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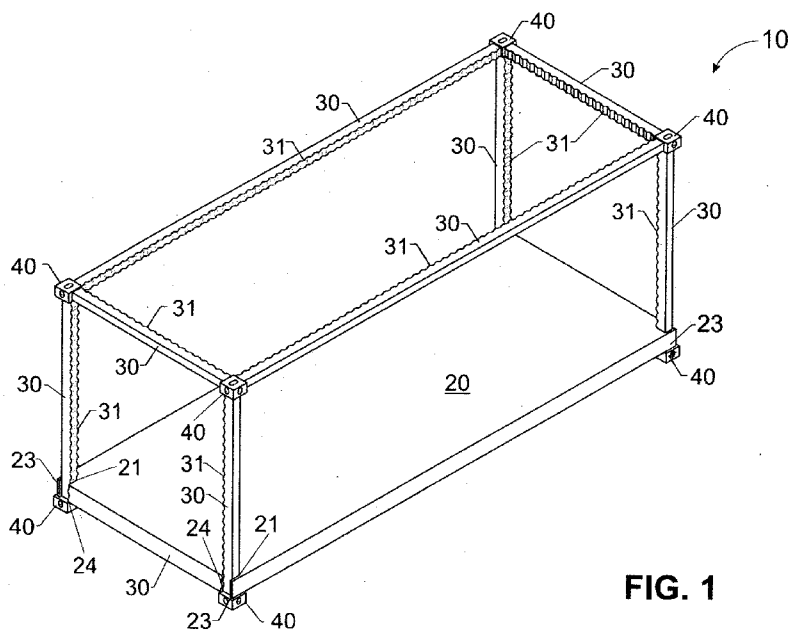


FIG. 1

(57) Abstract: A container/building system comprising; at least one elongate structural member at least one connecting member, the connecting member able to be realisablely connected to the structural member and at least one plate that is able to realisablely engage with at least one structural member.

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TITLE

A CONTAINER/BUILDING SYSTEM

FIELD OF THE INVENTION

5 This invention relates to a container/building system. In particular the invention relates to a modular container that can be assembled and disassembled to serve various needs including those of an expedient building system.

BACKGROUND TO THE INVENTION

10 Containers are used throughout the world to transport cargo. In 2011, approximately 90% of non-bulk cargo worldwide was moved by containers stacked on transport ships. Accordingly, containers form an integral part of the global transportation network for cargo.

15 Containers are intended to be used constantly. That is once a container is emptied of cargo, the container is reloaded with new cargo destined for a new destination. However, refilling a container once it has reached its destination is not always possible. The cost of transporting an empty container to a place where it is to be used is often considerably higher than the value of the used container. This often leads to unwanted stockpiling of containers at one location with a shortage of containers in another location.

20

The reference to any prior art in the specification is not, and should not be taken as, an acknowledgment or any form of suggestion that the prior art forms part of the common general knowledge.

OBJECTIVE OF THE INVENTION

25 It is an objective of the invention to overcome and/or alleviate one or more of the above disadvantages and/or to provide the consumer with a useful and/or commercial choice.

SUMMARY OF THE INVENTION

30 In one form, although not necessarily the only or broadest form, the invention resides in a container building system comprising;

- at least one elongate structural member;
- at least one connecting member, the connecting member able to be

realisably connected to the structural member; and

at least one plate that is able to realisably engage with at least one structural member.

5 The elongate structural member typically is either a beam or a post. The elongate structural member may be constructed from any suitable material. However, typically the elongate structural member is manufactured from steel, aluminium or composite material.

10 The elongate structural member may include a series of engagement members. The engagement members may be used to engage with the at least one plate.

15 The engagement members may form a repetitive pattern along at least part of the length of an elongate structural member. Typically, the engagement members extend along the majority of a length of an elongate structural member. Normally the engagement members are located only on a single side of a structural member. However, the engagement members may be located on more than one side of a structural member if desired.

20 Preferably the engagement members are in the form of a repeating wave. The wave may be a sine wave, modified square wave, triangular wave or saw tooth wave.

One or more of the engagement members may include an aperture that extends through the engagement member.

25 One or more joining members may be used to connect one or more elongate structural members to each other using one or more apertures that extend through the engagement members. Each joining member may include two or more engagement pins that may be used to connect two structural members together. Typically two or more joining members are used to join two elongate structural members together.

30 The elongate structural member may include at least one fastening portion to fasten the elongate structural member to the connecting member. Typically there is a fastening portion located adjacent the end of the elongate structural member. Each fastening portion may include at least one captured nut. Alternatively, the fastening portion may include a threaded hole.

The elongate structural member may also include a locating portion to align the elongate structural member with the connecting member. Typically there is a locating portion located adjacent the end of the elongate structural member. The locating portion may be in the form of one or more locating pins. Alternatively, the locating portion may be in the form of locating holes.

The connecting member may be made from a rectangular prism shaped, hollow body. The connecting member may be able to be connected to at least two elongate structural members. Preferably, the connecting member may be able to be connected to at least two elongate structural members. More preferably, the connecting member may be able to be connected to at least three elongate structural members.

Preferably, the connecting member may be connected to two elongate structural members to allow the elongate structural members to lie in two different planes. More preferably, the connecting member may be connected to three elongate structural members to allow the elongate structural members to lie in three different planes.

The connecting member may include at least one fastening portion to fasten an elongate structural member to the connecting member. A fastening portion of the connecting member is normally used in conjunction with the fastening portion of the elongate structural member to connect elongate structural member to the connecting member. Normally the connecting member has three fastening portions. A fastening portion of the connecting member may be in the form of a bolt or the like fastener.

The connecting member may include at least one access aperture to access the fastening portion of the connecting member. Preferably there are at least three access apertures. More preferably there are three access apertures.

The connecting member may include at least one locating portion to align an elongate structural member with the connecting member. A locating portion of the connecting member is normally used in conjunction with the locating portion of the elongate structural member to align the elongate structural member with the connecting member. Normally the connecting

member has three locating portions. The locating portion may be in the form of locating holes. Alternatively, the locating portion may be in the form of one or more locating pins.

5 The plate typically is used as a floor plate. However, it is envisaged that the plate may be used as a roof plate. The plate has at least one socket for location of an elongate structural member. Typically the plate has at least four sockets. More preferably, the plate has four sockets. The sockets are normally located at respective ends of the plates. However, it is envisaged that the sockets may be located on respective sides of the plate. The  
10 sockets are normally located adjacent the corners of the plate.

A series of tie holes may be spaced around the periphery of the plate. A series of ties may be plated within the holes to tie one plate to an adjacent plate. The tie may be located within a top of a one one plate and within a bottom of a tie hole in the adjacent plate. The ties may be substantially Z-  
15 shaped.

Each socket may have a series of engagement members. The engagement members of the socket are typically shaped to engage with the engagement members of an elongate structural member. The engagement members of the socket are shaped in a complimentary fashion to engage  
20 with the engagement members of an elongate structural member. Preferably the engagement members of the socket may be in the form of a repeating wave. The wave may be a sine wave, modified square wave, triangular wave or saw tooth wave.

A locking member may be used to hold a connecting member in engagement within a socket of the plate. The locking member may be  
25 located on either the connecting member or on the plate or on both. Preferably, the locking member is located in the plate. Typically there are the same number of locking members as there are sockets in the plate.

The plate may have at least one alignment member. Typically the  
30 alignment members are used to ensure the sockets are in alignment when plates are stacked on top of each other. Normally, there are at least four alignment members on a top face and bottom face of the plate. The

alignment member may be in the form of dimple and/or a projection.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Embodiment of the invention, by way of example only, will be described with reference to the accompanying drawings in which:

5 FIG 1 is an isometric view of a container/building system according to a first embodiment of the invention;

FIG 2 is a further isometric view of a container/building system according to a first embodiment of the invention;

10 FIG. 3 is an isometric view of a connecting member according to a first embodiment of the invention;

FIG. 4 is a side sectional view of a connecting member attached to an elongate structural member;

FIG. 5 is a side elevational view of a locking member attaching an elongate structural member to plate;

15 FIG 6A is a side elevational view of a container/building system having a single floor plate;

FIG 6B is a side elevational view of a container/building system that has numerous floor plates stacked together;

20 FIG 6C is a side elevational view of a container/building system having a single floor plate located in a different position to that shown in FIG 4A;

FIG 7 is an isometric view of a container/building system according to a second embodiment of the invention;

25 FIG 8 is a further isometric view of a container/building system according to a second embodiment of the invention;

FIG 9A to 9C show a detailed view of two elongate support members being joined together according to a second embodiment of the invention;

FIG 10 shows a detailed view of two plates being joined together according to a second embodiment of the invention; and

30 FIG 11A to 11D show perspectives views of how the container/building system can be used.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a modular container/building system 10 that is able to be assembled for carrying cargo and disassembled for transportation to other sites with a greatly reduced volume, that can then be assembled and disassembled to serve various needs including those of an expedient building system.

The container/building system 10 includes a floor plate 20, a number of elongate structural members 30 and a number of connecting members 40.

FIG 1 shows a modular container/building system with the floor plate at a lower level whist FIG. 2 shows a modular container/building system that has been assembled with the floor plate installed at an intermediate level.

The floor plate 20 is sustainably rectangular in shape and is constructed from steel. However it should be appreciated that other suitable materials may be used. The plate has four sockets 21 which are located within ends 22 of the floor plate. The respective sockets 21 are located adjacent corners 23 of the floor plate. Each of the sockets 21 is profiled to form engagement members 24. The engagement members 24 are formed in one side of the socket 21. However it should be appreciated that the engagement members 24 may be formed on opposite sides of the sockets. The engagement members 24 are in the form of a sine wave.

The floor plate also includes a series spaced apart projections (not shown) located on a top face of the floor plate and a series of dimples (not shown) located in a bottom face of the floor plate. The projections and dimples are relatively sized so that the dimples on one plate will receive the projections of another plate. The projections and dimples are used to align stacked plate.

The elongate structural members 30 are either posts or beams. For example in this embodiment there are four posts and eight beams. The posts and beams can be of variable length. However both the posts and beams are made from the same structural materials and have the same profile. Accordingly posts can be used as beams and vice versa.

Each elongate structural member 30 has a series of engagement members 31. The engagement members 31 run along one single side of the

elongate structural member 30. The engagement members 31 are in the form of a sine wave.

Each elongate structural member 30 is hollow. A captured nut 32 is located within each end of the elongate structure member. Two locating pins 33 are formed at end of the elongate structure member. The captured nut 32 and locating pins 33 are shown in FIG 4.

The connecting members 40 are located at the corners of the container/building system 10. A detailed view of the connecting member 40 is shown in FIG 3. Each connecting member 40 is formed by a hollow steel body 41. Each connecting member 40 is able to be used to connect three elongate structural members 30. Accordingly the body 41 has three associated bolts (not shown) and three associated access apertures 44. Further the body has three bolt holes 43 and three sets of four locating holes 44 (only one shown for the purposes of clarity). The locating holes 44 are located around the bolt holes 43. However it should be appreciated by a person skilled in the art that the number and position of the locating holes 44 may be varied according to the design.

In order to assemble the container/building system 10, the elongate structural members 30 that form the posts are located within respective sockets 21 of the plate 20. The elongate structural members 30 are orientated so that the engagement members of the elongate structural members 30 mate with the engagement members 24 of their respective sockets 21. A locking member 50 is then activated by tightening bolts 54 forcing a pressure plate 51 against the elongate structural members 30 to prevent removal of the elongate structural members from their respective sockets 21 as shown in FIG 5.

The connecting members 40 are then attached to each of the ends of the elongate structural members 30 that are engaged with the sockets 21. The connecting members 40 are attached to the ends of the elongate structural members 40 by placing the connecting members 40 adjacent the end of their respective elongate structural members 30 so that the locating pins 33 of respective elongate structural member 30 are located within the



locating holes 44 of the connecting member 40. This is shown in FIG 3. A bolt 45 is then placed through the appropriate access aperture 42 and the bolt hole 43 until it engages the captive nut 32 located within the elongate structural element 30. The bolt 45 is rotated until the bolt head engages the body 41 of the connecting member 40. A tool, such as a wheel brace, is then used to tighten the bolt 45 sufficiently so that the elongate structural member 30 is held tightly to the connecting member 40. This process is repeated for all of the elongate structural members 30 that form beams.

In order to disassemble the container/building system the bolts 45 are simply removed from the elongate structural members 30 to enable the connecting members 40 to be removed from the elongate structural members 30. The locking members 50 are then released, opening the respective sockets 21 to enable the elongate structural members 30 to be removed from the plate 20. In the disassembled state, the container/building systems are able to be transported in bulk.

FIG. 6B shows a number of floor plates 20 that have been stacked together. The floor plates 20 are aligned using projections which are located in a top face that mate with dimples located in a bottom face. This ensures that all of the sockets 21 are in alignment. When the sockets 21 are in alignment an elongate structural member 30 can be located through each of the sockets 21. The locking members 50 can then be simply engaged to ensure that the elongate member does not become displaced from the sockets 21.

FIG. 6C shows that the position of a floor plate 20 can be varied with respect to the elongate structural member 30.

FIG 7 and FIG 8 show a second embodiment of the invention. Like numerals have been used to describe like components. In this embodiment the engagement members 31 located on each of the elongate structural members 30 are in the form of a modified square wave as opposed to a sine wave. Similarly, engagement members 24 located within sockets 21 of the plate 20 are also in the form of a modified square wave as opposed to a sine wave. The connection and disconnection of the elongate structural

members 30 and the plate 20 are the same as described in the first embodiment.

Apertures 32 are located within each of the engagement members 31 located on each of the elongate structural members 30 as shown more clearly in FIGS 9A to 9C. These apertures 32 are used in conjunction with a joining member 33. The joining member 33 is formed from two pins 34 and a body 35 which are spaced and sized to be located within two apertures 32 of different elongate structural members 30. The two joining pins 34 are spaced apart and extend outwardly from the body 35.

In use, two elongate structural members 30 that are to be joined together are located adjacent each other so that their respective engagement members 31 are engaged. The joining pins 34 of the joining member 33 are then inserted into apertures 32 of different elongate structural members 30. This prevents separation of the two elongate structural members 30 with any down force being applied through the engagement members 31.

The plate 20 in this embodiment also has a series of tie holes 25 that are used to connect and support an adjacent plate 20A as shown in FIG 10. The tie holes 25 are within the plate 20 and are spaced around the plate 20. Two tie holes 25 are located adjacent each end of the plate 20 and three tie hole 25 are located adjacent each side of the plate 20. Ties 50 are used in conjunction with the tie holes to attach one plate 20 to an adjacent plate. Each tie 50 is in the form of a Z-shaped clip. The ties 50 are located within the top of the holes 50 on the plate 20 which is used to support the adjacent plate 20A. The ties 50 are located within the bottom of the slots in supported plate 20.

FIG 11A to 11D show the container/building system shown in FIG 7 to 10 in practical use. FIG 11A shows how a basic frame structure can be created using plates 20, elongate structural members 30, connecting members 40, and ties 50. A cover can then be used to cover the frame as shown in FIG 11B. Extensions can be made as shown in FIG 11C. Hard cladding can also be added as shown in FIG 11D.

In this specification, the terms "comprise", "comprises", "comprising" or

similar terms are intended to mean a non-exclusive inclusion, such that a system, method or apparatus that comprises a list of elements does not include those elements solely, but may well include other elements not listed.

5 It should be appreciated that various other changes and modifications may be made to the embodiment described without departing from the spirit or scope of the invention.

10

15

## CLAIMS:

1. A container/building system comprising;  
at least one elongate structural member;  
at least one connecting member, the connecting member able to be  
5 realisably connected to the structural member; and  
at least one plate that is able to realisably engage with at least one  
structural member.
2. The container/building system of claim 1 wherein the elongate  
structural member is either a beam or a post.
- 10 3. The container/building system of claim 1 or claim 2 wherein the at  
least one elongate structural member includes a series of engagement  
members.
4. The container/building system of claim 1 wherein the engagement  
members are used to engage with the at least one plate.
- 15 5. The container/building system of claim 3 or claim 4 wherein the  
engagement members form a repetitive pattern along at least part of the  
length of the at least one structural member.
6. The container/building system of any one of claims 3 to 5 wherein the  
engagement members extend along the majority of a length of the at least  
20 one elongate structural member.
7. The container/building system of any one of claims 3 to 6 wherein the  
engagement members are located only on a single side of the at least one  
structural member.
8. The container/building system of any one of claims 3 to 7 wherein the  
25 engagement members are in the form of a repeating wave.
9. The container/building system of claim 8 wherein the wave is selected  
from the group comprising a sine wave, a modified square wave, a triangular  
wave and a saw tooth wave.
10. The container/building system of any one of claims 3 to 7 wherein one  
30 or more of the engagement members include an aperture that extends  
through the engagement member.
11. The container/building system of claim 10 including at least one

joining member located within at least one aperture of an engagement member of two elongate structural members.

12. The container/building system of claim 11 wherein each joining member includes two or more engagement pins.

5 13. The container/building system of any one of the preceding claims wherein the elongate structural member includes at least one fastening portion to fasten the elongate structural member to the connecting member.

14. The container/building system of claim 13 wherein the fastening portion is located adjacent the end of the elongate structural member.

10 15. The container/building system of claim 13 or 14 wherein the fastening portion includes at least one captured nut.

16. The container/building system of claim 13 or 14 wherein the fastening portion includes a threaded hole.

15 17. The container/building system of any one of anyone of the preceding claims wherein the elongate structural member also include a locating portion to align the elongate structural member with the connecting member.

18. The container/building system of claim 17 wherein the locating portion is located adjacent the end of the elongate structural member.

20 19. The container/building system of claim 17 or 18 wherein the locating portion is in the form of one or more locating pins.

20. The container/building system of claim 17 or 18 wherein the locating portion is in the form of one or more locating holes.

21. The container/building system of any one of the preceding claims wherein the connecting member is a rectangular prism shaped, hollow body.

25 22. The container/building system of any one of the preceding claims wherein the connecting member is connected to at least two elongate structural members.

30 23. The container/building system of claim 22 wherein the connecting member is connected to two elongate structural members to allow the elongate structural members to lie in two different planes.

24. The container/building system of any one of the preceding claims wherein the connecting member includes at least one fastening portion to

fasten an elongate structural member to the connecting member.

25. The container/building system of claim 24 wherein the fastening portion of the connecting member is used in conjunction with the fastening portion of the elongate structural member to connect elongate structural member to the connecting member.

26. The container/building system of claim 24 or 25 wherein the connecting member has three fastening portions.

27. The container/building system of any one of claims 24 to 26 wherein the fastening portion of the connecting member is in the form of a bolt.

28. The container/building system of any one of claims 24 to 27 wherein the connecting member includes at least one access aperture to access the fastening portion.

29. The container/building system of claim 28 wherein there are at least three access apertures.

30. The container/building system of claim any one of the preceding claims wherein the connecting member include at least one locating portion to align an elongate structural member with the connecting member.

31. The container/building system of claim 30 wherein the locating portion of the connecting member is used in conjunction with the locating portion of the elongate structural member to align the elongate structural member with the connecting member.

32. The container/building system of claim 30 or 31 wherein the connecting member has three locating portions.

33. The container/building system of any one of claim 30 to 32 wherein the locating portion is in the form of locating holes.

34. The container/building system of any one of claim 30 to 32 wherein the locating portion is in the form of one or more locating pins.

35. The container/building system of any one of the preceding claims wherein the plate has at least one socket for location of an elongate structural member.

36. The container/building system of any one of the preceding claims wherein the plate has at least four sockets.

37. The container/building system of claim 36 wherein the sockets are located at respective ends of the plates.
38. The claimer of claim 36 or 37 wherein the sockets are located adjacent the corners of the plate.
- 5 39. The container/building system of any one of claims 35 to 38 wherein each socket has a series of engagement members.
40. The container/building system of claim 39 wherein the engagement members of the socket are shaped to engage with the engagement members of an elongate structural member.
- 10 41. The container/building system of claim 39 or 40 wherein the engagement members of the socket are shaped in a complimentary fashion to engage with the engagement members of an elongate structural member.
42. The container/building system of any one of claims 39 to 41 wherein the engagement members of the socket are in the form of a repeating wave.
- 15 43. The container/building system of claim 42 wherein the wave is selected from the group comprising a sine wave, modified square wave, triangular wave and saw tooth wave.
44. The container/building system of anyone of claims 35 to 43 wherein a locking member is used to hold a connecting member in engagement within
- 20 a socket of the plate.
45. The container/building system of claim 44 wherein the locking member is located on either the connecting member or on the plate or on both.
46. The container/building system of claim 44 or 45 wherein the locking
- 25 member is located in the plate.
47. The container/building system of any one of claims 44 to 46 wherein there are the same number of locking members as there are sockets in the plate.
48. The container/building system of any one of the preceding claims
- 30 wherein the plate has at least one alignment member.
49. The container/building system of claim 47 wherein there are at least four alignment members on a top face and bottom face of the plate.

50. The container/building system of claim 48 or 49 wherein the alignment member is in the form of dimple and/or a projection.



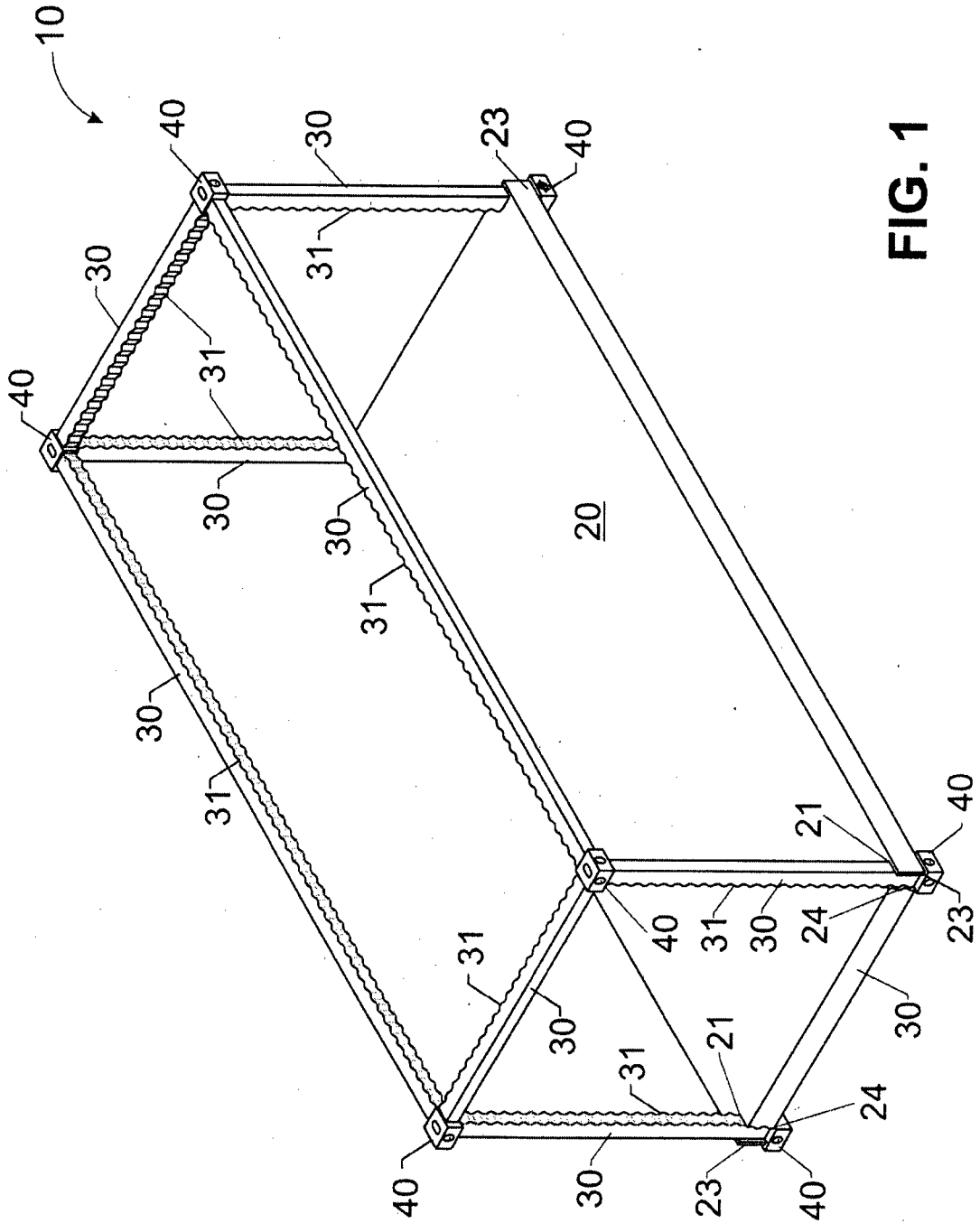


FIG. 1

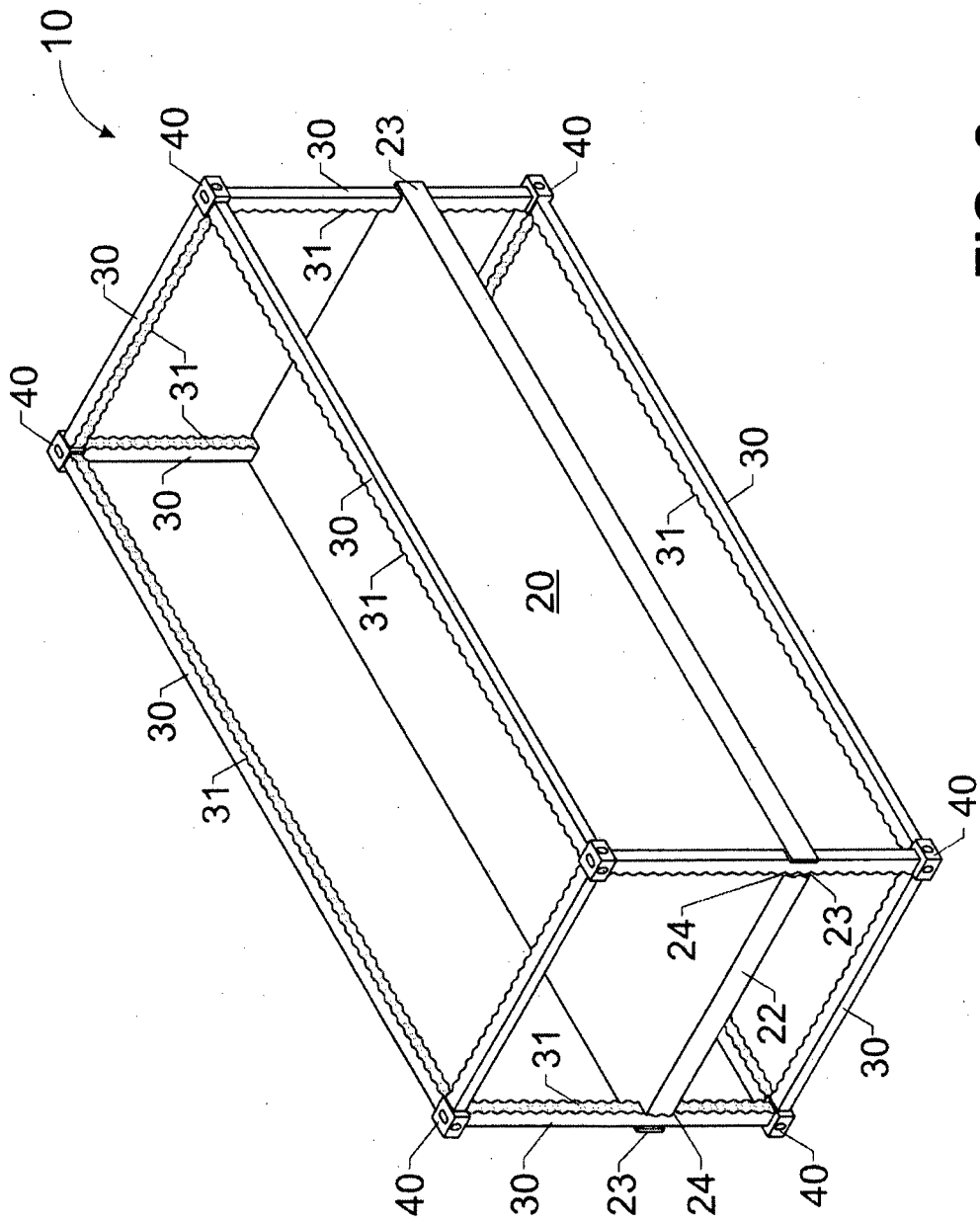


FIG. 2

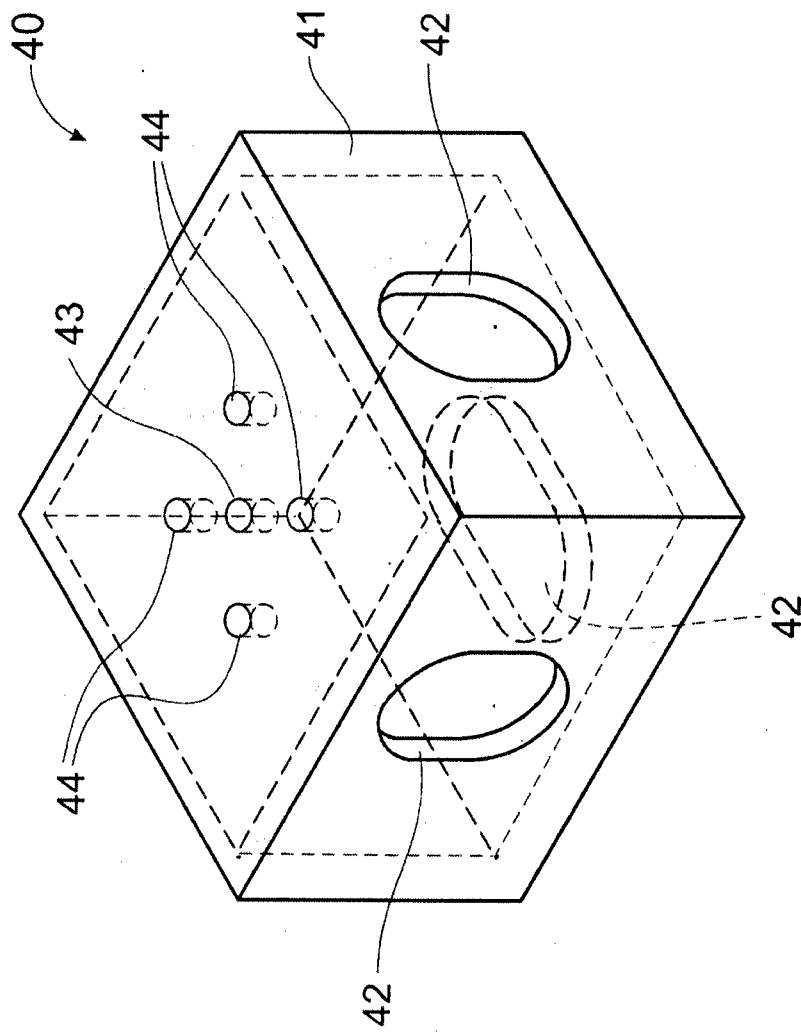


FIG. 3

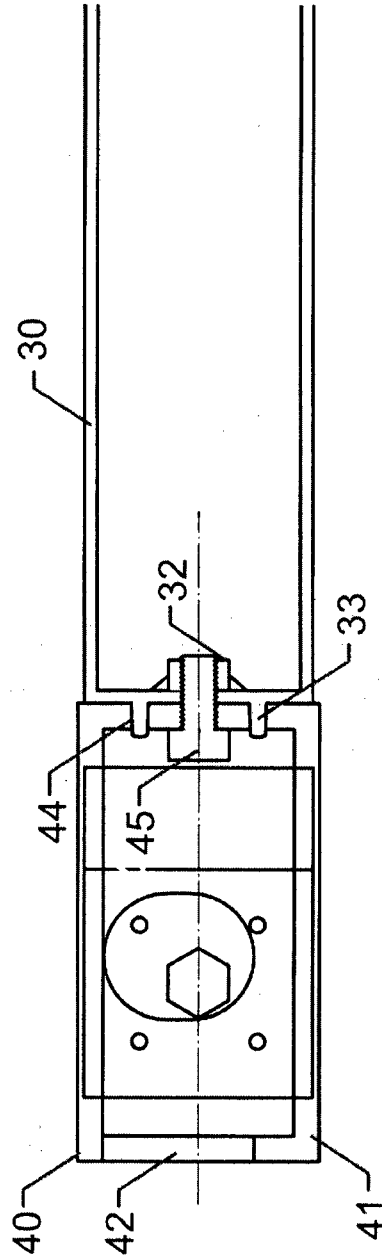


FIG. 4

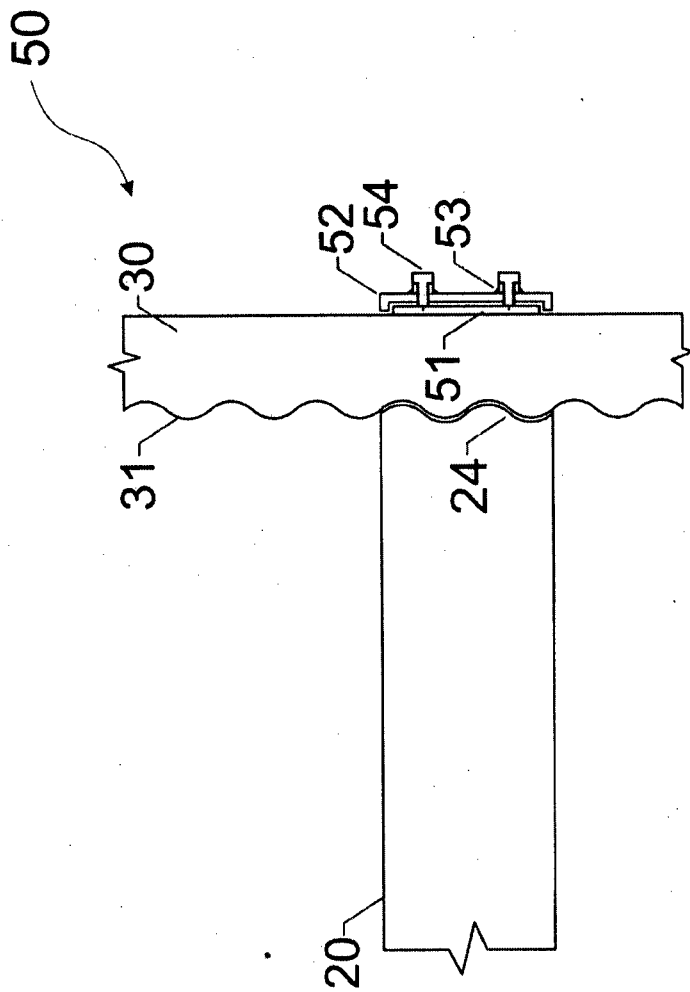


FIG. 5

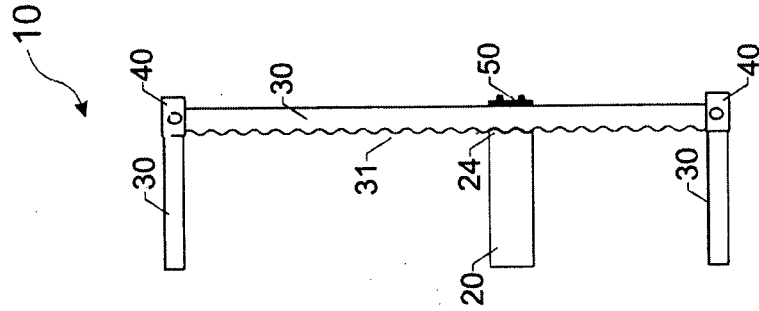


FIG 6C

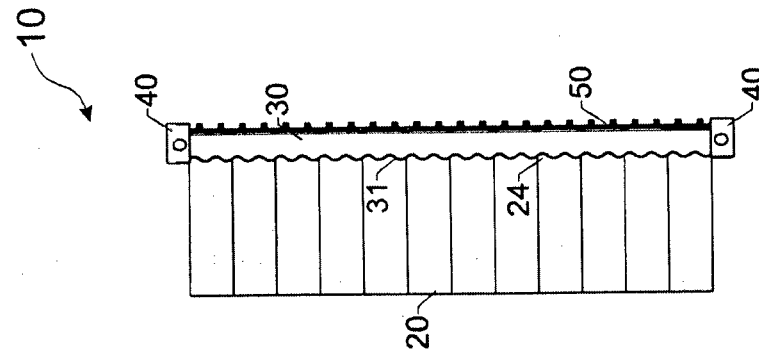


FIG 6B

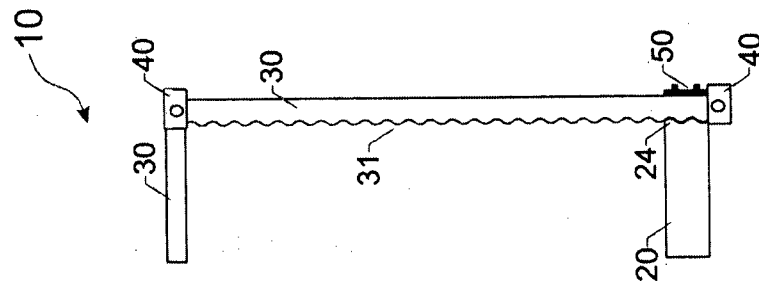


FIG 6A

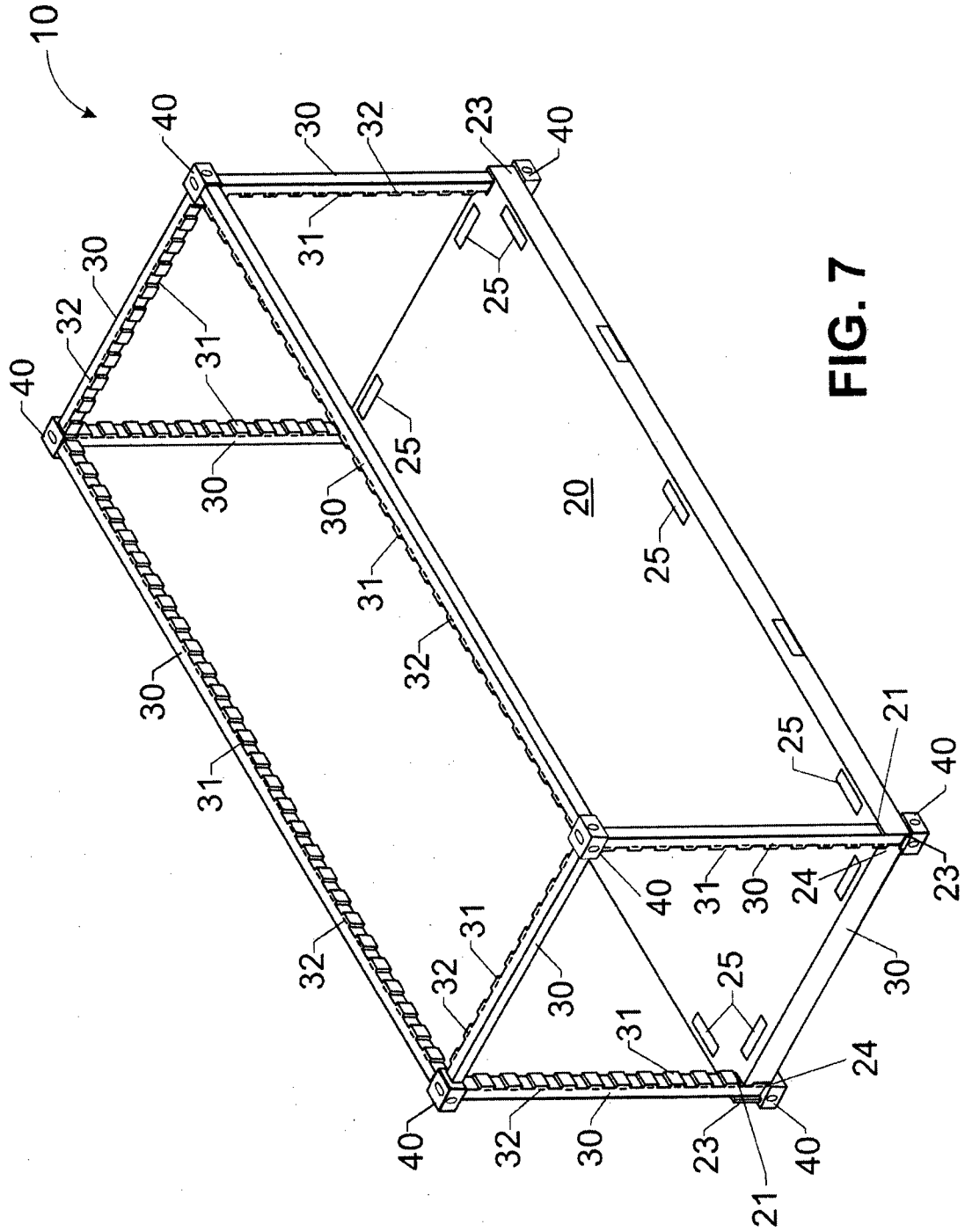


FIG. 7

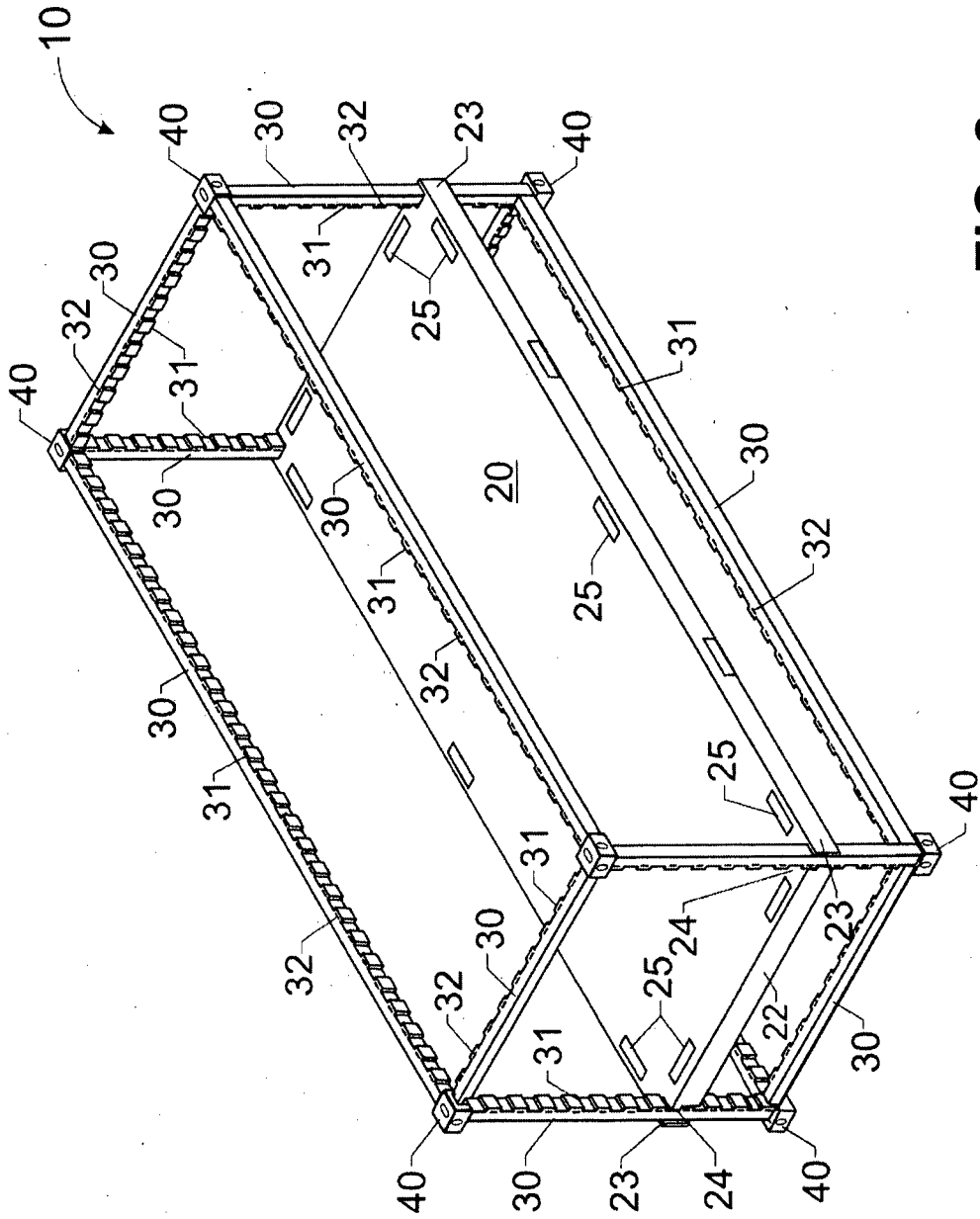
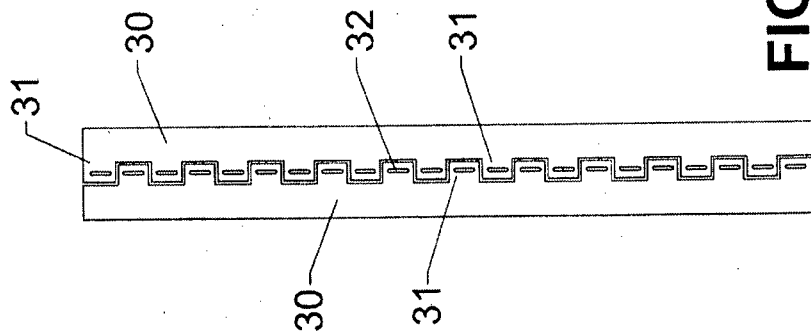
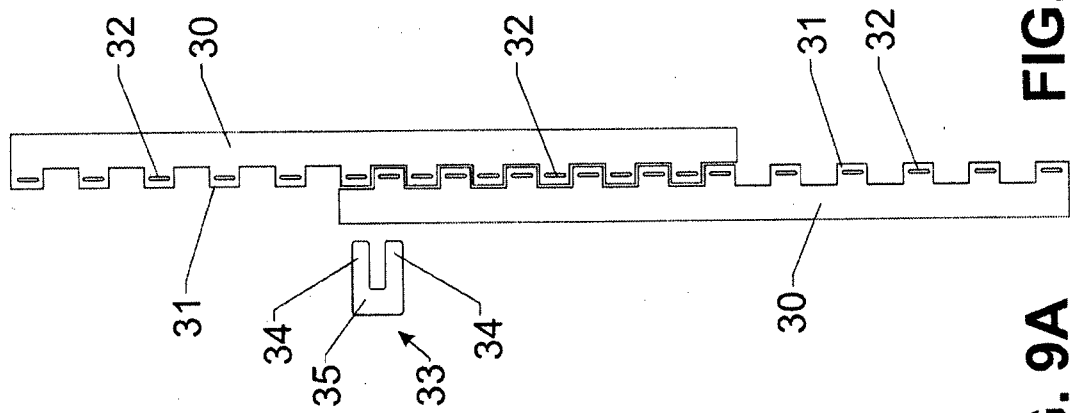
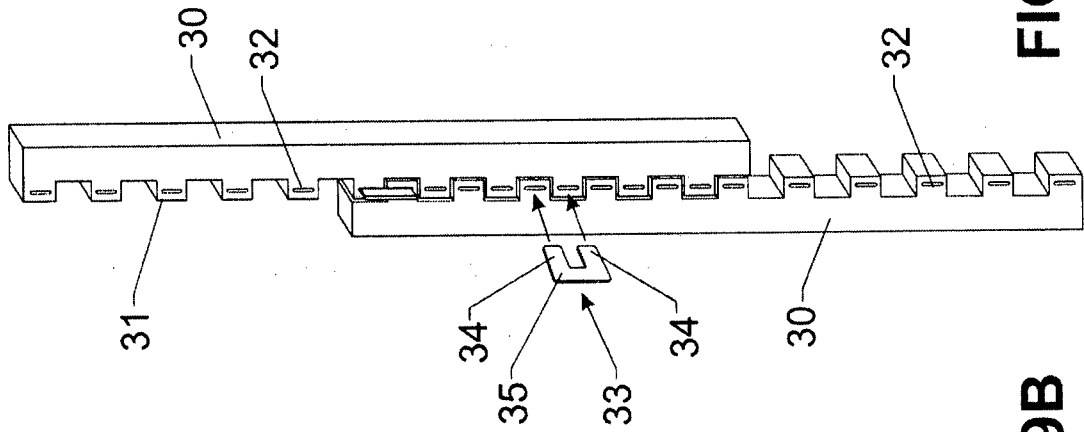
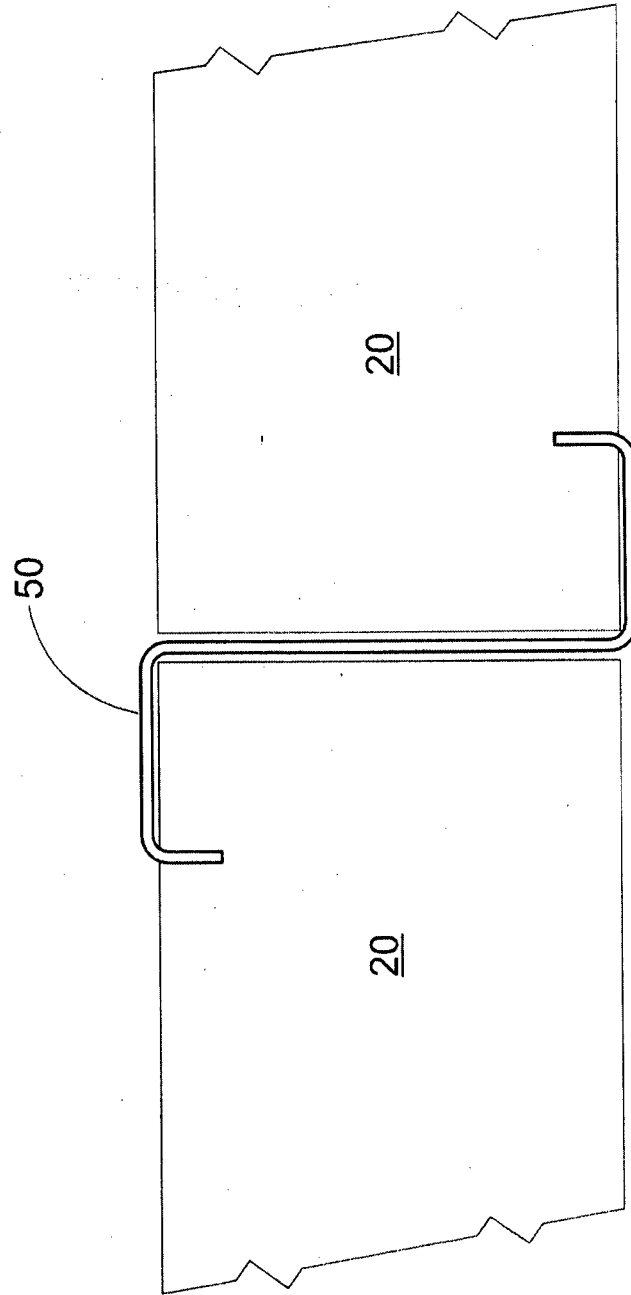


FIG. 8







**FIG. 10**

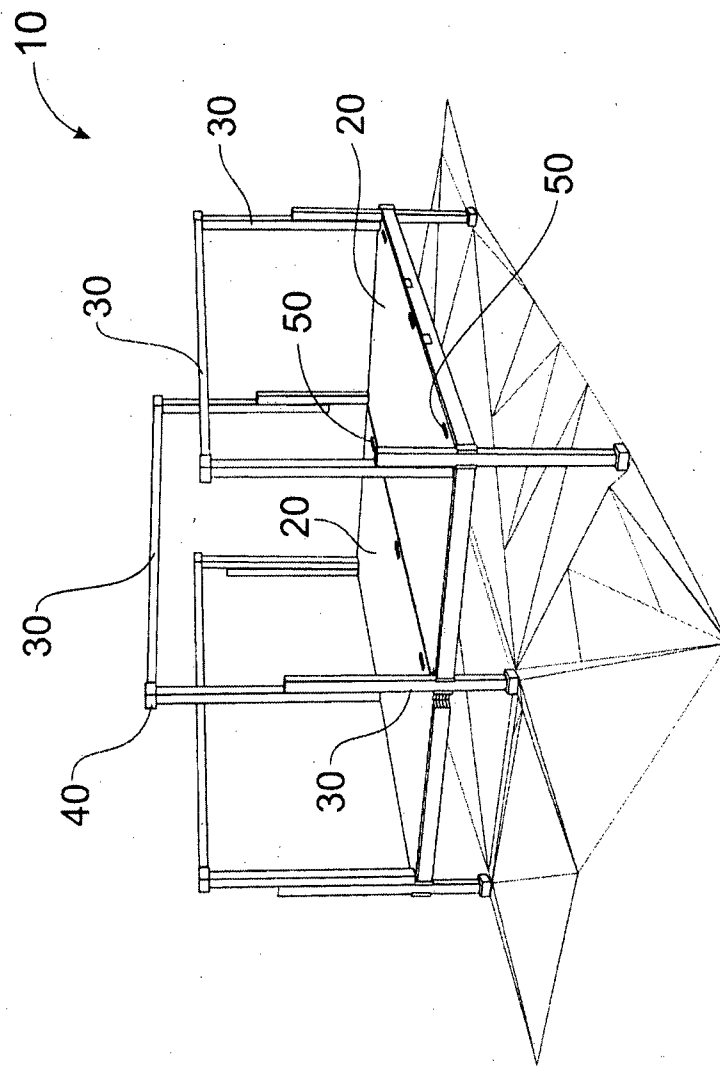


FIG. 11A

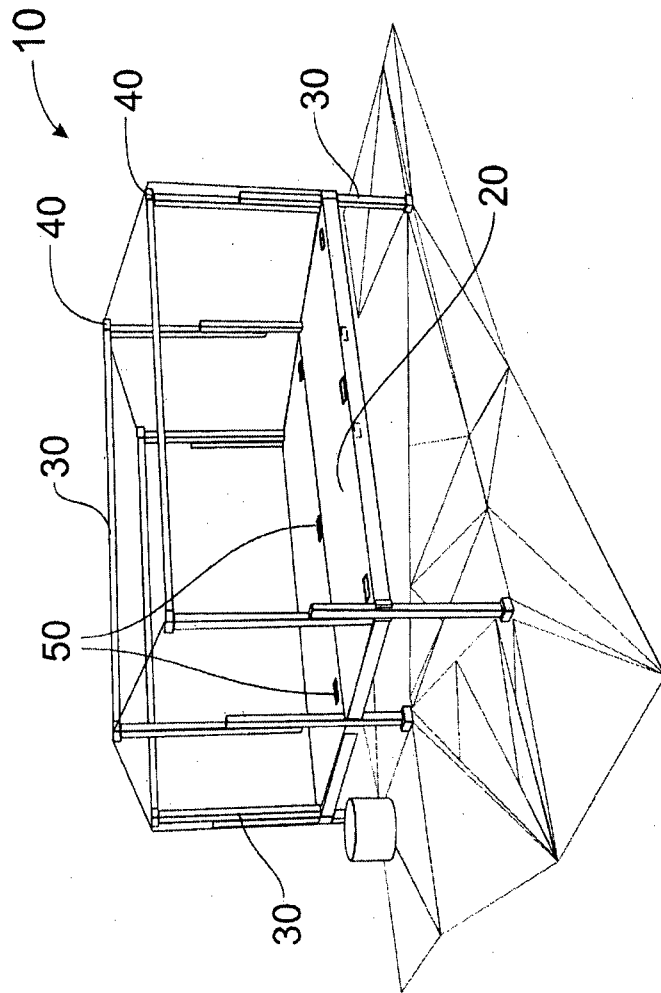


FIG. 11B

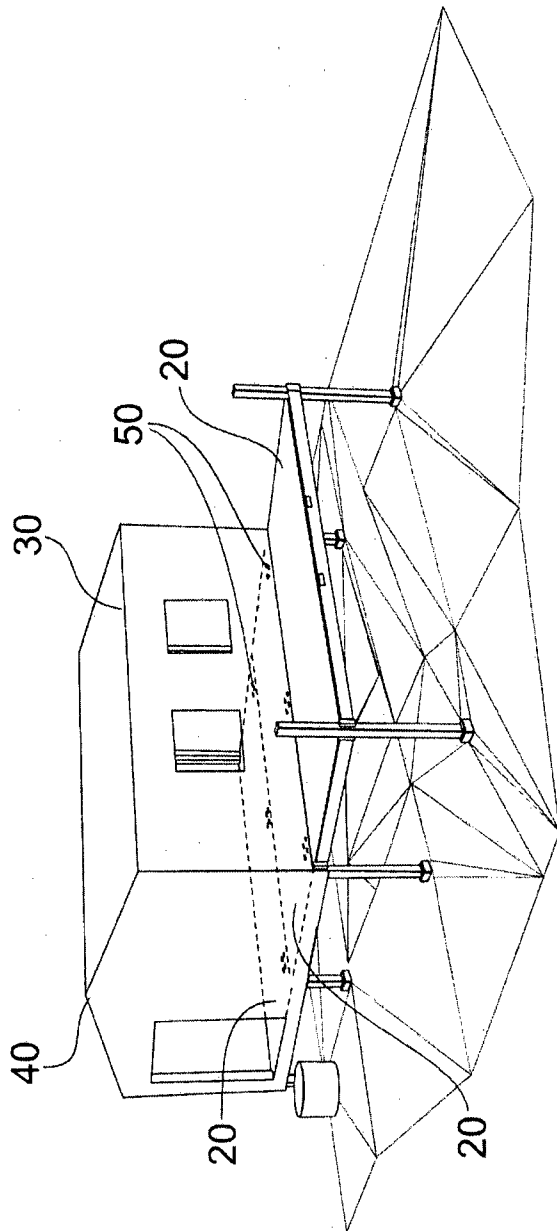


FIG. 11C

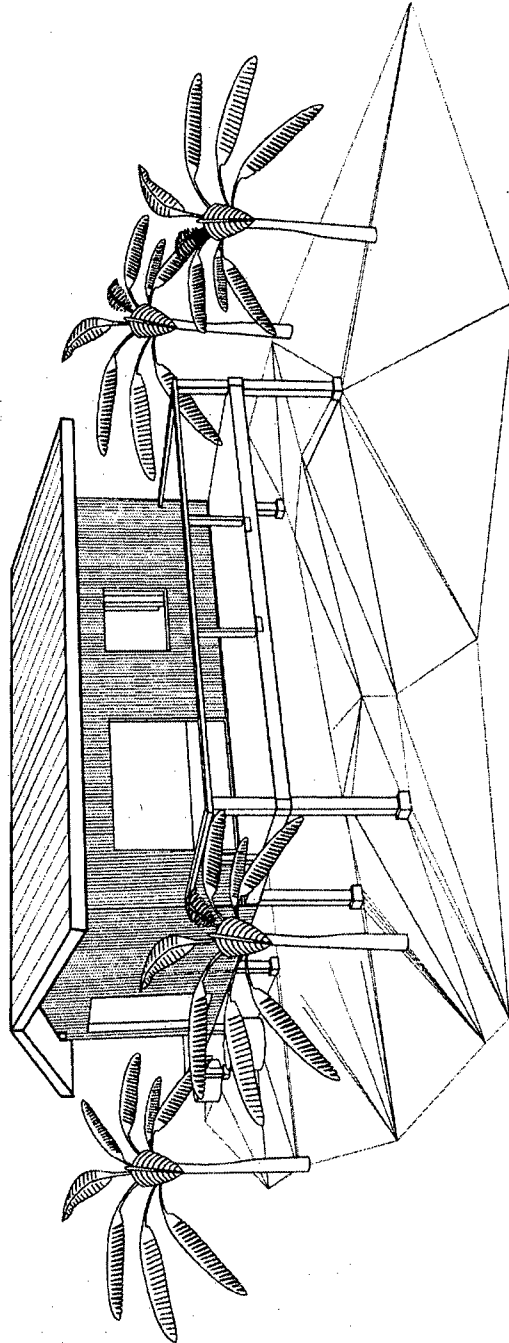


FIG. 11D

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/AU2013/001125**

## A. CLASSIFICATION OF SUBJECT MATTER

**B65D 88/52 (2006.01) B65D 90/00 (2006.01) E04H 1/12 (2006.01) E04B 1/343 (2006.01) E04B 1/38 (2006.01)**

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI using IC/EC/CN classification marks: B65D 88/10, 88/12, 88/52, 21/08, 25/06, 25/02, 61/-, 90/02, 90/20, 61-; E04H 1/02, 1/12; E04G 1/-, 3/-, 5/-, 7/-; E04B 1/343, 1/38; F16B 1/-, 5/06, 5/07, 5/00, 9/02, 12/-, 21/-; A47B 57/08, 57/20, 57/26, 57/32, 57/48, 57/54, 57/04, 57/58, 17/02, 17/03, 21/013, 27/14, 27/18, 96/07, 9/06, 9/08; and, keywords (member, beam, post, frame, structure, connect, engage, fasten, release, separate, detach, wave, sinusoid, plate, screen, shelf, adjust, and similar terms).

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	

 Further documents are listed in the continuation of Box C  See patent family annex

* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 31 January 2014	Date of mailing of the international search report 31 January 2014
<b>Name and mailing address of the ISA/AU</b>  AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaaustralia.gov.au Facsimile No.: +61 2 6283 7999	<b>Authorised officer</b>  Stuart Ash AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0399359633

## INTERNATIONAL SEARCH REPORT

International application No.

C (Continuation).

DOCUMENTS CONSIDERED TO BE RELEVANT

PCT/AU2013/001125

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2010/0176704 A1 (KIM) 15 July 2010 Abstract; figures 1, 6-7; and, paragraphs [0021], & [0046-56]. Abstract; figures 6-7; and, paragraphs [0021], & [0046-56].	1-3 1, 34, 48-50 35-47
X Y	US 4637763 A (VAN IPEREN) 20 January 1987 Figures 4, 7, 8, 12 & 22; column 5, lines 1-10, & 36-44. Figures 12 & 22; column 5, lines 1-10, & 36-44.	1-3, 5-7, 12, 15-16, 19, 21, 26-30, 32-34, 49 35-47
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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/AU2013/001125**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

<b>Patent Document/s Cited in Search Report</b>		<b>Patent Family Member/s</b>	
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		US 6227397 B1	08 May 2001

**End of Annex**