND ASSOCIATED CONNECTING MEANS
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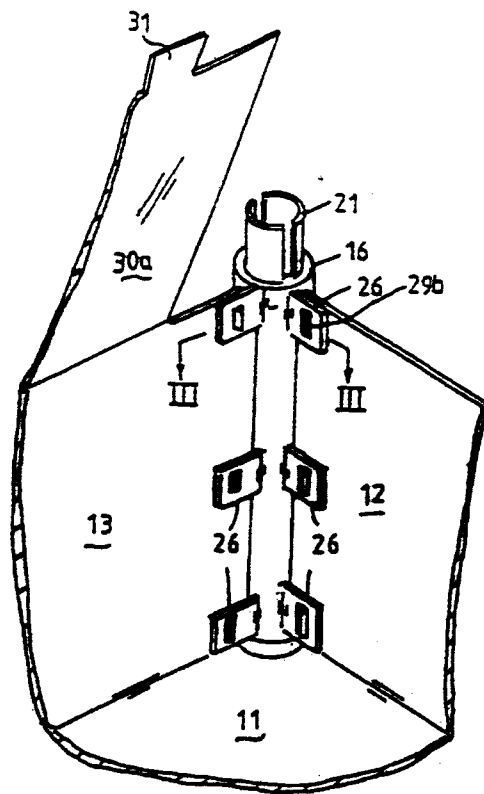
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FOR ABSTRACT SEE THE NEXT SHEET

(54) Title: COLLAPSIBLE CRATE AND ASSOCIATED CONNECTING MEANS

(57) Abstract

According to the invention there is provided a collapsible container (10) comprising a base panel (11); opposed side wall panels (13) and opposed end wall panels (12), the side wall panels (13) and end wall panels (12) being movable to an upright position relative to the base panel (11) so as to define corner zones at their junctions; and corner posts (25) releasably connecting adjacent side wall panels (13) and end wall panels (12) where they adjoin one another in the upright position, each corner post (25) having connecting formations (26, 28) for receiving and connecting the side wall panels (13) and end wall panels (12) thereto. The invention also extends to corner post (25) suitable for a container (10) formed of sheet material so as to define corner zones at a junction between side wall panels (13) and end wall panels (12) of the container (10); to a blank of sheet material for a collapsible container (10); and to a method of erecting a collapsible container (10).



**COLLAPSIBLE CONTAINER**  
**AND ASSOCIATED CONNECTING MEANS**

**Technical Field**

This invention relates to a collapsible container and to connecting means for use in  
5 association therewith.

**Background Art**

Collapsible containers of various designs are available on the market. They are particularly useful for the conveyance of produce such as fruit and vegetables, but are  
10 not confined to the conveyance of produce. Collapsible containers generally suffer from a number of disadvantages. One disadvantage is that they tend to be relatively complicated in their construction, which makes them relatively expensive to manufacture. In addition, collapsible containers can be difficult and time-consuming to erect, which often leads to user resistance to these types of containers. A further  
15 disadvantage is that, once erected, many of these types of containers lack rigidity so that they are relatively easily deformed through handling and stacking, often resulting therein that conveyed goods are damaged.

**Object of the Invention**

20 It is accordingly an object of the present invention to provide a novel collapsible container, which seeks to overcome the abovementioned disadvantages, or which at least will provide a useful alternative to prior art containers. A further object of the

invention is to provide a container, which can be of a relatively thin wall material yet capable of being stacked.

### Disclosure of the Invention

5 According to the invention there is provided a collapsible container comprising a base panel; opposed side wall panels and opposed end wall panels, the side wall panels and end wall panels being movable to an upright position relative to the base panel so as to define corner zones at their junctions; and

10 corner posts releasably connecting adjacent side wall panels and end wall panels where they adjoin one another in the upright position, each corner post having connecting formations for receiving and connecting the side wall panels and end wall panels thereto.

15 According to the invention there is also provided a corner post suitable for a container formed of sheet material so as to define corner zones at a junction between side wall panels and end wall panels of the container, the corner post comprising connecting formations for receiving and connecting the side wall panels and end wall panels thereto.

20 The connecting formations of the corner post may be adapted to interconnect with the side wall panels in the form of a snap fit.

Each corner post may comprise at least one set of flanges, the set of flanges comprising a pair of parallel flanges between which a side wall panel is received.

According to one form of the invention, each corner post may comprise a tubular member having two sets of flanges directed at substantially right angles to one another. Each pair of flanges may comprise an outer flange and an inner flange

Each outer flange may have integral lugs which engage in corresponding apertures formed in the side wall panels. The lugs on the outer flange may be located opposite corresponding apertures provided on the inner flange.

Alternatively, each outer flange may include at least one engaging formation adapted releasably to engage a slotted aperture formed in the inner flange. The engaging formation may protrude through a corresponding aperture formed in the side wall panels before locating in the slotted aperture of the inner flange.

According to an alternative form of the invention the corner post may comprise an outer post section which is adapted to mate with an outer surface of the corner zone;  
an inner post section which is adapted to mate with an inner surface of the corner zone; and

connecting means adapted to couple together the outer post section and the inner post section, so as to sandwich sheet material at the corner zone between these sections.

- 5 The connecting means may comprise engagement formations on the outer post section or on the inner post section, which mate with corresponding engagement formations on the inner post section or outer post section respectively.

The engagement formations may comprise tongue formations on the outer post  
10 section or inner post section, which are adapted to pass through apertures in the sheet material and which are adapted to engage the inner post section or outer post section as the case may be. Particularly, the tongue formations may extend from the inner post section and may be adapted to engage in apertures in the outer post section. More particularly, for engagement purposes the tongue formations may define lateral  
15 hook or barb elements that engage the outer post section.

The corner post also may include inter engaging tongue and groove formation at the upper ends of the post sections, with the inner post section preferably defining a  
20 downwardly directed groove formation and the outer post section an upwardly directed tongue formation.

Each corner post may include stacking means adapted releasably to engage complementarily dimensioned stacking means on a corresponding corner post when two containers according to the invention are stacked upon one another. Particularly, the stacking means may be a downwardly depending foot formation defined by the outer post section, with the inner post section being adapted to engage such foot formation, for example in spigot and socket fashion.

In one form of the invention, the stacking means may be an integral spigot located at one end of a corner post and adapted to be received in a socket formed in an opposite end of a corresponding corner post when two containers are stacked upon one another. In another form of the invention, the spigot may be in the form of an expanding barb adapted to pass through the base of the container and to lock within the socket.

The side wall panels and end wall panels may be connected to the base panel by any suitable hinge means such as ringlets, crease lines, perforations, film hinges or the like.

The container further may include at least two connectable roof panels adapted releasably to engage one another. Particularly, one roof panel may include a number of slotted apertures for receiving complementarily dimensioned lip formations extending from the other roof panel.

Also included within the scope of the invention is a blank of sheet material for a collapsible container, the blank comprising

a base panel;

opposed side wall panels hingedly connected to the base panel; and

5 opposed end wall panels hingedly connected to the base panel, the side wall panels and end wall panels being hingeable to an upstanding position relative to the base panel so as to define corner zones at their junctions, the arrangement being one wherein the side wall panels and end wall panels are provided with apertures at the corner zones, the apertures being adapted to receive fastening means for corner posts

10 therethrough.

The invention is further directed to a collapsible container including the corner post of the invention and the blank disclosed above.

15 Further included within the scope of the invention is a method of erecting a collapsible container comprising the steps of

providing the container blank and the corner posts in accordance with the invention;

folding the side wall panels and end wall panels of the blank into an upstanding position relative to the base so that their ends meet to define corner zones; and

20 releasably connecting corner posts to the side wall panels and end wall panels so as to clamp the sheet material at each corner zone there between.

**Brief Description of Drawings**

Without limiting the scope thereof, the invention will now be described by way of examples only with reference to the accompanying drawings in which -

Figure 1 is a perspective view of a container according to one embodiment of the invention with the container in an erected condition;

Figures 2 illustrate parts of the container of Figure 1;

and 3

Figure 4 is a perspective view of a container according to another embodiment of the invention with the container in an erected condition;

Figures 5 illustrate parts of the container of Figure 4;

and 6

Figures 7 illustrate erection and collapsing of the container of Figure 4;

to 9

Figure 10 is a schematic exploded perspective view of a corner post in accordance with yet a further embodiment of the invention in a disassembled form;

Figure 10A is a schematic exploded perspective from below of the corner post in Figure 10;

Figure 11 is a schematic perspective view of the corner post in Figure 10 in an assembled form;

Figure 12 is a plan view of a blank of a container in accordance with one embodiment of the invention; and

Figure 13 is a schematic perspective view of a container illustrated in Figure 12 in an assembled form and including the corner posts of Figure 10.

**Specific embodiment of the invention**

5 Referring first to Figures 1 to 3, a container according to the invention is generally designated by reference numeral 10 and comprises a base panel 11, a pair of opposed end wall panels 12 and a pair of opposed side wall panels 13. The base panel 11, end wall panels 12 and side wall panels 13 may be of any suitable material such as polypropylene, high density polyethylene, polycarbonate or even board material such  
10 as fluted paper board or fluted polymeric board.

The container 10 optionally may include two connectable roof panels 30a, 30b wherein one roof panel 30b includes a number of slotted apertures for receiving lip formations 31 extending from roof panel 30a.

15

The end wall panels 12 and side wall panels 13 are foldable relative to the base panel 11 with the end wall panels 12 and side wall panels 13 being attached to the base panel by any suitable connection means including ringlets, crease lines, perforations, film hinges or the like.

20

The container 10 includes a corner post 25 at each corner joining adjacent end wall panels 12 and side wall panels 13 where they adjoin one another in an upright

position. Apart from joining the side wall panels 13 with the end wall panels 12, the corner posts 25 also act as weight bearing members. As a result, the base panel 11, end wall panels 12 and side wall panels 13 can be of thin wall sheet material, thus saving materials costs.

5

In this embodiment of the invention, the corner post 25 comprises a tubular member 16 and three sets of flanges directed at substantially right angles to one another and integrally formed with the tubular member 16. Each set of flanges comprises a pair of parallel flanges 26, 28 between which an end wall panel 12 or a side wall panel 13, as the case may be, is received. Each pair of flanges 26, 28 comprises an outer flange 28 and an inner flange 26.

Each outer flange 28 includes an engaging formation including a rib 29a directed at a right angle to the outer flange 28, and an arrowed head 29b configured releasably to protrude through slotted aperture 27 provided in the end wall panel 12 or a side wall panel 13 so as to engage the inner flange 26 in a snap fit fashion.

The container 10 of the invention is fully collapsible in that the four corner posts 25 may be removed and the container 10 laid out in a flat condition, whereafter the end wall panels 12 and side wall panels 13 may be folded inwardly relative to the base panel 11 to form an easily transportable unit.

20

In this embodiment of the invention, each corner post 25 has an integral spigot 21 at its upper end which is receivable in a socket (not shown) formed in the lower end of a corresponding corner post 25 when two containers are stacked on one another.

5 Reference is now made to Figures 4 to 9. In this embodiment of the invention, a container according to the invention is generally designated by reference numeral 40. The container again includes end wall panels 12 and side wall panels 13 which are foldable relative to a base panel 11. In this embodiment of the invention the end wall panels 12 and side wall panels 13 are attached to the base panel 11 by means of  
10 ringlets 41 extending through apertures 51 peripherally located in the end wall panels 12, side wall panels 13 and the base panel 11.

The container 40 has a corner post 42 at each corner joining adjacent end wall panels 12 and side wall panels 13 where they adjoin one another in an upright position. Each  
15 corner post 42 comprises a tubular member 43 having two sets of parallel flanges 44 directed at right angles to one another and formed integrally with the tubular member 43. Each set of flanges 44 consists of an outer flange 44a and an inner flange 44b, between which an end wall panel 12 or side wall panel 13, as the case may be, is held.

20 It is a feature of the invention that the end wall panels 12 and side wall panels 13 are connected to the corner post 42 by way of a snap fit. It is achieved in this embodiment of the invention by the provision of a series of spaced lugs 45 on each

outer flange 44a, which align with and project into apertures 46 on each inner flange 44b. Corresponding apertures 47 are provided along each lateral edge of each of the end wall panels 12 and side wall panels 13.

5 Thus, when a corner piece 42 is connected to corresponding panels 12, 13, the lugs 45 snap into engagement with the apertures 47 in the end wall panels 12 and side wall panels 13 respectively. This is more clearly illustrated in Figure 7 where two panels 12, 13 are raised to a vertical position and a corner post 42 is positioned above the resultant corner and snapped into engagement with the panels 12, 13 by downward  
10 displacement of the corner post 42.

The container 40 of this embodiment of the invention is fully collapsible in that the four corner posts 42 may be removed and the container laid out in a flat condition as illustrated in Figure 8, whereafter the end wall panels 12 and side wall panels 13 again  
15 may be folded inwardly to form an easily transportable unit as shown in Figure 9.

Each corner post 42 has an integral spigot 48 at its lower end which is receivable in a socket 49 formed in the upper end of a corresponding corner post when two containers of the invention are stacked on one another. Each spigot 48 is slotted as  
20 indicated by numeral 50. The slots are designed to fit on to the upper free end of an end wall panel 12 or side wall panel 13, as the case may be, when containers 40 are

cross-bonded, that is to say when two containers are located on one another at right angles to their normal, orthogonal stacking position.

Reference is now made to Figures 10 to 13, which illustrate yet a further embodiment  
5 of the invention. In this embodiment of the invention, there is provided a corner post  
60 for a collapsible container 61, wherein the container 61 again comprises a base  
panel 11, a pair of opposed side wall panels 13 and a pair of opposed end wall panels  
12, the side wall panels 13 and end wall panels 13 meeting at corner zones 61a of the  
container 61.

10  
The corner post 60 of the invention comprises an inner post section 62, which is  
adapted to nest within a corner zone 61a, and an outer post section 63 which fits over  
the outer surface of the corner zone 61a, with connecting means being provided to  
couple the inner post section 62 and the outer post section 63 together with sheet  
15 material of the side wall panels 13 and end wall panels 12 at the corner zones 61a  
being sandwiched between these post sections 62, 63.

In the arrangement illustrated, the connecting means comprises a plurality of tongue  
elements 64 provided on one of the post sections 62, 63, in this case the inner post  
20 section 62, and which extend through apertures 71 in the sheet material 12, 13 and  
engage in slots 65 in the outer post section 63. For engagement purposes, the tongue  
elements terminate in hook formations 64a which engage behind the slots 65.

Alternatively, the tongue elements 64 could terminate in expanding barbs or other suitable locking means.

The corner post 60 of the invention further provides a foot formation 66 which  
5 protrudes below the surface of the base panel 11 of the container 61 to act as a  
surface engaging means or as a stacking formation which is adapted to nest within a  
corner of an underlying container. Thus for example, the foot formation 66 could  
extend from the lower extremity of the outer post section 63. With such an  
arrangement the inner post section 62 will preferably define a spigot formation 67  
10 which is adapted to mate with a corresponding aperture 66a defined adjacent the foot  
formation 66 to act as a further engagement means between the outer and the inner  
post sections 62, 63. In the arrangement illustrated, the spigot formation 67 includes  
an expanding barb arrangement for purposes of locking the spigot formation 67  
within the aperture 66a.

15

Both the inner and outer post formations 62, 63 are therefor of generally V-shaped  
cross-section and will preferably include reinforcing ribs as required, such as that  
shown at 68.

20 The inner and outer post section 62, 63 are further coupled together by means of  
mating tongue and groove formations 69, 70 provided at the upper extremities of the  
post sections 62, 63. In the arrangement illustrated, a groove formation 70 is defined

by the inner post section, and is adapted to receive a corresponding tongue formation 69 defined at the extremity of the outer post section 65.

As mentioned above, the corner post of the invention is in particular designed for use  
5 in erecting and strengthening a collapsible container, and a blank for such a container  
is shown in Figure 13. The blank comprises a base panel 11, a pair of opposed side  
wall panels 13 which are hinged to the base panel 11 along a crease line 12a, and two  
opposed end wall panels 12 also hinged to the base panel 11 along a crease line 13a.  
Thus, in a collapsed configuration, the side wall panels 13 and the end wall panels 12  
10 can be folded into positions overlying the base panel 11 for storage or transport  
purposes. In its erected configuration, the side wall panels 13 and end wall panels 12  
will be folded to extend upwardly at right angles from the base panel 11 so that the  
ends of these panels meet at four corner zones 61a.

15 Once the panels 12, 13 of the container have been folded as above, the corner post of  
the invention will be erected in each corner zone 61a to lock the container in its  
erected position. In such an erected position, the tongue elements 64, which lock the  
corner post sections 15, 16 to one another, will pass through apertures 71 (Figure 12)  
in the sheet material of the container. The spigot formation 67 on the inner post  
20 section 62 will also pass through an aperture 11a in the base panel 11 as spigot  
formation 67 engages within the aperture 66a.

Many other embodiments of the invention are possible without departing from the spirit or scope of the invention defined in the claims. For example, it will be appreciated that many different ways may be used to connect the corner posts of the container to the side wall panels. These may include providing slots in a corner post into which the side wall panels are fitted, flanges with studs on to which the panels are clipped, bulbous formations on the ends of the panels which snap into suitably shaped recesses in the corner posts, and interconnecting formations joined by pins or the like. The invention is directed to a corner post, a collapsible container utilizing the corner post as well as a blank adapted for forming the container of the invention.

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15

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**CLAIMS**

1. A collapsible container characterized in comprising

a base panel;

opposed side wall panels and opposed end wall panels, the side wall panels and

5 end wall panels being movable to an upright position relative to the base panel

so as to define corner zones at their junctions; and

corner posts releasably connecting adjacent side wall panels and end wall panels

where they adjoin one another in the upright position, each corner post having

connecting formations for receiving and connecting the side wall panels and

10 end wall panels thereto.

2. A corner post suitable for a container formed of sheet material so as to define

corner zones at a junction between side wall panels and end wall panels of the

container, the corner post characterized in comprising connecting formations

15 for receiving and connecting the side wall panels and end wall panels thereto.

3. A corner post according to claim 2 characterized therein that the connecting

formations of the corner post are adapted to interconnect with the side wall

panels in the form of a snap fit.

4. A corner post according to claim 2 characterized therein that each corner post comprises at least one set of flanges, the set of flanges comprising a pair of parallel flanges between which a side wall panel is received.
- 5 5. A corner post according to claim 4 characterized therein that each pair of flanges comprises an outer flange and an inner flange.
6. A corner post according to claims 4 or 5 characterized therein that each corner post comprises a tubular member having at least two sets of flanges directed at  
10 substantially right angles to one another.
7. A corner post according to claim 6 characterized therein that each outer flange has integral lugs which engage in corresponding apertures formed in the side wall panels.
- 15 8. A corner post according to claim 7 characterized therein that the lugs on the outer flange are located opposite corresponding apertures provided on the inner flange.
- 20 9. A corner post according to claim 6 characterized therein that each outer flange includes at least one engaging formation adapted releasably to engage a slotted aperture formed in the inner flange.

10. A corner post according to claims 3 or 9 characterized therein that the engaging formation protrudes through a corresponding aperture formed in the side wall panels before locating in the slotted aperture of the inner flange.
- 5 11. A corner post according to claim 2 characterized therein that the corner post comprises
- an outer post section which is adapted to mate with an outer surface of the corner zone;
- an inner post section which is adapted to mate with an inner surface of the corner zone; and
- 10 connecting means adapted to couple together the outer post section and the inner post section, so as to sandwich sheet material at the corner zone between these sections.
- 15 12. A corner post according to claim 11 characterized therein that the connecting means comprise engagement formations on the outer post section or on the inner post section, which mate with corresponding engagement formations on the inner post section or outer post section respectively.
- 20 13. A corner post according to claim 12 characterized therein that the engagement formations comprise tongue formations on the outer post section or inner post section, which are adapted to pass through apertures in the sheet material and

which are adapted to engage the inner post section or outer post section as the case may be.

14. A corner post according to claim 13 characterized therein that the tongue  
5 formations extend from the inner post section and are adapted to engage in apertures in the outer post section.
15. A corner post according to claim 13 characterized therein that for engagement  
10 purposes the tongue formations define lateral hook or barb elements that engage the outer post section.
16. A corner post according to claim 11 characterized therein that the corner post  
include inter engaging tongue and groove formations at the upper ends of the  
15 post sections, with the inner post section preferably defining a downwardly directed groove formation and the outer post section an upwardly directed tongue formation.
17. A corner post according to claim 2 characterized therein that each corner post  
20 includes stacking means adapted releasably to engage complementarily dimensioned stacking means on a corresponding corner post when two containers according to the invention are stacked upon one another.

18. A corner post according to claim 17 characterized therein that the stacking means is an integral spigot located at one end of a corner post and adapted to be received in a socket formed in an opposite end of a corresponding corner post when two containers are stacked upon one another.

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19. A corner post according to claims 17 and 18 characterized therein that the stacking means is a downwardly depending foot formation defined by the outer post section, with the inner post section being adapted to engage such foot formation, for example in spigot and socket fashion.

10

20. A corner post according to claim 18 characterized therein that the spigot is in the form of an expanding barb adapted to pass through the base of the container and to lock within the socket.

15 21. A collapsible container according to claim 1 characterized therein that the side wall panels and end wall panels are connected to the base panel by any suitable hinge means such as ringlets, crease lines, perforations, film hinges or the like.

22. A collapsible container according to claim 1 characterized therein that the  
20 container further includes at least two connectable roof panels adapted releasably to engage one another.

23. A collapsible container according to claim 22 characterized therein that one roof panel includes a number of slotted apertures for receiving complimentary dimensioned lip formations extending from the other roof panel.
- 5 24. A blank of sheet material for a collapsible container, the blank comprising a base panel;  
opposed side wall panels hingedly connected to the base panel; and  
opposed end wall panels hingedly connected to the base panel, the side wall panels and end wall panels being hingeable to an upstanding position relative to  
10 the base panel so as to define corner zones at their junctions, the arrangement being one wherein the side wall panels and end wall panels are provided with apertures at the corner zones, the apertures being adapted to receive fastening means for corner posts therethrough.
- 15 25. A collapsible container including the corner post of the invention and the blank as set out in the aforementioned claims.
- 20 26. A method of erecting a collapsible container comprising the steps of providing the container blank and the corner posts in accordance with the invention;  
folding the side wall panels and end wall panels of the blank into an upstanding position relative to the base so that their ends meet to define corner zones; and

releasably connecting corner posts to the side wall panels and end wall panels so as to clamp the sheet material at each corner zone there between.

- 5 27. A collapsible container substantially as herein illustrated and exemplified with reference to the accompanying drawings.
- 10 28. A corner post suitable for a container formed of sheet material substantially as herein illustrated and exemplified with reference to the accompanying drawings.
- 15 29. A blank of sheet material for a collapsible container substantially as herein illustrated and exemplified with reference to the accompanying drawings.
30. A method of erecting a collapsible container substantially as herein illustrated and exemplified with reference to the accompanying drawings.

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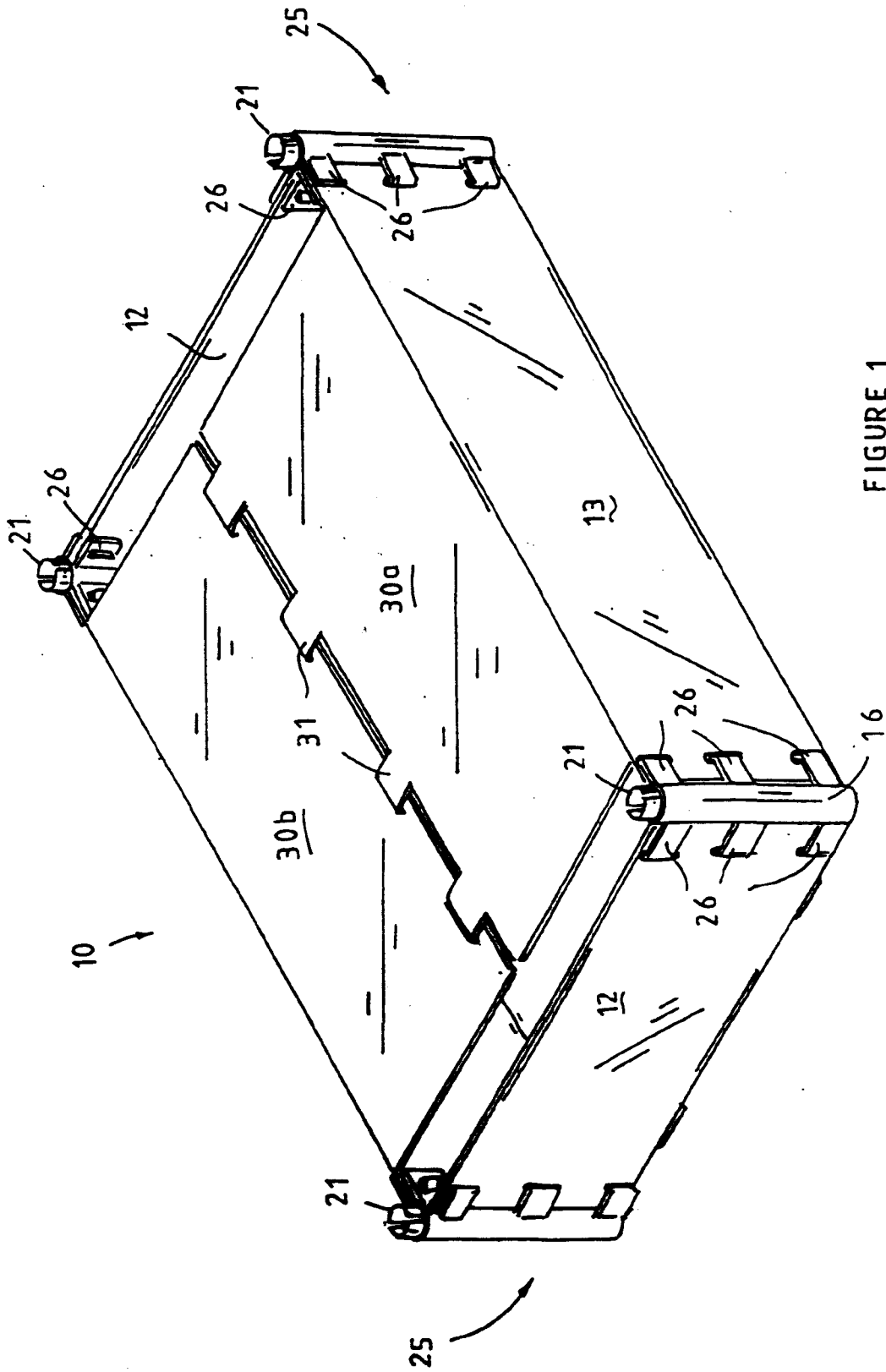


FIGURE 1

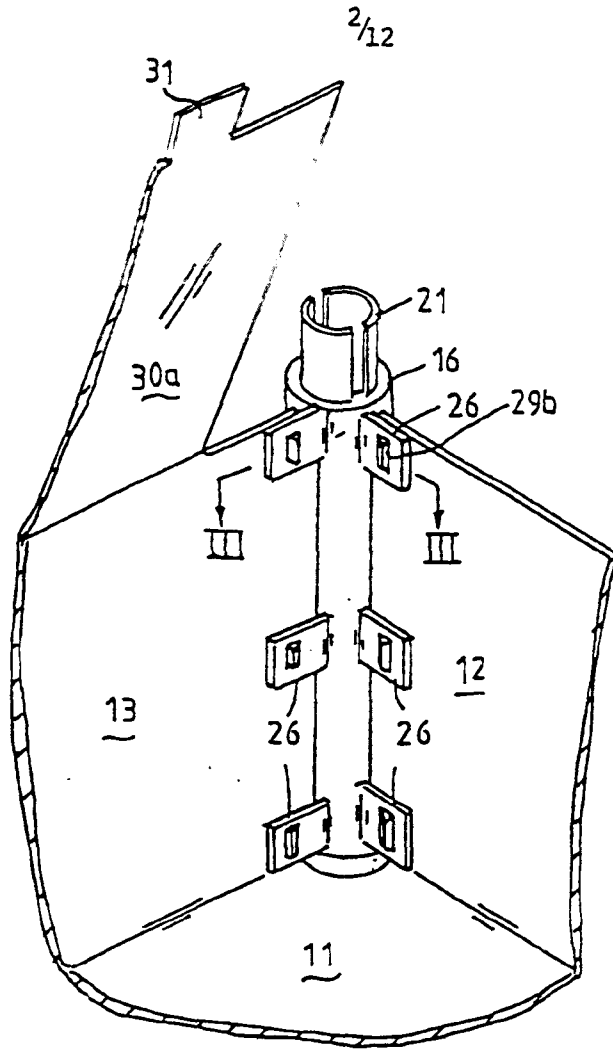


FIGURE 2

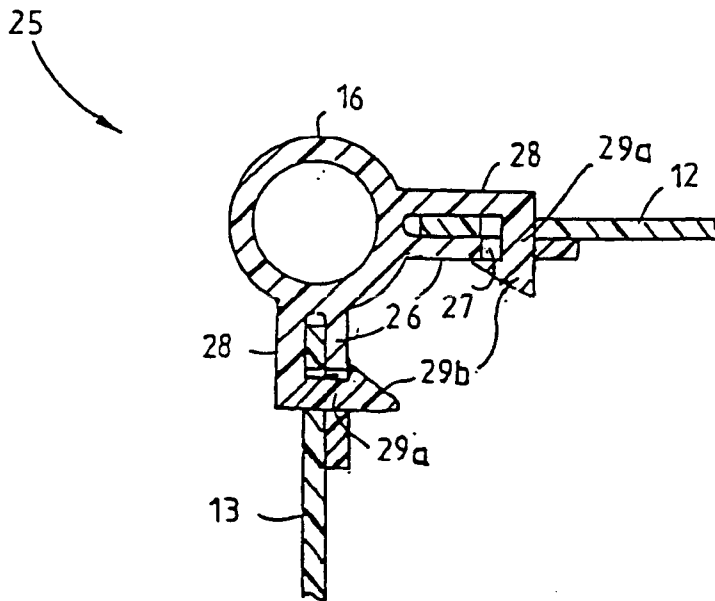


FIGURE 3

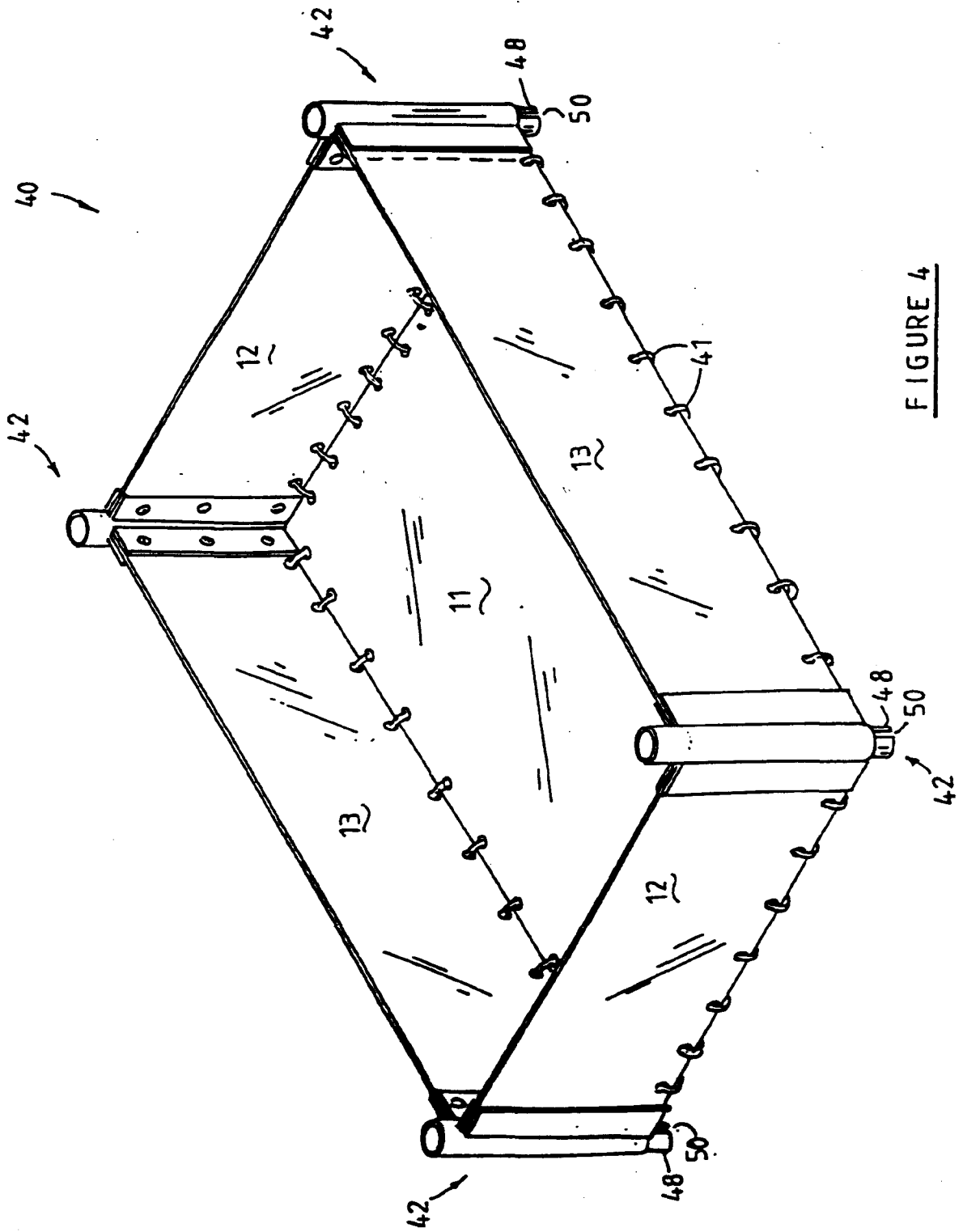


FIGURE 4



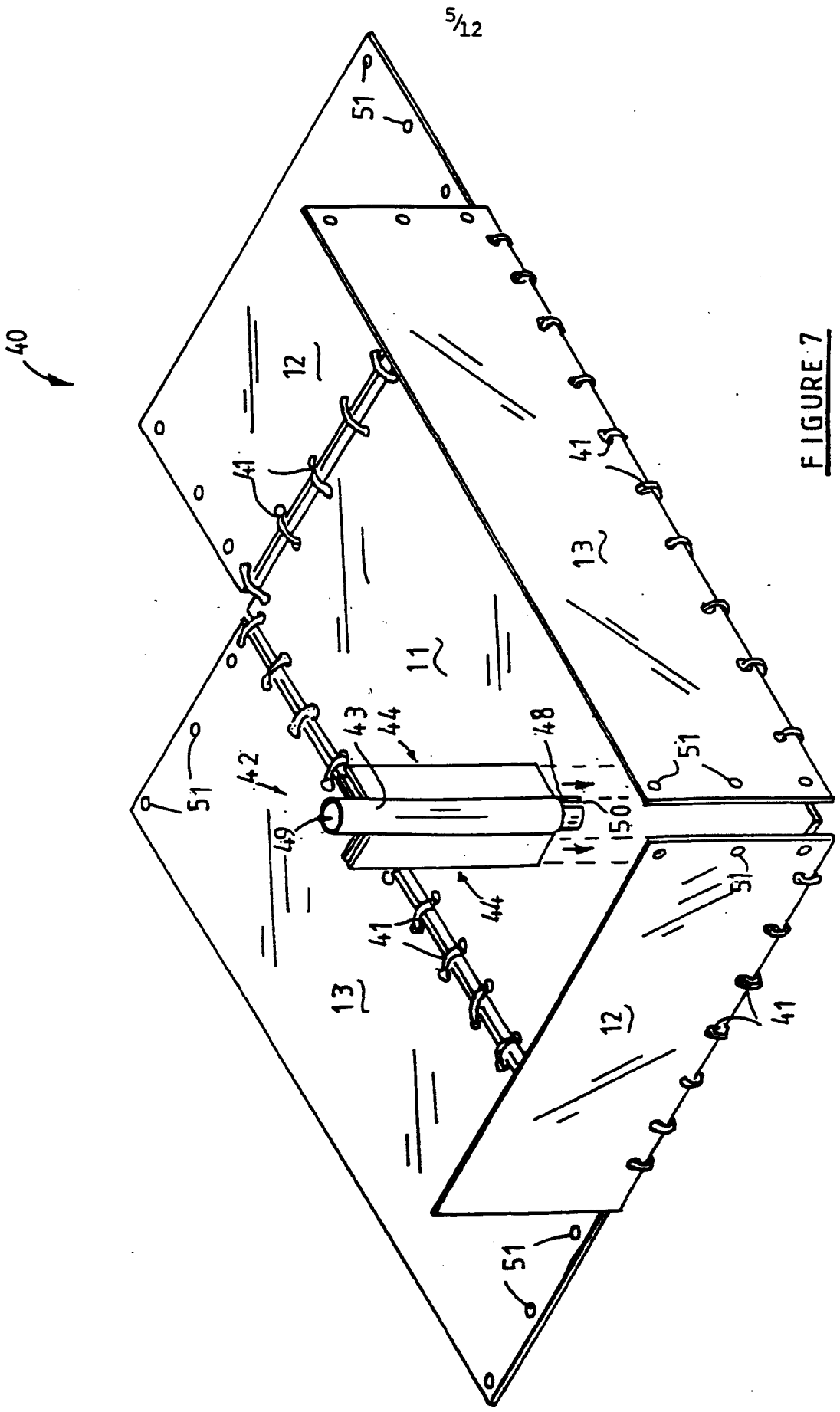


FIGURE 7

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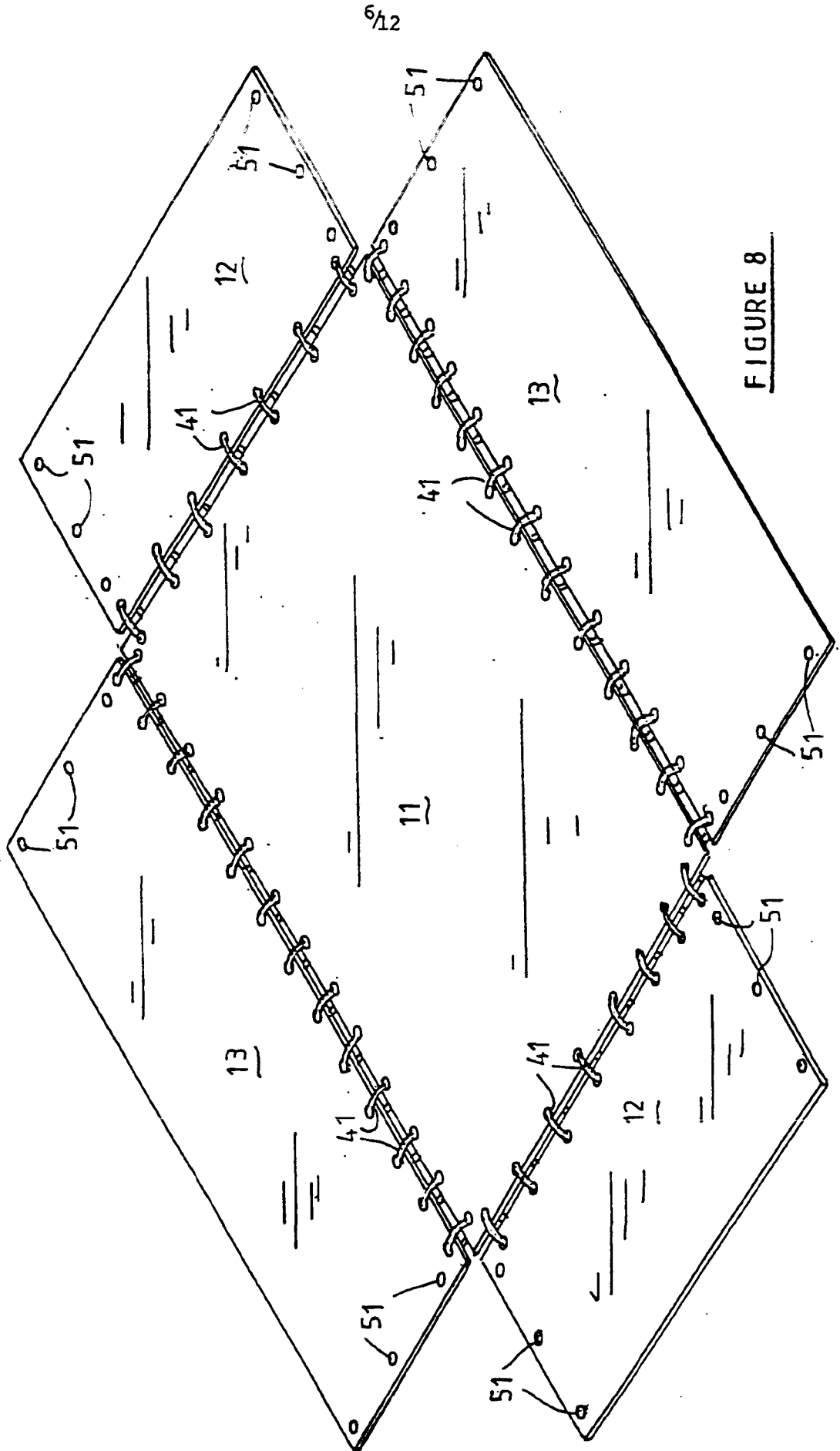


FIGURE 8

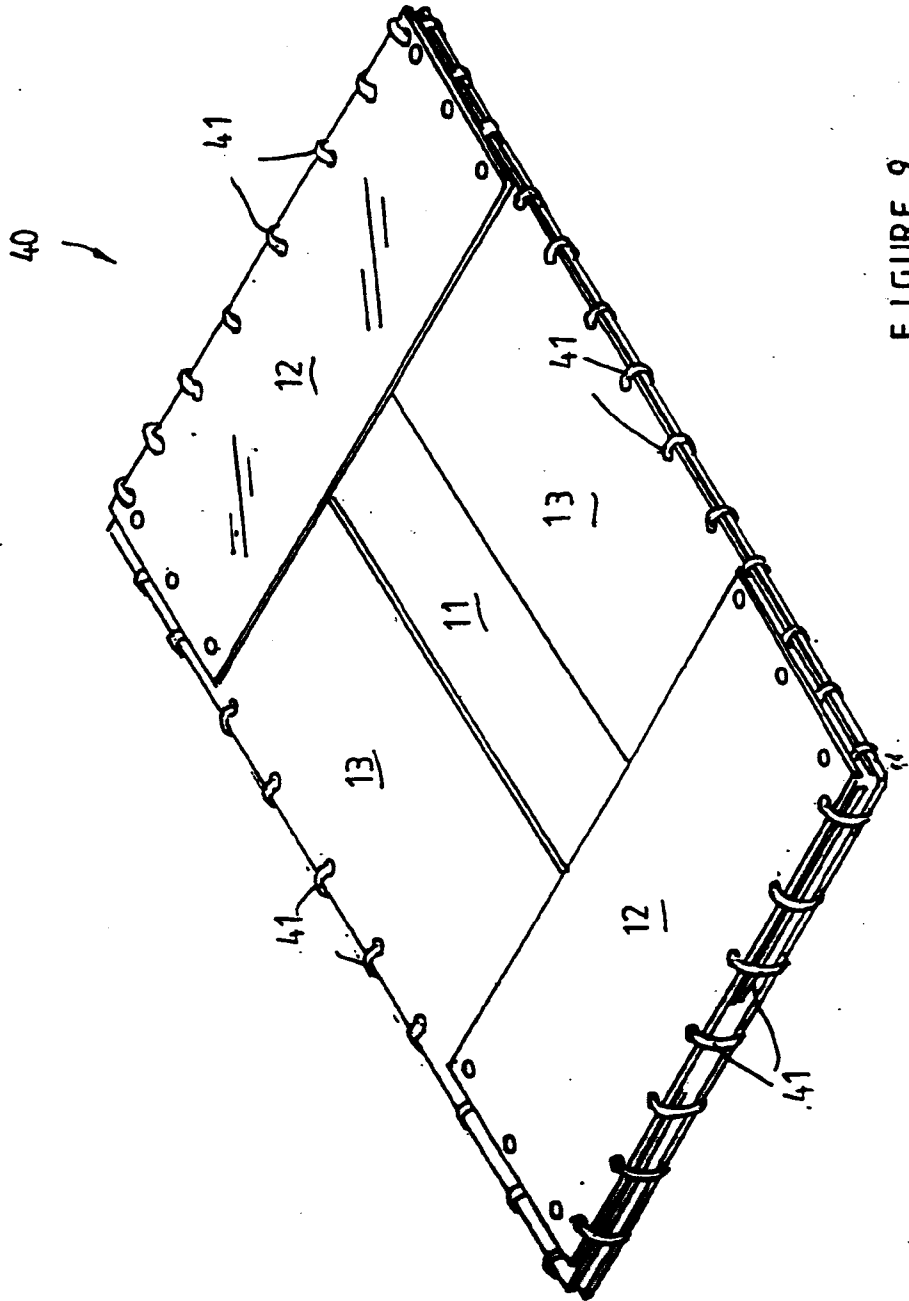


FIGURE 9

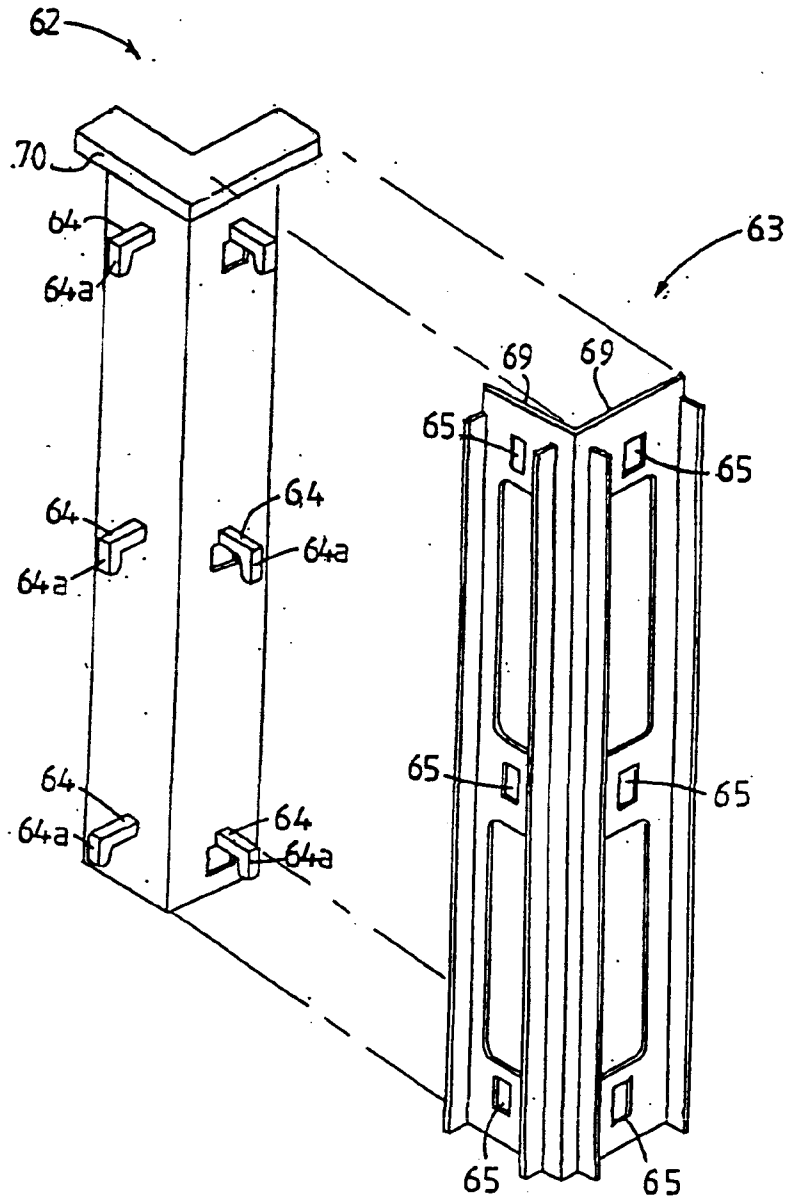


FIGURE 10

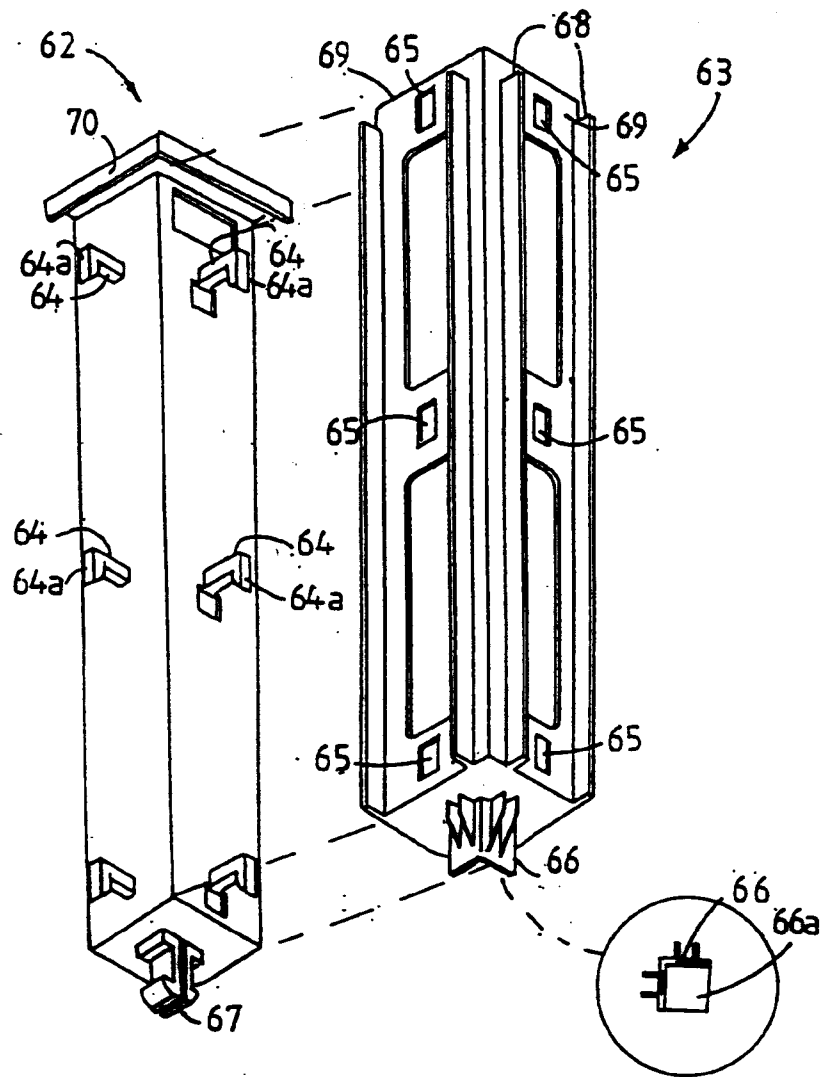


FIGURE 10a

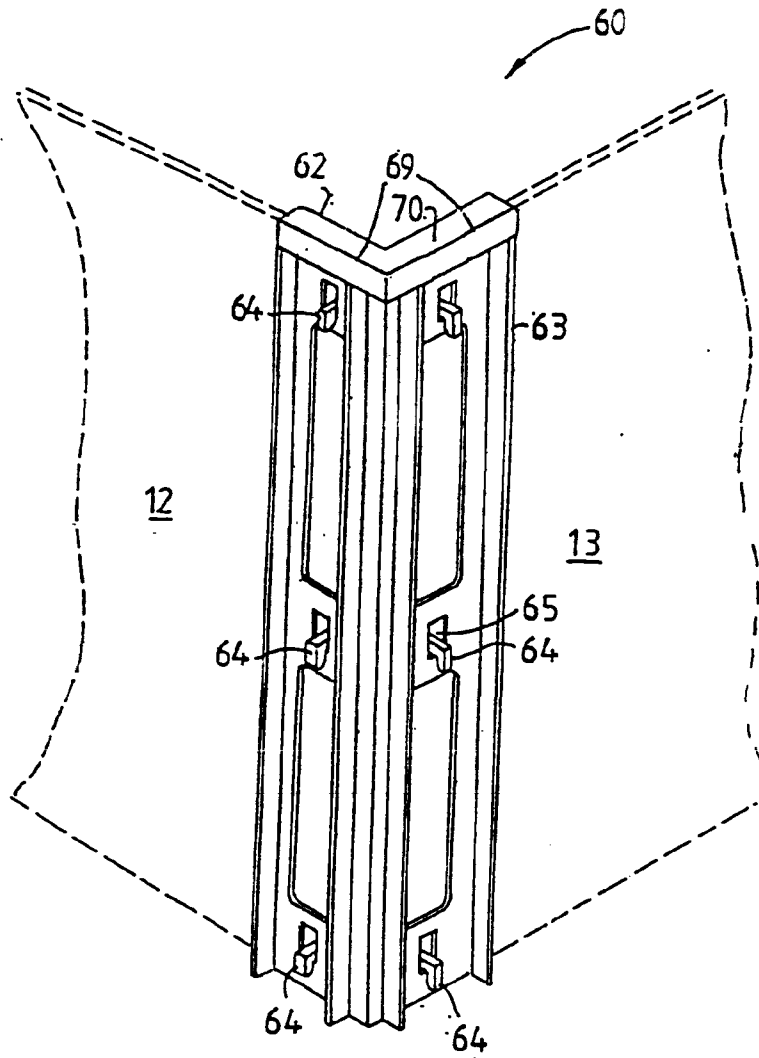


FIGURE 11

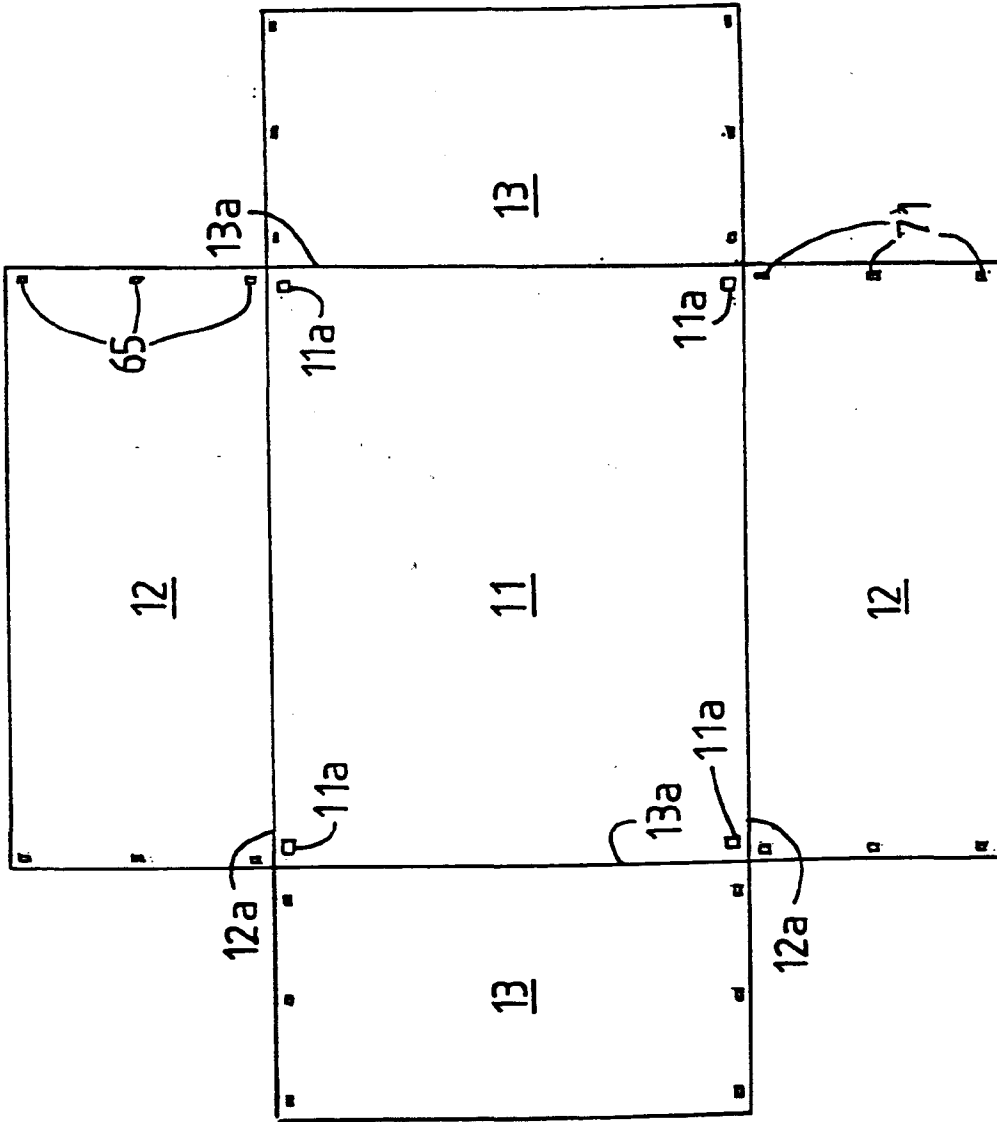


FIGURE 12

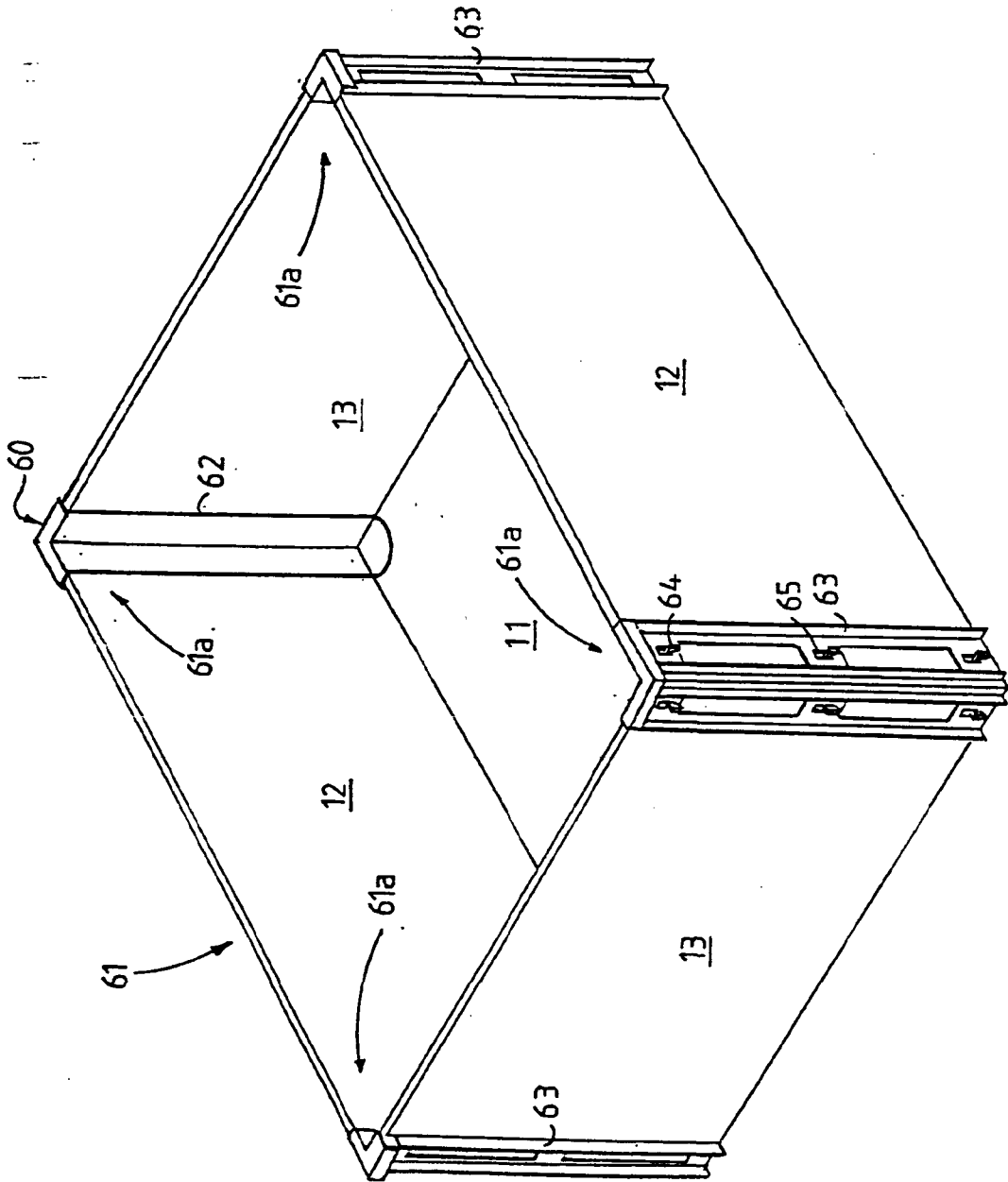


FIGURE 13