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(54) BUILDING BLOCK

BAUSTEIN

BLOC DE CONSTRUCTION

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Description

TECHNOLOGICAL FIELD

[0001] The disclosed subject matter pertains to building blocks. In particular, the subject matter pertains to plastic foldable blocks.

BACKGROUND ART

[0002] References considered to be relevant as background to the presently disclosed subject matter are listed below:

- US3,368,316
- US2003/029119
- US2008/292830

[0003] Acknowledgement of the above references herein is not to be inferred as meaning that these are in any way relevant to the patentability of the presently disclosed subject matter.

BACKGROUND

[0004] Building blocks made of various types of materials, such as plastic, wood, cardboard and even foam are known in the art. The blocks are used for different purposes, such as for building toys and toy structures, for erecting various structures for indoor or outdoor use, such as furniture structures.

[0005] For example, US3,368,316 is directed to a hollow building block foldable from a blank of cardboard like sheet material for use as a toy and decorative purposes and the like. The blank comprising a central panel having opposed pairs of parallel edges, side panels of similar shape to each other respectively foldably connected to one pair of opposed edges of the central panel, end panels of similar shape to each other and of the same width as the side panels foldably connected to the other pair of the opposed edges of said central panel, end flaps foldably connected to the opposite ends of each of the side panels and of similar shape to the end panels and overlying the end panels when the side and end panels are folded perpendicularly to the central panel from the same surface thereof and when the end flaps are folded to extend perpendicularly from the central and side panels, similar ears projecting from corresponding outer edges of the end flaps when so folded and overlying each other within the planes of the flaps. Also comprising means to secure said block in folded and erected position, and means including locking flaps foldably connected to the outer ends of the end panels and having openings complementary in shape to said ears. The locking flaps are folded over overlying pairs of the ears the latter are received through the openings to maintain the block in folded condition with the cars projecting perpendicularly from the face of said blocks which is opposite the central panel, the central panel having slots therein adjacent opposite edges thereof of a size adapted to receive the ears projecting from similar blocks when placed upon the central panel of the first-mentioned block to permit the interlocking of such blocks against relative lateral movement parallel to the central panels.

[0006] US2003/029119 is directed to a system for modular construction provided by interconnectable and stackable polymeric blocks having end and side walls connected to a top wall, and exterior and interior cylinders. The exterior cylinders are matable with the interior cylinders of a connecting block, and apertures in the top wall allow for re-bar, conduit or installation of insulation. Raised ribs located adjacent to the top wall contact the connecting block to further enhance stability of the erected structure.

[0007] US2008/292830 is directed to a method and apparatus regarding lightweight but robust multilayered foam furniture pieces. The furniture pieces include a foam base, a polymeric solidifying layer, and a decorative layer. The decorative layer can include an acrylic-based surface finish and/or one or more decorative pieces, tiles, or other variously shaped objects attached to the primer layer and/or part of the decorative layer.

[0008] EP 1 629 872 A1 relates to a toy building block comprising a hollow three-dimensional structure with a plurality of faces and provided on at least one of said faces with engagement means able to co-operate with complementary engagement means of another block. The three-dimensional structure is formed by a pliable element with a perimeter whose shape corresponds to the planar development of the block. The pliable element is provided with between adjacent portions forming the faces of the three-dimensional structure. Snap-in fastening means are provided for fastening each of said faces to an adjacent face of the three-dimensional structure.

[0009] GB 2 224 664 is directed to a blank for forming a block suitable for educational and play uses comprises a base, sides and top formed with each side attached to an edge of the base by a so-called "living hinge" and the top so attached to an edge of one of said sides. The other said sides have edge formations that engage complementary formations of the top to hold them together in the assembled block. Interengaging formations are also provided. The surfaces which will form the outside of the block have formations permitting blocks to be releasably connected.

[0010] CA 1 153 890 A1 describes a hollow form building block useful for toys as a constructional block for play houses, forts, and the like, which is formed of inexpensive sheet material such as corrugated cardboard. The block element is a hollow-form, polyhedron that is provided with end walls, one of which has a polygonal aperture and the other of which has a coacting polygonal raised rim that is formed by folded tabs cut from the end wall and coacting tabs folded from an underlying end wall. The raised rim coacts with the apertures of other block elements to provide element-to-element interconnecting means and

the raised rim also functions to secure the hollow-form block structure of the assembled, folded block element.

GENERAL DESCRIPTION

[0011] The presently disclosed subject matter is directed to a three dimensional building block comprising a plurality of integrally hinged panels constituting the block body, the body comprising at least three panels constituting at least two side walls and at least one functional wall, the functional wall comprising at least one coupling element; the building block further comprising two end walls wherein the block body is configurable between a disassembled, substantially flat configuration, and an erected configuration of a generally three dimensional hollow block body with the end walls configured to detachably attach to the open ends of the hollow block body.

[0012] The term 'living hinge' (also referred to as an 'integral hinge'), as used herein in the specification and claims denotes a flexible hinge portion. In accordance with certain embodiments the hinge is made from the same material as the side wall and the lid articulated it connects thereto, and is typically thinned or cut to allow the rigid pieces to bend along the line of the hinge.

[0013] In accordance with the disclosed subject matter there is also disclosed a system of stacked building blocks provided in a knocked down configuration, each building block comprising:

a. a block body, the body comprising four hingedly articulated panels constituting two side walls and at least two functional walls, each of the at least two functional walls comprising at least one coupling element;
b. two end walls;

wherein the block body is configurable between a knocked down, substantially flat configuration, and an erected configuration of a generally three dimensional hollow block body with the end walls configured to detachably attach to the open ends of the hollow block body; and
wherein, the building blocks are stacked in at least two columns such that, in each row of the at least two columns, two block bodies are co-extending and adjacently placed, such that two adjacent panels at least partially overlap, and wherein in each column, the block bodies fully overlap.

[0014] Any one or more of the following properties, designs, features and configurations can be associated with the building block structure subject of the presently disclosed subject matter, separately or in combinations:

- The building block can be stacked over a building block of a-like configuration;
- An array of smaller building blocks can be stacked over the building block having larger or different dimensions;
- The living/integral hinge connecting the panels of the building block can be continuous or interrupted to thereby define resilience thereof;
- The end walls of the building block are detachably attachable to the body structure of the building block;
- The detachment of any one or both of the end walls can facilitate access into the hollow space formed by the walls of the structure;
- The building block can comprise four panels connected through a living hinge forming a polygonal sheet, the panels correspond to the two side walls, the top wall and the bottom wall which in their folded, erected configuration form the hollow block body, and wherein, at least one of the panels is a functional wall, comprising at least one coupling element;
- The coupling element can be a stud or a stud receiving cavity; one functional wall can comprise both types of the coupling element;
- The polygonal sheet comprises two working edges interlockable when the sheet is erected to form the three-dimensional structure;
- At least part of the building block panels, can comprise raised longitudinal ribs, e.g., on the side walls, to impart rigidity and strength to the erected structure such that when erected the ribs extend such as to allow the block to withhold more weight when load is placed thereupon.
- The building block can comprise raised ribs, which constitute part of a movement preventing mechanism which imparts further characteristics of strength and inhibits unintentional movement and collapse of the side walls under weight/force;
- The building block can comprise one or more apertures to allow ventilation;
- The building block or parts thereof can be made by injection molding from plastic material;
- One or more building blocks can be stacked and/or interconnected to form furniture items;
- The building block can comprise four panels integrally hinged and have a parallelepiped configuration;
- The panel constituting the top wall of the building block can comprise outwardly protruding coupling studs and corresponding receiving cavities on the panel corresponding to the bottom wall;
- The coupling studs can be configured to interlock with the receiving cavities of the like building block;
- The coupling studs and the respective receiving cavities can extend coaxially;
- At least one side wall of the coupling stud can be slightly slanted, e.g. for extraction purposes;
- Any one of the studs or the cavities (or both), can be fitted with friction increasing elements and/or locking elements to prevent unintentional disengagement between the studs and the receiving cavities;
- The friction increasing/locking elements can be one or more outwardly protruding elements on at least one of the stud wall face designed to increase friction

when received in the receiving cavities and to lock the studs within said cavities in a firmer and stronger manner;

- The studs can have a rectangular cross section and the cavities have a respective shape, adapted to receive the stud;
- At least part of an outer surface of the building block can be fitted with friction increasing elements;
- At least one of the connecting elements can be configured with a snap-type arresting arrangement for engaging and arresting over a corresponding locking notch configured at a like building block;
- The building block can he provided with UV-protective layer;
- The side walls can be fitted with restraining members adjacent its edges; the restraining members can be configured to abut the inner side of the hollow body when in the erected configuration so as to impart the structure with strength.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In order to better understand the subject matter that is disclosed herein and to exemplify how it can be carried out in practice, embodiments will now be described, by way of non-limiting examples only, with reference to the accompanying drawings, in which:

Fig. 1A is a perspective top view of a building block in accordance with one example of the disclosed subject matter;

Fig. 1B is a perspective side and bottom view of a building block of Fig. 1A;

Fig. 1C is a bottom view of a building block of Fig. 1 A;

Fig. 2A is a cross sectional perspective view of a building block of Fig. 1A taken along lines A-A;

Fig. 2B is an enlargement of an area marked S in Fig. 2A;

Fig. 3 is a perspective view of a building block in accordance with the disclosed subject matter in a disassembled configuration;

Fig. 4A is a perspective view of a bottom side of the building block illustrated in Fig. 3 devoid the side walls;

Fig. 4B is a top view of a top side of the building block illustrated in Fig. 3 devoid the side walls;

Fig. 5 is a bottom perspective view of a side wall of the building block illustrated in Fig. 3

Fig. 6 is an enlarged, perspective view of an area marked I in Fig. 4A;

Fig. 7A is a side perspective view of stacked building blocks in accordance with the disclosed subject matter, the building blocks being in their disassembled, unfolded configuration;

Fig. 7B and **7C** illustrate a stack of twenty building blocks in accordance with the disclosed subject matter, the building blocks being in their disassembled, unfolded configuration and arranged to minimize package and transportation space, with Fig. 7B illustrating a free standing stack and Fig. 7C illustrating a packing in a box stack;

Fig. 8A is a side view of a block of Fig. 1 shown in a cross section taken along the lines B-B;

Fig. 8B is an enlarged view of the area marked II in Fig. 8A;

Fig. 9 is a perspective top view of the bottom side of a block in accordance with another example of the disclosed subject matter, in a disassembled configuration and devoid the side walls;

Figs. 10A and **10B** illustrate a furniture set and a plant holder constructed using the building blocks in accordance with the disclosed subject matter;

Figs. 11A-11C illustrate two blocks of different lengths in interlocked configurations;

Fig. 11D illustrates a cross section of two stacked blocks of Fig. 11C taken along the lines A-A;

Fig. 12 is a cross sectional view of a block in accordance with another example of the disclosed subject matter, the block having a shape of a trapezoid cube;

Fig. 13 is a cross sectional view of a block in accordance with yet an example of the disclosed subject matter, the block having a shape of a triangular prism; and

Fig. 14 is a cross sectional view of a block in accordance with yet another example of the disclosed subject matter, the block having outwardly curved sidewalls.

DETAILED DESCRIPTION OF EMBODIMENTS

[0016] The disclosed subject matter pertains to building blocks which are interlockable with like blocks. The building blocks in accordance with an example of the disclosed subject matter are made by injection molding from plastic material. The building blocks can be used for construction of various structures such as furniture items, seen for example in Fig. 10A, stationary structures such as a separation wall, or plant holders seen in Fig. 10B.

[0017] In accordance with the disclosed subject matter, the building blocks are configured to deploy between a disassembled substantially flat configuration and an erected configuration of a generally three dimensional structure.

[0018] The disclosed subject matter allows construction of modular structures comprising a plurality of blocks in accordance with the disclosed subject matter. Thus, for example, a plurality of the building blocks can be used to construct a plant holder and same blocks can be used to construct a table, sofa, armchair, etc.

[0019] Attention is first directed to Figs. 1-2 illustrating a building block generally designated **100** in accordance with one embodiment of the disclosed subject matter. The building block **100** has a hollow, generally parallelepiped configuration (cuboid in this case) and comprises two opposite side walls **110A** and **110B,** a top wall **120,**

a bottom wall **125** (seen best in Fig. 1B), constituting a body **105** of the block **100,** and two end walls designated as **115A** and **115B.** The top wall **120** of the block **100** comprises outwardly protruding coupling studs **130** and receiving cavities **140** on the bottom wall **125.** The coupling studs **130** are configured to interlock with the receiving cavities **140** of the like block **100.** Such interlocking can be seen in figures 11B through 11D. In accordance with this specific example the coupling studs **130** and the respective receiving cavities **140** extend coaxially as best seen in Figs. 1B, 2 and 11D. At least one side wall of the stud **130** is slightly slanted to facilitate removal thereof from the mold and in use, to facilitate interlocking with the cavity **140.** The studs **130** are further fitted with outwardly protruding longitudinal element **132** on each face thereof designed to increase friction when received in the receiving cavities **140** and to lock the studs **130** within said cavities **140** in a firmer and stronger manner. It will be appreciated that such outwardly protruding element is an optional feature and other friction increasing/locking elements can be utilized to achieve the same function. The protrusion can thus range in size, i.e. length of the protrusion measured outward from the outer wall of the stud 130, from 0-50mm, from 0-10mm, from 0-3mm depending on the required clamping force. Such protrusions can be configured on any number of faces of the stud. Alternatively, the studs can be free of any such elements.

[0020] The height h of the coupling stud **130** is equal to or less than the depth **H** of the receiving cavity **140** so as when the two like blocks **100** are interlocked the studs **130** are substantially received within the cavity **130** so as to form a unitary structure comprising the two blocks **100** substantially devoid of any space therebetween. The studs **130** in accordance with this specific example have a rectangular cross section and the cavities **140** have a respective shape each adapted to receive the stud **130.** As seen in Fig. 1C, the cavity further comprises a recess in its walls configured for snap engagement of the outwardly protruding element **132** fitted on the studs **130.** The exemplified block **100** comprises only four studs **130** with such protrusions **132,** disposed at the corners of the top wall **120,** however it will be appreciated that in accordance with the disclosed subject matter any number of studs **130** can be fitted with such elements.

[0021] While the current example is directed to a building block **100** comprising two rows of four coupling studs **130** each and respective two rows of four receiving cavities **140** the vast number of possible combinations is envisioned by the presently disclosed subject matter, e.g. block **200** comprising only two studs **230** in each row as seen in Fig. 9 in its flat, disassembled configuration and Figs. 11 in an assembled, configuration fitted over the block **100.** It is also to be understood that the modularity of the structures constructed from the blocks is facilitated as seen in Fig. 11. Further, the blocks **100,200** can be interlocked not necessarily when fully coextending but rather one block can be seated over a like block through part of its studs.

[0022] It will be appreciated that the block can have any dimensions desired for the specific design and can be shaped to conform to a particular construction application thus for example rather than having cuboid configuration as seen in Fig. 1A it is appreciated that the building block can have a shape of a pyramid or a triangle cross section. Such shapes are seen for example in Figs 12-14 , where cross sections of the blocks **500, 300, 400,** respectively are illustrated where features similar to those of block **100** are identified by same numerals, upped by **400, 200** and **300,** respectively and will be discussed herein after.

[0023] The end walls **115A** and **115B** of the block **100** exemplified in Fig. 1A are detachably attachable to the block's body structure **105.** In accordance with this example the end walls **115A** and **115B** are snap fitted to the open edges of the structure **105** as will be further discussed. It will be appreciated that other solutions can be employed to achieve the same result. Alternatively the one or both of the end walls **115A** and **115B** can be permanently attached to the body **105.**

[0024] The detachment of any one or both of the end walls **115A** and **115B** can facilitate access into the hollow space formed by the side walls of the structure, e.g. for storage. As best seen in Fig. 1B, the receiving cavities **140** on the bottom wall **125** of the block **100** further comprise apertures **142.** Such apertures allow ventilation of the block's **100** interior. It will be appreciated that such apertures **142** are optional. The blocks can be used to build structures for outdoor use. To provide such structures, e.g. a separation wall, with sturdiness and ability to withstand movement due to weather conditions or incidental displacement might be filled with weight increasing material such as sand, stones, liquid, etc. An outer layer of the block at least partially can be covered with a UV-protective layer or such material can be integrated into the block material.

[0025] Turning now to Figs. 3 through 6, a discussion will be provided on the structure and assembly of the building block **100** in accordance with an example of the disclosed subject matter. Fig. 3 illustrates all elements of the building block **100** illustrated in Fig. 1A in its collapsed configuration. Fig. 3 illustrates a polygonal sheet comprised of four integrally formed panels connected to each other through their respective edges by means of an integral hinge **134** (i.e. living hinge which can also be constituted e.g. by a thinned section of the material as seen in Fig. 6 or fold enabling perforations in the material, not shown). The panels correspond to the side walls **110A** and **110B,** the top wall **120** and the bottom wall **125** which in their folded, erected configuration form the hollow block body **105.** Also shown are the two end walls **115A** and **115B** which are configured for coupling to the polygonal sheet **105** when in its erected folded configuration.

[0026] Fig. 4A provides an illustration of the polygonal sheet illustrating its four panels **110A, 120, 110B,** and

125. Seen in a perspective bottom view of the sheet is an inner side of the building block which shows the two working edges **T1** and **T2** of the polygonal sheet. These edges **T1** and **T2** are interlockable when the sheet **105** is erected to form the three-dimensional structure seen in Fig. **1A.** In accordance with this embodiment the two working ends are configured for snap fitting one within the other. The working edge T**1** is associated with the bottom wall **125** while the working edge **T2** is associated with the side wall **110A.** The working edge T**1** is configured with a curved protrusion **127** adapted to be received within a slot **129** provided on the edge **T2** and lock therein, e.g. by snap fitting. When the two edges T**1** and T**2** arc brought together, the integral hinges come into operation to facilitate fold therealong such that the two side walls **110A** and **110B** are supported over the bottom wall **125** panel and support thereon the top wall panel **120.**

[0027] The panels are provided on the bottom side with raised ribs to impart these with rigidity. As seen in this figure raised longitudinal ribs are provided on the side walls **110A, 110B** to impart rigidity and strength to the erected structure such that when erected the ribs extend along the axis **X** (shown in Fig. 1A) thus configured to allow the block to withhold more weight when load is placed thereupon. Further ribs are provided on the bottom side of the top wall and the bottom wall as seen in Fig. 4A. The ribs of these panels are crossed surrounding each of the studs and the receiving cavities thereon, respectively. The outer edges of the top wall panel and the bottom wall panel adjacent the integral hinges are provided with further raised longitudinal ribs **158.** In accordance with this example, the ribs **158** are connected to the transverse ribs extending along these panels. These ribs **158** constitute part of a movement preventing mechanism which imparts further characteristics of strength and inhibits unintentional movement and collapse of the side walls under weight/force. The raised ribs **158** are configured for interlocking vis-à-vis the raised rib **155** on the side wall **110A** and **110B** which extend perpendicularly to the ribs **158** when the block is in its disassembled flat configuration. The end **155A** of the rib **155** adjacent the integral hinge **134** is configured with a cut out section forming a shoulder, having dimensions configured to fit over the raised rib **158.** The dimensions of the shoulder **155A** are such that the height **S** of the rib **158** and the length **L** of the cut out section **155A** are substantially the same so as for the shoulder to sit over the rib **158** and abut it in the event that force is exerted thereupon. Working configuration of this mechanism is best seen in Fig. 8B illustrating the shoulder **150A** sited over the raised rib **158** and supported thereupon.

[0028] With reference to Fig. 5, end walls **115A** and **115B** will not be described. As indicated hereinbefore, each end wall **115A** and **115B** is configured for attachment to the open ends of the hollow body **105.** The attachment in accordance with the illustrated example is through snap fitting facilitated by a receiving cavity **114** fitted at the edges of the end wall and corresponding protruding curved edges **112** (best seen in Fig. 2B) at the outer ends of the panels **110A, 120, 110B, 125.** It will be appreciated that whilst in the described examples the edges **112** are continuous along the ends, other configurations can be employed, such as non continuous edges, staggering edges etc. The side wall is fitted with raised reinforcing ribs **150** disposed at its bottom side **154** and restraining members **152** adjacent its edges. The restraining members **152** are configured to abut the inner side of the hollow body **105** when in the erected configuration so as to impart the structure with further strength.

[0029] Fig. 7A illustrates a plurality of blocks **100** in their disassembled, knocked down configuration stacked one over the other. As can be appreciated from this illustration, the block bodies **105** are stacked one over the other with the sidewalls **115A** and **115B** arranged therebetween to minimize the space for packing and transportation purposes.

[0030] Figs. 7B and 7C illustrate a stack **1000** of twenty building blocks **100** in a ten layer stack, the building blocks being in their knocked down, unfolded, configuration. The blocks are arranged as follows, allowing minimizing the size of a package for their transport, maximizing the use of the package space (e.g. as illustrated in Fig. 7C): the knocked down block body **105** is placed in the illustrated example face down (i.e. the surface facing outwards when in the erected configuration is facing down, although it will be appreciated that the other face of the block can face downwards) with the panel constituting the functional bottom wall **125** facing the outer end of the stack, seen at the left of the illustration, and the block of a similar configuration is placed adjacent (for the purposes of explanation, same elements of the block are identified using same numerals with added " ' "), however in a turned around, reversed configuration, such that the panel constituting the side wall **110A'** is now overlapping the panel **110A,** and the panel constituting the functional bottom wall **125'** facing the outer, other end of the stack, seen in the right side of the illustration. The two end walls **115A** and **115B** and **115A'** and **115B'** arc placed over the intermediate panels constituting the side walls **110B** and **110B'** of the respective block body. The following in stack layers are arranged in a similar manner. As can be seen in each row the adjacent panels overlap (in this example one panel from each side) and in each column, the adjacent block bodies fully overlap over all four of its panels. As can be appreciated from Fig. 7B and 7C, the height **H** of the panel comprising the receiving cavity **140,** the height **h** of the coupling stud and the panel it protrudes from and the height of the intermediate panels **110B** with the end wall **115** placed the rover as well as the height of the two overlapping side walls **110A** and **110A'** are substantially equal, thus contributing to the stability of the stack **1000,** with all possible gaps filled by the respective elements of the block. Thus, in each row, the two polygonal sheets 100 and 100' partially overlap over the panels 110A and 110A' and in each column, the two polygonal sheets fully overlap in both columns. Thus sheet

100 overlaps like sheet placed over in the same orientation and sheet 100' overlaps like sheet placed over in the same orientation over it.

[0031] It will be appreciated that the blocks can be arranged in a different manner and different stacking configurations are envisioned, *mutatis mutandis.*

[0032] Turning now to Figs. 12-14, Fig. 12 illustrates a block having a generally trapezoid cross section taken transversely, where the top wall **520** and the bottom wall **525** are parallel, and where the width **W** of the panel constituting the top wall **520** is broader than that of the bottom wall, having a width **w.** Fig. 13 illustrates a block **300,** having a generally triangular cross section, where the side walls **310 A** and **310B** are of the same dimensions and wherein the functional wall **321** connecting the side walls comprise a plurality of studs **330** (only one is seen in this view) and a plurality of receiving cavities **340.** Fig. 14 illustrates a block **400,** similar to the structure of block **100** with the difference that the side walls **410A** and **410B** are slightly outwardly curved.

Claims

1. A three dimensional building block (100; 200; 300; 400; 500) comprising a plurality of integrally hinged panels (110A, 110B, 115A, 115B, 120, 125; 310A, 310B; 410A, 420A; 520, 562) constituting the block body (105), the body (105) comprising at least three panels (110A, 110B, 115A, 115B, 125; 325; 425; 525) constituting at least two side walls (110A, 110B) and at least one functional wall (120, 125; 320, 325; 420, 425; 520, 525), the functional wall (120, 125; 320,325; 420, 425; 520, 525) comprising at least one coupling element (130, 140; 330, 340; 430, 440; 530, 540); the building block further comprising two end walls (115A, 115B;) wherein the block body is configurable between a disassembled, substantially flat configuration, and an erected configuration of a generally three dimensional hollow block body (105) with the end walls configured to detachably attach to the open ends of the hollow block body (105).

2. The building block in accordance with Claim 1, wherein the panel (120; 320; 420; 520) constituting the top wall of the building block comprises at least one outwardly protruding coupling stud (130; 330; 430; 530) and corresponding, at least one receiving cavity (140; 340; 440; 540) on the panel (120; 320; 420 520) corresponding to the bottom wall (125; 325; 425; 525).

3. The building block in accordance with Claim 1 or Claim 2, wherein the building block (100; 200; 300; 400; 500) can be stacked over a building block of a like configuration.

4. The building block in accordance with any one of the preceding Claims, wherein the end walls (115A, 115B) of the building block are detachably attachable to the block body (105).

5. The building block in accordance with any one of the preceding Claims, wherein the hollow space formed by the walls of the block body is configured as a storage space.

6. The building block in accordance with any one of the preceding Claims, wherein the building block (100) comprises four panels (110A, 110B, 120, 125) connected through living hinge (134) forming a polygonal sheet, each of the four panels corresponds to two side walls (110A, 110B), a top wall (120) and a bottom wall (125) which in their folded, erected configuration form the hollow block body, and wherein, at least one of the panels is a functional wall, comprising at least one coupling element (130, 140).

7. The building block (100; 200; 300; 400; 500) in accordance with any one of the preceding Claims, wherein the coupling element (130, 140) is an outwardly protruding stud (130) or a stud receiving cavity (140) and wherein the at least one functional wall (120, 125; 320, 325; 420, 425; 520, 525) comprises both types of the coupling element (130,140;330,340;430,440;530,540).

8. The building block (100; 200; 300; 400; 500) in accordance with any one of the preceding Claims, wherein the building block comprises at least two functional walls and wherein the coupling element (130, 140; 330, 340; 430, 440; 530, 540) is a stud or a stud receiving cavity and wherein at least one of the at least two functional walls (120, 125; 320, 325; 420, 425; 520, 525) comprise one type of the coupling element and at least one of the remaining of the at least two functional walls comprises respective, other type of the coupling element.

9. The building block (100; 200; 300; 400; 500) in accordance with any one of the preceding Claims, wherein the polygonal sheet comprises two working edges (T1, T2) interlockable when the sheet is erected to form the three dimensional body block.

10. The building block (100; 200; 300; 400; 500) in accordance with any one of the preceding Claims, wherein at least part of the panels of the building block comprise raised longitudinal ribs (155, 158) to impart rigidity and strength to the erected structure such that when erected the ribs extend such as to allow the block to withhold more weight when load is placed thereupon.

11. The building block (100; 200; 300; 400; 500) in accordance with any one of the preceding Claims,

wherein the building block comprises raised ribs (155, 158), which constitute part of a movement preventing mechanism which imparts further characteristics of strength and inhibits unintentional movement and collapse of the side walls under weight.

12. The building block (100; 200; 300; 400; 500) in accordance with any one of the preceding Claims, wherein the coupling studs (130; 330; 430; 530) can be configured to interlock with the receiving cavities (140; 340; 440; 540) of the like building block.

13. The building block (100; 200; 300; 400; 500) in accordance with any one of the preceding Claims, wherein the at least one coupling element (130, 140; 330, 340; 430, 440; 530, 540) is fitted with a friction increasing/locking element configured to increase friction when received in the respective coupling element of the like building block when stacked over a building block of a like configuration.

14. A system of stacked building blocks (1000) provided in a knocked down configuration, each building block (100; 200; 300; 400; 500) being in accordance with any one of the preceding claims, and comprising a block body (105), the body comprising four hingedly articulated panels (110A, 110B, 115A, 115B, 125; 325; 425; 525) constituting two side walls (110A, 110B) and at least two functional walls, (115A, 115B, 125; 325; 425; 525), wherein the building blocks are stacked in at least two columns such that, in each row of the at least two columns, two block bodies are co-extending and adjacently placed, such that two adjacent panels at least partially overlap, and wherein in each column, the block bodies fully overlap.

15. A system in accordance with claim 14, wherein, the end walls (115A, 115B) arc placed in a row over an intermediate, unengaged panel of the respective block body (105).

Patentansprüche

1. Dreidimensionaler Baublock (100; 200; 300; 400; 500), umfassend eine Mehrzahl von einstückig angelenkten Platten (110A, 110B, 115A, 115B, 120, 125; 310A, 310B; 410A, 420A; 520, 562), die den Blockkörper (105) darstellen, wobei der Körper (105) mindestens drei Platten (110A, 110B, 115A, 115B, 125; 325; 425; 525) umfasst, die mindestens zwei Seitenwände (110A, 110B) und mindestens eine Funktionswand (120, 125; 320, 325; 420, 425; 520, 525) darstellen, wobei die Funktionswand (120, 125; 320, 325; 420, 425; 520, 525) mindestens ein Koppelelement (130, 140; 330, 340; 430, 440; 530, 540) umfasst; wobei der Baublock weiterhin zwei Stirnseiten (115A, 115B;) umfasst, wobei der Blockkörper konfigurierbar ist zwischen einer zerlegten, im Wesentlichen flachen Konfiguration, und einer aufgestellten Konfiguration eines im Allgemeinen dreidimensionalen Hohlblockkörpers (105), wobei die Stirnseiten dazu konfiguriert sind, lösbar an den offenen Enden des Hohlblockkörpers (105) befestigt zu werden.

2. Baublock nach Anspruch 1, wobei die Platte (120; 320; 420; 520), die die Oberseite des Baublocks darstellt, mindestens einen nach außen überstehenden Koppelansatz (130; 330; 430; 530) und entsprechend mindestens einen Aufnahmehohlraum (140; 340; 440; 540) auf der Platte (120; 320; 420 520), die der Unterseite (125; 325; 425; 525) entspricht, aufweist.

3. Baublock nach Anspruch 1 oder Anspruch 2, wobei der Baublock (100; 200; 300; 400; 500) auf einem gleichartig konfigurierten Baublock gestapelt werden kann.

4. Baublock nach einem beliebigen der vorstehenden Ansprüche, wobei die Stirnseiten (115A, 115B) des Baublocks lösbar an dem Blockkörper (105) befestigt werden können.

5. Baublock nach einem beliebigen der vorstehenden Ansprüche, wobei der durch die Wände des Blockkörpers gebildete Hohlraum als Stauraum konfiguriert ist.

6. Baublock nach einem beliebigen der vorstehenden Ansprüche, wobei der Baublock (100) vier Platten (110A, 110B, 120, 125) umfasst, die durch Filmscharniere (134), die eine polygonale Bahn bilden, verbunden sind, jede der vier Platten zwei Seitenwänden (110A, 110B), einer Oberseite (120) und einer Unterseite (125) entspricht, die in ihrer gefalteten, aufgestellten Konfiguration den Hohlblockkörper bilden, und wobei mindestens eine der Platten eine Funktionswand ist, die mindestens ein Koppelelement (130, 140) umfasst.

7. Baublock (100; 200; 300; 400; 500) nach einem beliebigen der vorstehenden Ansprüche, wobei das Koppelelement (130, 140) ein nach außen überstehender Ansatz (130) oder ein Ansatz-Aufnahmehohlraum (140) ist und wobei die mindestens eine Funktionswand (120, 125; 320, 325; 420, 425; 520, 525) beide Typen des Koppelelements (130, 140; 330, 340; 430, 440; 530, 540) umfasst.

8. Baublock (100; 200; 300; 400; 500) nach einem beliebigen der vorstehenden Ansprüche, wobei der Baublock mindestens zwei Funktionswände umfasst und wobei das Koppelelement (130, 140; 330, 340; 430, 440; 530, 540) ein Ansatz oder ein Ansatz-

Aufnahmehohlraum ist und wobei mindestens eine der mindestens zwei Funktionswände (120, 125; 320, 325; 420, 425; 520, 525) einen Typ des Koppelelements umfasst und mindestens eine der übrigen der mindestens zwei Funktionswände jeweils den anderen Typ des Koppelelements umfasst.

9. Baublock (100; 200; 300; 400; 500) nach einem beliebigen der vorstehenden Ansprüche, wobei die polygonale Bahn zwei Arbeitskanten (T1, T2) umfasst, die verrastbar sind, wenn die Bahn aufgestellt ist, um den dreidimensionalen Körperblock zu bilden.

10. Baublock (100; 200; 300; 400; 500) nach einem beliebigen der vorstehenden Ansprüche, wobei mindestens ein Teil der Platten des Baublocks hochgezogene längs verlaufende Rippen (155, 158) umfassen, um der aufgestellten Struktur Steifigkeit und Festigkeit zu verleihen, so dass im aufgestellten Zustand die Rippen so verlaufen, dass der Block mehr Gewicht zurückhalten kann, wenn auf ihn Last aufgesetzt wird.

11. Baublock (100; 200; 300; 400; 500) nach einem beliebigen der vorstehenden Ansprüche, wobei der Baublock hochgezogene Rippen (155, 158) umfasst, die Bestandteil eines Bewegung verhindernden Mechanismus sind, was weitere Festigkeitseigenschaften verleiht und unbeabsichtigte Bewegung und das Zusammenbrechen der Seitenwände unter Gewicht verhindert.

12. Baublock (100; 200; 300; 400; 500) nach einem beliebigen der vorstehenden Ansprüche, wobei die Koppelansätze (130; 330; 430; 530) dazu konfiguriert werden können, mit den Aufnahmehohlräumen (140; 340; 440; 540) des gleichartigen Baublocks zu verrasten.

13. Baublock (100; 200; 300; 400; 500) nach einem beliebigen der vorstehenden Ansprüche, wobei das mindestens eine Koppelelement (130, 140; 330, 340; 430, 440; 530, 540) mit einem Reibung erhöhenden / verriegelnden Element ausgerüstet ist, das dazu konfiguriert ist, die Reibung zu erhöhen, wenn es im jeweiligen Koppelelement des gleichartigen Baublocks aufgenommen ist, wenn er auf einem Baublock einer gleichartigen Konfiguration gestapelt ist.

14. System von gestapelten Baublöcken (1000), das in einer zerlegten Konfiguration bereitgestellt ist, wobei jeder Baublock (100; 200; 300; 400; 500) einem beliebigen der vorstehenden Ansprüche entspricht, und das einen Blockkörper (105) umfasst, wobei der Körper vier schwenkbar angelenkte Platten (110A, 110B, 115A, 115B, 125; 325; 425; 525) umfasst, die zwei Seitenwände (110A, 110B) und mindestens zwei Funktionswände (115A, 115B, 125; 325; 425; 525) aufweisen, wobei die Baublöcke in mindestens zwei Säulen gestapelt sind, so dass in jeder Reihe der mindestens zwei Säulen zwei Blockkörper nebeneinander verlaufen und aneinander angrenzend angeordnet sind, so dass zwei aneinander angrenzende Platten mindestens teilweise überlappen, und wobei in jeder Säule die Blockkörper vollständig überlappen.

15. System nach Anspruch 14, wobei die Stirnseiten (115A, 115B) über einer dazwischenliegenden, nicht im Eingriff befindlichen Platte des jeweiligen Blockkörpers (105) in einer Reihe angeordnet sind.

Revendications

1. Bloc de construction tridimensionnel (100 ; 200 ; 300 ; 400 ; 500) comprenant une pluralité de panneaux articulés de manière intégrale (110A, 110B, 115A, 115B, 120, 125 ; 310A, 310B ; 410A, 420A ; 520, 562) constituant le corps de bloc (105), le corps (105) comprenant au moins trois panneaux (110A, 110B, 115A, 115B, 125 ; 325 ; 425 ; 525) constituant au moins deux parois latérales (110A, 110B) et au moins une paroi fonctionnelle (120, 125 ; 320, 325 ; 420, 425 ; 520, 525), la paroi fonctionnelle (120, 125 ; 320, 325 ; 420, 425 ; 520, 525) comprenant au moins un élément d'accouplement (130, 140 ; 330, 340 ; 430, 440 ; 530, 540) ; le bloc de construction comprenant en outre deux parois d'extrémité (115A, 115B) dans lequel le corps de bloc est configurable entre une configuration désassemblée, sensiblement plane, et une configuration érigée d'un corps de bloc creux généralement tridimensionnel (105) avec les parois d'extrémité configurées pour se fixer de manière amovible aux extrémités ouvertes du corps de bloc creux (105).

2. Bloc de construction selon la revendication 1, dans lequel le panneau (120 ; 320 ; 420 ; 520) constituant la paroi supérieure du bloc de construction comprend au moins une cheville d'accouplement faisant saillie vers l'extérieur (130 ; 330 ; 430 ; 530) et, de manière correspondante, au moins une cavité de réception (140 ; 340 ; 440 ; 540) sur le panneau (120 ; 320 ; 420 ; 520) correspondant à la paroi inférieure (125 ; 325 ; 425 ; 525).

3. Bloc de construction selon la revendication 1 ou la revendication 2, dans lequel le bloc de construction (100 ; 200 ; 300 ; 400 ; 500) peut être empilé sur un bloc de construction d'une configuration similaire.

4. Bloc de construction selon l'une quelconque des revendications précédentes, dans lequel les parois d'extrémité (115A, 115B) du bloc de construction

peuvent être fixées de manière amovible au corps de bloc (105).

5. Bloc de construction selon l'une quelconque des revendications précédentes, dans lequel l'espace creux formé par les parois du corps de bloc est configuré comme un espace de stockage.

6. Bloc de construction selon l'une quelconque des revendications précédentes, dans lequel le bloc de construction (100) comprend quatre panneaux (110A, 110B, 120, 125) reliés par charnière intégrale (134) formant une feuille polygonale, chacun des quatre panneaux correspond à deux parois latérales (110A, 110B), une paroi supérieure (120) et une paroi inférieure (125) qui, dans leur configuration pliée, érigée, forment le corps de bloc creux, et dans lequel au moins un des panneaux est une paroi fonctionnelle, comprenant au moins un élément d'accouplement (130, 140).

7. Bloc de construction (100 ; 200 ; 300 ; 400 ; 500) selon l'une quelconque des revendications précédentes, dans lequel l'élément d'accouplement (130, 140) est une cheville faisant saillie vers l'extérieur (130) ou une cavité de réception de cheville (140) et dans lequel l'au moins une paroi fonctionnelle (120, 125 ; 320, 325 ; 420, 425 ; 520, 525) comprend les deux types de l'élément d'accouplement (130, 140 ; 330, 340 ; 430, 440 ; 530, 540).

8. Bloc de construction (100 ; 200 ; 300 ; 400 ; 500) selon l'une quelconque des revendications précédentes, dans lequel le bloc de construction comprend au moins deux parois fonctionnelles et dans lequel l'élément d'accouplement (130, 140 ; 330, 340 ; 430, 440 ; 530, 540) est une cheville ou une cavité de réception de cheville et dans lequel au moins une des au moins deux parois fonctionnelles (120, 125 ; 320, 325 ; 420, 425 ; 520, 525) comprend un type de l'élément d'accouplement et au moins une restante des au moins deux parois fonctionnelles comprend un autre type respectif de l'élément d'accouplement.

9. Bloc de construction (100 ; 200 ; 300 ; 400 ; 500) selon l'une quelconque des revendications précédentes, dans lequel la feuille polygonale comprend deux bords de travail (T1, T2) emboîtables lorsque la feuille est érigée pour former le corps de bloc tridimensionnel.

10. Bloc de construction (100 ; 200 ; 300 ; 400 ; 500) selon l'une quelconque des revendications précédentes, dans lequel au moins une partie des panneaux du bloc de construction comprend des nervures longitudinales surélevées (155, 158) pour conférer rigidité et résistance à la structure érigée de telle sorte que lorsqu'elle est érigée, les nervures s'étendent de sorte à permettre au bloc de supporter un poids plus grand quand une charge est disposée sur celui-ci.

11. Bloc de construction (100 ; 200 ; 300 ; 400 ; 500) selon l'une quelconque des revendications précédentes, dans lequel le bloc de construction comprend des nervures surélevées (155, 158), qui font partie d'un mécanisme de prévention du mouvement qui confère des caractéristiques supplémentaires de résistance et empêchent un mouvement involontaire et l'effondrement des parois latérales sous le poids.

12. Bloc de construction (100 ; 200 ; 300 ; 400 ; 500) selon l'une quelconque des revendications précédentes, dans lequel les chevilles d'accouplement (130 ; 330 ; 430 ; 530) peuvent être configurées pour s'emboîter avec les cavités de réception (140 ; 340 ; 440 ; 540) du bloc de construction similaire.

13. Bloc de construction (100 ; 200 ; 300 ; 400 ; 500) selon l'une quelconque des revendications précédentes, dans lequel l'au moins un élément d'accouplement (130, 140 ; 330, 340 ; 430, 440 ; 530, 540) est équipé d'un élément de blocage/augmentation du frottement configuré pour augmenter le frottement lorsqu'il est reçu dans l'élément d'accouplement respectif du bloc de construction similaire lorsqu'il est empilé sur un bloc de construction d'une configuration similaire.

14. Système de blocs de construction empilés (1000) fourni dans une configuration démontée, chaque bloc de construction (100 ; 200 ; 300 ; 400 ; 500) étant conforme à l'une quelconque des revendications précédentes, et comprenant un corps de bloc (105), le corps comprenant quatre panneaux articulés par charnière (110A, 110B, 115A, 115B, 125 ; 325 ; 425 ; 525) constituant deux parois latérales (110A, 110B) et au moins deux parois fonctionnelles (115A, 115B, 125 ; 325 ; 425 ; 525), dans lequel les blocs de construction sont empilés en au moins deux colonnes, de telle sorte que, dans chaque rangée des au moins deux colonnes, deux corps de bloc sont disposés de manière coextensive et adjacente, de sorte qu'au moins deux panneaux adjacents se chevauchent au moins partiellement, et dans lequel dans chaque colonne les corps de bloc se chevauchent entièrement.

15. Système selon la revendication 14, dans lequel, les parois d'extrémité (115A, 115B) sont disposées en une rangée au-dessus d'un panneau intermédiaire non engagé du corps de bloc respectif (105).

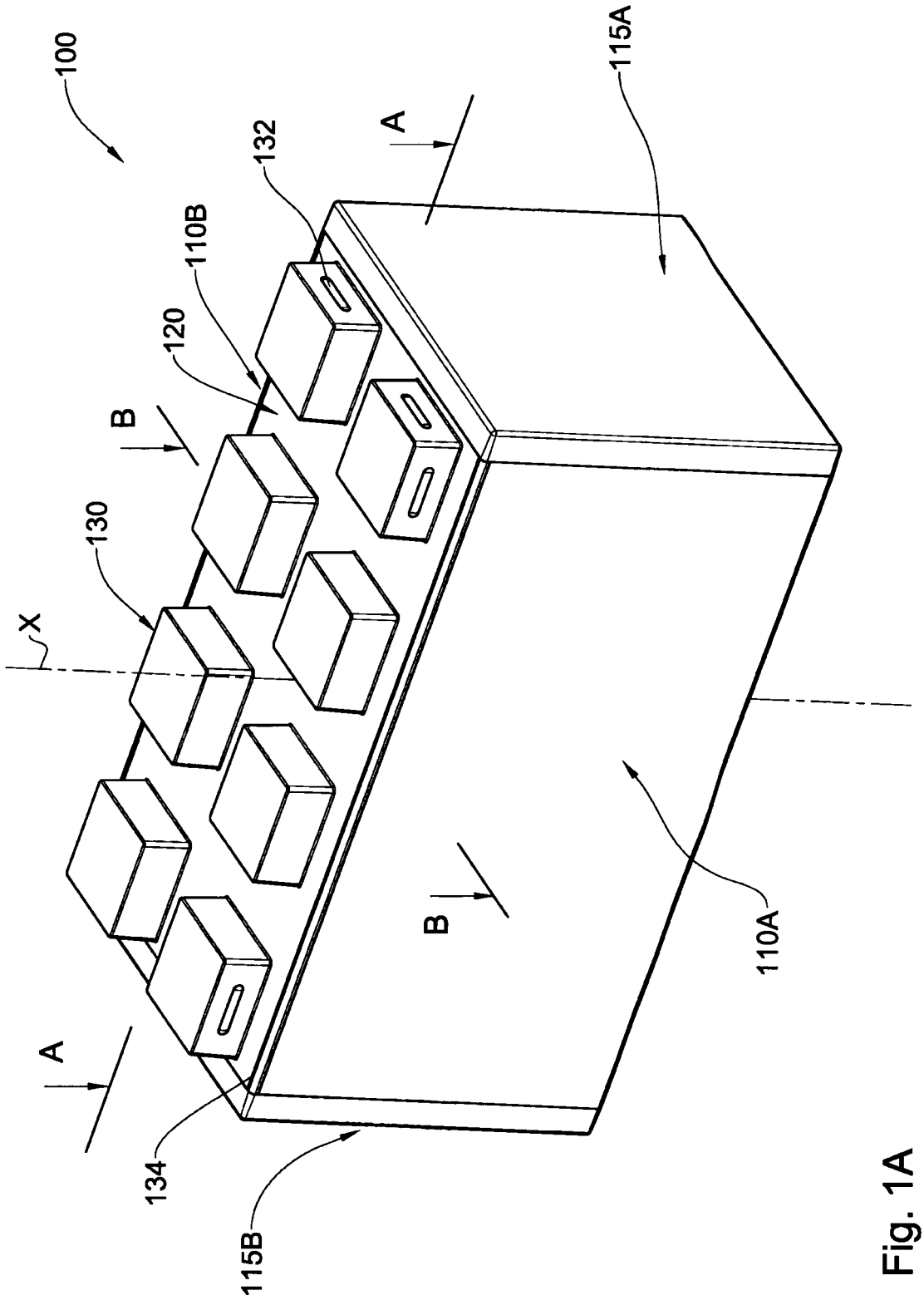

Fig. 1A

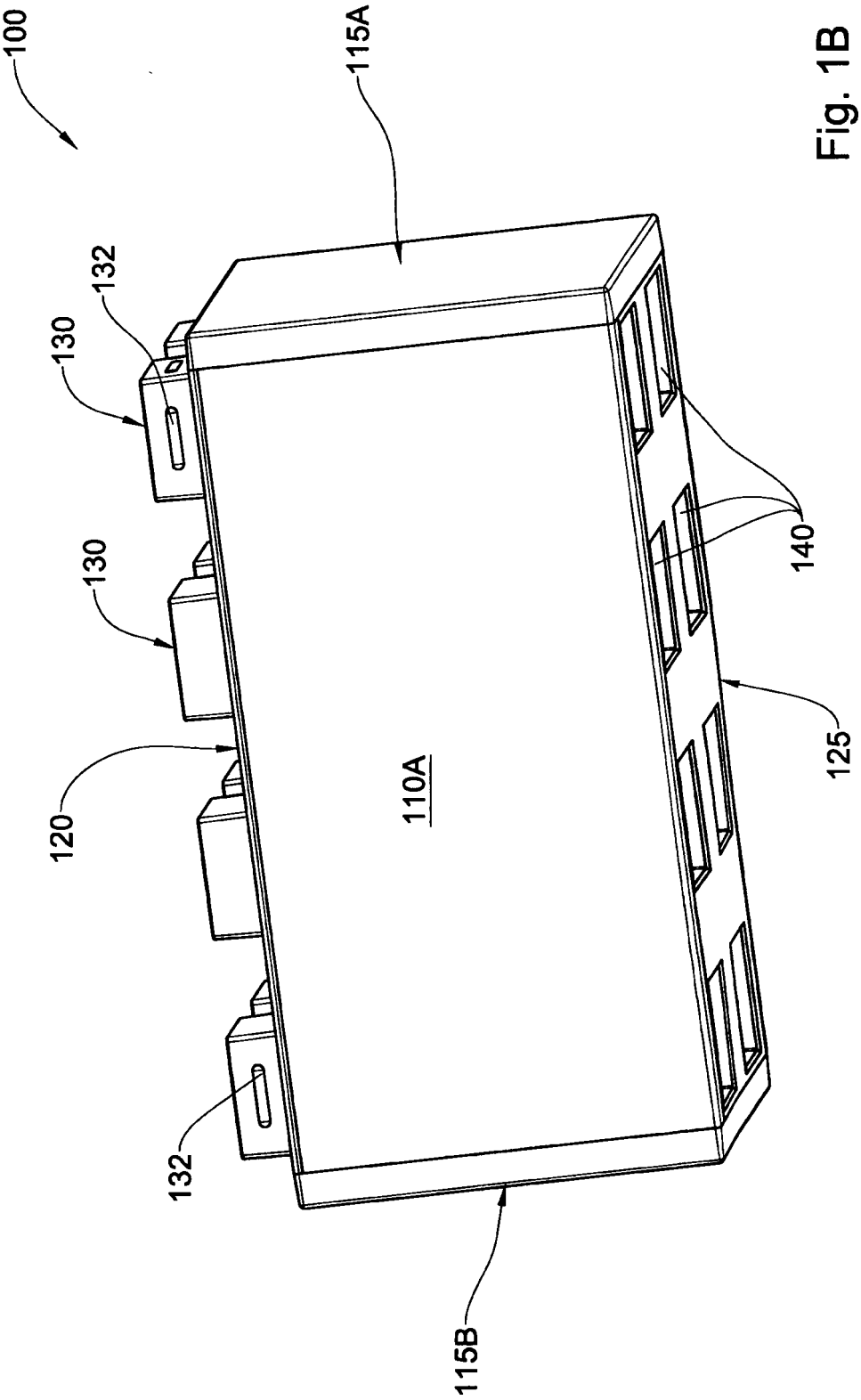

Fig. 1B

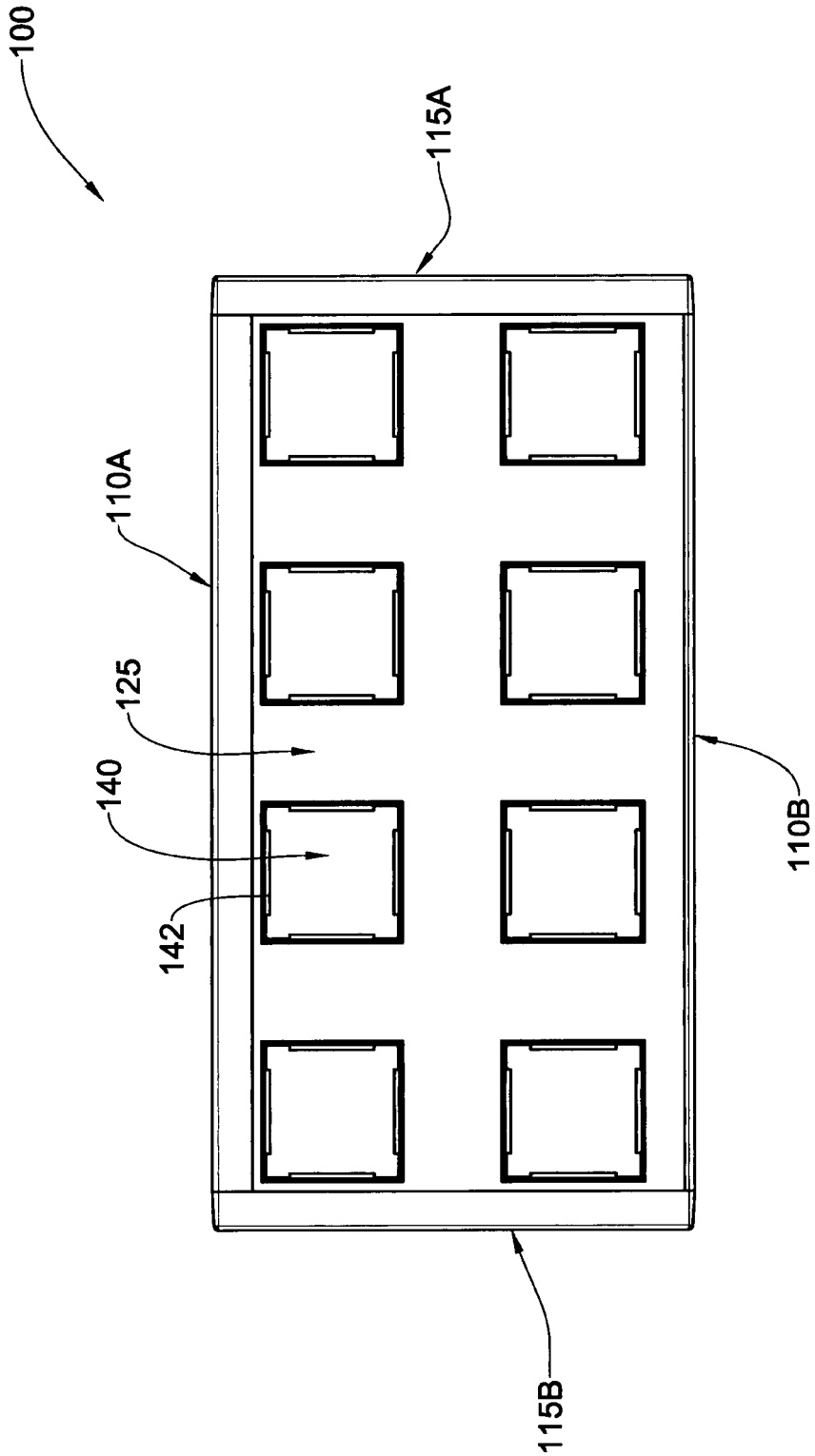

Fig. 1C

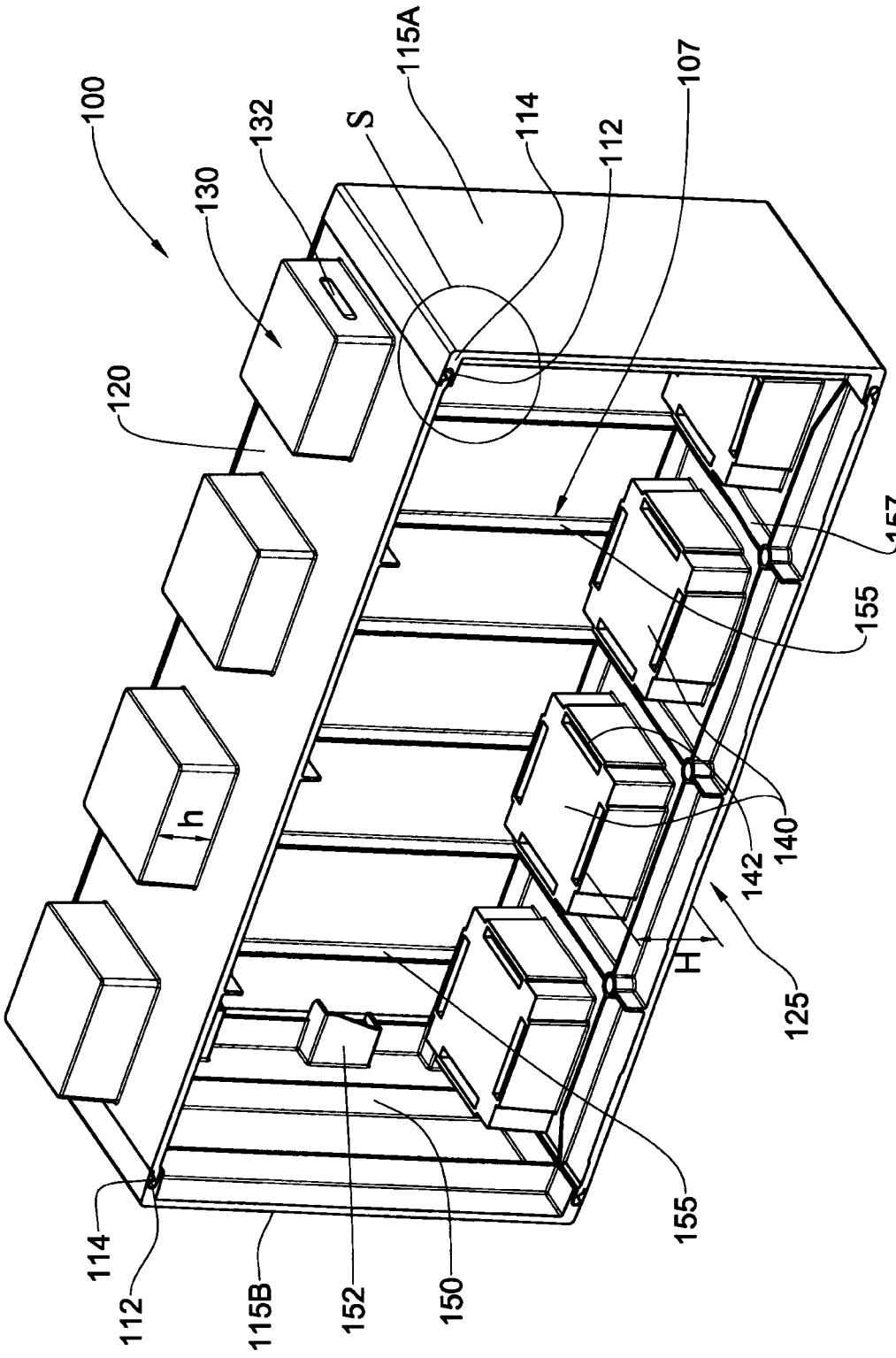
100
130
132
S
115A
114
112
107
120
157
155
h
140
142
H
125
114
112
115B
152
150
155

Fig. 2A

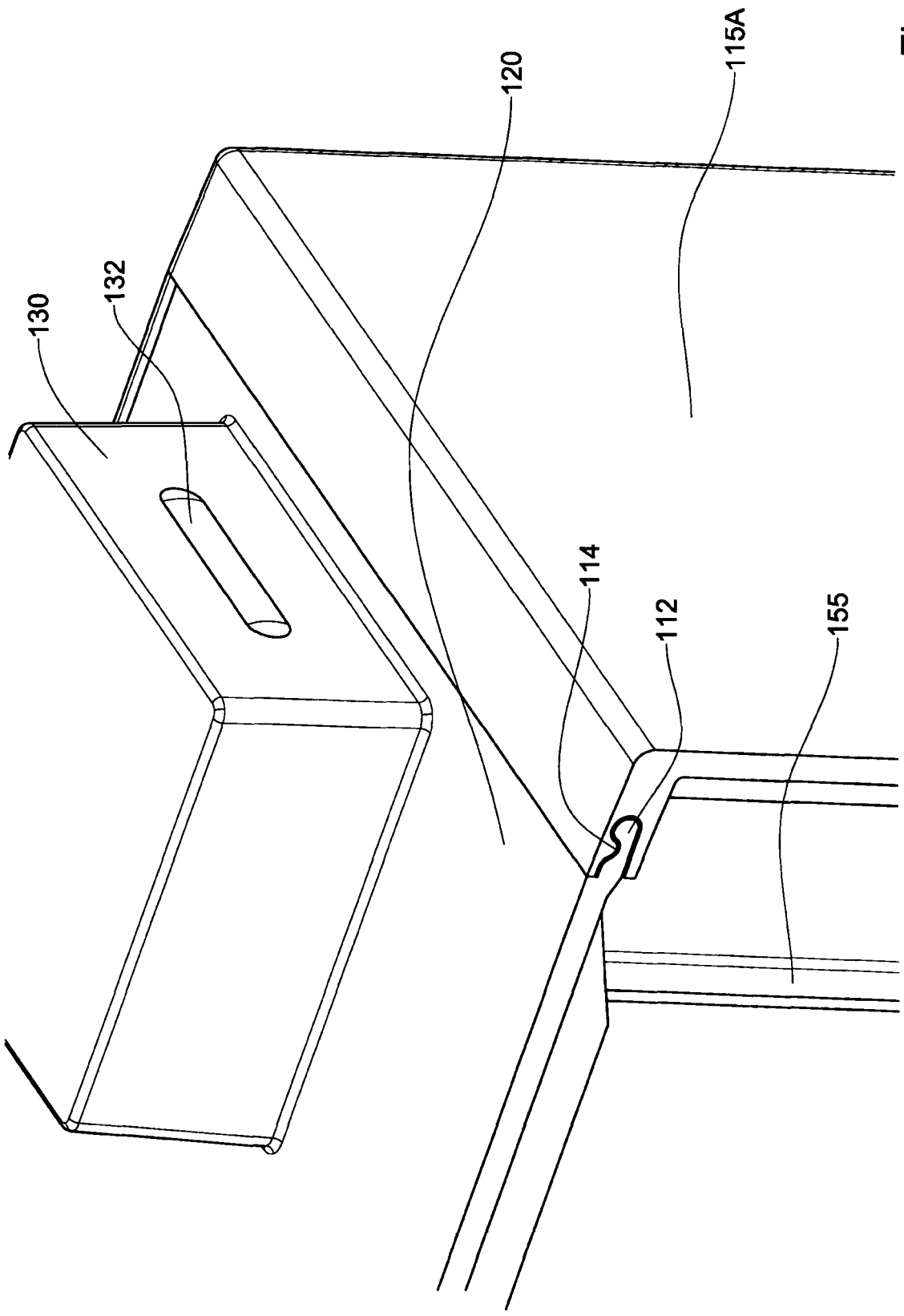

Fig. 2B

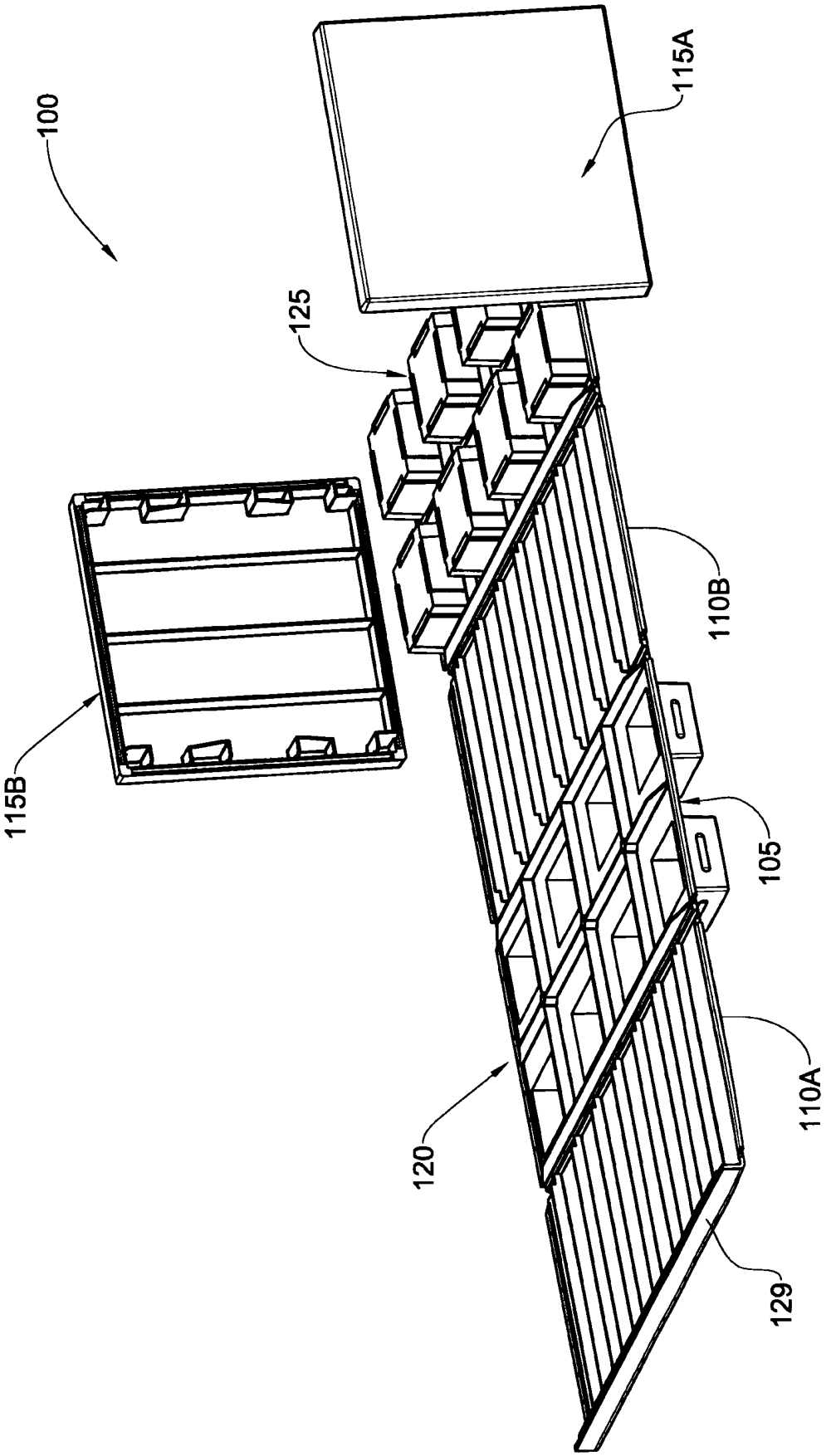

Fig. 3

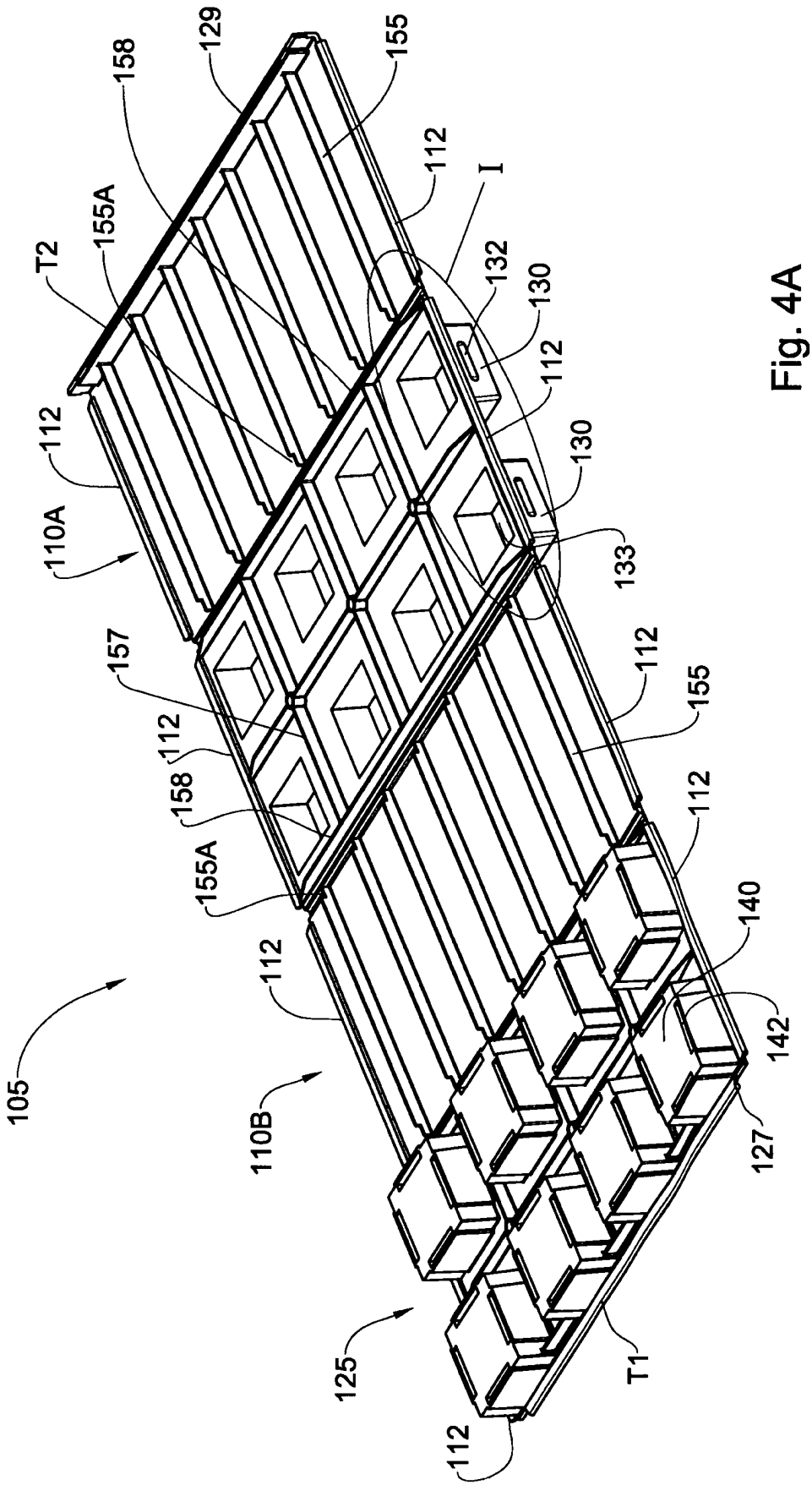
129
158
155
112
I
155A
T2
132
130
112
112
130
110A
133
157
112
155
112
158
112
155A
140
112
142
105
110B
127
125
T1
112

Fig. 4A

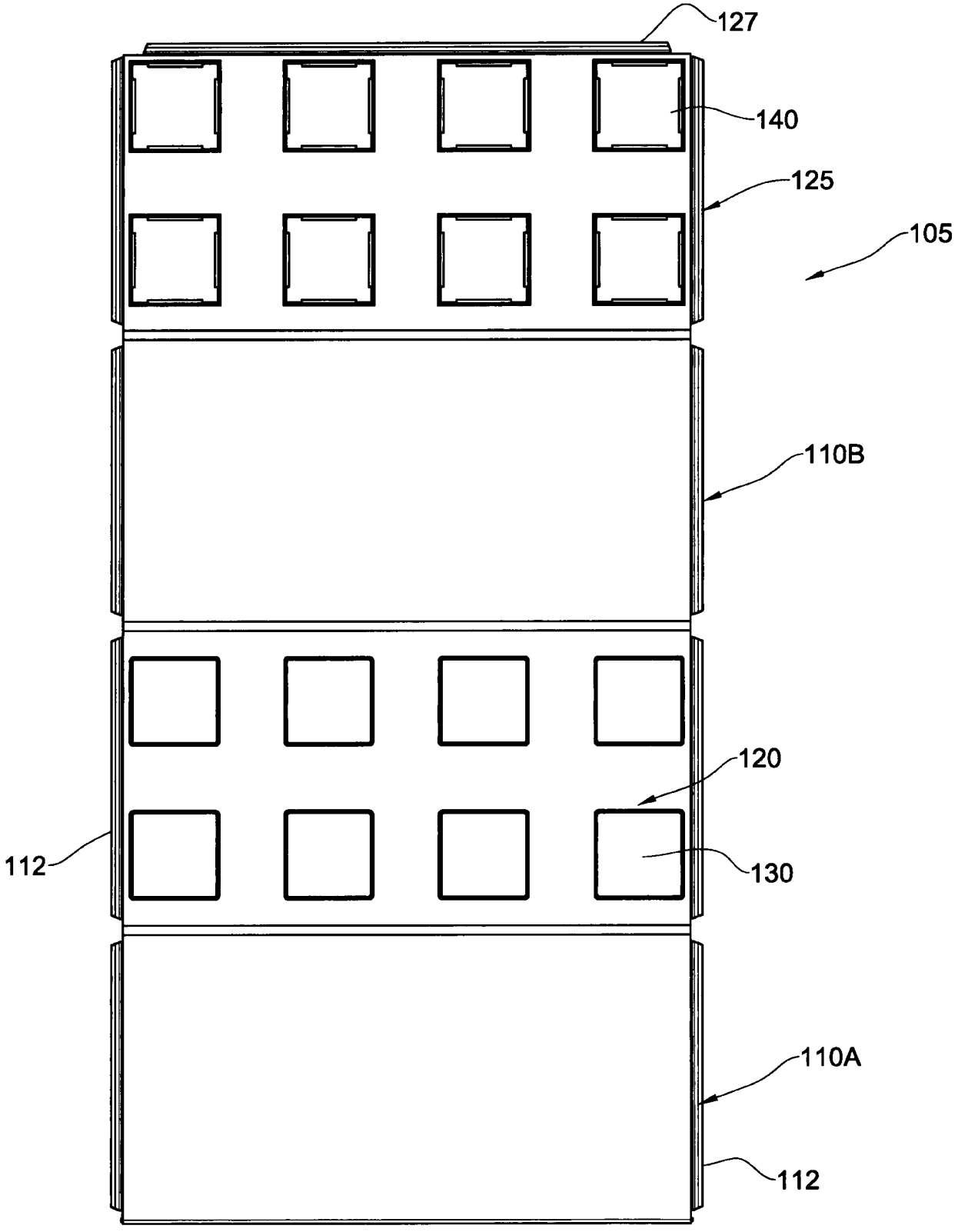

Fig. 4B

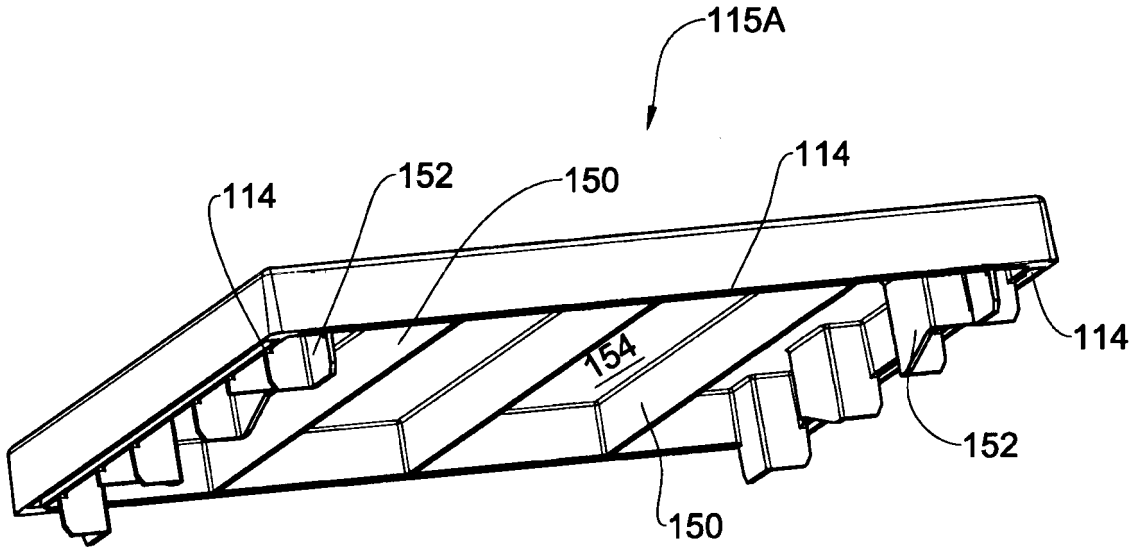
115A
114
152
150
114
154
114
152
150

Fig. 5

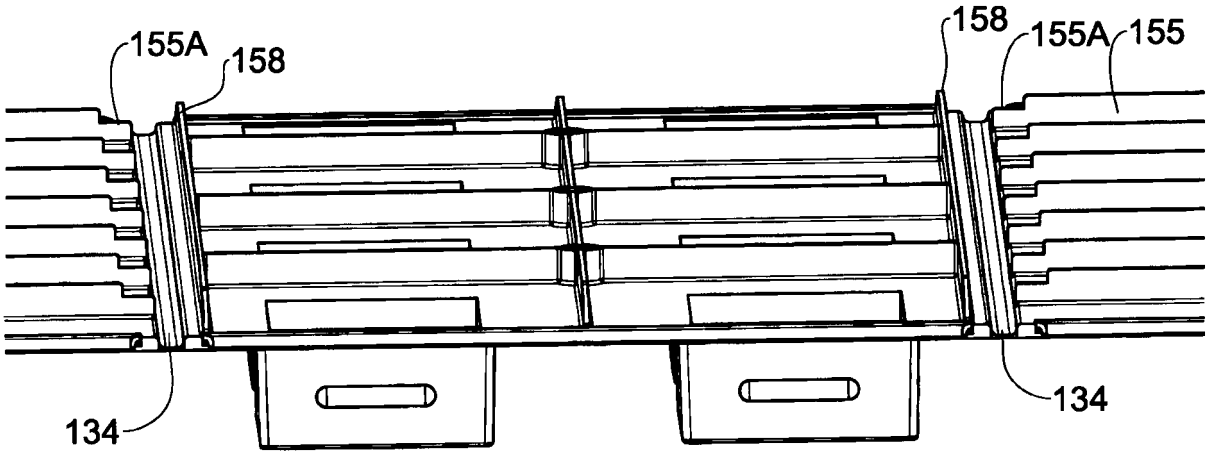
155A
158
158
155A
155
134
134

Fig. 6

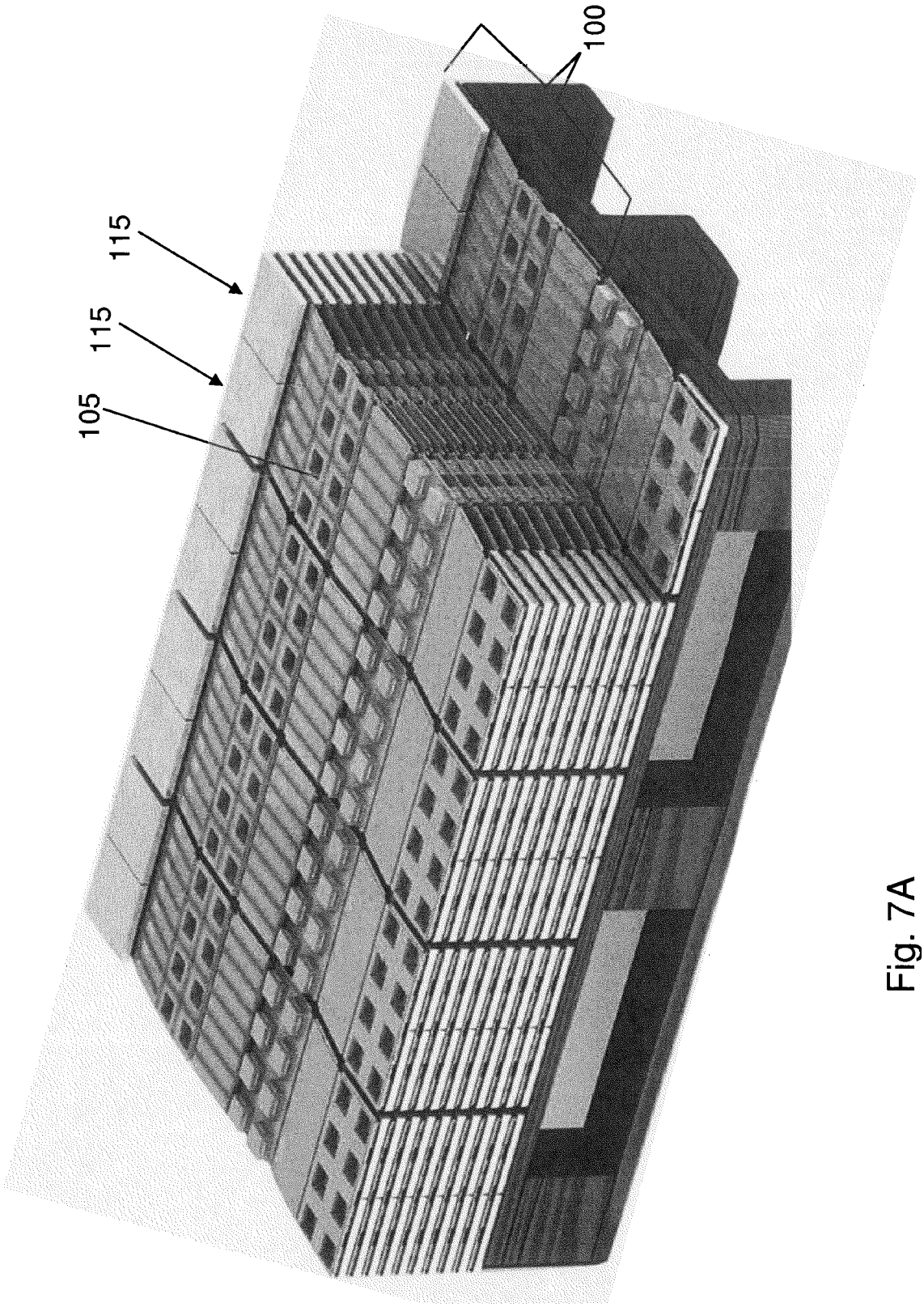

Fig. 7A

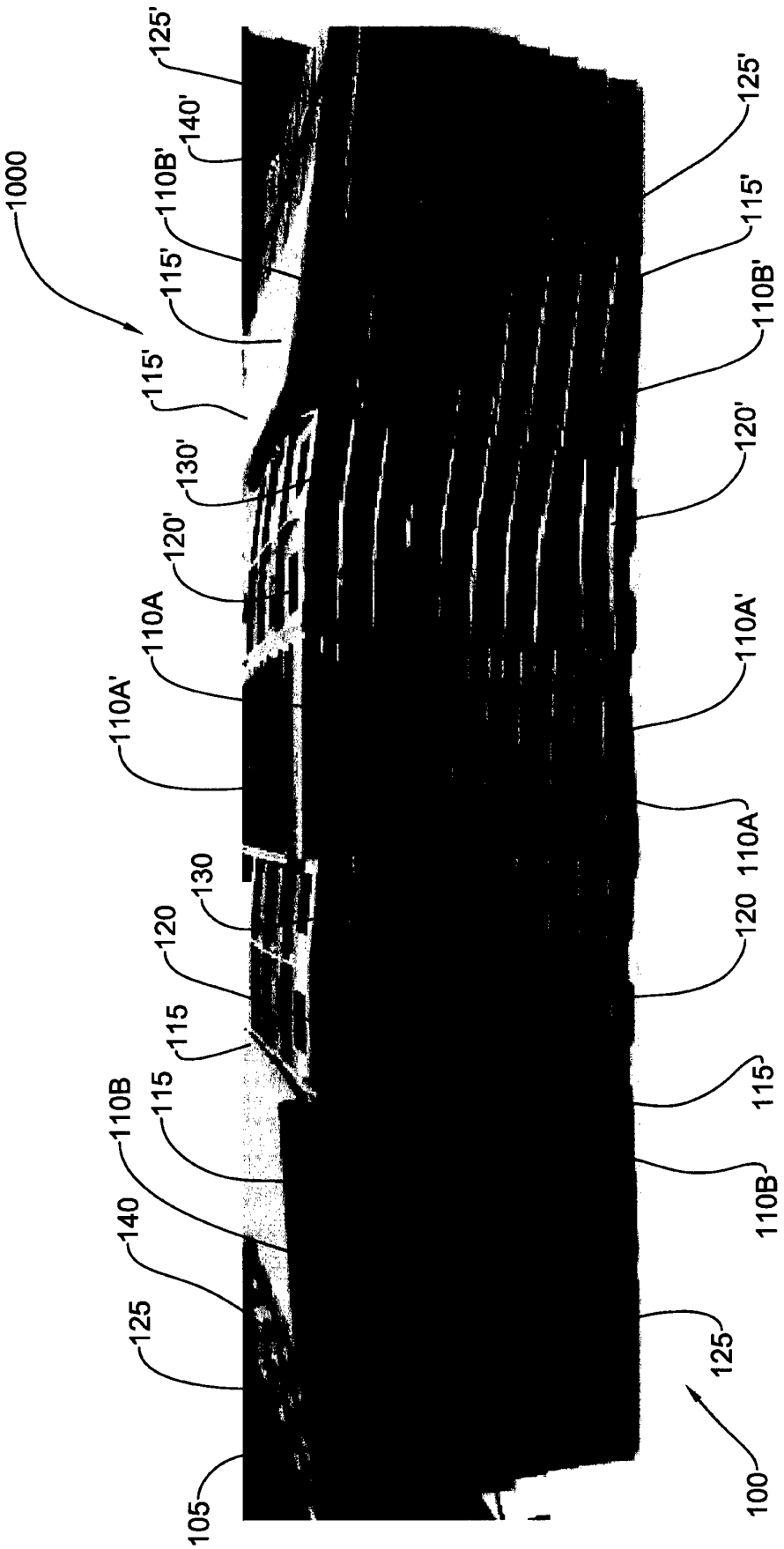
1000
125'
140'
110B'
115'
115'
130'
120'
110A
110A'
130
120
115
110B
115
140
125
105
125'
115'
110B'
120'
110A'
110A
120
115
110B
125
100

Fig. 7B

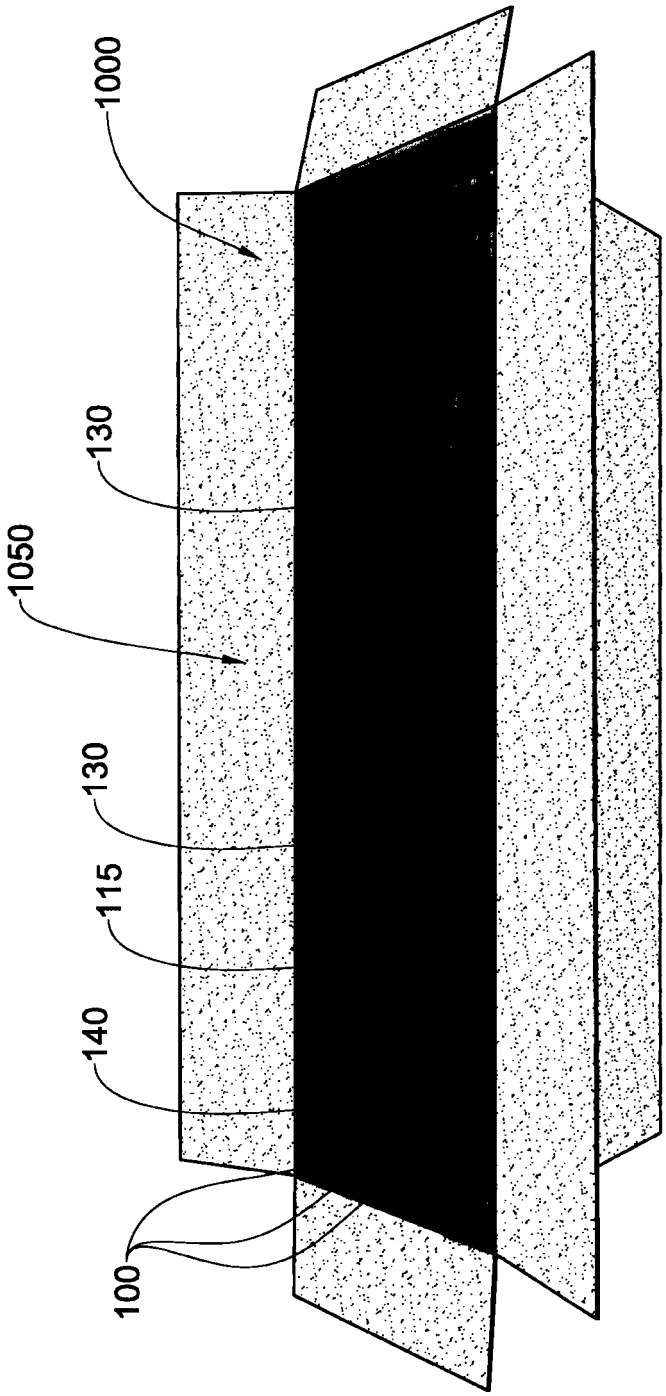

Fig. 7C

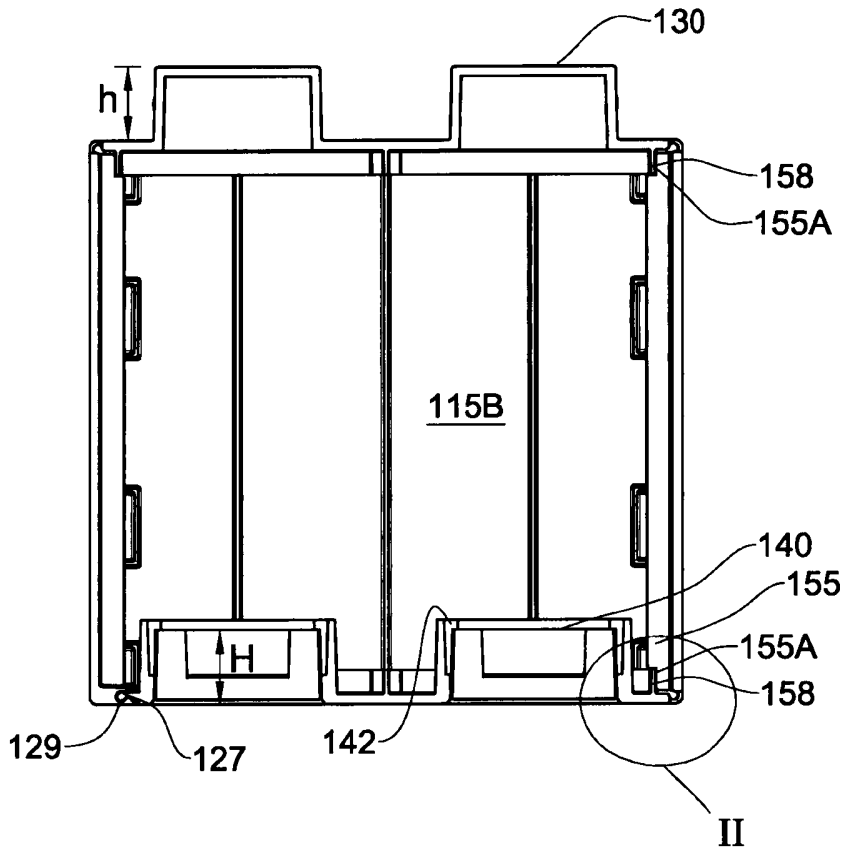
130
h
158
155A
115B
140
155
H
155A
158
129
127
142
II

Fig. 8A

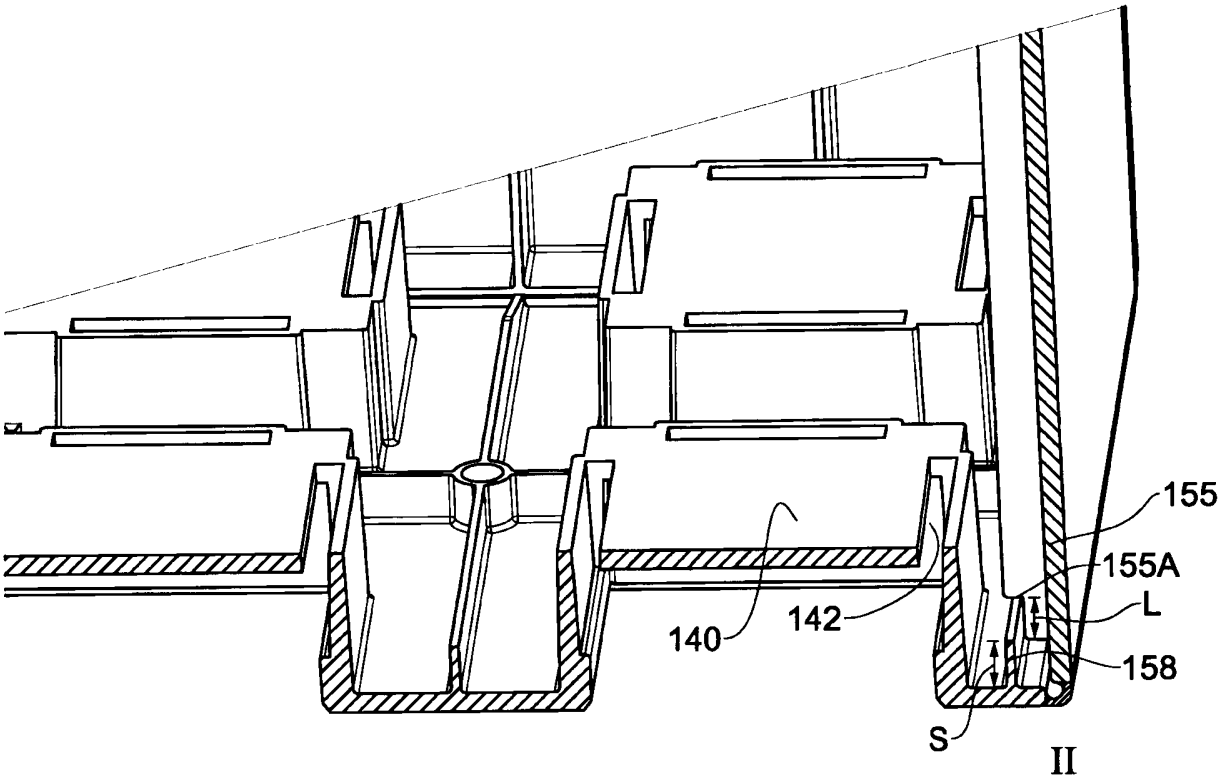
155
155A
L
158
140
142
S
II

Fig. 8B

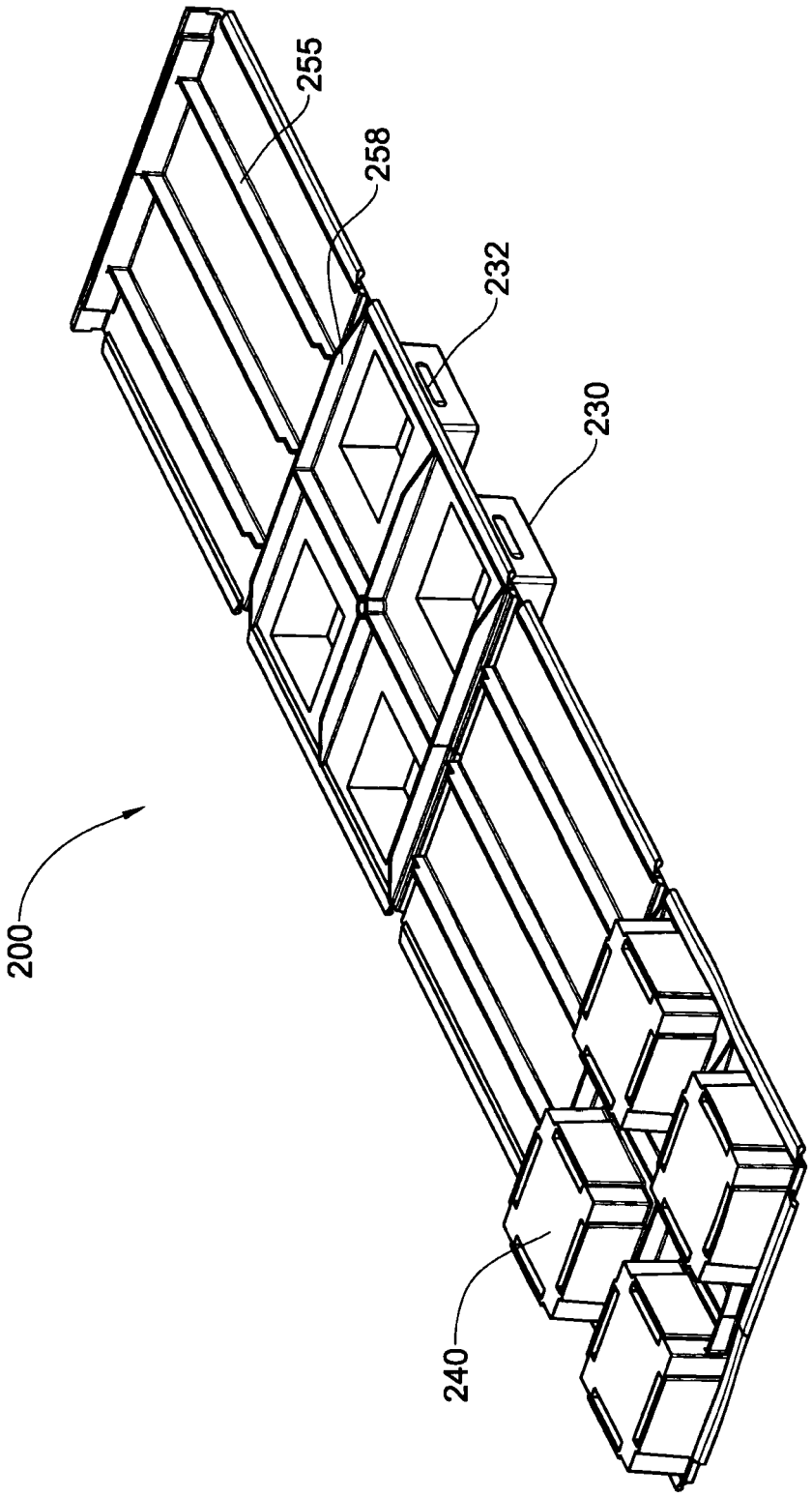

Fig. 9

Fig. 10A

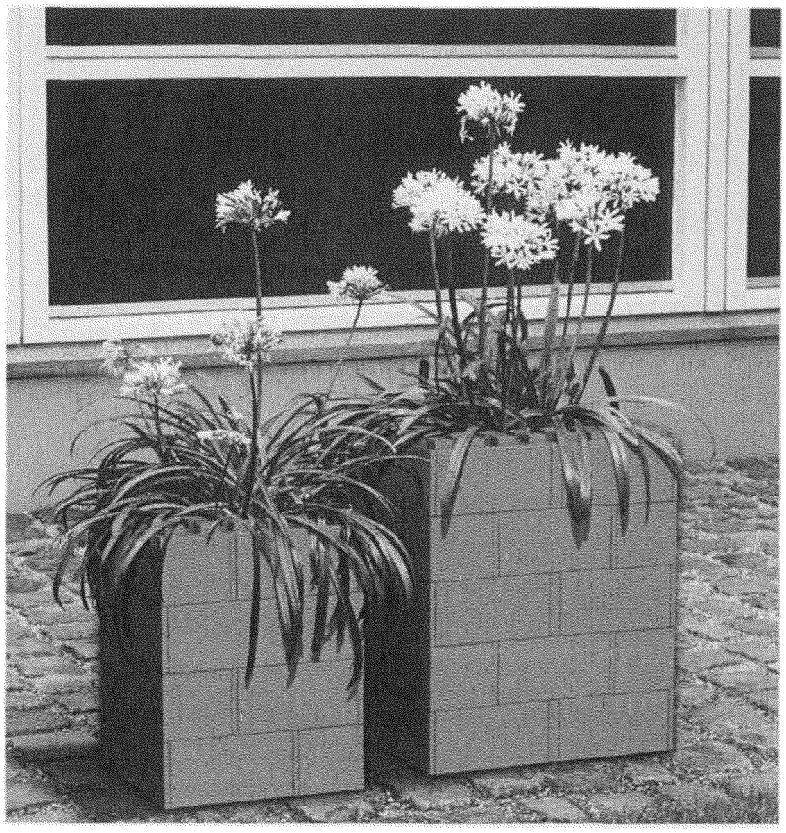

Fig. 10B

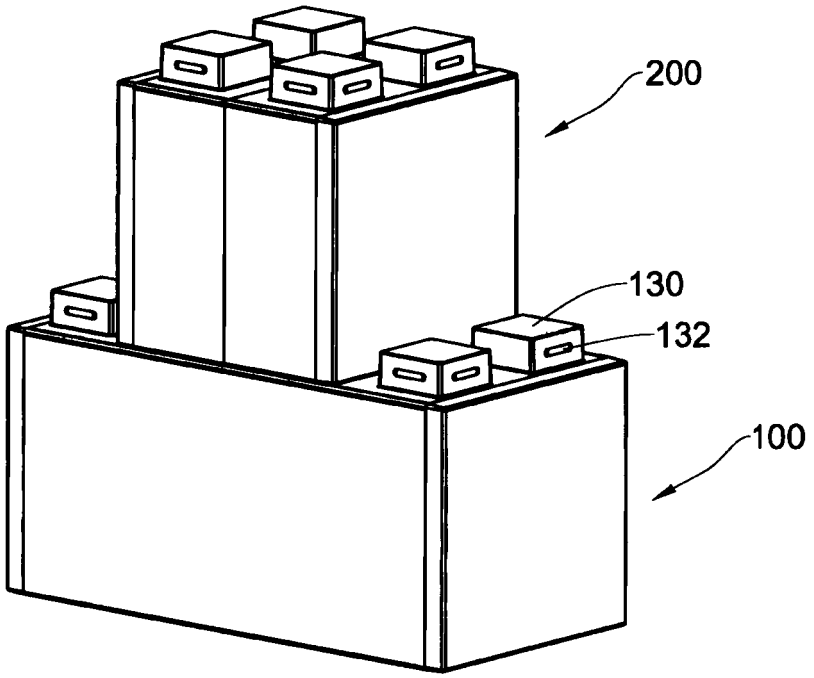

Fig. 11A

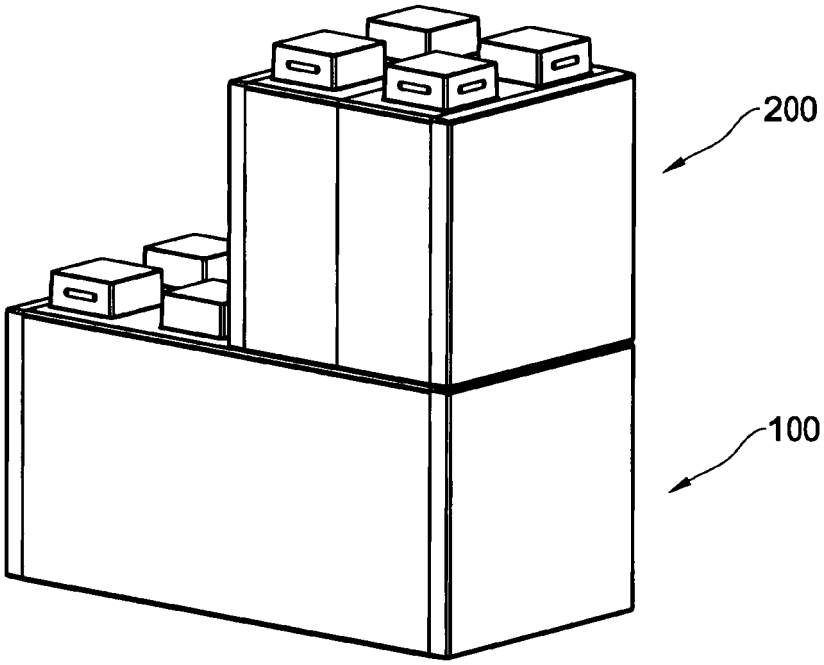

Fig. 11B

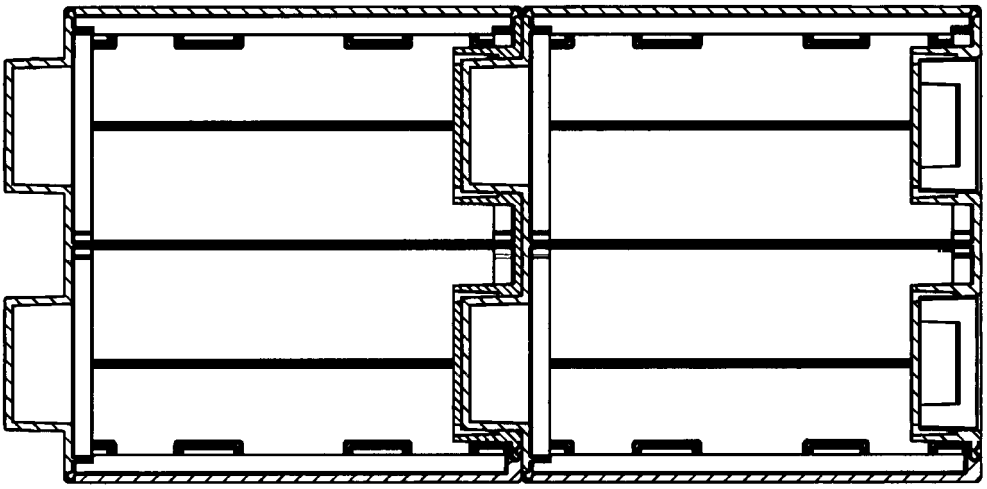

Fig. 11D

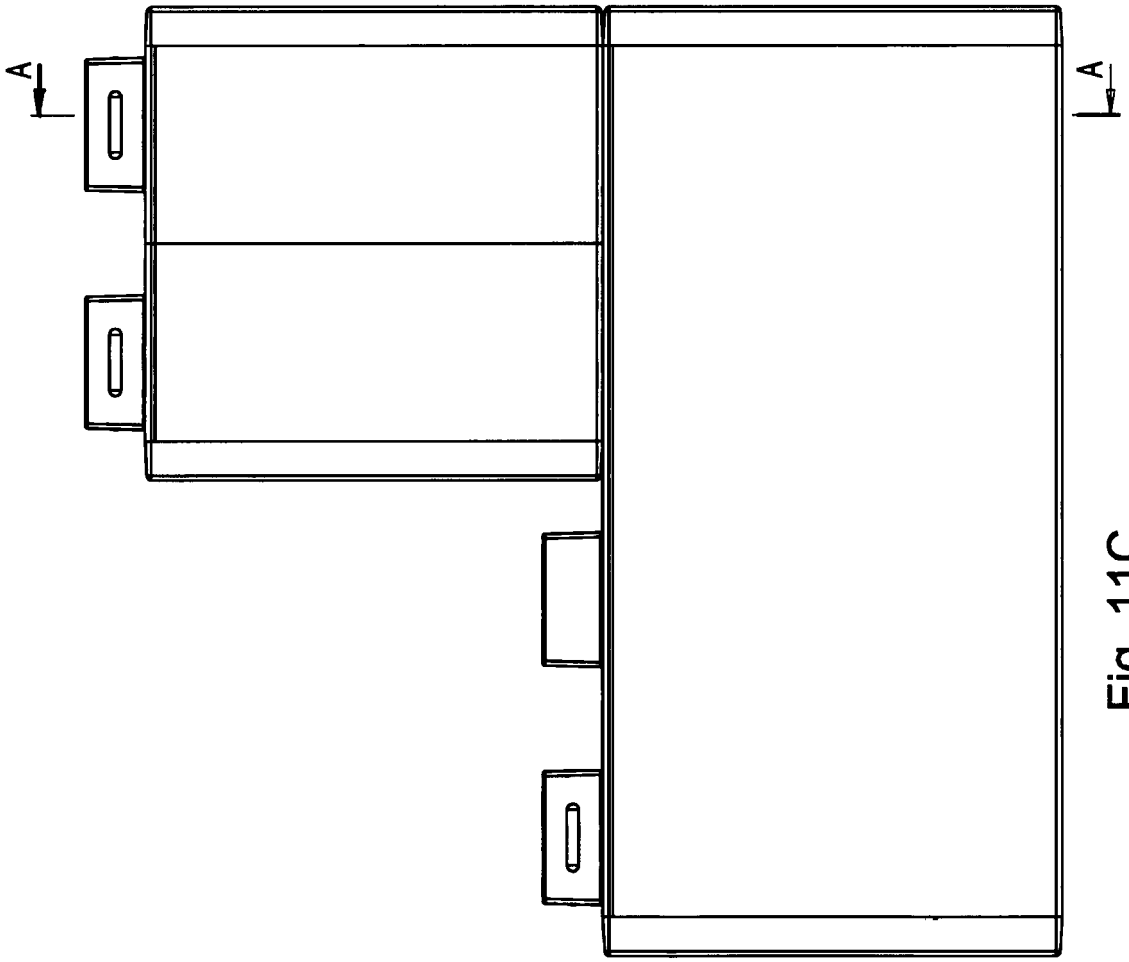

Fig. 11C

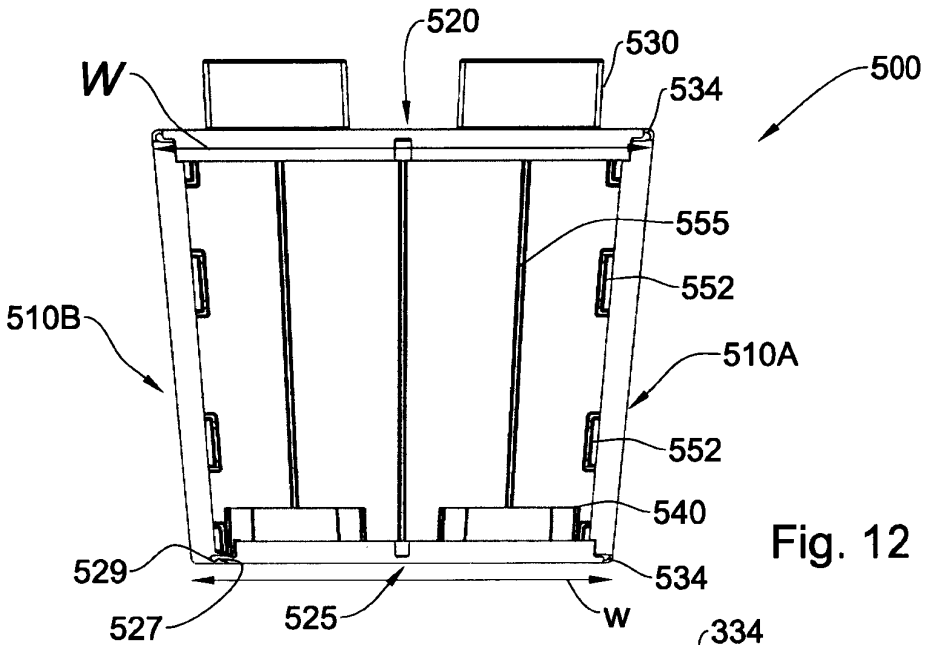

Fig. 12

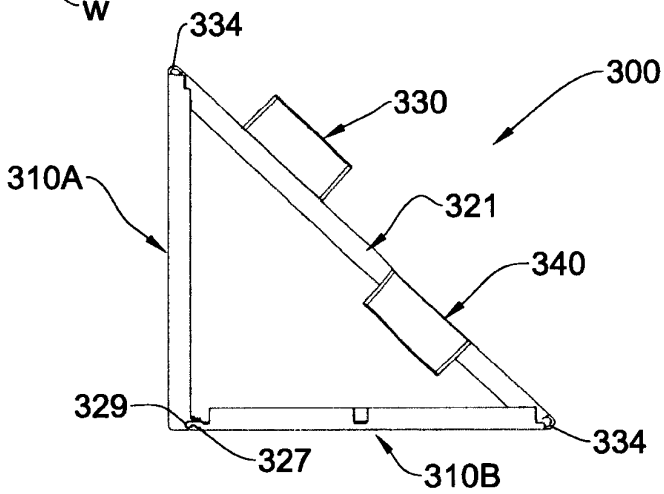

Fig. 13

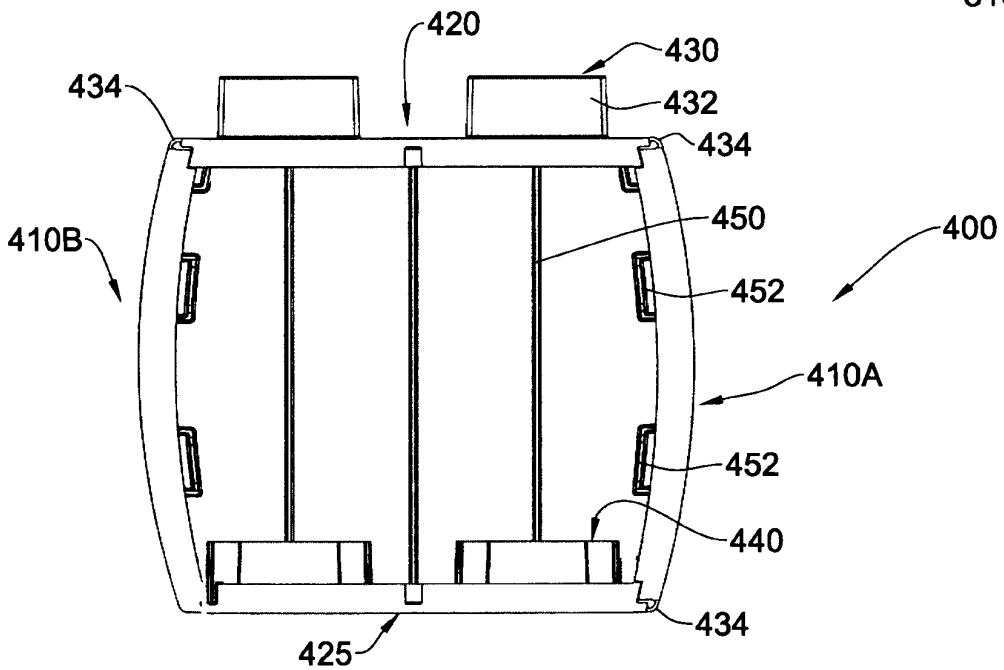

Fig. 14

REFERENCES CITED IN THE DESCRIPTION

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