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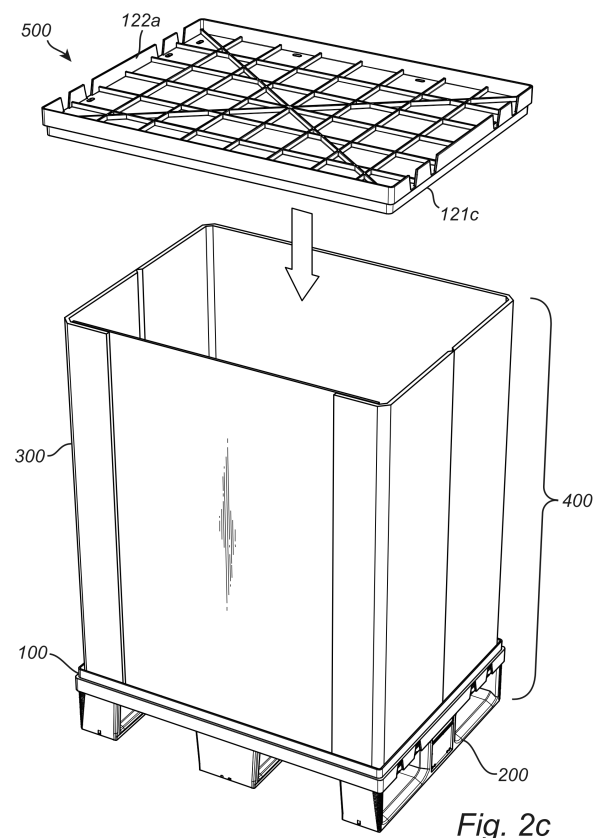
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(54) **PALLET DIVIDER, KIT OF PARTS, AND PALLET SYSTEM**

(57) The disclosure relates to a pallet divider (100) comprising a body portion (110) having a first set of one or more rims (121a-d) extending from the body portion (110) in a first direction (N1), and a second set of one or more rims (122a-d) extending from the body portion (110) in a second direction (N2), wherein the rims of the first set of one or more rims (121a-d) form an outer perimeter configured to receive and thereby keep, in a first use mode, a lower portion or, in a second use mode, an upper portion of a pallet superstructure (300) in an intended position relative to the pallet divider (100), wherein the rims of the second set of one or more rims (122a-d) form an outer perimeter configured to receive, in the first user mode, an upper portion of a pallet, or, in the second use mode, a lower portion of an optional second pallet (200) and thereby keep the pallet divider (100) in an intended position relative to the respective pallet (200). The disclosure also relates to a kit of parts and a pallet system. The disclosure also relates to a kit of parts and to a pallet system.



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## Description

### Field of invention

**[0001]** The invention relates to a pallet divider. The invention also relates to a kit of parts for a pallet system. The invention also relates to a pallet system.

### Technical Background

**[0002]** Pallets are used for transporting goods and play a crucial role in logistics and supply chain management. They provide a stable base for handling large quantities of items and they facilitate lifting the items with, for example, a forklift, a pallet jack or other material handling equipment.

**[0003]** A pallet can be equipped with a superstructure to hold or store the items to be transported. To maximize space utilization inside a truck, a container or any other transporting means, pallets and their superstructure can be stacked on top of each other.

**[0004]** When stacking pallets and their respective superstructure, it is important that they do not move with respect to each other and lose stability.

**[0005]** In US 4,413,737 and US4,480,748 there is disclosed a concept with specifically designed pallets having protruding portions that fit into each other by flipping and rotating one pallet with respect to another. Thereby making the pallets stably stackable.

**[0006]** However, one drawback with this solution is that in order to stack two superstructures, four pallets are used: one at the bottom, two in between the superstructures, and one at the top. Pallets take up space and are of considerable weight, which needs to be accounted for during transport and might increase transport costs. Additionally, when the pallets are transported empty for reuse, there are more pallets to transport which requires more transport resources. Also, it is difficult to position the inverted pallet, acting as a lid, on the superstructure. There is no space for any forklift and the pallet is heavy which renders it difficult to lift by hand.

**[0007]** Furthermore, designing pallets in this a manner to make them stably stackable, increases design complexity and requires a more complex manufacturing process.

**[0008]** US 2018/251259 discloses a system with a plastic pallet, a superstructure, and a pallet stacker. The pallet stacker is designed to be positioned on top of the superstructure and is provided with a plurality of recesses or boots. Each boot is configured to receive a respective foot of an upper pallet. Design complexity is reduced, but there is limited flexibility since the feet of the pallet need to fit snugly in the boots of the pallet stacker.

**[0009]** Therefore, there is still a need for a solution to which is flexible and which is easy to use when stacking pallets and their respective superstructures.

### Summary of invention

**[0010]** It is an object of the invention to address one or more of the challenges relating to stacking pallets and superstructures

**[0011]** This object has been achieved in accordance with a first aspect of the invention by a pallet divider comprising a body portion having four side edges and a main extension defining opposing first and second rectangular, geometrical major surfaces,

a plurality of rims or rim portions which extend from the body portion in a first direction and which are provided on all the four side edges,

a plurality of protrusions extending from the body portion in a second direction, the second direction being opposite the first direction,

wherein the plurality of rims or rim portions include a first set of one or more rims which form an outer perimeter and/or a third set of one or more rims which form an inner perimeter such that the plurality of rims or rim portions of the first and/or the third set receive and/or span, respectively, and thereby keep, in a first use mode, a lower portion, and, in a second use mode, an upper portion of a pallet superstructure in an intended position relative to the pallet divider, wherein the plurality of protrusions include a second set of one or more rims provided on all the four side edges, and forming an outer perimeter protruding such that the plurality of protrusions, in the first user mode, receive an upper portion of a pallet, and, in the second use mode, are configured to receive a lower portion of an optional second pallet and thereby keep the pallet divider in an intended position relative to the respective pallet,

wherein the pallet divider in the first use mode is configured to be positioned on top of the pallet and beneath the superstructure and be oriented in a first orientation with the first direction facing upwardly, and

wherein the pallet divider in the second use mode is configured to be positioned on top of the superstructure and be oriented in a second orientation with the second direction facing upwardly such that a second pallet optionally may be positioned on the pallet divider.

**[0012]** First, it may be noted that the geometrical major surfaces does not necessarily need to be physical major surfaces. However, the geometrical major surface may fully or partly be formed of a physical major surface. The geometrical major surface is generally intended to refer to the shape a thin, pliable paper would assume when put on top of a first and a second side, respectively, of the pallet divider. The first and second major surfaces may be formed identically or differently from each other. The first and/or second major surfaces may for example be made from solid material; which also may be referred to as a

continuous surface. Alternatively, the first and/or second major surfaces may comprise parts where material is missing to e.g., facilitate a more cost-efficient manufacturing process and/or to minimize the total weight of the pallet divider. Minimizing the total weight of the pallet divider is beneficial during transportation as a reduced weight requires less transporting resources such as fuel. Moreover, low weight is beneficial when the pallet divider is to be put on top of a superstructure. Preferably, the first major surface, which is configured to form a load bearing surface, is to a major extent formed of a physical surface. In one embodiment, the first major surface is a fully continuous physical surface. The first and/or second geometrical major surface may, but need not, be planar. It is preferred that the second geometrical major surface, but not necessarily the physical surface, is planar such that it will fit nicely onto a load bearing surface of standard pallets.

**[0013]** As indicated above, the plurality of rims or rim portions which extend from the body portion in a first direction include a first set of one or more rims and/or a third set of one or more rims. The plurality of rims or rim portions are preferably provided on all the four side edges. That is, there is preferably at least one rim or rim portion from the first set and/or the third set of rims on all the four side edges. It may in this context be noted that the rims do not necessarily extend along the whole length of the respective side. Preferably, there is a rim from the first set of one or more rims on all the four side edges. Preferably, there is a rim from the third set of one or more rims on all the four side edges. The rims of the first set of rims are configured to form an outer perimeter defining an outer boundary of the position of the superstructure. The rims of the third set of rims are configured to form an inner perimeter defining an inner boundary of the position of the superstructure. The rims of the third set of rims may also be said to span an inner perimeter. It may also be noted that provided on all four sides may in respect of the third set of rims functionally also include a rim extending along one side and extending all the way up to an adjoining orthogonal side. The third set of rims may in a minimalistic design be formed of four pins located in the four corners such that the four pins span an inner perimeter. However, as will be indicated below, it is preferred that the rims of the first set of rims and the second set of rims actually have an extension along the side along which it is referred to be positioned at; such as along a centre portion and/or a corner portion, or even along the full length of the respective side. To functionally keep the superstructure in intended position relative to the pallet divider, it is e.g., conceivable to provide four internal corners formed of the third set of rims in combination with centre portions of the first set of rims and of the third set of rims, on some or preferably all four sides. Thereby, the corners of the superstructure will be kept in position and the mid portions of the superstructure walls will be prevented from bulging inwardly or outwardly. Alternatively, or complementary thereto, the corners of the superstructure may

be kept in the intended position by four external corners formed of the first set of rims.

**[0014]** Providing the pallet divider with rims configured to receive and thereby keep an upper or a lower portion of a pallet and/or a pallet superstructure in an intended position relative to the pallet divider is beneficial for the stability of the stack. The rims may be configured to locally confine the pallet and/or pallet superstructure and to ensure minimal movement of a pallet, a pallet divider and a pallet superstructure with respect to each other.

**[0015]** The fact that the pallet divider is configured to, with its second set of rims, receive an upper portion of a pallet and to, with its first set of rims, receive a lower portion of a pallet superstructure, means that the pallet divider, in this first use mode, may act as an adapter between the pallet and the superstructure. The second set of rims are easily, and preferably, designed to fit snugly on an outside of the upper portion of a pallet. Since the outer dimensions of most pallets are in accordance with a limited number of standardized sizes, the use of first and second set of rims allows a specific pallet divider to be used basically with any kind of pallet of a specific standardized size independently of the actual design of the pallet. By designing the pallet divider to be used in two use modes, with the first major surface facing upwardly respectively downwardly, the first set of rims will in both use modes be facing the superstructure; the lower portion and the upper portion, respectively. Thus, it is possible to design a suitable connection between the superstructure and the pallet divider without being unduly restricted by the design between the pallet divider and the pallet's upper portion and lower portion, respectively. Moreover, by using a pallet divider as an adapter between the pallet and superstructure, there is no need for any complex design of the superstructure to be able to both attach to different kinds of pallets as well as being capable of directing the force of an upper pallet down to the bottom pallet.

**[0016]** The fact that the pallet divider is configured to receive an upper portion of a pallet superstructure, means that the pallet divider can function as a lid for the superstructure. Functioning as a lid is beneficial as it contributes to keeping goods items that are held in the superstructure safely inside the superstructure, as well as protecting the goods items. In this second use mode, the pallet divider is oriented with the first geometrical major surface facing downwardly.

**[0017]** The fact that the pallet divider is configured to receive a lower portion of a pallet, means that the lid of one superstructure can support and function as the base of a second optional pallet which in turn may support another superstructure. This is beneficial as it means that there is no need for multiple different structures to function as a lid and a base. Instead, the pallet divider can be described as having a dual-purpose, being able to function both as the lid and the base. Minimizing the number of necessary structures, and especially the number of un-

iquely identified structures, is beneficial for the logistics of transportation because it facilitates the provision of a less complex supply chain.

**[0018]** Thus, the general design of the pallet divider makes it easier to implement the use of pallets with superstructures capable of supporting a second pallet to be stacked thereupon. There is typically no need to change the pallet used. There is only a need to keep track of one kind of pallet divider and the desired kind of superstructure. The pallet divider can be designed to be comparably light weight. The pallet divider can simply be turned upside down and there is typically no need to keep track of any specific in-plane rotational orientation. Thus, the pallet divider is comparably easy to handle by hand by any person involved in the loading or shipping of the pallets.

**[0019]** As indicated above, the pallet divider comprises a plurality of protrusions extending from the body portion in a second direction, the second direction being opposite the first direction. The plurality of protrusions include a second set of one or more rims forming an outer perimeter. The one or more rims of the second set of one or more rims are provided on all four side edges. The plurality of protrusions may also include inner protruding portions. In a preferred embodiment, the plurality of protrusions include a second set of one or more rims forming an outer perimeter and no inner protruding portions. In an alternative embodiment, there is both a second set of one or more rims forming an outer perimeter and inner protruding portions. In a non-claimed embodiment, there is only inner protruding portions.. The inner protruding portions may e.g., be configured to extend into recesses present in the upper portion of the pallet and/or the upper portion of the pallet. A wooden pallet according to EU standard is typically formed of three stringers (upper stringer board, blocks, and lower stringer boards) which are connected by a plurality of upper deck boards extending across the width of the pallet. The upper deck boards are positioned at distance from each other such that there is formed a plurality of openings in the load bearing surface. It is e.g., possible to provide the pallet divider with a plurality of protrusions, such as blocks or pins, extending downwardly and fitting into a respective opening. The protrusions may e.g., interact with two opposing inner edges or two opposing outer edges of opposing openings. Thereby it is possible to keep the pallet divider in the intended position on top of the pallet. When the pallet divider is in the second use, the three stringers on the underside of the pallet typically provide abutment surfaces such that the protrusions that fitted into the openings will now e.g., interact with the inside edges of the stringers. However, to keep the pallet from sliding along the direction of the stringers, the pallet divider is preferably provided with a second set of rims on at least two sides extending orthogonally to the direction of the stringers.

**[0020]** It is also conceivable that the pallets are designed with openings in or through the corner blocks. In

such a design the protrusions protruding in the second direction may interact with the openings in the corner blocks from both the upper side of the pallet when in the first use mode and from the underside of the pallet when in the second use mode.

**[0021]** The pallet divider may according to one aspect of the invention comprise a body portion having four side edges and a main extension defining opposing first and second rectangular, geometrical major surfaces, a first set of one or more rims extending from the body portion in a first direction and a second set of one or more rims extending from the body portion in a second direction, the second direction being opposite the first direction, wherein the first set of one or more rims and the second set of one or more rims are provided on all the four side edges, wherein the rims of the first set of one or more rims forms an outer perimeter configured to receive and thereby keep, in a first use mode, a lower portion or, in a second use mode, an upper portion of a pallet superstructure in an intended position relative to the pallet divider, wherein the rims of the second set of one or more rims form an outer perimeter configured to receive, in the first use mode, an upper portion of a pallet, or, in the second use mode, a lower portion of an optional second pallet and thereby keep the pallet divider in an intended position relative to the respective pallet, wherein the pallet divider in the first use mode is configured to be positioned on top of the pallet and beneath the superstructure and be oriented in a first orientation with the first direction facing upwardly, and wherein the pallet divider in the second use mode is configured to be positioned on top of the superstructure and be oriented in a second orientation with the second direction facing upwardly such that a second pallet optionally may be positioned on the pallet divider.

**[0022]** The rims of the first set of one or more rims may be provided at least along an outer portion as seen along the length of one or more of the, preferably all four, side edges. Outer portion is intended to refer to a portion which is outer as seen along the length of the respective side edge. It is preferred that there is a rim along both outer portions of respective side edge. Outer portion is intended to refer to the first and/or last 25% of the length. In other words, the rims may be positioned close to the corners of the pallet divider. By providing the rims close to the corners of the pallet divider, a strong connection to pallet superstructure may be provided. By placing the first set of one or more rims close to the corners of the pallet divider, easier handling of the pallet divider onto/from the pallet superstructure may be provided. Furthermore, in case of two stacks colliding with each other, the rims being provided close to or even at the corners of the pallet divider may prevent the pallet superstructure from being damaged as the rims may take most of the hit. By providing the rims along each side edge of the four side edges the rims of the first set of one or more rims are able to provide enough stability and confinement to the pallet superstructure by simply being present on all four sides. It may be noted that the rims may, but need not, join up and

form a single continuous rim around the corner. A single continuous rim around the corner is beneficial from the perspective of the two adjoining rims of orthogonal extension strengthen each other and thereby reduces the risk of a rim portion unintentionally being folded inwardly or flared outwardly.

**[0023]** The first set of one or more rims may, alternatively or complementary to being provided along outer portions, be provided along a centre portion of the length of one or more of the, preferably all four, side edges. In other words, when used as an alternative, the rims may be missing along the outer portions close to the corners of the pallet divider. Placing the rims along the centre of the pallet divider may e.g., be beneficial to confine superstructures provided with vertical hinges to allow for a collapsible superstructure and it may also be considered a less complex design and thus easier manufacturing of the pallet divider. When used as a complement, the rims of the first set of rims may form a continuous rim along both the outer portions and the central portion, or may form a discontinuous rim formed of three portions, along a first outer portion, a central portion and a second outer portion. Irrespective of if the central portion is connected to the outer portions or not, the outer portions of joining edges may, but need not, form a continuous corner.

**[0024]** It is also conceivable to have different combinations of the above, such as e.g., rims of the first set of rims being provided along outer portions on all four side edges and along centre portions on only some of the side edges. The rims of the first set may e.g., be provided along centre portions on those sides which are provided with hinges.

**[0025]** The second set of one or more rims may be provided along at least an outer portion as seen along the length all four side edges. Outer portion is intended to refer to a portion which is outer as seen along the length of the respective side edge. It is preferred that there is a rim along both outer portions of respective side edge. Outer portion is intended to refer to the first and/or last 25% of the length. In other words, the one or more rims of the second set of one or more rims may be positioned close to the corners of the pallet divider. The pallet divider may be designed such that both the first set of one or more rims and the second set of one or more rims are positioned along the outer portions of the pallet divider, leading to a symmetrical design of the pallet divider which e.g., may be beneficial when it comes to directing forces from the second pallet down through the superstructure to the first pallet. As is the case with the rims of the first set, also the rims of the second set may, but need not, join up and form a single continuous rim around the corner. It may in this context be noted that variants, embodiments, and advantages disclosed with reference to the first set of rims are equally applicable for the second set of rims, and vice versa, unless explicitly stated otherwise.

**[0026]** The second set of one or more rims may, alternatively or complementary to being provided along outer portions, be provided along a centre portion of the length of one or more of the, preferably all four, side edges. In

other words, when used as an alternative, the rims may be missing along the outer portions close to the corners of the pallet divider. When used as a complement, the rims of the second set of rims may form a continuous rim along both the outer portions and the central portion or may form a discontinuous rim formed of three portions, along a first outer portion, a central portion and a second outer portion. Irrespective of if the central portion is connected to the outer portions or not, the outer portions of joining edges may, but need not, form a continuous corner. Similarly as for the first set of rims, the second set of rims may also be provided in accordance with combinations of the above, such as with rims along outer portions on all four sides and rims along centre portions only e.g., in case the length of the side exceeds a certain distance.

**[0027]** The second set of one or more rims may be configured to extend less in the second direction, or be missing, along a part of the length of respective side edge corresponding to the locations of the fork entries of a pallet. It is especially preferred that at these fork entries, there is no rim or rim having an extension along the second direction from the second geometrical major surface being less than the total distance between the upper load surface of the pallet and the upper surface of the fork entries. This configuration is beneficial as it facilitates a forklift to easily enter the fork entries and lift a pallet, including the pallet divider and pallet superstructure from or onto a stack without risking to damage the rims of the second set. Some pallets have in all or some directions a lower deckboard under a stringer or under feet-forming blocks and some pallets have in some directions downwardly fully open channels for a wheel-forklift. When the pallet divider is used as a lid, the one or more rims of the second set will extend upwardly. In this case, it is especially preferred that at these fork entries of the second pallet, there is no rim or rim having an extension along the second direction from the second geometrical major surface being less than the total distance between the bottom of the pallet and the upper surface of any lower deckboard. In case the pallet divider is configured to be used in a system with pallets with forklift entries without lower deckboards being present, it is preferred that the rim of the second set of rims is completely missing at those forklift entries, or at least designed not to form a rim but rather a cushion.

**[0028]** The first geometrical major surface may be a load bearing surface. As indicated above, the load bearing surface is preferably to a major part a continuous surface. A load bearing surface is beneficial as it allows for the load to be more evenly distributed between the pallet and the pallet divider. Dividing the load more evenly contributes to better stability and further reduces the strain on the pallet and/or the pallet divider, thereby extending the lifespan and reducing the need for frequent replacement of the pallet and/or the pallet divider. The first geometrical major surface is preferably a planar surface which to a major part is a continuous surface.

**[0029]** The rims of the second set of one or more rims

may extend in the second direction past the second rectangular geometrical surface. With such a design, the pallet divider may simply rest with the second geometrical major surface on the load bearing surface of the pallet. Similarly, the rims of the first set of one or more rims may extend in the first direction past the first rectangular geometrical surface.

**[0030]** The pallet divider may comprise plastic as a major constituent. The pallet divider can be made of a single material throughout, or of a combination of materials throughout, or of a different material for different parts of the pallet divider. Preferably, a lightweight material is used, such as plastic, to limit the total transportation weight. Preferably, a material with high durability is used to increase the lifespan of the pallet divider and to ensure stability of the pallet divider over time. By making the pallet divider out of a recycled material, such as recycled plastic, the pallet divider may be more sustainable with regard to the environment. When the pallet divider is made from plastic, manufacturing the pallet divider can be facilitated by for example moulding, such as injection moulding, for high precision and volume production. Alternatively, it can be manufactured by thermoforming, which is cost effective and allows for rapid prototyping and adjustment to design changes. It is further noted that the pallet divider can be designed and manufactured to comply with standard measurements and requirements of pallets.

**[0031]** The second geometrical major surface may be defined by a plurality of structural elements extending from and providing bending stiffness to the body portion. The second geometrical major surface may e.g., be defined by the bottoms a plurality of vertical walls extending from a first physical surface forming the first geometrical major surface. The vertical walls may extend in a crisscross pattern. The plurality of structural elements may collectively be referred to as a webbing.

**[0032]** The pallet divider may further comprise a third set of rims extending from the body portion in the first direction and being provided at a distance inwardly from the first set of rims.

**[0033]** According to a second aspect of the invention the above-mentioned object is achieved by a kit of parts for a pallet system comprising two pallet dividers according to the first aspect of the invention and a superstructure. One of the two pallet dividers may receive the lower portion of the superstructure, thereby functioning as a base for the superstructure. The second pallet divider of the two pallet dividers may receive the upper portion of the superstructure, thereby functioning as a lid for the superstructure.

**[0034]** According to a third aspect of the invention the above-mentioned object is achieved by a pallet system comprising a pallet, a first pallet divider according to the first aspect of the invention, a first superstructure, and a second pallet divider according to the first aspect of the invention, arranged one on top of the other. The first pallet divider is configured to receive the upper portion of the

pallet on one side and the lower portion of the superstructure on the other side, thereby functioning as a supporting base between the pallet and the superstructure. The second pallet divider is configured to receive the upper portion of the superstructure, thereby functioning as a lid to the superstructure.

**[0035]** The pallet system may further comprise a second pallet positioned on top of the second pallet divider, a third pallet divider according to the first aspect of the invention, a second superstructure, and a fourth pallet divider according to the first aspect of the invention, arranged on top of each other. Hence, the second pallet divider is further configured to receive the lower portion of the second pallet, thereby functioning both as a lid for the first superstructure and as a base for the second pallet. The third pallet divider is configured to receive the upper portion of the second pallet, and the lower portion of the second superstructure, thereby functioning as a supporting base between the second pallet and the second superstructure. The fourth pallet divider is configured to receive the upper portion of the second superstructure, thereby functioning as a lid to the second superstructure.

**[0036]** The invention may also in short be said to relate to a pallet divider comprising a body portion having a first set of one or more rims extending from the body portion in a first direction, and a second set of one or more rims extending from the body portion in a second direction, wherein the rims of the first set of one or more rims form an outer perimeter configured to receive and thereby keep, in a first use mode, a lower portion or, in a second use mode, an upper portion of a pallet superstructure in an intended position relative to the pallet divider, wherein the rims of the second set of one or more rims form an outer perimeter configured to receive, in the first use mode, an upper portion of a pallet, or, in the second use mode, a lower portion of an optional second pallet and thereby keep the pallet divider in an intended position relative to the respective pallet. The features introduced above, and the advantages associated thereto, as well as features introduced in the detailed description, are equally applicable to the pallet divider as introduced in short here.

#### Brief description of the drawings

**[0037]** The invention will by way of example be described in more detail with reference to the appended schematic drawings, which shows presently preferred embodiments of the invention.

Figure 1a schematically discloses in a perspective view a pallet divider with a first major surface facing upwardly.

Figure 1b schematically discloses in a perspective view the pallet divider with a second major surface facing upwardly.

Figure 2a schematically discloses in a perspective view a pallet divider and a pallet before the pallet

divider is positioned on the pallet.

Figure 2b schematically discloses in a perspective view the pallet divider, the pallet, and a superstructure with the pallet divider positioned on top of the pallet but before the superstructure is positioned on top of the pallet divider.

Figure 2c schematically discloses in a perspective view the first pallet divider between the pallet and the superstructure, and a second pallet divider on top of the superstructure.

Figure 3a schematically discloses in a perspective view of two systems positioned side by side where each system comprises a pallet, a pallet divider, a superstructure, and a pallet divider.

Figure 3b schematically discloses in a perspective view the two systems stacked one on top of the other.

Figure 4 schematically discloses in a cross-sectional side view of a pallet divider.

Figure 5a-d schematically discloses in perspective views various alternative embodiments of a pallet divider.

#### Detailed description of preferred embodiments

**[0038]** Figure 1a discloses a pallet divider 100 in a first use mode. In this first use mode, the pallet divider 100 is positioned or oriented such that it is configured to be placed on top of a top side of a pallet 200 (as shown in figures 2a-b) and to receive the underside of a superstructure 300 (as shown in figure 2b-c).

**[0039]** Figure 1b discloses a pallet divider 100 in a second use mode with an orientation such that it is configured to be placed on top of a superstructure (as shown in figure 2c) and to optionally receive the bottom of a second pallet (as shown in figures 3a-b).

**[0040]** The pallet divider 100 comprises a body portion 110 which has four side edges 110a-d. The body portion 110 has a main extension which defines a first geometrical major surface A1 and a second geometrical major surface A2. The first geometrical major surface A1 is formed on one side of the body portion 110 and the second geometrical major surface A2 is formed on an opposite side of the body portion 110. The geometrical major surfaces A1, A2 are preferably rectangular. A rectangular shape typically corresponds to a corresponding extension of a pallet. It may be noted that the pallet divider may have other shapes if designed to be used with pallets having other shapes, such as any kind of polygonal shape, preferably a like sided polygonal shape or preferably a least symmetrical along one, preferably two, orthogonal lines, such as a triangle, preferably a like sided triangle, or an eight-sided polygon.

**[0041]** The pallet divider 100 comprises a first set of one or more rims 121a-d extending from the body portion 110 in a first direction N1. The first direction N1 is preferably normal direction to the first geometrical major surface A1. However, some or all of the rims 121a-d may be flared outwardly a few degrees, such as between

0-5°. Preferably, the rims 121a-d of the first set of rims each are provided along a respective one of all four side edges 110a-d of the body portion 110 of the pallet divider 100. Preferably, each of the rims 121a-d of the first set of rims is provided along the full length of the respective one of the four side edges 110a-d of the pallet divider 100. A first major surface A1 of the pallet divider 100 as disclosed in the embodiment shown in the drawings as a continuous surface, but it is appreciated that it may be textured, be broken up in interconnected islands or broken up by slots or other shapes, to e.g., aid in keeping load in the intended position. Alternatively or complementary thereto, the first geometrical major surface may have a pattern according to the side shown in Figure 1b to provide improved stability.

**[0042]** The pallet divider 100 comprises a second set of one or more rims 122a-d extending from the body portion 110 in a second direction N2. The second direction N2 is preferably normal direction to the second geometrical major surface A2. However, some or all of the rims 122a-d may be flared outwardly a few degrees, such as between 0-5°. The second direction N2 is substantially opposite the first direction N1; give or take a few degrees if any of the rims 121a-d, 122a-d are flared outwardly.

**[0043]** Preferably, the rims 122a-d of the second set of rims 122a-d of the pallet divider 100 are provided along all four side edges 110a-d of a body portion 110 of the pallet divider 100. Each of the rims 122a-d of the second set of rims may be provided along the full extension of the respective one of the four side edges 110a-d of the pallet divider 100. In the embodiment of figures 1a-b, the rims 122b, 122d extend continuously or fully along the long edges 110b, 110d of the pallet divider 100, and the rims 122a, 122c extend partially along the short edges of the pallet divider 100. The second set of rims 122a-d is configured to receive or confine an upper or lower portion of the pallet to further improve the stability of the interaction between the pallet divider 100 and pallet. The second set of rims 120a furthermore extends outwardly beyond the first set of rims 121a-d (as shown e.g., in Figure 1b), serving as, for example, a bumper in case of a collision with another pallet divider, pallet, superstructure or other object.

**[0044]** With reference to figure 1b, the pallet divider 100 is in this orientation configured to be placed on top of a superstructure as shown in Figure 2c, functioning as a lid. In a stack, another pallet can be placed on top of the pallet divider 100 in this position. The dimensions of the pallet divider 100 may correspond to the dimension of a standardized pallet or may be custom made to correspond to custom pallets and superstructures.

**[0045]** The webbing 111 of the pallet is substantially formed of a plurality of ribs or walls arranged in a criss-cross pattern that act as beams and increases the bending stiffness of the body portion 110. The webbing 111 may also provide friction between the pallet divider 100 and the pallet, contributing to a more stable interaction between the pallet divider and the pallet and to keep the

pallet divider 100 and the pallet in the desired position relative to each other. As shown in figure 1b, the webbing 111, rims 122a-d, and/or the load bearing surface A1 may be provided with drain holes or drain openings 112, 113, 114, respectively. In figure 1b, there is only indicated one drain opening 112 in the webbing 111. However, it is preferred that there is drain openings 112 such that all compartments along the outer perimeter are interconnected with at least one compartment that in turn is provided with a drain opening 113 in one of the rims 122a-d.

**[0046]** Figure 2a discloses how a pallet divider 100 is positioned on a pallet 200. Underneath the pallet divider 100, a pallet 200 is shown. The second set of rims 122a-d of the pallet divider 100 is configured to enclose an upper portion of the pallet 200, thereby providing stability to the stacked structure. The enclosure of the pallet 200 by the pallet divider 100 is such that there is minimal movement of the pallet divider 100 once it is placed on top of the pallet 200. The enclosure is, however, not too tight such that tension and/or strain arises in the pallet divider 100, which might impact the stability of the stacked structure. The pallet 200 may adhere to standardized measurements or may be custom made. The pallet divider 100 corresponds to the dimension of the pallet 200, which can be standardized or custom. The pallet 200 comprises a plurality of fork entries of various kinds 210a-b, and 210c-d, respectively, configured to admit a fork. The second set of rims 122a-d of the pallet divider 100 may extend less, or be missing, along the part of the side edges that correspond the location of the fork entries, such as e.g., fork entries 210a-b. In the embodiment shown in Figure 2a, the first set of rims 120a extend equally along the second direction N2 at the fork entries 210a-b as along the rest of the side edge(s) of the pallet. It is appreciated that the respective rim of the second set of rims 122a-d may, as is indicated in Figure 5b, be fully omitted, or extend less downwardly, along the fork entries 210a and 210b, respectively. In this design with portions of the rims 122a-d being omitted, or extending less downwardly, each of those portions has preferably a width W being slightly larger than the corresponding width of the respective fork entry 210a-b such that the two end points of the width W will be outside the width of the respective fork entry 210a-b. The second set of rims 122a-d may at the location of the fork entries, such as e.g., fork entries 210c-d be provided with cut-outs 124 extending from the free edge of the rim towards and preferably all the way to the body portion 111 such that there is formed a rim portion 122c', 122c'' at the respective fork entry, such as fork entries 210c-d, which rim portions 122c', 122c'' are more or less separated from the neighbouring portions of the respective rim 122c. It may be noted that each of the rims 120a-d of the second set of rims may be designed as a continuous rim with a height h2 along the second direction N2. This height h2 may be constant or varying along the length of the respective side edge 110a-d of the body portion 111. Also any of the examples

of reduced height, omitted, or recesses defining a portion more or less separated from the neighbouring parts of the rims may, but need not, be provided on the pallet divider 100 to be in register with any one of the fork entries 210a-d.

**[0047]** Figure 2b discloses the pallet divider 100 and pallet 200 as shown in Figure 2a stacked on top of each other, together with a superstructure 300. The superstructure is received by the second set of rims 120b of the pallet divider 100, thereby being restricted in its movement. The superstructure can be of any dimension suitable for the items that are to be transported. The material of the superstructure is dependent on the requirements for the stability and integrity of the of the superstructure. Suitable material may be metal, plastic, wood, or other rigid materials. The superstructure may be of basically any design. It may be formed of a plurality of levels being interlockingly stackable onto each other. It may be formed of a single superstructure of the desired height. The superstructure may be foldable such that it may be flat-laid. The superstructure may be provided with sections that are removable or foldable relative to the other parts such that there is provided easy access into the interior of the superstructure. In the embodiment disclosed in Figure 2b, the superstructure 300 is foldable about hinge portions 310a-d extending along the vertical corners and along hinge portions 310e-f extending vertically along a respective centre portion of the shorter sides 300a, 300c. In the embodiment disclosed in Figure 2b, the front 300d is formed of side portions 315a-b and a centre portion 315c. The side portions 315a-b are hingedly connected to the side walls 300a, 300c. The whole centre portion 315c is removable. The entire stack 400, e.g., the pallet 200, the pallet divider 100 and the superstructure 300 can be lifted by a forklift through the fork entries 210a-b or 210c-d of the pallet 200. This means that the contents of the superstructure 300 may be moved without the need to first remove the superstructure 300 from the stack.

**[0048]** As is shown e.g., in Figure 4, the respective side wall 300a-d of the superstructure 300 is configured to be positioned inside of the respective rim 121a-d of the first set of rims. The pallet divider 100 is further provided with a third set of rims 123a-d which extends from the body portion 111 along the first direction N1. These rims 123a-d preferably extends along a normal direction N1 of the first major surface A1, but may be flared inwardly a few degrees, such as between 0-5°. The rims 123a-d of the third set of rims are positioned a short distance inwardly from the respective rim 121a-d of the first set of rims. The rims 123a-d of the third set of rims may be continuous rims extending along the full length of the respective side 110a-d of the pallet divider. The rims 123a-d of the third set of rims may be in the form of intermittent pieces of rims. However, it is preferred that there is pieces of rims 123a-d at least in the corners. It is also preferred that there is pieces of rims at least in a central portion of each side 110a-d. The respective side

wall 300a-d of the superstructure is configured to be positioned outside of the respective rim 123a-d of the third set of rims. The respective side wall 300a-d is positioned between the respective rim 121a-d of the first set of rims and the respective rim 123a-d of the third set of rims. The first and third set of rims 121a-d, 123a-d may be said to form a groove along the side edges of the body portion 111 on the same side as the first major surface A1. The bottom of the groove may be on the same level as the first major surface A1. It is also conceivable that the bottom of the groove is offset a short distance along the first direction N1, such that there e.g., is provided space for some additional material thickness of the pallet divider 100 where forces from the superstructure 300 are transferred through the pallet divider 100 to the pallet 200. The third set of rims 123a-d may be omitted altogether. This is e.g., useful for cases where the superstructure is a rigid member without any hinges or the like. Alternatively, the third set of rims 123a-d may be omitted and the first major surface A1 may be provided with a step that extends in the second direction N2 thereby forming a groove extending around the perimeter of the body portion 110.

**[0049]** Figure 2c discloses a stack 400 of the components from Figure 2b with a pallet 200, a first pallet divider 100, a superstructure 300. A second pallet divider 500 is disclosed and configured such that it functions as a lid to superstructure 300, e.g., in the same position as the pallet divider as shown in figure 1b. The pallet divider 500 is of the same kind, preferably identical to, the pallet divider 100 and a separate reference numeral 500 is used merely to facilitate describing the different uses of the pallet divider 100 at the bottom and the pallet divider 500 at the top. In the configuration referred to as pallet divider 500 shown in the drawings, the rims 121a-d of the first set of rims extend downwardly along an outside of a top portion of the respective wall 300a-d of the superstructure 300. The rims 123a-d of the third set of rims extends along an inside of the top portion of the respective wall 300a-d of the superstructure 300. The second pallet divider 500 functions as a lid, which e.g., can be used to ensure safe storage of items inside the superstructure 300. During transport, the stack 400 typically includes a lid 500. When the stack 400 is moved within a production site of the like, the lid 500 may be omitted to facilitate access to the interior of the superstructure 300.

**[0050]** Figure 3a discloses a pair of stacks 401 and 402 with a respective lid 501, 502 positioned as indicated in Figure 2c. Any one of the stacks 401, 402 can be lifted by a fork through the fork entries of one of the pallets 201 and 202. The stacks 401 and 402 can be identical to each other, or they can be of different configurations, for example by having superstructures 301 and 302 of different heights. Preferably, the material of the superstructures 301 and 302 is the same as this provides a better structural integrity to the two stacks 401, 402 when they are placed on top of each other. In any case, it is preferred that the pallets 201, 202 are of the same kind, such as of

the same kind of standard pallet. It is also preferred that the superstructures 301, 302 are of the same kind, at least in the sense that their footprint is the same and that the respective top portions and bottom portions are designed similarly such that they will interact with the pallet dividers 101, 102, 501, 502 in the same manner. Thereby it is possible to have four pallet dividers 101, 102, 501, 502 being identical to each other.

**[0051]** Figure 3b discloses the stacks 401, 402 of Figure 3a placed, or stacked, on top of each other. Stack 401 can be lifted e.g., by a forklift to be placed on top of stack 402. When stack 401 is positioned on top of stack 402, the pallet 201 is placed on top of the second pallet divider 502 of stack 402. The rims 122a-d of the second set of rims will now form a trough-like structure and will receive a lower portion of the pallet 201. The rims 122a-d will extend upwardly along outside surfaces of the lower portion of the pallet 201 and thereby keep the pallet 201 of the upper stack 401 in place. Thus, depending upon where in the stack the pallet divider 100 is positioned, the pallet divider 100 may be said to assume a first or a second use mode. In figure 3b, the pallet dividers 101, 102 are in used according to the first use mode and the pallet dividers 501, 502 are used in the second use mode.

**[0052]** Figure 5a discloses a schematic view of a close-up of a lower portion of a stack 400 as shown before. The first set of rims 121a-d and the second set of rims 122a-d are configured to keep the pallet divider 100, the pallet 200 and the superstructure 300 in the intended position relative to each other. In the embodiment shown in figures 1-4 and 5a, the rims of the first set of rims 121a-d are provided as continuous rims along the full length of all sides. That is, the rims of the first set of rims 121a-d are provided along an outer portion as seen along the length of each side edge of the pallet divider 100, as well as along the centre portion. The rims of the second set of rims 122a-d are provided along outer portions of the respective side. In other words, the first set of rims 121a-d and the second set of rims 122a-d are positioned close to the corners of the pallet divider 100. In the embodiment shown in figures 1-4 and 5a, the first set of rims 121a-d and the second set of rims 120b form a continuous rim around the corner. It is, however, appreciated that the first set of rims 121a-d and the second set of rims 121a-d can be discontinuous, e.g., comprising of different parts that may join at the corners. In the embodiment shown in figures 1-4 and 5a, the second set of rims 122a-d are provided with cut-outs 124 along some parts of the extension of the rim thereby forming a discontinuous rim 122c. It may in this context be noted that the term cut-outs 124 is not intended to infer that they have to be formed by cutting away material but rather describe the shape. The cut-outs 124 may also be referred to as recesses 124. The cut-outs 124 may be formed to provide a flexibility to the rims. They may also double as drain holes 113 discussed above.

**[0053]** Figure 5b indicates a possible variation where the cut-outs 124 has been omitted. Figure 5b also in-

indicates a possible variation where the second set of rims 121a-d is missing or has a smaller extension along the second direction N2 along the fork entries 210a and 210b of the pallet 200.

[0054] Figures 5c-d disclose, similarly to figure 5a, a schematic view of a close-up of the lower portion of a stack 400 as shown before. Figure 5c indicates a possible variation with the second set of rims 122a-d extending around and forming a physical corner whereas the first set of rims 121a-d are missing close to a corner. Figure 5d indicates a possible variation with the first set of rims 121a-d extending around and forming a physical corner whereas the second set of rims 122a-d are missing close to a corner. These two may also be combined such that both the first set of rims 120a and the second set of rims 120b are provided along a centre portion of the length of the side edges of pallet divider 100 and missing along the outer portions close to the corners of the pallet divider 100.

[0055] It is appreciated that the various variations indicated in Figures 5a-d can be combined, e.g., in different permutations. The first set of rims 121a-d can be provided along an outer portion of the pallet divider 100, while the second set of rims 122a-d can be provided along a centre portion of the pallet divider 100, or vice versa.

[0056] Even though it is preferred that the pallet divider is designed in accordance with the disclosure in the detailed disclosure of preferred embodiments and the appended drawings, it should be noted that a specific preferred embodiment of a specific part does not necessarily have to be combined with a specific embodiment of another component. Thus, advantages associated with a specific embodiment, including one or more features of a specific part, may be accomplished even though the other parts are designed in accordance with the more general disclosure under the summary of the invention rather than being defined in accordance with the specific embodiment disclosed in the detailed description. It is contemplated that there are numerous modifications of the embodiments described herein, which are still within the scope of the invention as defined by the appended claims.

## Claims

### 1. Pallet divider (100) comprising

a body portion (110) having four side edges (110a-d) and a main extension defining opposing first and second rectangular, geometrical major surfaces (A1, A2),  
a plurality of rims or rim portions (121a-d, 123a-d) which extend from the body portion (110) in a first direction (N1) and which are provided on all the four side edges (110a-d),  
a plurality of protrusions (122a-d) extending from the body portion (110) in a second direction

(N2), the second direction (N2) being opposite the first direction (N1),

wherein the plurality of rims or rim portions (121a-d, 123a-d) include a first set of one or more rims (121a-d) which form an outer perimeter and/or a third set of one or more rims (123a-d) which form an inner perimeter such that the plurality of rims or rim portions (121a-d, 123a-d) of the first and/or the third set receive and/or span, respectively, and thereby keep, in a first use mode, a lower portion, and, in a second use mode, an upper portion of a pallet superstructure (300) in an intended position relative to the pallet divider (100),

wherein the plurality of protrusions (122a-d) includes a second set of one or more rims (122a-d) provided on all four side edges (110a-d), and forming an outer perimeter protruding such that the plurality of protrusions (122a-d), in the first user mode, receive an upper portion of a pallet, and, in the second use mode, are configured to receive a lower portion of an optional second pallet (200) and thereby keep the pallet divider (100) in an intended position relative to the respective pallet (200),

wherein the pallet divider (100) in the first use mode is configured to be positioned on top of the pallet (200) and beneath the superstructure (300) and be oriented in a first orientation with the first direction (N1) facing upwardly, and wherein the pallet divider (100) in the second use mode is configured to be positioned on top of the superstructure (300) and be oriented in a second orientation with the second direction (N2) facing upwardly such that a second pallet (200) optionally may be positioned on the pallet divider (100).

2. A pallet divider (100) according to claim 1, wherein the rims of the first set of one or more rims (121a-d) are provided at least along an outer portion as seen along the length of one or more, preferably all four side edges (110a-d).

3. A pallet divider according to claim 1 or 2, wherein the rims of the first set of one or more rims (121a-d) are provided along a centre portion of the length of each of the four side edges.

4. A pallet divider according to any one of the preceding claims, wherein the second set of one or more rims (122a-d) are provided along at least an outer portion as seen along the length of one or more of, preferably all four side edges.

5. A pallet divider according to any one of the preceding claims, wherein the second set of one or more rims are provided along a centre portion of the length of

one or more of the, preferably all four, side edges.

6. A pallet divider according to any one of the preceding claims, wherein the rims (122a-d) of the second set of one or more rims are configured to extend less in the second direction, or be missing, along a part of the length of respective side edge corresponding to a location of a fork entry of a pallet. 5
7. A pallet divider according to any one of the preceding claims, wherein the first geometrical major surface is a load bearing surface. 10
8. A pallet divider according to any one of the preceding claims, wherein the rims of the second set of one or more rims (122a-d) extend in the second direction (N2) past the second rectangular geometrical major surface (A2). 15
9. A pallet divider according to any one of the preceding claims, wherein the pallet divider (100) comprises plastic as a major constituent. 20
10. A pallet divider according to any one of the preceding claims, wherein the second geometrical major surface (A2) is defined by a plurality of structural elements (111) extending from and providing bending stiffness to the body portion (110). 25
11. A pallet divider according to any one of the preceding claims, further comprising a third set of rims (123a-d) extending from the body portion (110) in the first direction (N1) and being provided at a distance inwardly from the first set of rims (121a-d). 30  
35
12. A kit of parts for a pallet system comprising two pallet dividers (100) according to any one of claims 1-11, and a superstructure (300). 40
13. A pallet system comprising a pallet (200), a first pallet divider (100) according to any one of claims 1-11, a first superstructure (300), and a second pallet divider (100) according to any one of claims 1-11, arranged one on top of the other. 45
14. Pallet system according to claim 13, further comprising a second pallet (200) positioned on top of the second pallet divider (200), a third pallet divider (100) according to any one of claims 1-11, a second superstructure (300), and a fourth pallet divider (100) according to any one of claims 1-11, arranged one on top of the other. 50

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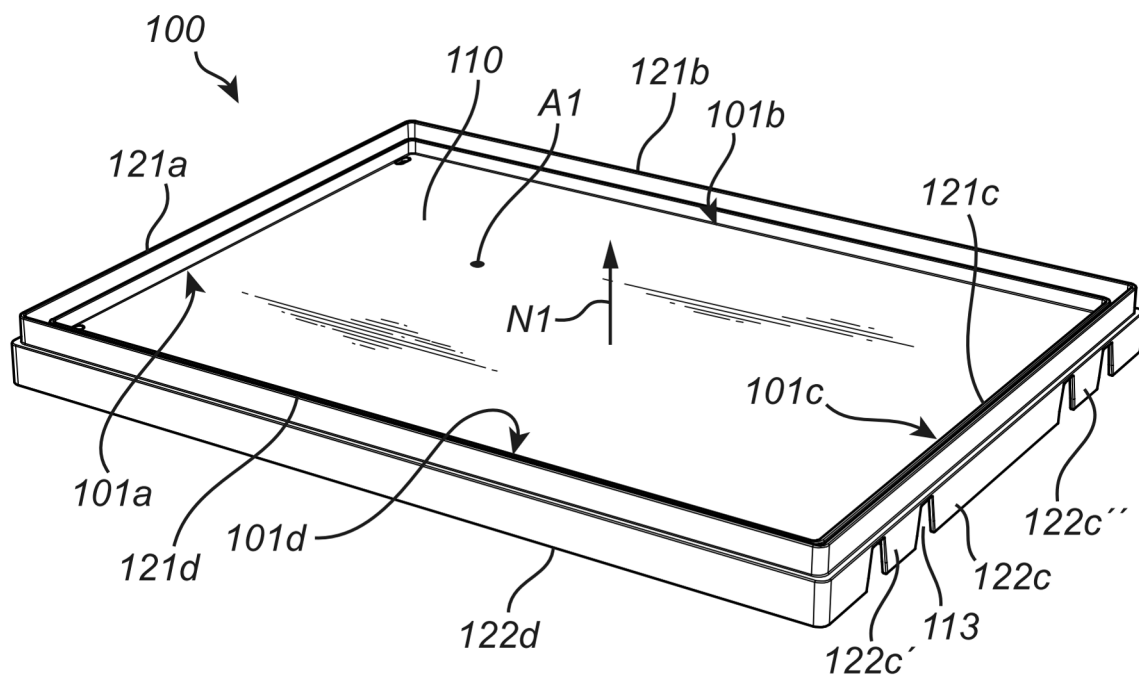


Fig. 1a

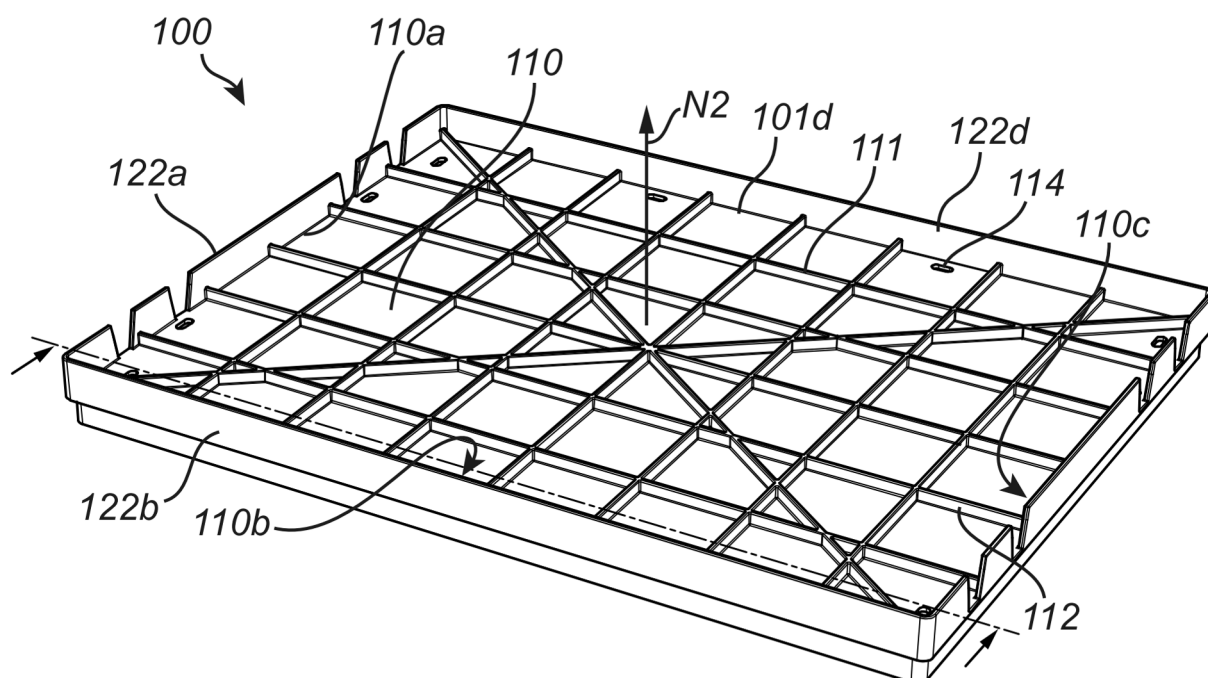


Fig. 1b

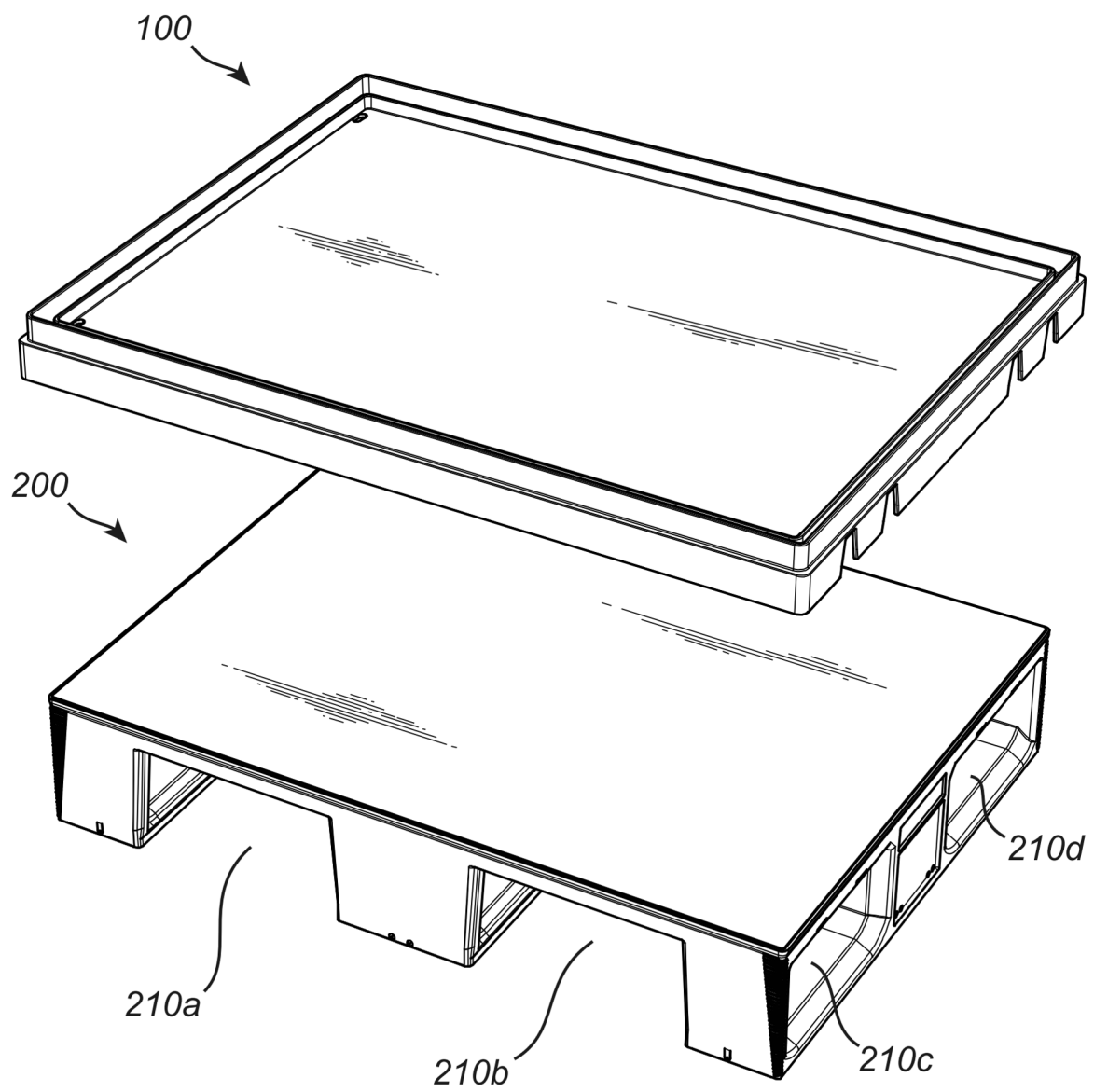


*Fig. 2a*

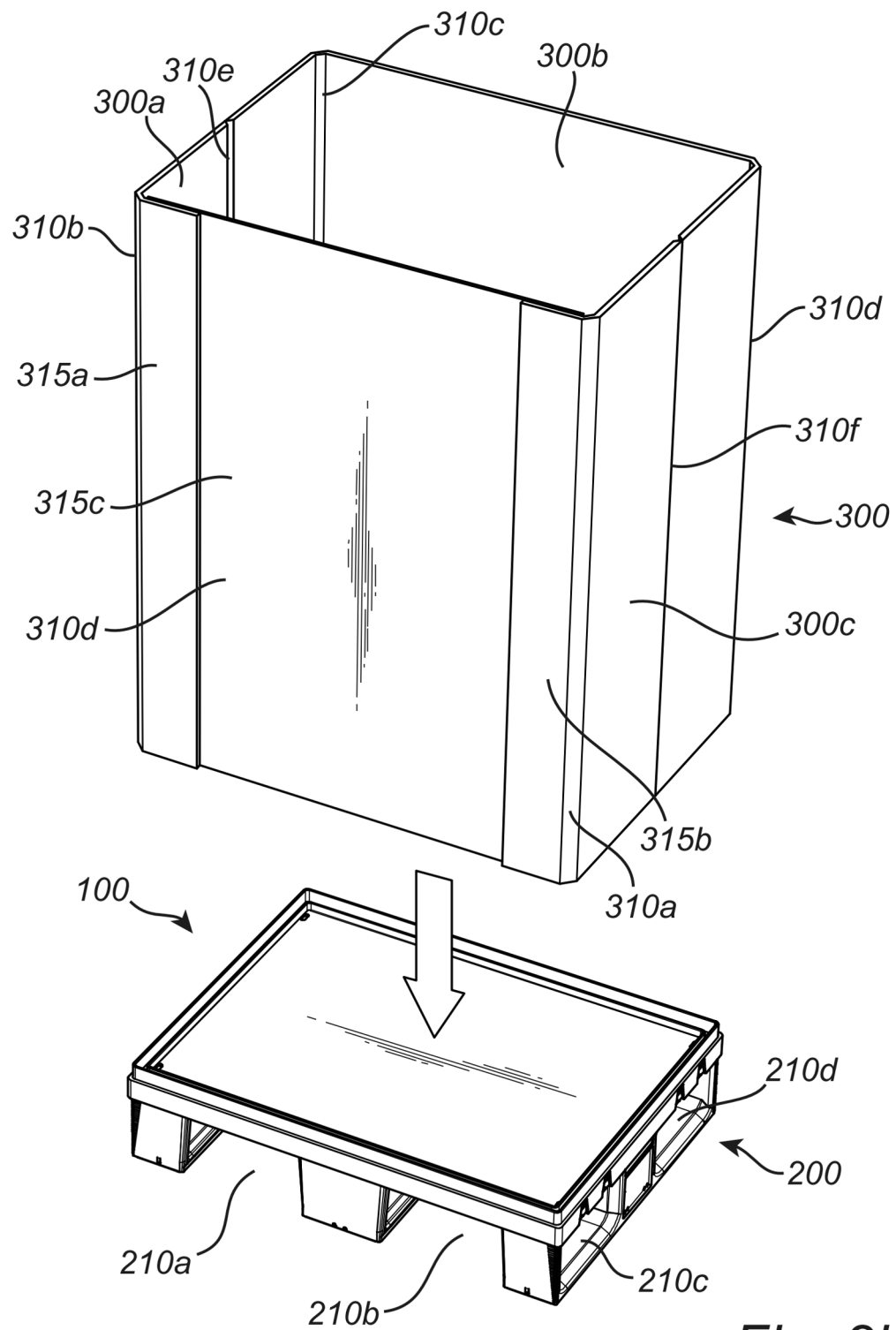
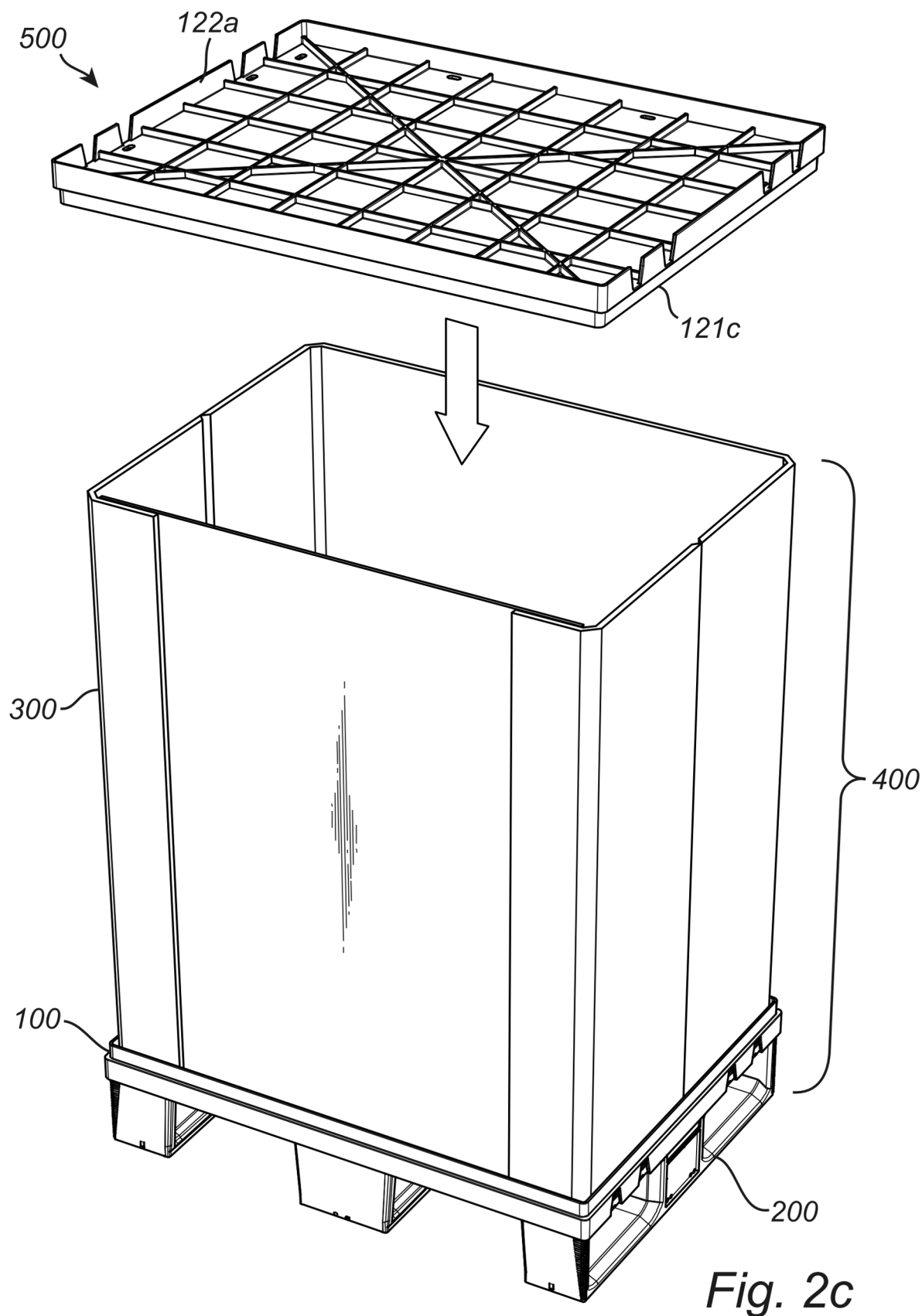


Fig. 2b



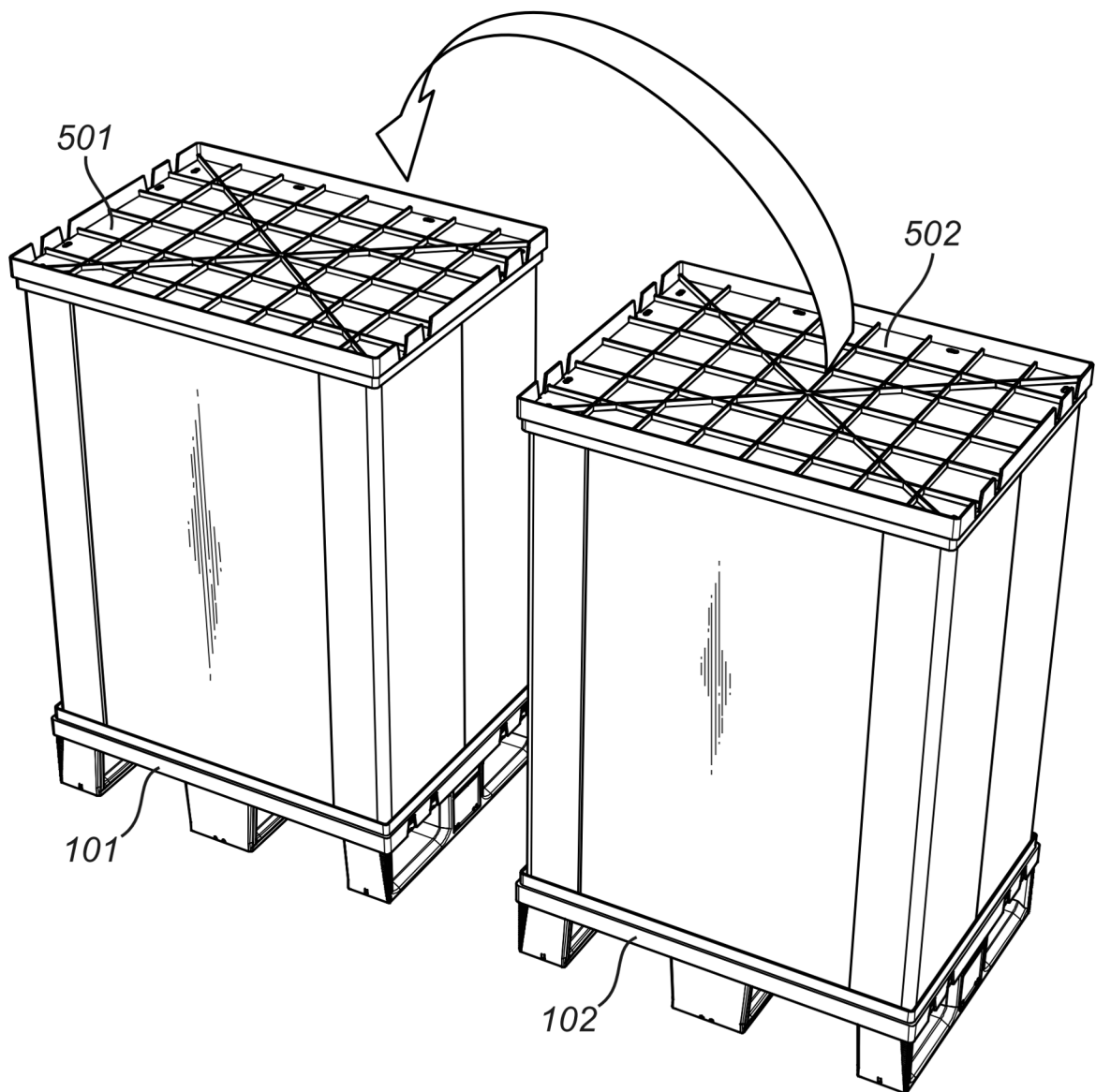


*Fig. 3a*

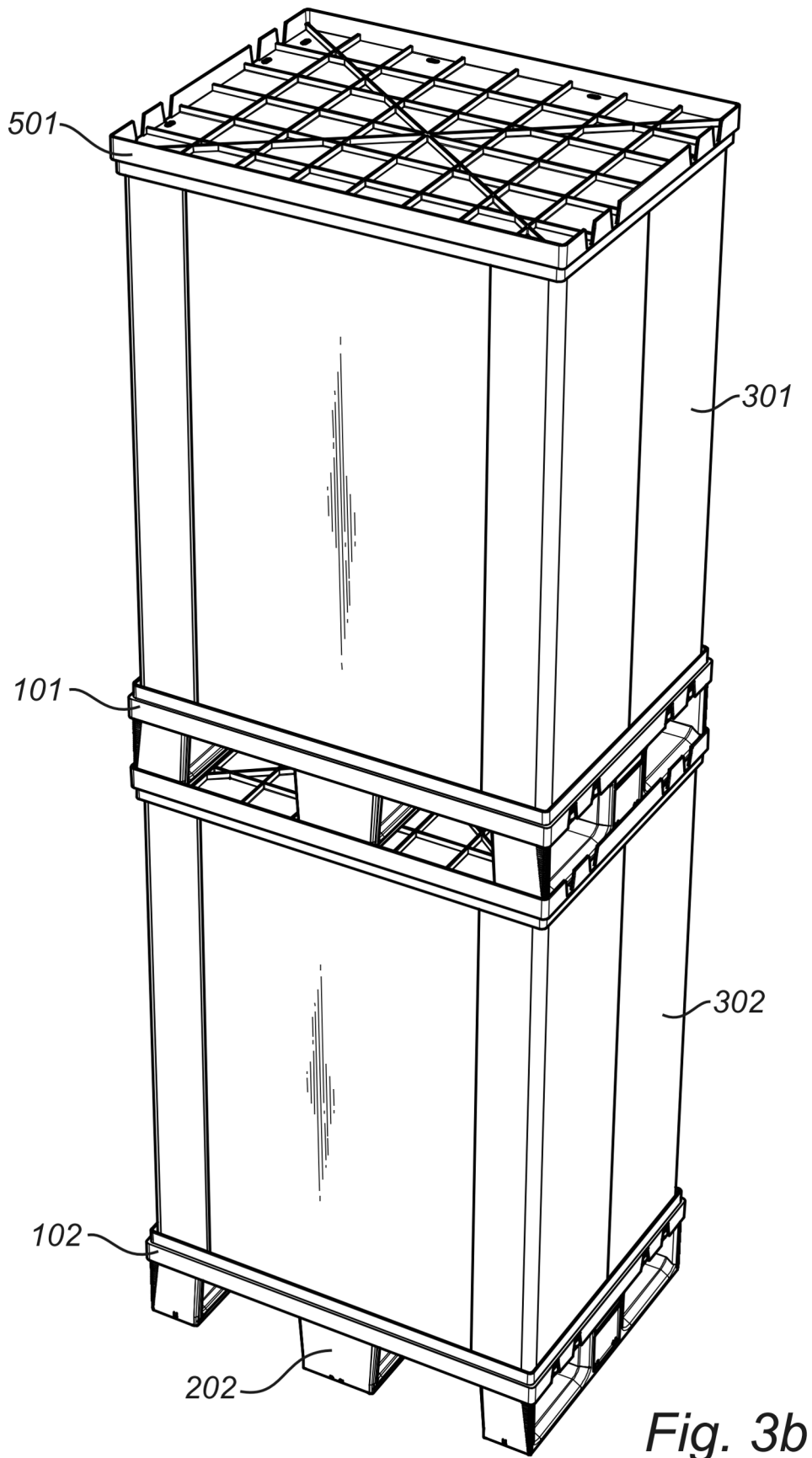


*Fig. 3b*

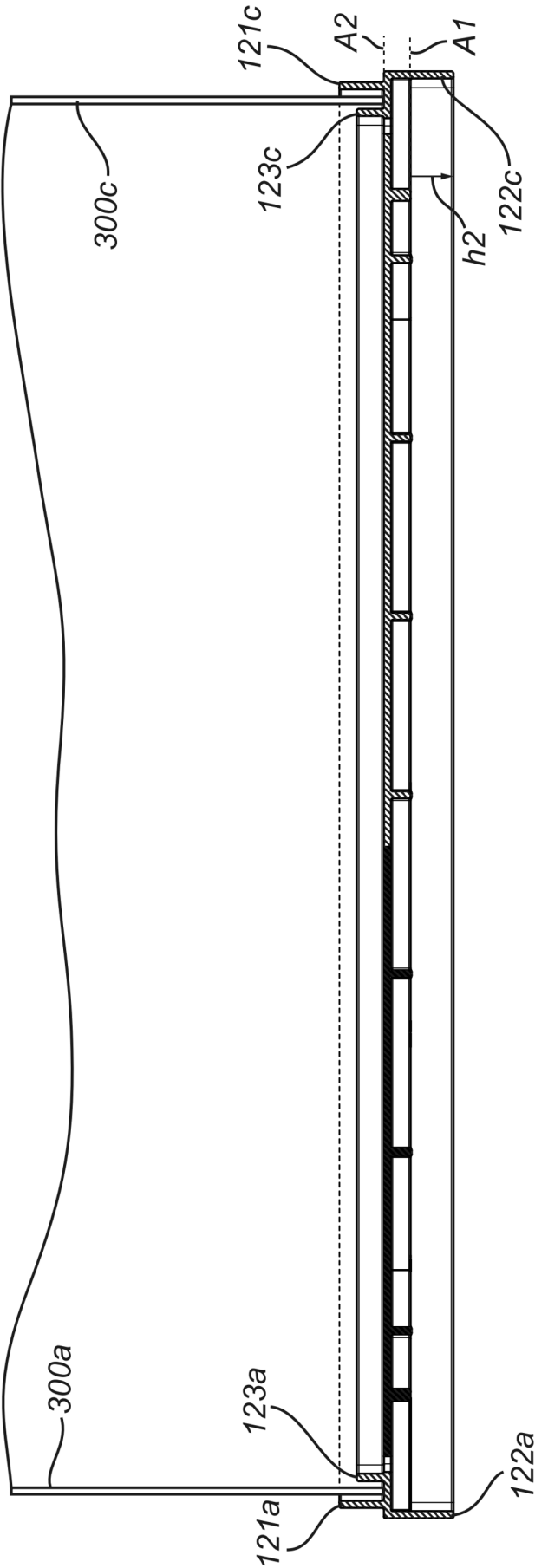
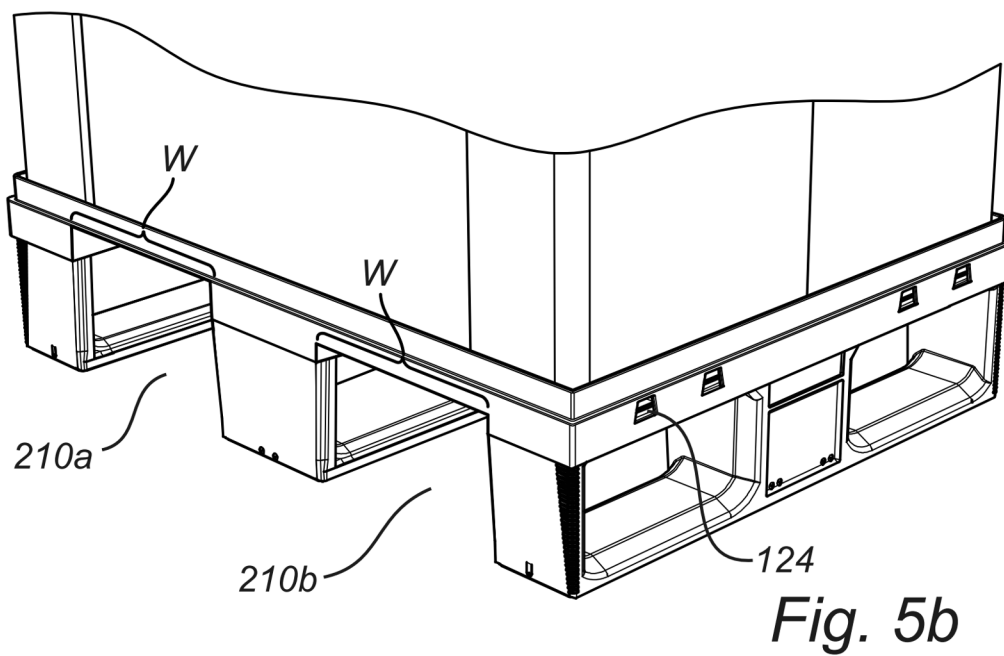
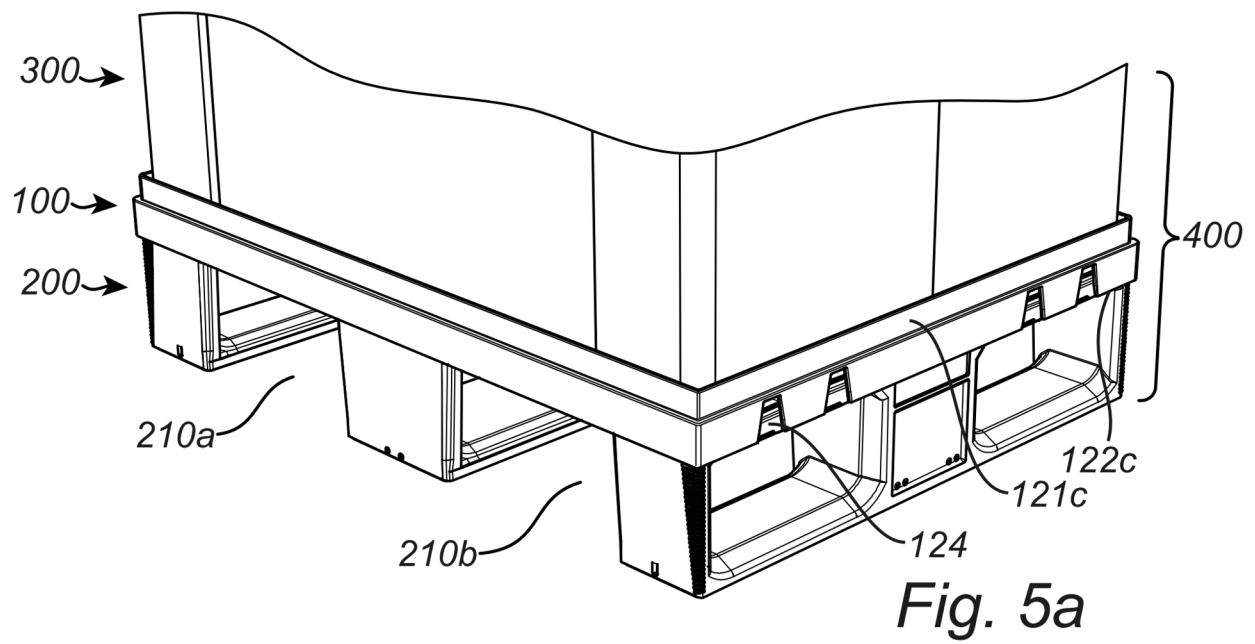


Fig. 4



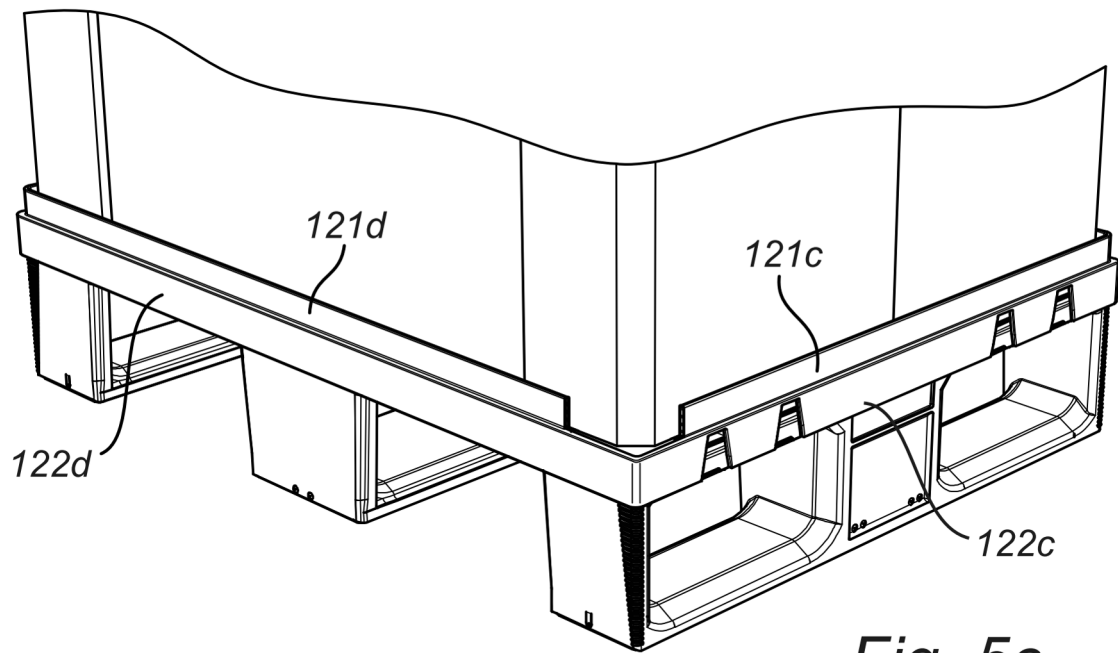


*Fig. 5c*

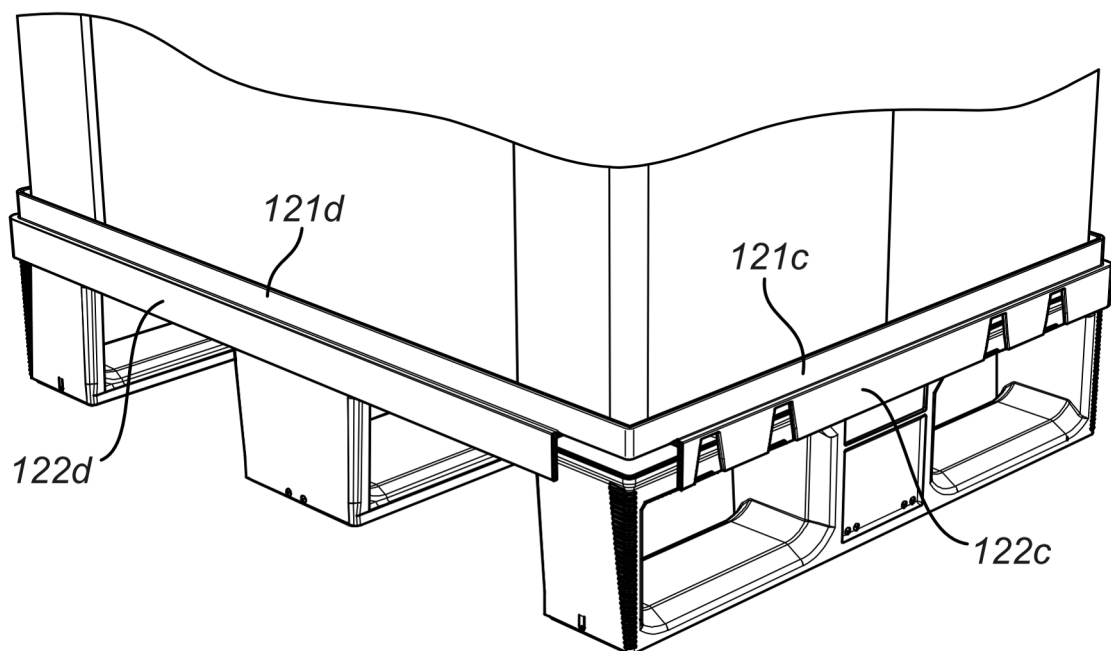


*Fig. 5d*



## EUROPEAN SEARCH REPORT

Application Number

EP 26 16 9522

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category                                                                         | Citation of document with indication, where appropriate, of relevant passages                                                     | Relevant to claim                | CLASSIFICATION OF THE APPLICATION (IPC) |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------|
| X                                                                                | DE 10 2006 022196 A1 (FESER MICHAEL [DE])<br>15 November 2007 (2007-11-15)                                                        | 1,2,4,<br>6-9,<br>11-14<br>10,14 | INV.<br>B65D19/06                       |
| Y                                                                                | * paragraph [0046] - paragraph [0063];<br>figures 1-3 *                                                                           |                                  |                                         |
| X                                                                                | US 2017/313487 A1 (THOMPSON BENJAMIN JOEL<br>[US] ET AL) 2 November 2017 (2017-11-02)                                             | 1,2,4,<br>7-14                   |                                         |
| Y                                                                                | * paragraph [0006] - paragraph [0030] *<br>* figures 1-5 *                                                                        | 14                               |                                         |
| X                                                                                | US 6 718 887 B1 (COOK SR DENNIS G [US])<br>13 April 2004 (2004-04-13)<br>* column 3, line 3 - column 6, line 47;<br>figures 1-7 * | 1-9                              |                                         |
| X                                                                                | US 6 488 200 B1 (JENSEN JR ROBERT F [US])<br>3 December 2002 (2002-12-03)                                                         | 1,2,4-9                          |                                         |
| Y                                                                                | * column 3, line 29 - column 8, line 37;<br>figures 1-7 *                                                                         | 14                               |                                         |
| X                                                                                | US 2021/276761 A1 (BANIK JOACHIM [US])<br>9 September 2021 (2021-09-09)                                                           | 1,2,4-9                          | TECHNICAL FIELDS<br>SEARCHED (IPC)      |
| Y                                                                                | * paragraph [0007] - paragraph [0041] *<br>* figures 1-10 *                                                                       | 10                               | B65D                                    |
| The present search report has been drawn up for all claims                       |                                                                                                                                   |                                  |                                         |
| Place of search                                                                  |                                                                                                                                   | Date of completion of the search | Examiner                                |
| Munich                                                                           |                                                                                                                                   | 29 July 2026                     | Fitterer, Johann                        |
| CATEGORY OF CITED DOCUMENTS                                                      |                                                                                                                                   |                                  |                                         |
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| Y : particularly relevant if combined with another document of the same category |                                                                                                                                   |                                  |                                         |
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# **ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.**

EP 26 16 9522

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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29-07-2026

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