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(54) Title: PARTITION ASSEMBLY FOR A SHIPPING CONTAINER

(57) Abstract: The present invention provides an apparatus for partitioning an interior of a shipping container, the apparatus including at least one beam extendable between recessed portions of opposing sidewalls of the container, the recessed portions acting to at least partially restrain the at least one beam, and a panel supported by the at least one beam so as to partition the interior. A shipping container including a partition assembly is also provided.

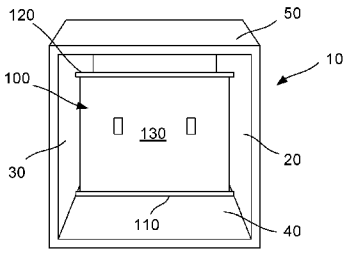

Fig. 1A

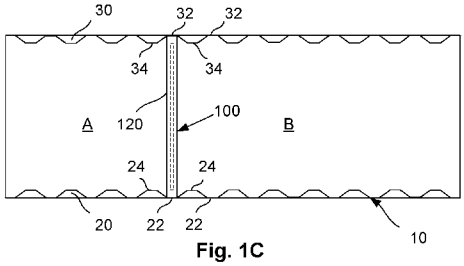

Fig. 1C

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PARTITION ASSEMBLY FOR A SHIPPING CONTAINER

Priority Documents

[0001] The present invention claims priority from Australian Provisional Application No. 2015901619 titled "PARTITION ASSEMBLY FOR A SHIPPING CONTAINER" and filed on 6 May 2015, the content of which is hereby incorporated by reference in its entirety.

Background of the Invention

[0002] The present invention relates to shipping containers for the transportation and storage of goods and materials and a partition assembly therefor.

Description of the Prior Art

[0003] The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that the prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

[0004] A shipping container (otherwise known as an intermodal, freight or ISO container) is a standardised reusable steel box used for the storage and transportation of goods and materials within a global containerized intermodal freight transport system. Shipping containers are manufactured in standard sizes typically ranging from between 8 to 56 feet in length. The interior of shipping containers defines a large internal space where goods and materials are loaded for transportation and storage.

[0005] In international containerized shipping, ISO standards define Full Container Load (FCL) shipping and Less than Container Load (LCL) shipping. In FCL shipping, a container is typically filled with cargo for one consignee. Conversely in LCL shipping, cargo owned by multiple consignees is typically grouped together in one container to make up a full load.

[0006] In LCL shipping in particular, since there is no control over the nature of the cargo which is loaded into the same container, there is an inherent risk of cargo damage or cargo being accidentally lost or mixed up with cargo from a different consignment. For FCL shipping, there is also a risk of damage as a result of cargo interfering with other cargo of the shipment. In shipping generally, it is also undesirable to have loads capable of moving around in the container (particularly when the container is not full).

[0007] Furthermore, loading a container is typically time consuming as goods must be arranged within the container so as to minimise damage to fragile or delicate goods in the shipment.

[0008] In addition to reducing the likelihood of damaged or lost cargo, shippers and freight forwarders are continually seeking to reduce freight costs. Many shippers are reviewing their supply chain and logistics operations in order to identify ways to reduce freight costs for their consignments. While such strategies can offer some improvement, some consignments remain inherently difficult and expensive to freight. For example, some consignments loaded into a container do not permit the full available space of the container to be used effectively which increases the cost of freight.

[0009] It is against this background, and the problems and difficulties associated therewith, that the present invention has been developed.

Summary of the Present Invention

[0010] In one broad form the present invention seeks to provide an apparatus for partitioning an interior of a shipping container, the apparatus including:

a) at least one beam extendable between recessed portions of opposing sidewalls of the container, the recessed portions acting to at least partially restrain the at least one beam; and,

b) a panel supported by the at least one beam so as to partition the interior.

[0011] Typically, the recessed portions of the sidewalls are trough portions of corrugated panels consisting of alternating crest and trough portions.

[0012] Typically, the panel is disposed in an upright orientation with respect to a floor of the container to thereby partition the interior of the container into sections forward and aft of the panel.

[0013] Typically, the at least one beam includes a first beam adapted to receive a lower portion of the panel and a second beam adapted to receive an upper portion of the panel thereby sandwiching the panel between the first and second beams.

[0014] Typically, each beam has an opening that extends in a direction of elongation of the beam for receiving a respective upper or lower portion of the panel.

[0015] Typically, an interference or friction fit is formed between each opening and the respective upper or lower portion of the panel.

[0016] Typically, the panel further includes one or more apertures usable as hand holds to carry the panel.

[0017] Typically, the panel is foldable.

[0018] Typically, the panel includes a first panel hingedly connected to a second panel.

[0019] Typically, the panel includes vertical stiffeners extending along an inner edge of the first and second panels proximate a join between the first and second panels.

[0020] Typically, the vertical stiffeners abut when the panel is unfolded.

[0021] Typically, the panel is disposed in a horizontal orientation parallel to a floor of the container to thereby partition the interior of the container into sections above and below the panel.

[0022] Typically, the at least one beam includes a plurality of beams spaced apart in a direction of elongation of the container.

[0023] Typically, the plurality of beams are positioned at a height above the floor of the container and wherein the panel is supported above the beams.

[0024] Typically, each of the plurality of beams is supported above the floor by a pair of posts coupled to each beam that project downwardly towards the floor.

[0025] Typically, the pair of posts project downwardly in the vicinity of opposing ends of each beam.

[0026] Typically, each post is inserted into a respective beam through a complementary opening in the beam.

[0027] Typically, the apparatus further includes a pair of further beams that contact the floor and extend in a direction of elongation of the container proximate respective sidewalls thereof.

[0028] Typically, one of the pair of posts is coupled to one of the pair of further beams and the other of the pair of posts is coupled to the other of the pair of further beams.

[0029] Typically, the further beams each have a plurality of openings for receiving a plurality of posts.

[0030] Typically, the panel has a stepped profile.

[0031] Typically, one or more beams are tubular.

[0032] Typically, the beams are cylindrical or rectangular.

[0033] Typically, one or more beams are manufactured from one of:

a) plastic;
b) metal;
c) paper; and,
d) wood.

[0034] Typically, the panel is manufactured from one of:

a) plastic;
b) metal;
c) paperboard; and,

d) wood.

[0035] Typically, the panel has a reinforced structure.

[0036] In another broad form, the present invention seeks to provide a shipping container, including:

a) a body having an interior and including at least a pair of opposing sidewalls; and

b) a partition assembly, including:

i) at least one beam extendable between recessed portions of the sidewalls, the recessed portions acting to at least partially restrain the at least one beam; and,

ii) a panel supported by the at least one beam that partitions the interior of the body.

[0037] Typically, the partition assembly is installable in-situ when loading the container.

[0038] Typically, the partition assembly divides the interior of the container into lengthwise compartments.

[0039] Typically, the partition assembly divides the interior of the container into compartments in a direction defined between a floor and a roof of the container.

[0040] In another broad form, the present invention seeks to provide a method of partitioning an interior of a shipping container, the method including:

a) positioning at least one beam between recessed portions of opposing sidewalls of the container so that the at least one beam is at least partially restrained by the recessed portions; and,

b) installing a panel between the sidewalls so as to partition the interior, the panel supported by the at least one beam.

[0041] In another broad form, the present invention seeks to provide an apparatus for partitioning an interior of a shipping container, the apparatus including:

a) a first tubular beam extendable between opposing sidewalls of the container;

b) a second tubular beam extendable between the sidewalls, the second beam spaced apart from the first beam; and,

c) a foldable panel supported by the first and second beams so as to partition the interior about opposing sides of the panel.

Brief Description of the Drawings

[0042] An example of the present invention will now be described with reference to the accompanying drawings, in which: -

[0043] Figure 1A is a front perspective view of a shipping container showing an example of an apparatus for partitioning an interior of the shipping container;

[0044] Figure 1B is a sectional side view of the shipping container of Figure 1A;

[0045] Figure 1C is a sectional top view of the shipping container of Figure 1A;

[0046] Figure 2A is a front view of the apparatus for partitioning an interior of a shipping container shown in Figure 1A;

[0047] Figure 2B is a side view of the apparatus of Figure 2A;

[0048] Figure 2C is an enlarged side view of an upper portion of the apparatus of Figure 2A;

[0049] Figure 3 is a detailed top view of a portion of a beam of the apparatus engaged in a recessed portion of a sidewall of the container;

[0050] Figure 4 is a perspective view of an example of a beam of the apparatus that is extendable between recessed portions of opposing sidewalls of the container;

[0051] Figure 5A is sectional side view of an example of a shipping container having a plurality of apparatus for partitioning an interior of the shipping container;

[0052] Figure 5B is a sectional top view of the shipping container of Figure 5A;

[0053] Figures 6A to 6C provide sequential views showing assembly of a further example of an apparatus for partitioning an interior of a shipping container;

[0054] Figure 7A is a front perspective view of another example of an apparatus for partitioning an interior of a shipping container having a foldable panel;

[0055] Figure 7B is an end view of the apparatus of Figure 7A in a folded configuration;

[0056] Figure 7C is a top view of the apparatus of Figure 7A being unfolded towards an in use configuration.

[0057] Figure 8A is a front perspective view of a shipping container showing a further example of an apparatus for partitioning an interior of the shipping container;

[0058] Figure 8B is a sectional side view of the shipping container of Figure 8A;

[0059] Figure 8C is a sectional top view of the shipping container of Figure 8A;

[0060] Figure 9A is a front perspective view of a shipping container showing a further example of an apparatus for partitioning an interior of the shipping container;

[0061] Figure 9B is a sectional side view of the shipping container of Figure 9A;

[0062] Figure 9C is a sectional top view of the shipping container of Figure 9A; and,

[0063] Figure 10 is a perspective view of an example of the coupling between a beam and a post of an apparatus for partitioning an interior of a shipping container.

Detailed Description of the Preferred Embodiments

[0064] An example of an apparatus 100 for partitioning an interior of a shipping container 10 will now be described with reference to Figures 1A to 1C.

[0065] The shipping container 10 (also known as an ISO or intermodal container) described herein may be of any standard design in the art and may encompass containers of any size, including for example from 8 to 56 feet in length. Generally, the container 10 has an elongate steel box structure having a floor 40, roof 50, opposing side walls 20, 30 and ends. Access to an interior of the container is generally provided by end doors which are hinged to opposite sides of the container, and which are openable to allow loading and unloading of goods from the container.

[0066] In this example, the apparatus 100 or partition assembly includes at least one beam 110, 120 extendable between recessed portions 22, 32 of opposing sidewalls 20, 30 of the container 10. The recessed portions act to at least partially restrain the at least one beam 110, 120. In this way, the at least one beam 110, 120 is at least partially restrained from moving in a direction of elongation of the container 10. The recessed portions 22, 32 of opposing sidewalls 20, 30 may take various forms including cut-outs or slots, however in a typical example, the sidewalls 20, 30 are made from corrugated panels comprising alternating crest portions 24, 34 and trough portions 22, 32 and the recessed portions are defined by trough portions 22, 32 of the panels as shown in Figure 1C for example.

[0067] The apparatus 100 further includes a panel or divider 130 supported by the at least one beam 110, 120 so as to partition the interior of the container 10. In its simplest form, the apparatus 100 may include a single beam supporting the panel, however usually the apparatus will include two or more spaced apart beams supporting the panel. The panel 130 may be configured in a vertical orientation as shown in Figures 1A to 1C or in a horizontal orientation as will be described in more detail below.

[0068] In the example shown, the panel 130 partitions or divides the container 10 into compartments or sections A, B disposed about opposing sides 136, 138 of the panel 130. Whilst in some configurations, the compartments may be enclosed, typically this is not the case and the panel simply acts as a device to physically separate or delineate various goods stored in the container. In the example shown, a gap is provided between the top of beam 120 and the roof 50 for purposes of ease of installation.

[0069] The above described arrangement permits an interior of a shipping container to be partitioned into sections thereby enabling various goods to be separated in the container which reduces the likelihood of damage during storage or transport and also mitigates the risk of goods being mixed up or lost particularly in LCL consignments. The apparatus may further be useful in preventing loads from moving around in the container by creating a physical barrier. In some arrangements, such as when the panel is disposed in a horizontal configuration, the available space inside the container can be utilised more effectively permitting more goods to be loaded into the container which assists in reducing freight costs. Furthermore, the arrangement is advantageous as it is able to provide better protection to fragile or delicate goods by separating them from goods that may otherwise cause damage to them such as heavy or sharp objects.

[0070] In this regard, the arrangement may also reduce the time taken to load or pack the container as goods can simply be loaded and then partitioned from other goods, whereas previously loading containers would have required more planning to ensure for example that heavy items were not packed on top of or adjacent fragile or delicate items and the like.

[0071] The ability for the recessed portions to at least partially restrain the at least one beam supporting the panel effectively allows the position of the apparatus with respect to the container to be maintained without being physically fixed or otherwise fastened to the container. This enables the apparatus to be removable and easily reconfigured as needed to suit different cargo types. A further advantage of this method of restraint is that it permits the apparatus to be installed quickly as fasteners or additional mounting hardware are not required.

[0072] A number of further features shall be now described with reference to Figures 2A to 10.

[0073] In Figures 2A to 2C, the apparatus 100 is shown in further detail. As described previously, in this example, the panel 130 is disposed in an upright orientation with respect to the floor 40 of the container 10 to thereby partition the interior of the container 10 into sections A, B forward and aft of the panel 130. In this example, the at least one beam includes a first beam 110 adapted to receive a lower portion 134 of the panel 130 and a second beam 120 adapted to receive an upper portion 132 of the panel 130, thereby sandwiching the panel 130 between the first and second beams 110, 120. In the example shown, the upper and lower portions 132, 134 of the panel 130 correspond with the top and bottom of the panel 130 respectively when the panel is erected in an upright configuration.

[0074] Typically, each beam has an opening that extends in a direction of elongation of the beam for receiving a respective upper or lower portion of the panel. In Figure 4, there is shown an example of a lower beam 110 spanning in a direction of elongation from end 114 to end 116 and having a longitudinally extending opening 112 which may be a slot or cut-away section in the main body of the beam. Although the structure of the beam may vary, typically the beams are tubular in order to minimise weight and production cost, although solid beams could also be used. The beams may have any suitable profile including cylindrical or rectangular.

[0075] In use, the lower portion 134 of the panel is inserted through opening 112 of beam 110. The longitudinal edges 113, 115 of the opening 112 may be urged apart slightly to allow

the lower portion 134 of the panel 130 to be inserted therein. Alternatively, the lower portion 134 of the panel 130 may have tapered edges to facilitate insertion and urging apart of the longitudinal edges 113, 115. In a further example, the opening 112 of beam 110 may be tapered to facilitate easier insertion. Typically the edges 113, 115 are resilient so that after being urged apart they exert a clamping or return force about opposing sides of the panel 130 sufficient to removably secure the beam 110 to the panel 130. The second beam 120 is coupled to the upper portion 132 of the panel 130 in a similar manner by locating the upper portion 132 in opening 122 of the beam 120. The upper portion 132 of the panel 130 may optionally have tapered edges as well or alternatively opening 122 may be tapered to facilitate easier insertion. In this way, an interference or friction fit is formed between each opening and the respective upper or lower portion of the panel.

[0076] As shown in Figure 2C, when coupled, the upper portion 132 of the panel 130 may be inserted into the beam 120 so as to abut an internal portion of the beam 120. Similarly, the lower portion 134 of the panel 130 may abut an internal portion of beam 110 when the apparatus 100 is assembled.

[0077] In an example, to assist in lifting, carrying and installing the panel 130, the panel 130 may include one or more apertures usable as hand holds to carry the panel 130.

[0078] Typically, the panel is manufactured from a suitable plastic, wood, paperboard or metal. In an exemplary example, the panel may be manufactured from cardboard or a reinforced paperboard, for example having a honeycomb structure in order to maximise strength and stiffness while minimising cost of production. Other composite reinforced materials may also be suitable. To improve durability and reusability of the product, the panel may be manufactured from a suitable metal such as aluminium or steel, or a reinforced composite metal structure. In one example, the panel is 30mm thick.

[0079] The beams may be manufactured from any suitable plastic, metal, wood, paper based material including for example cardboard, polyvinyl chloride (PVC) and the like.

[0080] As previously described, the beams 110, 120 extend or span between recessed portions of the opposing sidewalls 20, 30 which act to at least partially restrain the beams.

Typically, the internal sidewalls of shipping containers are manufactured from corrugated steel panels having a plurality of alternating crest and trough portions. As shown in Figure 3, typically the corrugations are trapezoidal having crest portions 34, trough portions 32 and angled sections 33, 35 extending between adjacent crest and trough portions. By way of example, Figure 3 shows a detailed view of a beam 110 that extends between opposing sidewalls of the container. The beam 110 is positioned with respect to the corrugated sidewall 30 so that end 114 abuts trough portion 32. The diameter or width of beam 110 is such that it corresponds approximately to the width of trough portion 32. When positioned in this manner, the end 114 of the beam 110 is effectively sandwiched between angled portions 33, 35 of the corrugation. These angled sections 33, 35 largely restrain the end 114 of the beam 110 from moving in a direction of elongation of the container. The same engagement occurs at end 116 of beam 110 with respect to corrugations of sidewall 20. As panel 130 is connected to beam 110, the panel 130 is also restrained and located in essentially a fixed position with respect to the container without actually being directly secured or fastened to the container. Further restraint is provided by beam 120 which is also engaged with the corrugated sidewalls 20, 30 in a similar manner.

[0081] In alternative arrangements, there may be provided multiple apparatus 100 for partitioning an interior of a shipping container 10 into more than two compartments. In the example shown in Figures 5A and 5B, there is provided a pair of apparatus 100 as previously described that are spaced apart along the length of the container to partition the container into compartments or sections A, B and C. Each apparatus 100 is positioned in the container and restrained by engagement between beams and corrugations of sidewalls, 20, 30 as previously described. Such an arrangement may be particularly useful for separating LCL shipments containing cargo owned by more than two consignees.

[0082] The beams previously described for supporting the panel have been illustrated as single lengths of pipe. In a further example, each beam may comprise multiple sections that are connected together to form a support. For example, with reference to Figures 6A to 6C there is shown an apparatus 200 for partitioning an interior of a shipping container having a first beam comprising sections 110A, 110B and 110C, a second beam comprising sections

220A, 220B and 220C and panel 230. The profile of each section may be similar to that previously described having a respective longitudinal opening for receiving an upper or lower portion 232, 234 of the panel 230.

[0083] In Figure 6A, the apparatus 200 is shown in a configuration whereby end sections 210A, 210B of the first beam are coupled to the lower portion 234 of the panel 230 so that a first end of section 210A is aligned with side edge 235 of panel 230 and a first end of section 210B is aligned with side edge 233 of panel 230. Similarly, end sections 220A, 220B of the first beam are coupled to the upper portion 232 of the panel 230 so that a first end of section 220A is aligned with side edge 235 of panel 230 and a first end of section 220B is aligned with side edge 233 of panel 230. In this configuration, the apparatus 200 may be lifted into the container 10 by hand holds 237, 238 for example and located in approximate position.

[0084] When correctly aligned between opposing trough portions of corrugated sidewalls 20, 30, the end sections 210A, 210B, 220A and 220B may slide outward along the upper and lower portions of the panel 230 until they are brought into abutting engagement with the respective trough portions. At this point, intermediate sections 210C and 220C are introduced and located between end sections 210A, 210B and 220A, 220B respectively. Various locking arrangements may be provided to connect the intermediate sections to the end sections. For example, the sections may snap fit together.

[0085] Alternatively, the sections may be arranged telescopically such that the end sections slide out from the intermediate sections.

[0086] A further example of an apparatus 300 for partitioning an interior of a shipping container is shown in Figures 7A to 7C. In this example, the apparatus 300 includes a foldable panel 330. The panel 330 comprises a first panel 340 and a second panel 350 hingedly connected along a join 331 by hinge 370. The ability to fold the panel is particularly advantageous for transport and delivery to a customer, storage and ease of access into a shipping container. A single-piece panel may be nearly the same size as the door entrance of the container (which is narrower than the internal width of the container) and so carrying a single-piece panel into the container may be difficult. In order to get a single-piece panel into

a container easily, it may have to made narrower than what is desired. A folding panel overcomes this potential problem and allows the total width of the unfolded panel to substantially span across the interior of the container. The panel is also easier to carry in a folded configuration and provides improved transportability and storage as it takes up much less space (for example 2200mm x 1150mm instead of 2200mm x 2300mm).

[0087] In order to increase strength and stiffness, the foldable panel 330 may be reinforced by vertical stiffeners 360, 370 which are secured along an inner edge of a face of both the first panel 340 and the second panel 350 proximate the fold. The stiffeners 360, 370 are arranged so as to abut along inner faces 362, 372 when the panel 330 is unfolded. The stiffeners 360, 370 may extend part way along the height of the first and second panels 340, 350 or alternatively may extend the full height of the panels 340, 350 if additional strength is necessary.

[0088] Typically, the stiffeners 360, 370 are secured to rear faces 342, 352 of the first and second panels 340, 350 respectively (the rear faces or sides face the rear wall of the container in use). In this manner, the stiffeners 360, 370 typically face the load in the container which is stored behind the panel 330). If a load was exerted on the panel 330, the inner faces 362, 372 of the stiffeners 360, 370 would be urged together thereby increasing strength and stiffness of the panel 330.

[0089] The first and second panels 340, 350 as well as the vertical stiffeners 360, 370 may be manufactured from any suitable plastic, wood, paperboard or metal. In an exemplary example, the panel may be manufactured from cardboard or a reinforced paperboard, for example having a honeycomb structure in order to maximise strength and stiffness while minimising cost of production. Other composite reinforced materials may also be suitable. To improve durability and reusability of the product, the panel may be manufactured from a suitable metal such as aluminium or steel, or a reinforced composite metal structure. Hinge 370 may be a piece of paper adhered (for example glued) to both panels 340, 350. Alternatively, a plastic or metal hinge may be mounted to the panels to connect them together and allow them to fold.

[0090] The panel 330 is supported between lower and upper beams 310, 320 which extend between recessed portions of opposing sidewalls of a shipping container in the same manner as previously described with respect to beams 110, 120 of apparatus 100.

[0091] Now referring to Figures 8A to 8C, there is shown a further example of an apparatus 400 for partitioning an interior of a shipping container 10. In this arrangement, a panel 430 is disposed in a horizontal orientation parallel to the floor 40 of the container to thereby partition the interior of the container into sections A, B above and below the panel 430. The panel 430 is supported by a plurality of beams spaced apart in a direction of elongation of the container 10 (beams transverse to the sidewalls). In the example shown, there are two longitudinally spaced apart beams 410, 420 that support the panel 430. The beams 410, 420 are positioned at a height above the floor of the container 10 such that the panel, in use, provides a mezzanine level disposed partway between the floor 40 and the roof 50 of the container 10.

[0092] In the example shown, each beam 410, 420 is supported above the floor 40 by a pair of posts 440 coupled to each beam 410, 420 that project downwardly towards the floor 40. Typically, each pair of posts 440 project downwardly in the vicinity of opposing ends of each beam as shown which creates a wide footprint of support for the apparatus 400 and assists in creating a stable platform. In the example shown, the posts 440 are positioned alongside sidewalls 20, 30. Whilst the posts 440 may abut the floor 40 directly, typically the posts are adjoined to a pair of further beams 450 that contact the floor 40 and extend in a direction of elongation of the container proximate the respective sidewalls 20, 30 thereof. One of each pair of posts 440 is coupled to one of the pair of further beams 450 and the other of the pair of posts 440 is coupled to the other of the pair of further beams 450. In other examples, beams 450 may extend transversely between the sidewalls 20, 30 so as to span across the container.

[0093] Typically, each post 440 is inserted into a respective beam 310, 420, 450 through a complementary opening in the beam. For a cylindrical post, a complementary cut-out is made in the respective beam having a curved profile enabling the post to be received within the aperture formed in the beam. Similarly, for a rectangular post, a complementary opening

would be formed to receive a rectangular profile therein. The pair of further longitudinally extending beams 450 each have a plurality of openings for receiving a plurality of posts 440 that are spaced apart along the length of the beams 450. Whilst the arrangement shown in Figures 8A to 8C shows only two posts 440 adjoining each beam 450, it is to be appreciated that this is illustrative only and that several more posts 440 spaced at more regular intervals may be used. The spacing between adjacent posts is determined by the distance between adjacent troughs of the corrugated sidewalls to ensure that the transverse beams 410, 420 supporting the panel 430 are aligned appropriately between trough portions of opposing sidewalls.

[0094] In an example, the distance between adjacent troughs is 275mm and so accordingly adjacent posts and corresponding transverse beams are spaced apart by 275mm or a multiple thereof including 550mm and 825mm for example.

[0095] The above described example apparatus 400 partitions the container 10 by forming a mezzanine level disposed between the floor and the roof of the container. Goods can be separated by packing them above and below the panel 430. For example, fragile or delicate goods may be loaded below the panel 430 to ensure that goods packed above the panel 430 do not come into contact with them. In this sense, the panel 430 may act as a cover to protect particular items.

[0096] The apparatus 400 is restrained from longitudinal movement in the same way as the upright panel arrangement. The transverse beams 410, 420 extend between trough portions 22, 32 of opposing sidewalls 20, 30 and are at least partially restrained by the corrugations as previously described.

[0097] In Figures 9A to 9C there is shown a further example of an apparatus 500 for partitioning an interior of a shipping container 10. This arrangement is similar to the apparatus described with reference to Figures 8A to 8C except that it provides a panel having a stepped profile to thereby form a pair of mezzanine levels, thereby partitioning the interior of the container into compartments or sections A, B, C, D. The panel comprises a lower section 532 and an upper section 536 which are optionally connected through an upright

section 534. The panel is supported by transverse beams 510, 512, 514, 516 and 518 which are spaced apart so as to ensure that each beam extends between trough portions 22, 32 of opposing sidewalls 20, 30 as seen in Figure 9C.

[0098] In this example, posts 540 project downward from the lower section 532 of the panel and posts 542 project downward from the upper section 536 of the panel. Posts 540 are shorter than posts 542 to accommodate the difference in height between the upper and lower panel sections. The posts 540, 542 terminate in longitudinally extending further beams 550 disposed proximate the respective sidewalls 20, 30. In other examples, beams 550 may extend transversely between the sidewalls 20, 30 so as to span across the container.

[0099] Posts and beams may be coupled in the same way as previously described via complementary openings in the beams which receive the ends of the posts. An example of such a coupling is shown in Figure 10, which illustrates posts 640 received in complementary openings 652 in beam 650. In the example shown, the posts 640 are round or cylindrical and the beam 650 is rectangular. Any suitable profile of post and beam may be used, including but not limited to, profiles having rectangular (e.g. square), circular or elliptical cross sections. Typically, the posts and beams will be tubular members and manufactured from one of plastic (e.g. PVC), wood or paperboard (e.g. cardboard), although various metals such as steel and aluminium may also be used. Similarly, the panel may be manufactured from any suitable plastic, metal, wood or paperboard such as cardboard as previously described.

[0100] This stepped arrangement shown in Figures 9A to 9C may be useful for example to cover an object having an irregular shape. For example, when a vehicle is loaded into the container, the lower section 532 of the panel may be positioned to cover the bonnet of the vehicle and the upper section 536 of the panel may be positioned to cover the roof of the vehicle. In this way, a certain degree of protection can be provided to the vehicle or any other irregularly shaped object and other goods can be loaded onto the stepped mezzanine levels above the object in order to maximise use of available space inside the container.

[0101] In the previously described examples, there is also provided a shipping container including a body having an interior and including at least a pair of opposing side walls. The

shipping container further includes a partition assembly including at least one beam extendable between recessed portions of the sidewalls, the recessed portions acting to at least partially restrain the at least one beam. The partition assembly further includes a panel supported by the at least one beam that partitions the interior of the body.

[0102] The partition assembly may be configured to divide the interior of the container into lengthwise compartments. Alternatively, the partition assembly may be configured to divide the container into compartments in a direction defined between a floor and a roof of the container. The shipping container may include a plurality of partition assemblies arranged in any suitable manner depending on the cargo and goods to be loaded into the container.

[0103] Advantageously, the partition assembly is installable in-situ when loading the container. The partition assembly is removable and easily assembled and disassembled on site.

[0104] A method of partitioning an interior of a shipping container shall now be described. Firstly, the method includes positioning at least one beam between recessed portions of opposing sidewalls of the container so that the at least one beam is at least partially restrained by the recessed portions. Typically, the at least one beam is positioned by locating a first end of the at least one beam in a trough portion of a sidewall with the beam at an angle of inclination with respect to the floor or roof of the container. The beam can then pivot about the first end until the second end is located within a corresponding trough portion of the opposing side wall. The at least one beam will be positioned when the beam extends parallel to the floor or roof and is at least partly restrained from moving in a direction of elongation of the container by the recessed portions (e.g. trough portions).

[0105] The method further includes installing a panel between the sidewalls so as to partition the interior of the container, wherein the panel is supported by the at least one beam. The panel may be coupled or connected to the at least one beam, for example by locating an upper or lower portion of the panel in an opening of the at least one beam. Alternatively, the panel may simply sit above the at least one beam without being connected to the at least one beam.

[0106] In the example of an apparatus having an upright panel, a lower beam may be positioned as described above. The panel may then be erected in the container by locating a lower portion thereof in an opening of the lower beam. An upper beam may then be positioned by rotating the beam until its opening faces downward towards an upper portion of the panel. A first end of the upper beam may then by located in a trough portion of a sidewall with the beam at an angle of inclination with respect to the roof of the container. The upper beam can then pivot about the first end until the second end is located within a corresponding trough portion of the opposing side wall. The upper beam can then slide down to allow the upper portion of the panel to be received in the opening of the upper beam. Alternatively, the upper beam may be positioned between opposing sidewalls as high in the container as possible. After the panel has been secured in the lower beam, the upper beam can be pulled down and secured over the upper portion of the panel.

[0107] In the example of an apparatus having a horizontal panel, a pair of longitudinally extending beams may be positioned alongside opposing walls of the container. A plurality of upwardly extending posts may then be inserted into complementary apertures of each longitudinally extending beam. In this step, posts are inserted into corresponding apertures of each longitudinally extending beam so as to form pairs. Transverse beams that span across the container between opposing sidewalls are then positioned, for example using the same technique as described above wherein a first end of a beam is located in a trough portion of a sidewall with the beam at an angle of inclination with respect to the floor or roof of the container. The beam can then pivot about the first end until the second end is located within a corresponding trough portion of the opposing side wall. The beam can then slide down to engage a respective pair of posts which are located in complementary apertures in the transverse beam. The panel is then located on top of the plurality of transverse beams which support the panel in a horizontal orientation to thereby form a mezzanine level within the container.

[0108] Throughout this specification and claims which follow, unless the context requires otherwise, the word “comprise”, and variations such as “comprises” or “comprising”, will be

understood to imply the inclusion of a stated integer or group of integers or steps but not the exclusion of any other integer or group of integers.

[0109] Persons skilled in the art will appreciate that numerous variations and modifications will become apparent. All such variations and modifications which become apparent to persons skilled in the art, should be considered to fall within the spirit and scope that the invention broadly appearing before described.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1) Apparatus for partitioning an interior of a shipping container, the apparatus including:
   a) at least one beam extendable between recessed portions of opposing sidewalls of the container, the recessed portions acting to at least partially restrain the at least one beam; and,
   b) a panel supported by the at least one beam so as to partition the interior.
2) Apparatus according to claim 1, wherein the recessed portions of the sidewalls are trough portions of corrugated panels consisting of alternating crest and trough portions.
3) Apparatus according to claim 1 or claim 2, wherein the panel is disposed in an upright orientation with respect to a floor of the container to thereby partition the interior of the container into sections forward and aft of the panel.
4) Apparatus according to claim 3, wherein the at least one beam includes a first beam adapted to receive a lower portion of the panel and a second beam adapted to receive an upper portion of the panel thereby sandwiching the panel between the first and second beams.
5) Apparatus according to claim 4, wherein each beam has an opening that extends in a direction of elongation of the beam for receiving a respective upper or lower portion of the panel.
6) Apparatus according to claim 5, wherein an interference or friction fit is formed between each opening and the respective upper or lower portion of the panel.
7) Apparatus according to any one of the preceding claims wherein the panel further includes one or more apertures usable as hand holds to carry the panel.
8) Apparatus according to any one of the preceding claims wherein the panel is foldable.
9) Apparatus according to claim 8, wherein the panel includes a first panel hingedly connected to a second panel.
10) Apparatus according to claim 9, wherein the panel includes vertical stiffeners extending along an inner edge of the first and second panels proximate a join between the first and second panels.
11) Apparatus according to claim 10, wherein the vertical stiffeners abut when the panel is unfolded.

12) Apparatus according to claim 1 or claim 2, wherein the panel is disposed in a horizontal orientation parallel to a floor of the container to thereby partition the interior of the container into sections above and below the panel.

13) Apparatus according to claim 12, wherein the at least one beam includes a plurality of beams spaced apart in a direction of elongation of the container.

14) Apparatus according to claim 13, wherein the plurality of beams are positioned at a height above the floor of the container and wherein the panel is supported above the beams.

15) Apparatus according to claim 14, wherein each of the plurality of beams is supported above the floor by a pair of posts coupled to each beam that project downwardly towards the floor.

16) Apparatus according to claim 15, wherein the pair of posts project downwardly in the vicinity of opposing ends of each beam.

17) Apparatus according to claim 14 or claim 15, wherein each post is inserted into a respective beam through a complementary opening in the beam.

18) Apparatus according to claim 16 or claim 17, further including a pair of further beams that contact the floor and extend in a direction of elongation of the container proximate respective sidewalls thereof.

19) Apparatus according to claim 18, wherein one of the pair of posts is coupled to one of the pair of further beams and the other of the pair of posts is coupled to the other of the pair of further beams.

20) Apparatus according to claim 19, wherein the further beams each have a plurality of openings for receiving a plurality of posts.

21) Apparatus according to any one of claims 12 to 20, wherein the panel has a stepped profile.

22) Apparatus according to any one of the preceding claims, wherein one or more beams are tubular.

23) Apparatus according to claim 22, wherein the beams are cylindrical or rectangular.

24) Apparatus according to any one of the preceding claims, wherein one or more beams are manufactured from one of:

a) plastic;

b) metal;

c) paper; and,

d) wood.

25) Apparatus according to any one of the preceding claims, wherein the panel is manufactured from one of:

a) plastic;

b) metal;

c) paperboard; and,

d) wood.

26) Apparatus according to claim 25, wherein the panel has a reinforced structure.

27) A shipping container, including:

a) a body having an interior and including at least a pair of opposing sidewalls; and

b) a partition assembly, including:

i) at least one beam extendable between recessed portions of the sidewalls, the recessed portions acting to at least partially restrain the at least one beam; and,

ii) a panel supported by the at least one beam that partitions the interior of the body.

28) The shipping container according to claim 27, wherein the partition assembly is installable in-situ when loading the container.

29) The shipping container according to claim 27 or claim 28, wherein the partition assembly divides the interior of the container into lengthwise compartments.

30) The shipping container according to claim 27 or claim 28, wherein the partition assembly divides the interior of the container into compartments in a direction defined between a floor and a roof of the container.

31) A method of partitioning an interior of a shipping container, the method including:

a) positioning at least one beam between recessed portions of opposing sidewalls of the container so that the at least one beam is at least partially restrained by the recessed portions; and,

b) installing a panel between the sidewalls so as to partition the interior, the panel supported by the at least one beam.

32) Apparatus for partitioning an interior of a shipping container, the apparatus including:

a) a first tubular beam extendable between opposing sidewalls of the container;

b) a second tubular beam extendable between the sidewalls, the second beam spaced apart from the first beam; and,

c) a foldable panel supported by the first and second beams so as to partition the interior about opposing sides of the panel.

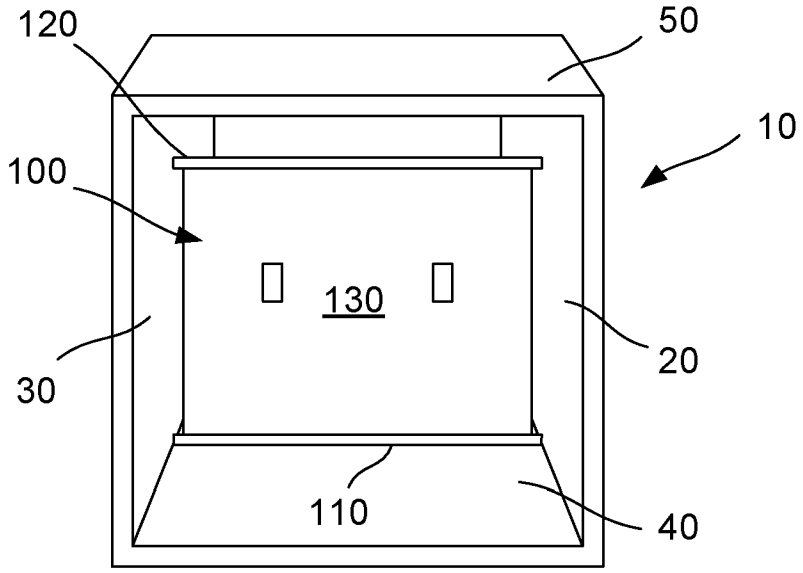

Fig. 1A

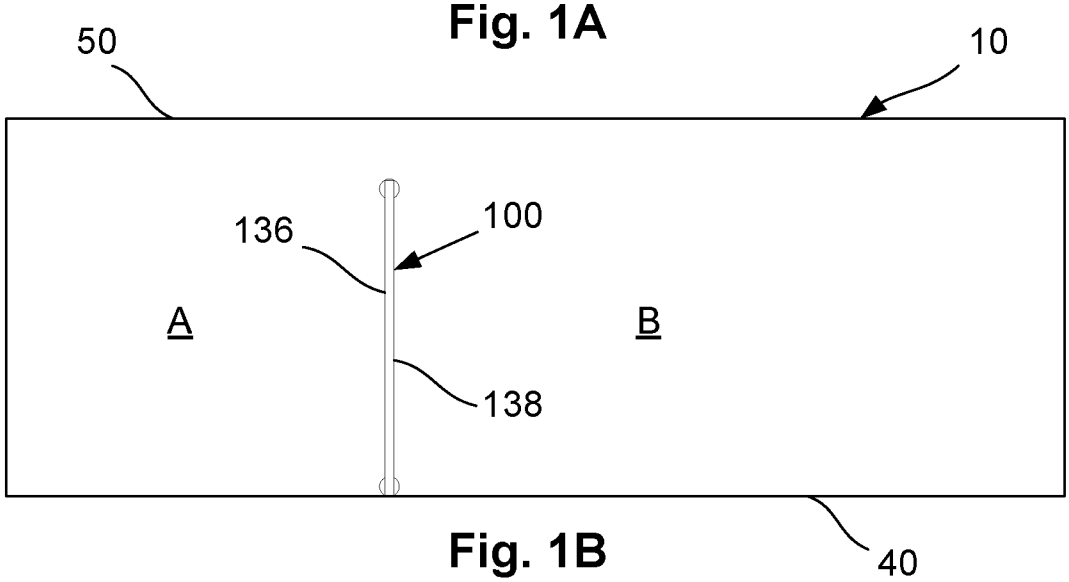

Fig. 1B

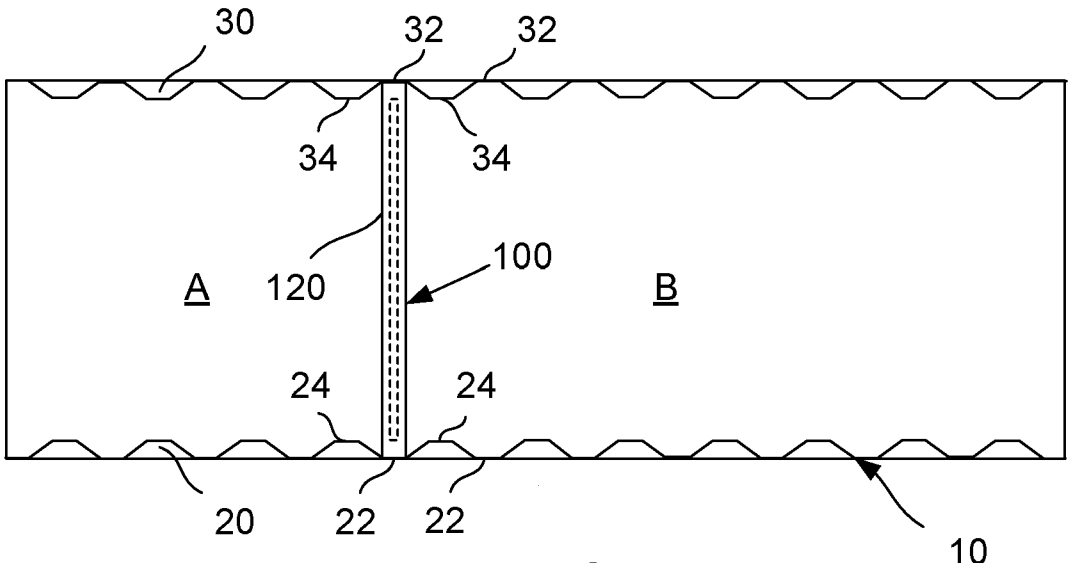

Fig. 1C

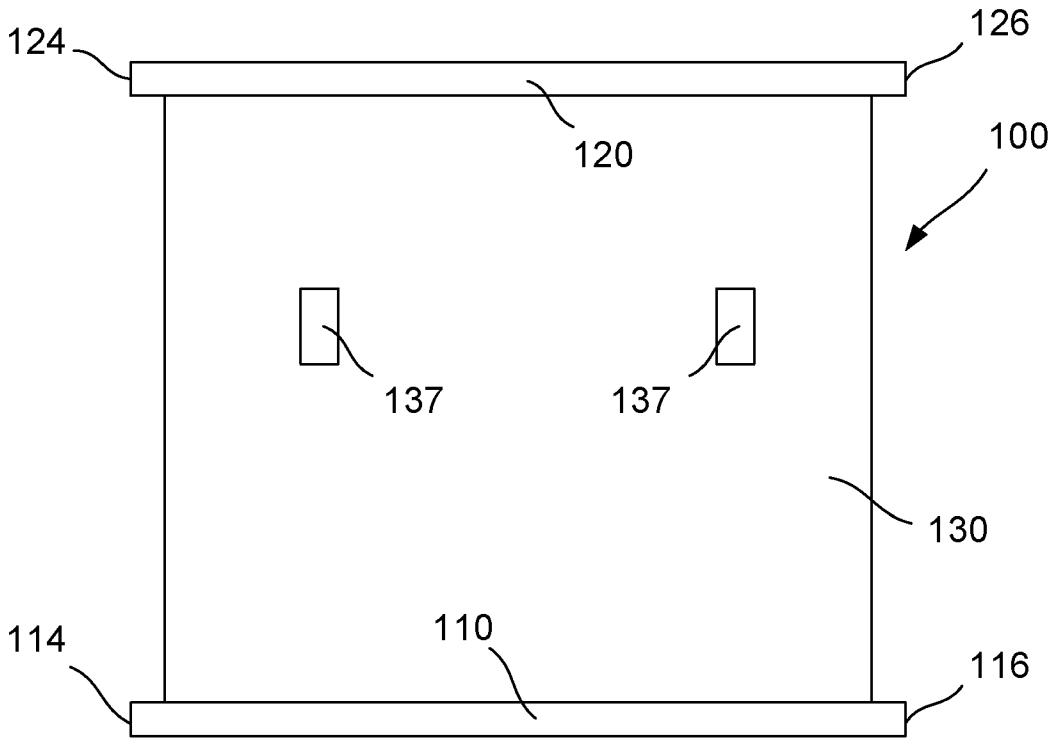

Fig. 2A

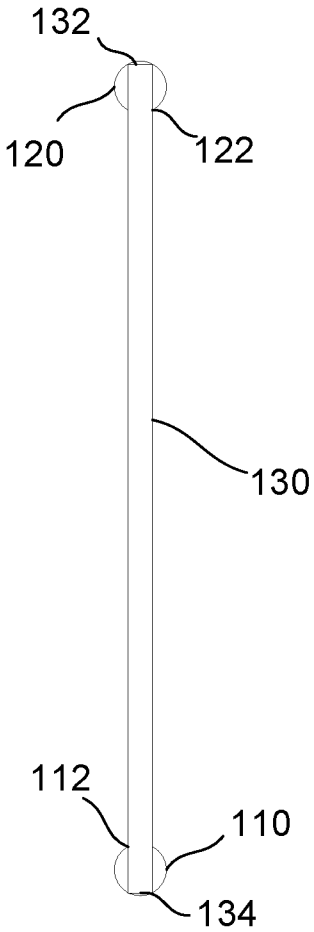

Fig. 2B

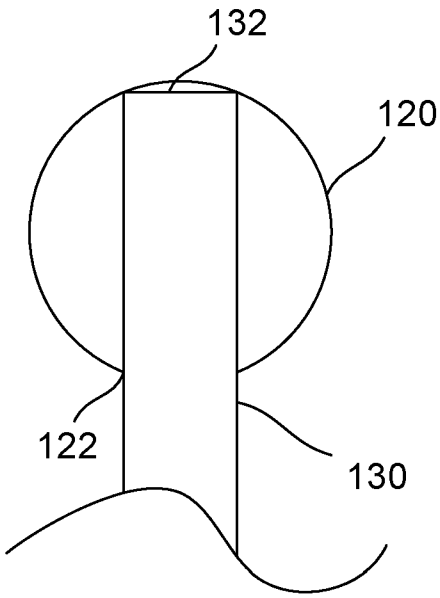

Fig. 2C

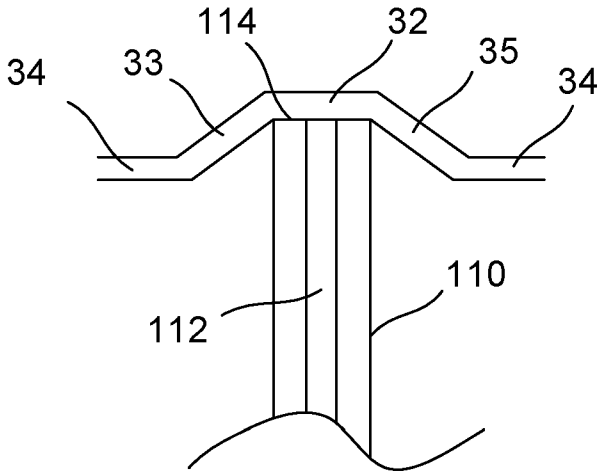

Fig. 3

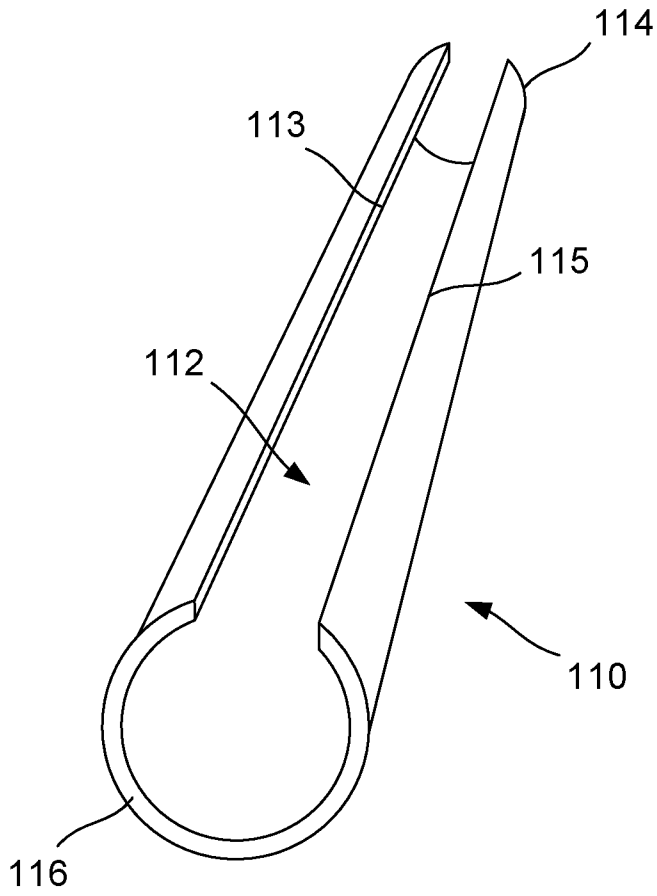

Fig. 4

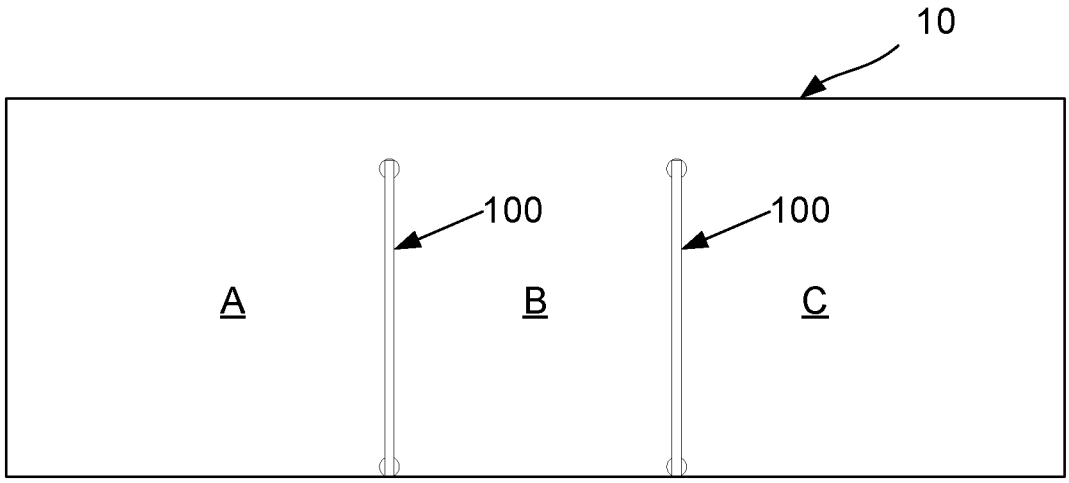

Fig. 5A

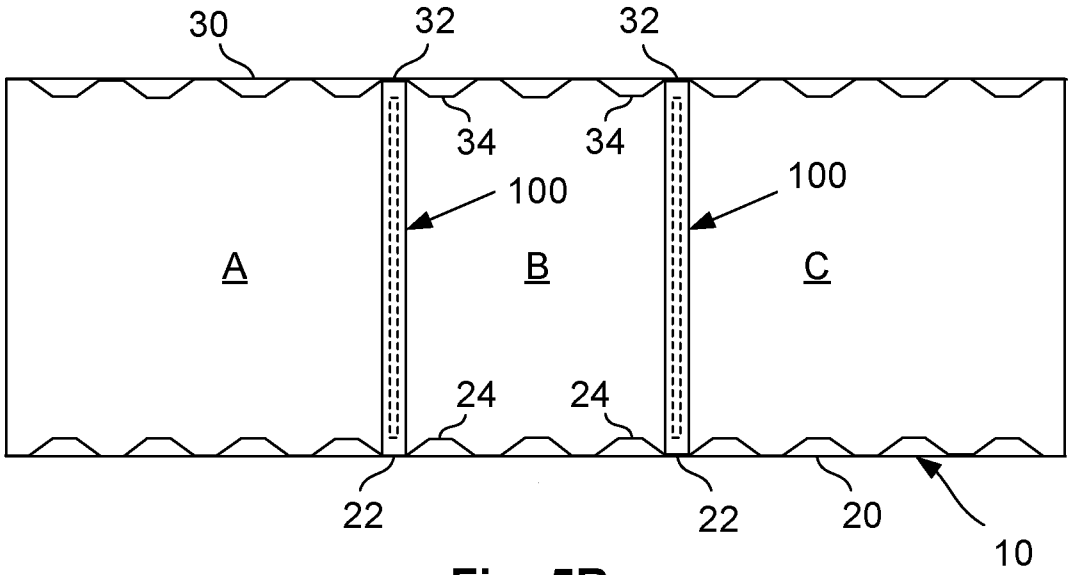

Fig. 5B

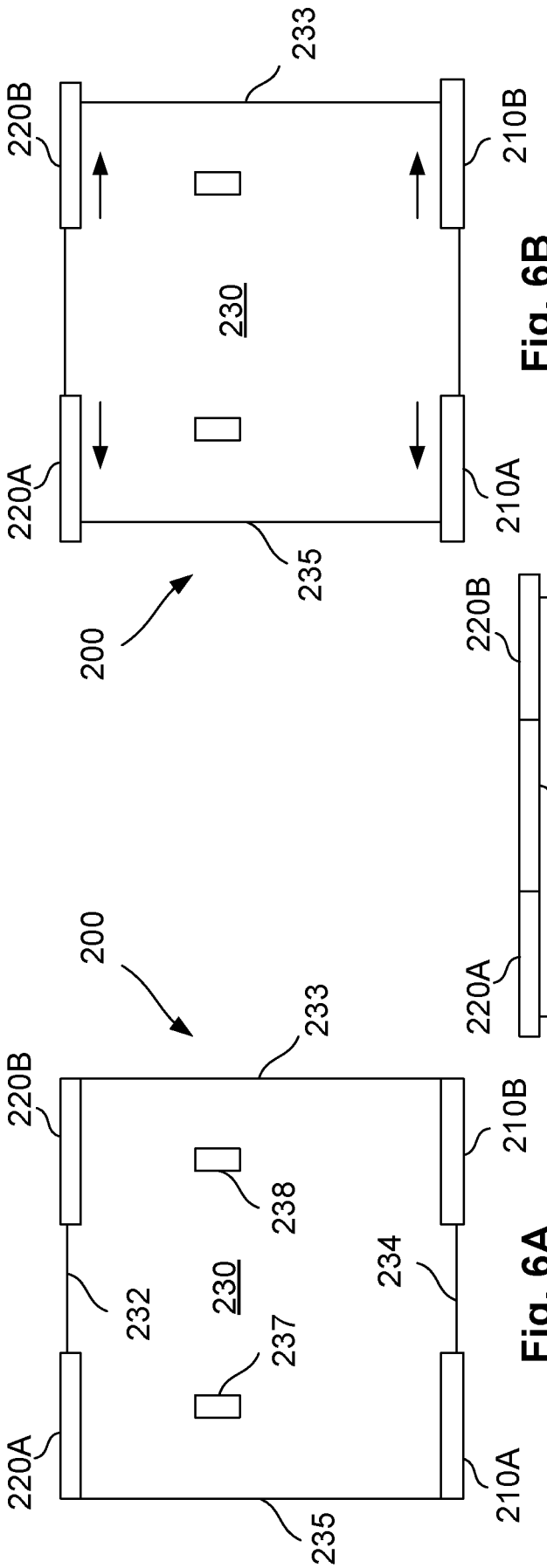

Fig. 6A

Fig. 6B

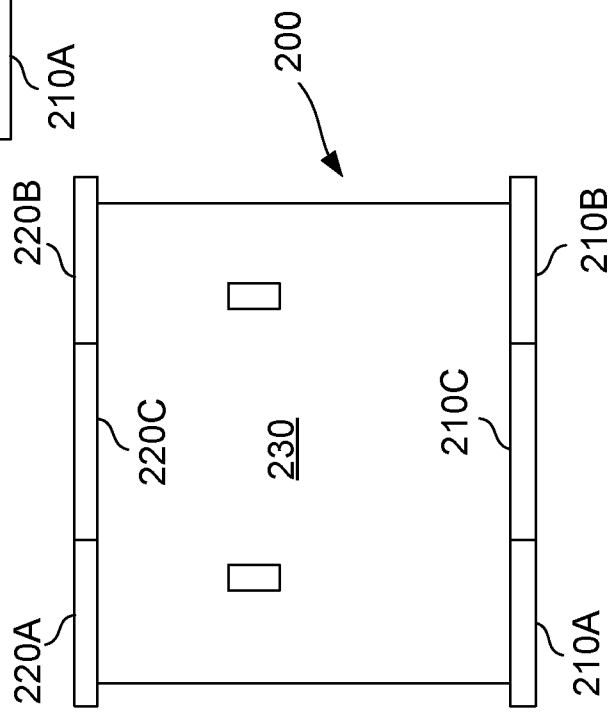

Fig. 6C

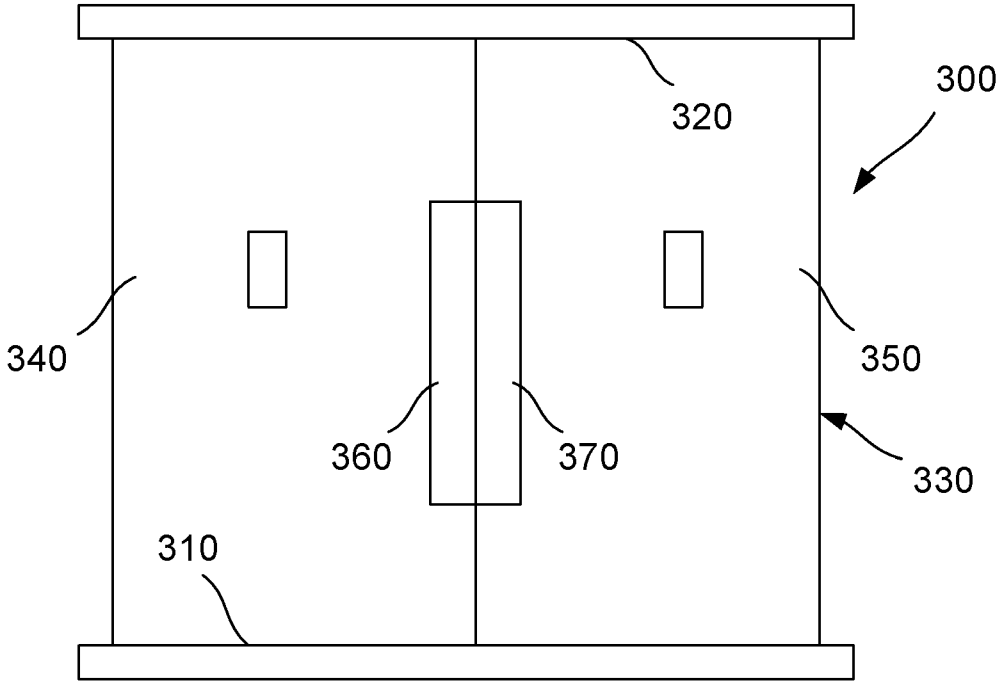

Fig. 7A

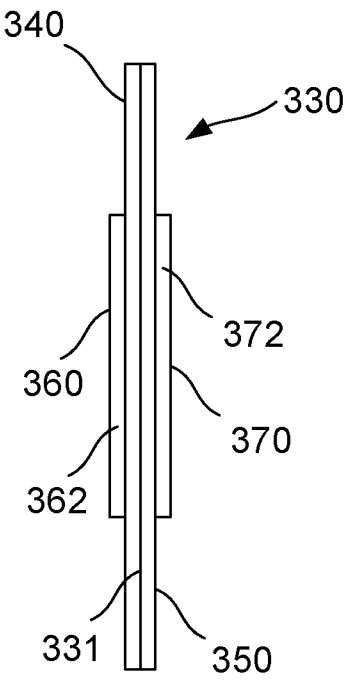

Fig. 7B

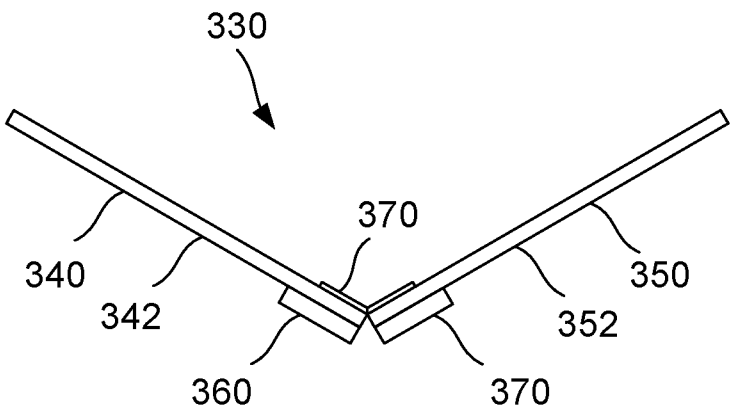

Fig. 7C

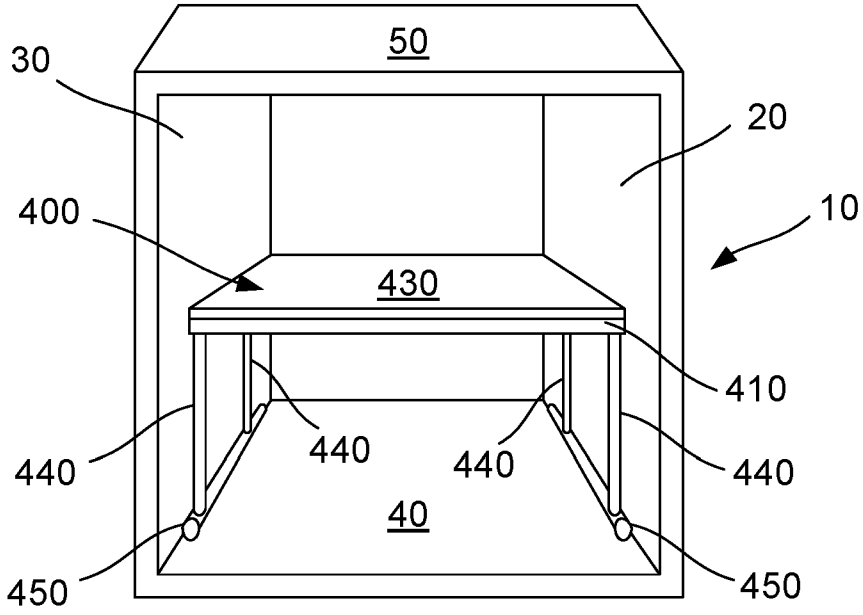

Fig. 8A

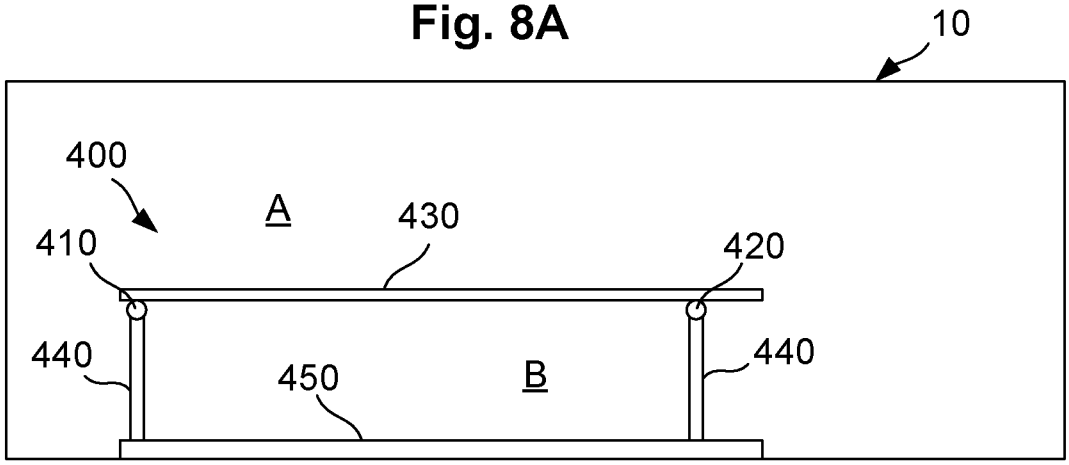

Fig. 8B

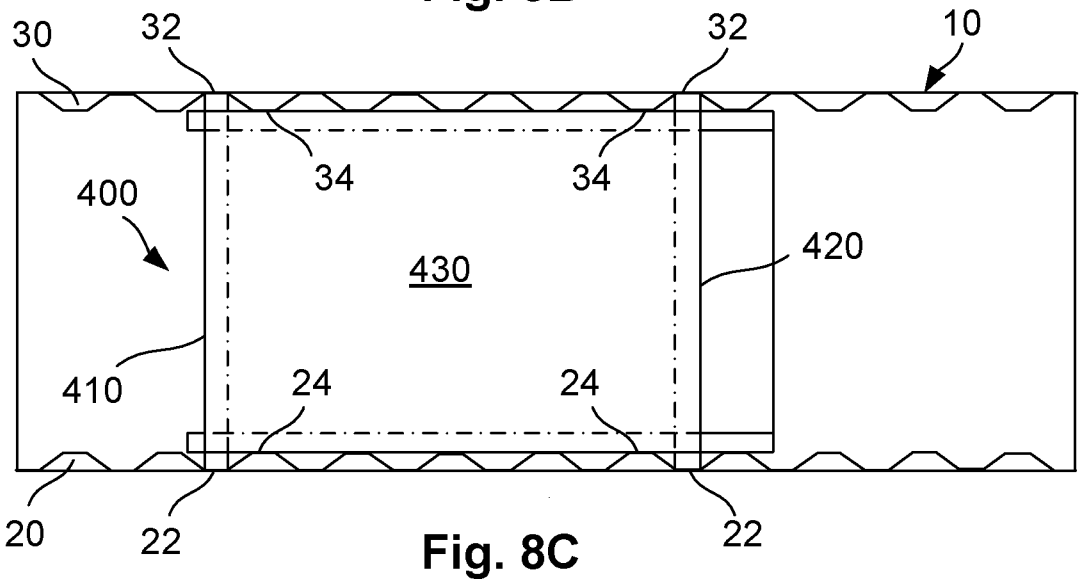

Fig. 8C

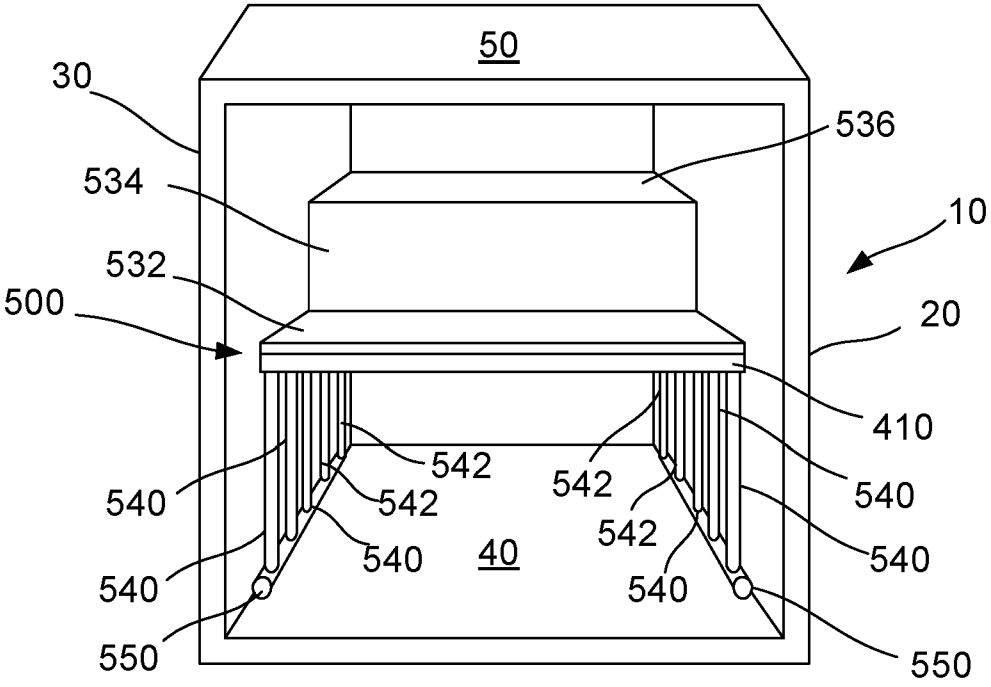
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Fig. 9A

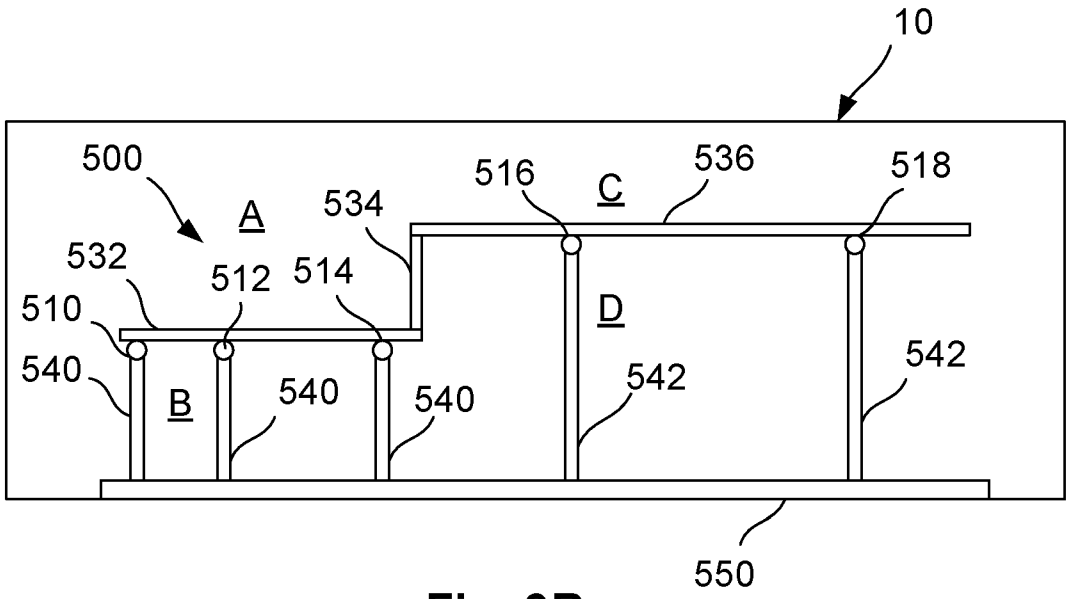
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Fig. 9B

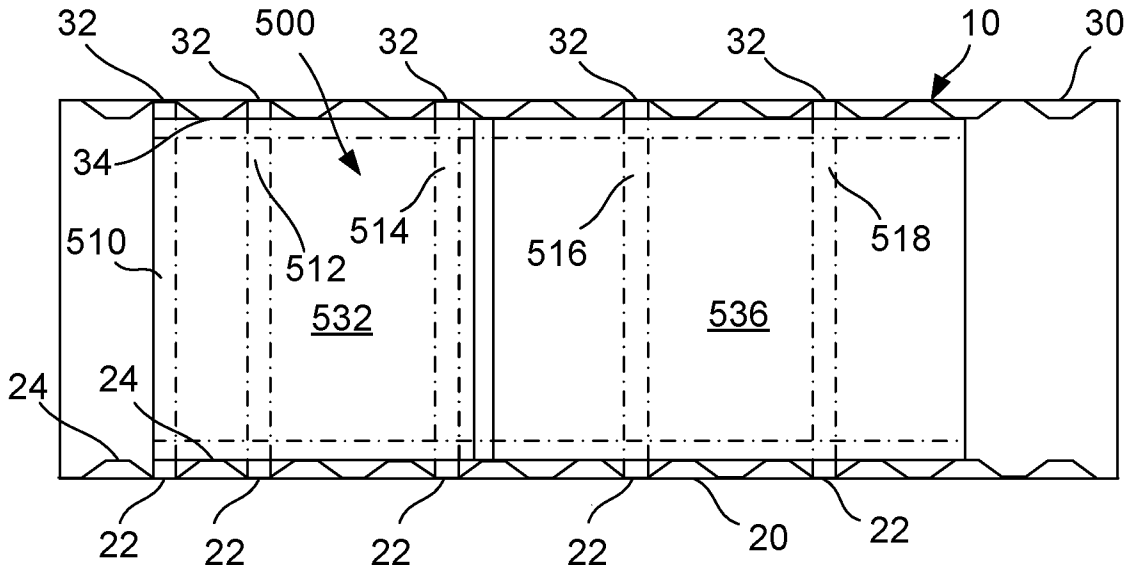
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Fig. 9C

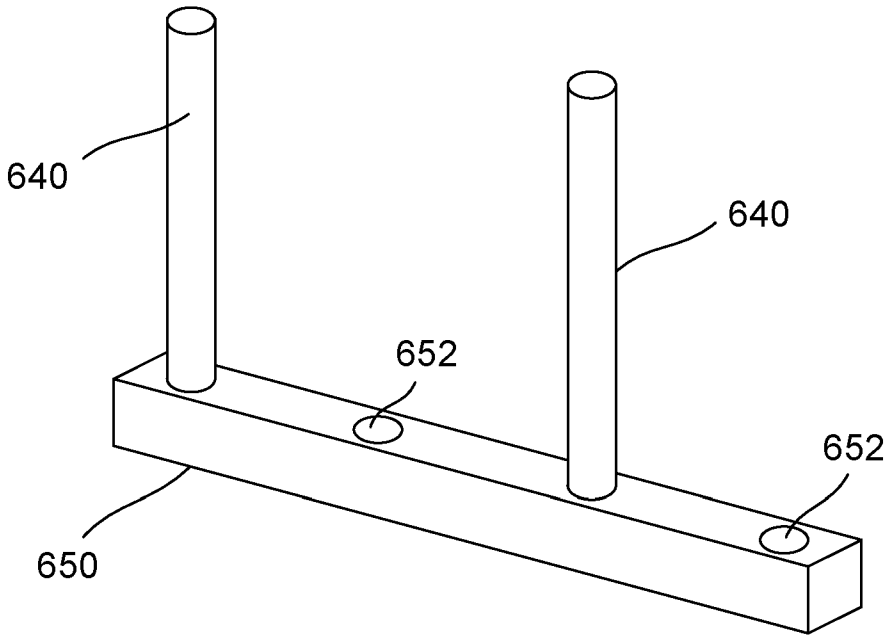
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Fig. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2016/050322

A. CLASSIFICATION OF SUBJECT MATTER

B65D 88/02 (2006.01) B65D 25/04 (2006.01) B65D 90/00 (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)

1. WPIAP, EPODOC: CPC B65D 88/121 and (B65 D90/0066, B65D 90/0053, B65D 90/02) 2. CPC B65D 88/121 and keywords (partition, side, vertical, opposite, wall) and like terms. 3. IPC, CPC B65D88/02/LOW, B65D 25/04/LOW, B65D 25/10, CPC B65D90/0066, IPC B65d 90/- and keywords (partition, recess, opposite, wall, beam, panel. 4. Keywords: (freight, cargo, shipping, container partition, opposite, wall, recess, beam, volume, change) and like terms. 5. CPC: E04H1/-, E04H3/- and keywords (freight, shipping, container) and like terms. 6. Keywords (freight, shipping, container, partition, beam, opposite, wall, panel) and like terms. 7. IPC: B65D 88/02, B65D 25/04/LOW, CPC: B65D 90/0066 and keywords (partition, beam, opposite, wall) and like terms. 8. AusPAT, Espace for Applicant/Inventor's name: Huggett, Bradley Michael. 9.Google patent searches: (shipping, container, partition, beam, panel, trough) and like 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	

[X] Further documents are listed in the continuation of Box C [X] 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

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 July 2016	20 July 2016

Name and mailing address of the ISA/AU

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Dr Arun Sharma
AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)
Telephone No. 0262223642

INTERNATIONAL SEARCH REPORT C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		International application No. **PCT/AU2016/050322**
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/0074310 A1 (DAVIES et al.) 07 April 2005 Figures 1-3, 5; Paragraph [0029], [0031[0035]	1, 3, 7-9, 24-26, 31
X	US 2009/0016840 A1 (SQUYRES et al.) 15 January 2009 Figures 2-4; paragraphs [0014],[0029]; paragraph [0030] lines 1-7	1, 3, 7-9, 24-31
X	GB 841535 A (ARNULF CARL WENNER) 20 July 1960 Figures 1-6; page 4-lines 11-14; page 4 –34-41, lines 54-56; page 2, lines 83-87	1, 7-9, 12-17, 22-23, 24-27, 29-32
A	US 2005/0141980 A1 (SQUYRES) 30 June 2005 Whole document	1-32
A	JP H0858464 A (NIPPON FURUHAAFU KK) 05 March 1996 Whole document	1-32
P,X	US 2015/0151667 A1 (KNOX) 04 June 2015 Figure 1; paragraphs[0017], [0021], [0030]	1, 3, 24, 27-29

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/AU2016/050322**

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.

Patent Document/s Cited in Search Report		**Patent Family Member/s**	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**
US 2005/0074310 A1	07 April 2005	US 2005074310 A1	07 Apr 2005
		US 6981828 B2	03 Jan 2006
		CA 2483353 A1	02 Apr 2005
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GB 841535 A	20 July 1960	None	
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		US 9211835 B2	15 Dec 2015
		CA 2872414 A1	02 Jun 2015

End of Annex

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.