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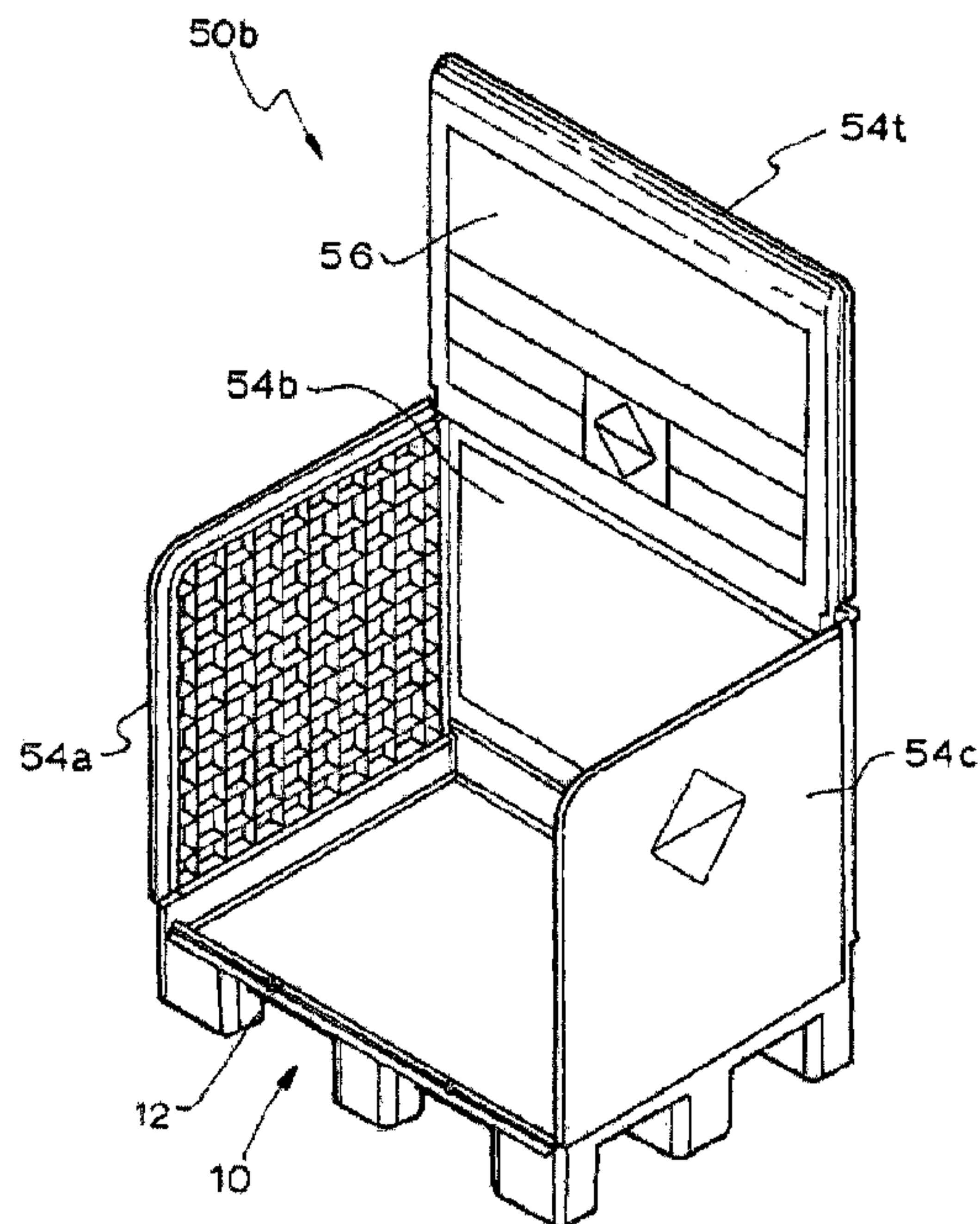


Fig.20b

(57) Abrégé/Abstract:

A pallet system (50b) is formed from a pallet (10) and a plurality of panels (54a, 54b, 54c, 54t and 56). The pallet (10) has a base (12) configured to receive members of a lifting apparatus to enable lifting of the pallet (10). The panels (54a, 54b, 54c, 54t and 56) are coupled to each other and the pallet (10) to enable the panels to be moved between a closed configuration and an open configuration. In the closed configuration the panels can surround and contain one or more articles on the pallet (10). In the open configuration one of the panels is positioned to provide an opening to enable transfer of an article through the opening onto or off of the pallet (10) in a direction substantially parallel to a plane of the pallet (10).

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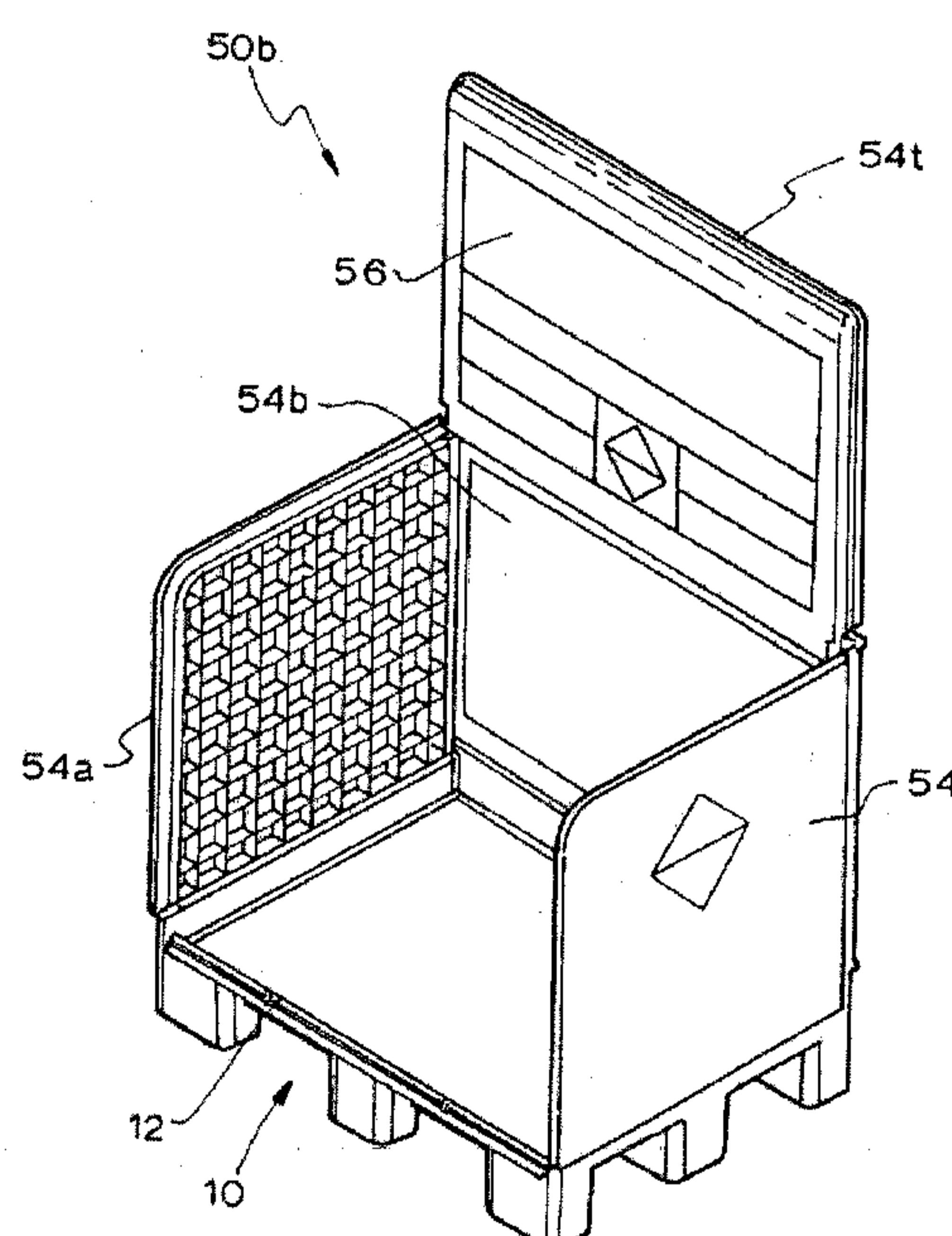
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(54) Title: PALLET AND PALLET SYSTEM



(57) Abstract: A pallet system (50b) is formed from a pallet (10) and a plurality of panels (54a, 54b, 54c, 54t and 56). The pallet (10) has a base (12) configured to receive members of a lifting apparatus to enable lifting of the pallet (10). The panels (54a, 54b, 54c, 54t and 56) are coupled to each other and the pallet (10) to enable the panels to be moved between a closed configuration and an open configuration. In the closed configuration the panels can surround and contain one or more articles on the pallet (10). In the open configuration one of the panels is positioned to provide an opening to enable transfer of an article through the opening onto or off of the pallet (10) in a direction substantially parallel to a plane of the pallet (10).

Fig.20b

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PALLET AND PALLET SYSTEM

Technical Field

5 A pallet and pallet system are disclosed. The pallet and pallet system may be used to store and transport articles and in particular, but not exclusively, articles comprising or containing hazardous waste. In an alternate application the pallet system may use as a point of sale goods transport, storage and display system.

10 Background Art

Articles comprising or containing hazardous waste may be stored and transported on pallets. The pallets may be in the form of traditional wooden pallets, or banded pallets made from plastics material. At times hazardous liquid leaks from the articles on the 15 pallet. Also an article may fall from a pallet when being lifted or transported. This can also result in the leakage of hazardous waste.

The above references to the background art do not constitute an admission that the art forms are part of the common general knowledge of a person of ordinary skill in the art. 20 The above references are also not intended to limit the application of the pallet system as disclosed herein.

Summary of the Disclosure

25 In a first aspect there is disclosed a pallet comprising:

a base configured to receive members of a lifting apparatus enabling the pallet to be lifted by the base, the base having a receptacle into which liquid falling onto the pallet drains and a support grate overlying the receptacle.

30 In one embodiment the pallet is configured to support the grate to form a void in the receptacle below the grate.

In one embodiment an absorbent pad disposed in the void.

35 In one embodiment the absorbent pad comprises a material having properties to neutralize action of the liquid.

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In one embodiment the support grate is demountably engaged in the base.

In a second aspect there is disclosed a pallet system comprising:

- 5 a pallet having a base configured to receive members of a lifting apparatus
- enabling the pallet to be lifted by the base; and
- a plurality of panels coupled to each other and the pallet in a manner to enable the panels be moved between a closed configuration where the panels can surround and contain one or more articles supported on the pallet, and a flat pack configuration the panels are moved to lay flat and overlie the pallet.

10

In a third aspect there is disclosed a pallet system comprising:

- 15 a pallet having a base configured to receive members of a lifting apparatus
- enabling the pallet to be lifted by the base; and,
- a plurality of panels coupled to each other and the pallet in a manner to enable the panels be moved between a closed configuration where the panels can surround and contain one or more articles on the pallet, and an open configuration where one of the panels is positioned to provide an opening to enable transfer of an article through the opening onto or off of the pallet in a direction substantially parallel to a plane of the pallet.

20

In one embodiment the pallet is a banded pallet. This is the pallet may comprise a base having a receptacle into which liquid falling onto the pallet drains.

- 25 In one embodiment when the panels are in the open configuration the one panel is arranged to lie substantially parallel with and above a second of the panels.

In one embodiment when the panels are in the open configuration the one panel is arranged to lie substantially parallel with and overlie a third of the panels.

- 30 In one embodiment at least three of the panels are pivotally coupled together about mutually parallel pivot axes.

In one embodiment two of the at least three panels comprise the one panel and the second panel.

35

In one embodiment a further one of the at least three panels comprises the third panel.

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In one embodiment when in the closed configuration the panels collectively form an enclosure that extends about and over the pallet.

5 In one embodiment when in the closed configuration the panels collectively form an enclosure that extends about and over the pallet, wherein the one panel is parallel with the third panel and the second panel is spaced from and extends over the pallet.

In one embodiment the plurality of panels comprises a fourth panel and a fifth panel each of which is pivotally coupled to the pallet.

10

In one embodiment the panels are arranged to form a weatherproof enclosure when in the closed configuration to substantially prevent ingress of liquid onto the pallet.

15 In one embodiment the base comprises: a receptacle in which liquid falling onto the pallet drains, and wherein the pallet has a support grate overlying the receptacle; and, an absorbent pad disposed in the receptacle.

20 In one embodiment the panels are further arranged to enable them to be moved to a stack configuration wherein the one panel is positioned to provide an opening to enable transfer of an article through the opening onto or off of the pallet in a direction substantially parallel to a plane of the pallet and wherein the one panel is behind another of the panels when viewed in a direction from the opening toward the pallet wherein a pallet of a second pallet system can be stacked on the pallet system.

25 25 In one embodiment at least one of the panels has a continuous surface to prevent liquid from passing through the panel.

In one embodiment at least one of the panels is made of a plastics material.

30 30 In one embodiment at least one of the panels comprises a metal frame.

In one embodiment of the third aspect the panels are further arranged to enable them to be moved to a flat pack configuration where the panels lay flat on and overlie the pallet.

35

In one embodiment when in the flat pack configuration the one panel is uppermost.

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In a fourth aspect there is disclosed a pallet system comprising:

- a pallet having a base configured to receive members of a lifting apparatus enabling the pallet to be lifted by the base; and a plurality of panels coupled to each other and the pallet, the panels being configurable in a plurality of relative juxtapositions without decoupling from the pallet, and wherein in one configuration the panels together with the pallet form an enclosed space in which articles supported on the pallet can be located.
- 5

In one embodiment a first of the panels is coupled to other panels in a manner to
10 enable the first panel to form a gate or door that can be moved from a closed position that prevents access into the enclosed space and an open position in which the first panel is disposed above another of the panels and opens to an enclosed space to enable transfer of an article through the opening onto or off of the pallet in a direction substantially parallel to a plane of the pallet.

15

In one embodiment of each or any of the second to fourth aspects each panel is pivotally coupled to at least one of: (a) another panel; and (b) the pallet.

In a fifth aspect there is disclosed a pallet system comprising:

- 20 a pallet having a base configured to receive members of a lifting apparatus enabling the pallet to be lifted by the base; and,
- 25 a fence demountably connectable to the pallet the fence comprising a plurality of panels, the fence having a closed state where the fence is able to extend wholly about a periphery of the pallet, and an open state where one of the panels is positioned to provide an opening in the fence to enable transfer of an article through the opening onto or off the pallet.

In one embodiment the pallet comprises one or more recesses for receiving the fence.

- 30 In one embodiment the one or more recesses comprise a plurality of holes and the fence comprises a plurality of elements configured to seat in the holes.

35 In one embodiment the one panel is arranged to engage and disengage remaining panels to close or open the opening by relative motion in a plane parallel to a plane of the gate.

In one embodiment the one panel is arranged to connect to a second panel in a

- 5 -

position elevated with respect to the second panel when the fence is in the open state.

In one embodiment the second panel is opposite the opening when the fence is in the open state.

5

In one embodiment the one panel carries indicia relating to one or more of loading limits of the pallet or safe handling of articles on the pallet.

10 In one embodiment an inwardly facing surface of the fence comprises an electrically insulating material.

In one embodiment the plurality of panels are pivotally coupled to each other.

15 In one embodiment the base comprises one or more of channels configured to receive one or more times of a forklift truck.

In one embodiment the base comprises a receptacle in which liquid falling onto the pallet in an area surrounded by the fence drains, and wherein the pallet includes a support grate overlying the receptacle.

20

Brief description of the Drawings

Notwithstanding any other forms which may fall within the scope of the pallet system as set forth in the Summary, specific embodiments will now be described, by way of 25 example only, with reference to the accompanying drawings in which:

Figure 1 is an exploded view of an embodiment of the pallet from the top;

Figure 2 is an exploded view from the bottom of the pallet shown in Figure 1;

Figure 3 is a section view of the pallet;

30 Figure 4 is a schematic representation of an absorbent pad which may be incorporated in the pallet;

Figure 5 is a schematic representation of a first embodiment of a pallet system incorporating a pallet of the type shown in Figures 1 – 3 and a fence in a disassembled state;

35 Figure 6 is a representation of the pallet system shown in Figure 5 with the fence in the process of being coupled to the pallet;

Figure 7 is a schematic representation of the pallet system illustrating a gate of the

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- fence connectable in two different positions;
- Figure 8 is a schematic representation of a second embodiment of a pallet system in the closed configuration;
- Figure 9 depicts a pallet system of Figure 8 in a partially open configuration;
- 5 Figure 10 depicts a pallet system of Figure 8 in the open or display configuration;
- Figure 11 depicts a pallet system of Figure 8 in a partially closed or flat pack condition;
- Figure 12 depicts the pallet system of Figure 8 further progressed toward but not in the flat pack configuration;
- Figure 13 depicts a pallet system of Figure 8 in the flat pack configuration;
- 10 Figure 14 is a perspective view of a third embodiment of the pallet system in a closed configuration;
- Figure 15 is a perspective view of a pallet incorporated in the pallet system of Figure 14;
- 15 Figure 16a depicts an inside view of one of the panels incorporated in the panel system of Figure 14;
- Figure 16b depicts an outside view of the same panel of the pallet system of Figure 14;
- Figure 16c is an end view of a portion of the panel shown in Figure 16a;
- Figure 17 is a perspective view of a back panel incorporated in the pallet system of Figure 14;
- 20 Figure 18 is a perspective view of a top panel incorporated in the panel system of Figure 14;
- Figure 19 is a perspective view of a front panel incorporated in the pallet system of Figure 14;
- Figures 20a – 20f depict in sequence the reconfiguration of the panels of the pallet
- 25 system shown in Figure 14 moving from a closed configuration to a flat pack configuration; and,
- Figure 20g depicts a plurality of panel systems of the type shown in Figure 14 in the flat pack configuration and stacked on top of each other.
- 30 Detailed Description of the Preferred Embodiments

Figure 1 illustrates an embodiment of a pallet 10. The pallet 10 in this embodiment is a banded pallet and comprises a base 12 having a receptacle 14 into which liquid falling onto the pallet 10 can drain. The base 12 in this embodiment is of a generally rectangular configuration and is provided with four sides 16a, 16b, 16c and 16d (hereinafter referred to in general as "sides 16"). As seen clearly in Figures 1 and 3, in the inner surfaces 18a – 18d (hereinafter referred to in general as "inner surfaces 18")

of the sides 16 are formed, at mid-height level, with a reduction of thickness to form a ledge 20 which extends wholly about receptacle 14. A planar liquid impervious wall 22 extends across and perpendicular to the sides 16 to form a bottom wall of the receptacle 14. Thus the receptacle is defined by the inner surfaces 18 of the sides 16
5 and the wall 22.

A grate 24 having a matrix of openings 26 is demountably supported in the base 12 by sitting on the ledge 20. When the grate 24 is seated on the ledge 20, upper surface 30 of the grate 24 lies flush with an upper surface 32 of the sides 16.
10

Strengthening ribs 34 are formed integrally with a surface of the wall 22 outside of the receptacle 14. A plurality (in this instance nine) legs 36 are formed integrally with and depend from the matrix of ribs 34. The legs 36 themselves are arranged in a 3x3 matrix like pattern. Further, the legs 36 are mutually spaced apart to create channels
15 38 there between. The channels 38 are configured to enable the pallets 10 to be lifted by the base. For example this may be achieved by inserting or otherwise placing the tines of a forklift truck into respective parallel channels 38.

With reference to Figure 1, the inner surfaces 18 at corners 40 of the base 12 extend
20 diagonally to form respective diagonal surfaces 42. In this embodiment recesses in the form of holes 44 are formed at each corner 40 between the diagonal surface 42 and the adjacent sides 16 of that corner 40. However in alternate embodiments described later in the specification the recesses 44 are not required and thus not provided.
25

When the grate 24 is seated on the ledge 20 a void 46 is created between the wall 22 and a facing underside of the grate 24. The void 46 corresponds to the space bound by the wall 22, inner surfaces 18 and diagonal surfaces 42 up to the ledge 20. An absorbent mat or pad 48 can be optionally provided to substantially fill the void 46.
30 The pad 48 is made of a material which is able absorb and thereby contain liquid which drains into the receptacle 14. Thus, if the pallet 10 is dropped or held at an angle inclined to the horizontal, liquid in receptacle 22 which is absorbed by the pad 48 will be retained within the pad 48 and thus does not spill from the pallet 10. In some embodiments the pad 48 comprises or includes a material which is able to neutralize adverse effects or undesirable characteristics of liquid which may drain into receptacle
35 22. For example, when the pallet 10 is used to carry lead acid batteries, the pad 48 may contain a chemical to neutralize battery acid which may spill from the batteries into the receptacle 22.

Figures 5 – 7 depict a basic embodiment of a pallet system 50 which comprises the pallet 10 together four demountably connectable panels namely: left hand panel 54a; back panel 54b; right hand panel 54c (hereinafter referred to in general as “panels 54”) 5 and a further panel 56 which can act as a gate or door (shown in Figure 7). The panels 54 are pivotally coupled together so that they can be folded or pivoted onto each other to form a flat pack for transportation purposes. Each of the panels 54 is of a length substantially equal to a length of a side 16 of the pallet 10. The panels 54 are provided with depending feet or pins 58 which are configured and located so as to seat 10 in or otherwise engage the holes 44. In this instance, a middle panel 54b is formed with two feet 58 while opposite panels 54a and 54c are each with one foot 58.

Each panel 54 and the panel 56 comprise an outer frame 55 in the configuration of an inverted “U” with a straight and elongated bottom. Free ends of the frame 55 form the 15 legs 58. Two spaced apart flat cross members 57 extend across the outer frame 55. A slat 59 extends perpendicular to and across the cross members 57 and to the outer frame 55. In one embodiment the outer frame 55, cross members 57 and slat 59 are made from a metal such as but not limited to aluminum.

- 20 The panels 54 and 56 can be coupled to each other and the pallet in a manner to enable the panels be moved between a closed configuration where the panels can surround and contain one or more articles on the pallet, and an open configuration where one of the panels is positioned to provide an opening to enable transfer of an article through the opening onto or off of the pallet in a direction substantially parallel to 25 a plane of the pallet. In the closed configuration the panel 56 is coupled between the panels 54a and 54c. The open configuration is shown in Figure 7, where the panel 56 is moved to lie parallel with and above the back panel 54b to form an opening 60 to allow article to be placed on or taken from the pallet 10.
- 30 Each of the panels 54a and 54c distant the panel 54b is provided with two aligned sleeves 62. The sleeves 62 may be generally aligned with the adjacent ends of the cross members 57. A single sleeve 64 is provided on opposite sides of the panel 54b at a location near opposite ends of its upper most cross member.
- 35 Two depending lower and upper fingers 66 and 68 respectively are fixed to each side of the panel 56. The fingers can engage with the sleeves 62 of panels 54a and 54c to close the opening 60. In this configuration the panels 54 and 56 together form a fence

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52 that extends wholly about the periphery of (i.e. surrounds) the pallet 10. This prevents articles on the pallets 10 from falling from the pallet as may otherwise occur when pallet 10 is being transported, lifted or otherwise moved.

5 When it is desired to load articles onto or unload articles from the pallet system 50 the panel 56 can be moved by decoupling it from the sleeves 62 to thereby create the opening 60 and reconnected or engaged with the panel 54b by locating the fingers 66 in the sleeves 64. This can be performed by lifting then lowering of the panel 56 relative to the other panels 54 in a plane of the panels. When the panel 56 is engaged
10 with the sleeves 64 is elevated with respect to the remaining panels 54 and can act as or can otherwise carry a sign. For example the panel 56 can be provided with a sign, indicia or markings 59 to provide information regarding loading limits of the pallet 10 or safe handling of articles on the pallet 10. The sign, indicia or markings 59 may also include hazardous waste warnings.

15

Inwardly facing surfaces 70 of the panels 54 and 56 may comprise an electrically insulating sheet 72 made from plastics material. The provision of the electrically insulating material is particularly beneficial when the system 50 is used for the collection and transport of lead acid batteries. In this regard, if a battery were to tip or
20 to otherwise fall so that its terminals bear against the sheet 72, the terminals would be prevented from electrically shorting.

Figures 8 – 13 depict a second embodiment of a pallet system 50a. In describing the pallet system 50a the same reference numbers as used in relation to the description of
25 the pallet system 50 will be used to denote the features that have the same or similar function.

The pallet system 50a is very similar in structure and operation to the pallet system 50 with the significant differences being that in the pallet system 50a, an additional top
30 panel 54t is coupled between the panel 56 and the back panel 54b; and each of the panels 54, 56 is coupled to at least either one other pallet, or the pallet 10. For example, panel 56 is coupled to panel 54t; panel 54c is coupled to the pallet 10, panel 54b is pivotally coupled to the pallet 10 and to panel 54t; and panel 54a is coupled to the pallet 10. As in the pallet system 50, in the pallet system 50a each panel 54, 56 is
35 made of a metal frame and may carry insulating sheets 72. The pallet 10 in this embodiment need not, but if desired may, include the grate 24 or the pad 48 of the system 50. In this embodiment of the pallet system 50a which is being used for the

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purpose of waste management where the waste may comprise or contain a liquid the pallet 10 is illustrated as a banded pallet so that it can contain a volume of liquid that may leak or spill. However if the pallet system 50a is being used for or as a point of sale device then the pallet 10 need not be a banded pallet. Rather in that instance an 5 unbanded or regular pallet can be used.

As in the first embodiment in the pallet system 50a, the panels 54, 56 are reconfigurable in a plurality of relative juxtapositions. One of these juxtapositions corresponds to the panels being in a closed configuration where the panels 54, 56 can 10 surround and contain one or more articles on the pallet 10. This configuration is shown in Figure 8. As will be immediately apparent in this configuration the top panel 54t extends over the pallet 10 and above each of the other panels 54a, 54b, 54c and 56. This differs from the pallet system 50 in which there is no equivalent top panel. Thus with the pallet system 50a, the panels 54, 56 together with the pallet 10 form an 15 enclosed space when the panels are in the closed configuration.

Each of panels 54a, 54b and 54c is pivotally coupled to the pallet 10. In this embodiment the pivot coupling is by way of a plurality of upright posts 80 formed or attached at each corner of the pallet 10 and respective pivot pins 84a, 84b, 84c (herein 20 after referred to in general as "pivot pins 84") shown in Figures 10 and 11 that connect the respective panels to the posts 80. The panel 54t is pivotally coupled along one side to the panel 54b; and is pivotally coupled at an opposite side to the panel 56.

In order to move the panels from the closed configuration to an open configuration, the 25 panel 54t is pivoted upwardly about the pivot with panel 54b so as to in effect lift the panel 56 from the pallet 10. A transition state of the panels moving from the closed to the open configuration is shown in Figure 9.

Figure 10 depicts the panels in the open configuration. Here the panel 56 overlies the 30 panel 54t and is parallel with both panel 54t and the panel 54b. Further, panel 56 is disposed above the panel 54b. The insulating sheet 72 on the panel 56 also bears indicia or markings to acts the sign 59. In this instance the sign 59 carries both advertising material and safety warnings. When the panels 54, 56 are in the 35 configuration shown in Figure 10, then articles such as batteries can be loaded onto the pallet 10 by way of front loading. That is, a person may simply transfer a battery onto or from the pallet 10 by moving it in a general direction parallel to the plane of the pallet 10.

Figures 11 – 13 show the panels being progressively moved to a flat pack position in which all of the panels are laid flat on and overlie the pallet 10. Moving the panels to the flat pack position may be achieved by initially pivoting the panels 54a and 54c, one 5 after the other inwardly to lie over the pallet 10. Next, the panel 54t (together with overlying panel 56) is pivoted toward the pallet 10 and in front of the panel 54b. This is depicted in Figure 12. (But in an alternative scenario which is not shown, the panel 54t together with overlying panel 56 can be pivoted away from the pallet 10 to behind the panel 54b.) Lastly, the panel 54b is pivoted forward to overlie the pallet 10 and the 10 previously folded panels 54a and 54c. The panels 54, 56 and indeed the pallet system 50 are now in the flat pack position.

The panels 54a, 54b and 54c are pivotally coupled by their respective pivot pins 84 at different heights to the respective posts 80 to enable the panels 54, 56 to lay flat. In 15 particular, in this embodiment, panel 54a it is pivotally coupled to post 80 by pivot pins 84a (see Figure 10) which are located near the pallet 10. The panel 54b is pivotally coupled by pivot pins 84b to the posts 80 in a plane parallel to and distant the pallet 10. The panel 54c is coupled to the posts 80 by pivot pins 84c that lay in a plane parallel to the pallet 10 and in-between the pins 84a and 84b. By folding or laying flat the panels 20 54 in a sequence commensurate with increasing vertical distance from their pivot pins 84 to the panel 10, the panels can be folded or laid down to form the flat pack configuration shown in Figure 13. Most specifically the panels 54 are folded down in the order of panel 54a first, then panel 54c, and lastly panel 54b.

25 The pins 84b which are displaced at the greatest vertical distance from the panel 10 are nonetheless disposed inboard of the upper most ends 86 of the posts 80. Therefore when the panels 54, 56 are in the lay flat configuration shown in Figure 13, a seat 88 is formed on an inside of the posts 80. The seats 88 can receive the bottom of feet 36 in the corners of another pallet system 50a to facilitate stacking of the pallet 30 systems 50a.

The pallet system 50a is also provided with a plurality of catches or latches that enable the panels 54, 56 to be releasably engaged to each other in various relative juxtapositions. In one example, the latches/catches may be arranged to enable 35 engagement and disengagement by way of resilient snap action. Figure 11 illustrates as an example one form of latch 90 provided on the panel 54b. The latches 90 comprise hook like structures that are able to resiliently spring open and subsequently

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close about sides of the panels 54a and 54c. The precise structure and operation of the latches/catches is not a critical aspect of the pallet systems 50. Any type of latch/catch that enables the releasable engagement of the panels will suffice. The latches/catches are arranged to enable engagement of the panels 54, 56 in at least the 5 following configurations:

- (a) the closed configuration depicted in Figure 8 where the panel 54b is engaged with the panels 54a and 54c, and the panel 56 is engaged with the panels 54a and 54c. Further, stops 92 are provided in the posts 80 to seat bottom corners of the panel 56 when in the closed configuration;
- 10 (b) the open or display configuration shown in Figure 10 where each of panels 54a, 54b and 54c is upright and panel 56 is parallel with and above panel 54b;
- (c) an unload or dump configuration where the where each of panels 54a, 54b and 54c is upright and both of panels 54t and 56 are folded back 15 behind and mutually parallel with the panel 54b (in this configuration the pallet system 50a can be picked up for example with a forklift truck and tipped to enable dumping of articles on the pallet 10); and
- (d) a flat pack configuration where the panels 54, 56 are in the folded down configuration as depicted in Figure 12.

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Figures 14 – 20g depict a further embodiment of a pallet system 50b and components thereof. In broad terms, the pallet system 50b differs from the pallet system 50a by way of the physical structure and configuration of the panels 54, 56 and the pallet 10. However the functionality and operation of the pallet system 50b and its component 25 parts is in substance the same as that for the pallet system 50a. The pallet 10 in the pallet system 50b need not, but if desired may, include the grate 24 or the pad 48 of the system 50. Further as described in relation to the system 50a, the pallet 10 in system 50b is shown as a banded pallet but if used for a purpose where containment of waste materials is not an issue the pallet 10 may be a or regular pallet.

30

Each of the panels 54 and 56 of the pallet system 50b is formed with a continuous surface to prevent liquid from passing through the panels. Conveniently, this may be achieved by forming each of the panels 50, 56 from a plastics material. Further, the panels 54, 56 and the pallet 10 are formed so that when in the closed configuration 35 together they define a substantially enclosed space that is also substantially weatherproof. This arises from relatively close fitting of the edges of the panels 54 and 56 when in the closed configuration.

- With specific reference to Figure 15, the pallet 10 is of the same general configuration and performs the same function as the pallet 10 in the first and second embodiments of the pallet systems 50 and 50a. However the pallet 10 in the system 50b does differ
- 5 by the staggering of the heights of the walls 16a – 16d and the provision of integrated hinge portions 96a, 96b and 96c(hereinafter referred to in general as "hinge portions 96"). In particular, in terms of vertical height from the inner wall 22 of the pallet 10, wall 16d is the shortest, followed by wall 16c, 16a and 16b which is the highest. It is only the walls 16a, 16b and 16c which comprise or otherwise contain the hinge portions 96.
- 10 The hinge portions 96 are formed at the uppermost ends of the respective walls. Thus, the hinge portions 96a, 96b and 96c are also staggered in height from the wall 22. This is equivalent to the staggering in the height of the pivot pins 84 in the pallet system 50a.
- 15 In one further variation the pallet 10 in the system 50b is not formed with an internal ledge 20. Rather, in this embodiment a grate (not shown) equivalent to the grate 24 is simply placed on the wall 22 and inside of the walls 16.
- Figures 16a and 16b depict the panel 54c of the pallet system 50b from the inside and
- 20 the outside respectively. The panel 54c is made from a plastics material and has an outer surface 100 which is planar and continuous. Along a bottom edge of the panel 54c is an integrated hinge portion 102c which is configured to cooperate with the hinge portion 96c to form a hinge joint. The hinge joint is completed by insertion of a pin (not shown) that provides a pivot axis and couples the hinge portions 96c to the hinge
- 25 portion 102c. A further edge 104 of the panel 54c is formed with a rebate 106 that is configured to sit inside of a lateral lip 108c of the panel 54b (shown in Figure 17). The inside surface 110 of the panel 54c is formed with a square matrix of strengthening ribs 112.
- 30 As an optional feature which is illustrated in Figures 16a and 16c locating lips 113 can be provided on an outer most peripheral rib 115. The lips 113 extend in the plane of the panel 54c but stop short of the outer most edge of the panel 54c. Further the lips 112 are spaced from an inside of the outside surface 100 to form a gap 117. The panels 54t and 56 may be provided with similar downward projecting lips or indeed full
- 35 length lips that are configured and positioned to slide behind the lips 113 into the gaps 117 when being moved to the closed configuration. This has the effect of the drawing the panel 54c (and panel 54a when provided with the lips 113) inwardly in the event

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they may be flexed slightly outward when in the open configuration. It also provides additional rigidity and stability to the pallet system 50b when in the closed configuration.

- 5 The panel 54a is not illustrated in detail but has a structure that is a mirror image of panel 54c.

Figure 17 illustrates a perspective view of the panel 54b. The panel 54b is provided with hinge parts 114b along a bottom edge, and hinge parts 116b along a top edge.

- 10 Lips 108a and 108c project at right angles from the plane of the panel 54b along the two sides that do not comprise the hinge portions 114b and 116b. In the assembled pallet system 50b the hinge portion 114b mates with the hinge portion 96b to form a continuous piano hinge. This hinge is completed by the provision of one or more elongate pins which form a pivot axis and couple the hinge portions 96b and 114b together. Both inner and outer surfaces of the panel 54b are formed as continuous planar surfaces. Inside surface 118 of the panel 54b may be used to carry signage or other indicia such as for example a sign similar to the sign 91 shown in Figure 11. The lip 108a overlaps a rebate in the panel 54a similar to the rebate 106 in the panel 54c when the panel 54a is folded up.

- 15
- 20 Figure 18 shows a perspective view from the top of the top panel 54t. The panel 54t is made of a plastics material and is formed with a continuous planar outer surface 120. The inner surface or side of panel 54t has the same structure as that of surface 110 of panel 54c. Opposite edges of the panel 54t are formed with hinge portions 122b and 124 respectively. The hinge portions 122b couple with the hinge portions 116b to form a piano hinge which is completed by the provision of pivot pins that engage the portions 116b and 122b. The hinge portions 124 on the panel 54t couple with hinge portions 126 (see Figure 19) of the panel 56 to likewise form a piano hinge which is completed by the provision of one or more pivot pins.

- 25
- 30 Figure 14 depicts the pallet system 50b with its panels 54 and 56 moved to the closed configuration so as together with the pallet 10 define an enclosed space. Due to the physical nature and configuration of the panels 54, 56 the pallet system 50b is substantially weatherproof so that articles held within the pallet system 50b when in the closed configuration are substantially protected from the external environment.

35 Figures 20a – 20f depict in sequence the reconfiguring of the panels from the closed

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position to an open or display position shown in Figure 20b, and subsequently to a flat pack position shown in Figure 20f. The sequence of motion of the panels in moving through these positions is as follows. In Figure 20a, the panels are shown initially moved from the closed position to a partially open position where the panel 54t is 5 pivoted upwardly or in a clockwise direction relative to the panel 54b. This results in the panel 56 being lifted from the pallet 10 and indeed also pivoting in an anticlockwise direction relative to the panel 54t.

Figure 20b depicts the panels 54, 56 in an open or display position in which the panel 10 54t has been pivoted through 90° to lie parallel with the panel 54b, and the panel 56 has been pivoted through 90° relative to the panel 54t so as to overlie the panel 54t. Further, in this configuration the panel 56 is disposed above the panel 54b so that the signage on the panel 56 remains visible. The panels 54t and 56 are held in this configuration in the absence of any external applied force by way of integrated latches 15 or catches as in the pallet system 50a.

Figure 20c illustrates the panels 56 and 54t being pivoted together in a clockwise direction about the panel 54b. This pivoting is arrested when the panels 54t and 56 lie parallel with the panel 54b. While this specific configuration is not depicted, this may 20 correspond with an unload configuration of the pallet system 50b. In the unload configuration articles held on the pallet 10 can be dumped into a larger waste receptacle by use of for example a forklift which can lift the pallet system 50b by placement of its tines in the channels 38 between the legs 36. Subsequent manipulation of the forks and forklift truck can facilitate tipping of the pallet system 50b 25 to allow articles stored thereon to simply fall off by action of gravity.

Figure 20d illustrates a continuation in the process of moving the panels 54, 56 to the lay flat configuration. Here, the panel 54c is being pivoted inwardly to lie on the pallet 10. Thereafter, as shown in Figure 20e, the panel 54a is pivoted inwardly to overlie the 30 panel 54c and the underlying pallet 10. Lastly, as shown in Figure 20f, the panel 54b is pivoted in a forward direction to overlie the panel 54a.

In a minor variation, and as shown in Figure 20f the panel 56 may be provided with a plurality of shallow recesses 130 shaped and located to receive the legs 36 of an 35 overlying pallet system 50b in the flat pack configuration. This facilitates stacking of pallet systems in the flat pack configuration as depicted in Figure 20g. Additionally the recesses enable stacking of pallet system 50b in the closed configuration in which the

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pallet systems 50b may be filled with articles.

Whilst a number of specific embodiments have been described, it should be appreciated that the pallet and pallet system may be embodied in many other forms.

- 5 For example the panels 54, 56 and indeed the pallet 10 may be made from materials other than metallic materials and plastics. For example these components may be made from composite materials including fiber glass reinforced plastic composites. The sheets 72 in the pallet system 50a may be configured to wholly overlie their respective panel frames 55 rather than to leave gaps as currently shown in Figures 8-10. 10 Also, the pallet systems may be used for a variety of purposes including for the storage and transport of articles containing hazardous liquids but also as point of sale devices. For example, the pallet systems 50 may be used at service (i.e. petrol) stations to hold commonly vended products such as compressed gas bottles or water bottles. When the service station is open, the pallet systems 50 and more particularly 15 their respective panels may be moved to the open or display configuration enabling customers to visualize the contents of the pallets and access articles held therein. Also, suppliers can easily restock the pallet systems 50 when in this configuration. When the service station is closed, the pallet systems 50 may be moved to the closed configuration to prevent access to their contents. To this end when using the pallet 20 systems 50a or 50b they may also be provided with lock systems that enable pallet systems 50a, 50b to be permanently locked for example by way of a locking bar and/or padlocks.

In the claims which follow, and in the preceding description, except where the context 25 requires otherwise due to express language or necessary implication, the word "comprise" and variations such as "comprises" or "comprising" are used in an inclusive sense, i.e. to specify the presence of the stated feature but not to preclude the presence or addition of further features in various embodiments of the pallet and pallet system as disclosed herein.

CLAIMS:

1. A pallet system comprising:
 - a pallet having a base configured to receive members of a lifting apparatus
 - 5 enabling the pallet to be lifted by the base; and
 - a plurality of panels coupled to each other and the pallet in a manner to enable the panels be moved between a closed configuration where the panels can surround and contain one or more articles supported on the pallet, and a flat pack configuration the panels are moved to lay flat and overlie the pallet.
- 10
2. A pallet system comprising:
 - a pallet having a base configured to receive members of a lifting apparatus
 - enabling the pallet to be lifted by the base; and,
 - a plurality of panels coupled to each other and the pallet in a manner to enable
 - 15 the panels be moved between a closed configuration where the panels can surround and contain one or more articles on the pallet, and an open configuration where one of the panels is positioned to provide an opening to enable transfer of an article through the opening onto or off of the pallet in a direction substantially parallel to a plane of the pallet.
- 20
3. The pallet system according to claim 1 or 2 wherein when the panels are in the open configuration the one panel is arranged to lie substantially parallel with and above a second of the panels.
- 25
4. The pallet system according to claim 3 wherein panels are in the open configuration the one panel is arranged to lie substantially parallel with and overlie a third of the panels.
5. The pallet system according to any one of claims 1 – 4 wherein at least three of
- 30
- the panels are pivotally coupled together about mutually parallel pivot axes.
6. The pallet system according to claim 5 wherein two of the at least three panels comprise the one panel and the second panel.
- 35
7. The pallet system according to claim 6 wherein a further one of the at least three panels comprises the third panel.

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8. The pallet system according to any one of claims 1 – 7 wherein when in the closed configuration the panels collectively form an enclosure that extends about and over the pallet.
- 5 9. The pallet system according to claim 7 wherein when in the closed configuration the panels collectively form an enclosure that extends about and over the pallet, wherein the one panel is parallel with the third panel and the second panel is spaced from extends over the pallet.
- 10 10. The pallet system according to claims 8 or 9 wherein the plurality of panels comprises a fourth panel and a fifth panel each of which is pivotally coupled to the pallet.
- 15 11. The pallet system according to any one of claims 1 – 10 wherein the panels are arranged to form a weatherproof enclosure when in the closed configuration to substantially prevent ingress of liquid onto the pallet.
12. The pallet system according to any one of claims 1 – 11 wherein the base comprises: a receptacle in which liquid falling onto the pallet drains.
- 20 13. The pallet system according to any one of claims 1 – 12 wherein the panels are further arranged to enable them to be moved to a stack configuration wherein the one panel is positioned to provide an opening to enable transfer of an article through the opening onto or off of the pallet in direction substantially parallel to a plane of the pallet
- 25 14. The pallet system according to any one of claims 1 – 13 wherein at least one of the panels has a continuous surface to prevent liquid from passing through the panel.
15. The pallet system according to any one of claims 1 – 14 wherein at least one of the panels is made of a plastics material.
- 30 35 16. The pallet system according to any one of claims 1 – 13 wherein at least one of the panels comprises a metal frame.

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17. The pallet system according to any one of claims 2 – 16 wherein the panels are further arranged to enable them to be moved to a flat pack configuration where the panels lay flat on and overlie the pallet.

5 18. The pallet system according to claim 17 wherein when in the flat pack configuration the one panel is uppermost.

19. A pallet system comprising:
a pallet having a base configured to receive members of a lifting apparatus
10 enabling the pallet to be lifted by the base; and a plurality of panels coupled to each other and the pallet, the panels being configurable in a plurality of relative juxtapositions without decoupling from the pallet, and wherein in one configuration the panels together with the pallet form an enclosed space in which articles supported on the pallet can be located.

15 20. The panel system according to claim 19 wherein a first of the panels is coupled to other panels in a manner to enable the first panel to form a gate or door that can be moved from a closed position that prevents access into the enclosed space and an open position in which the first panel is disposed above another of the panels and 20 opens to an enclosed space to enable transfer of an article through the opening onto or off of the pallet in a direction substantially parallel to a plane of the pallet.

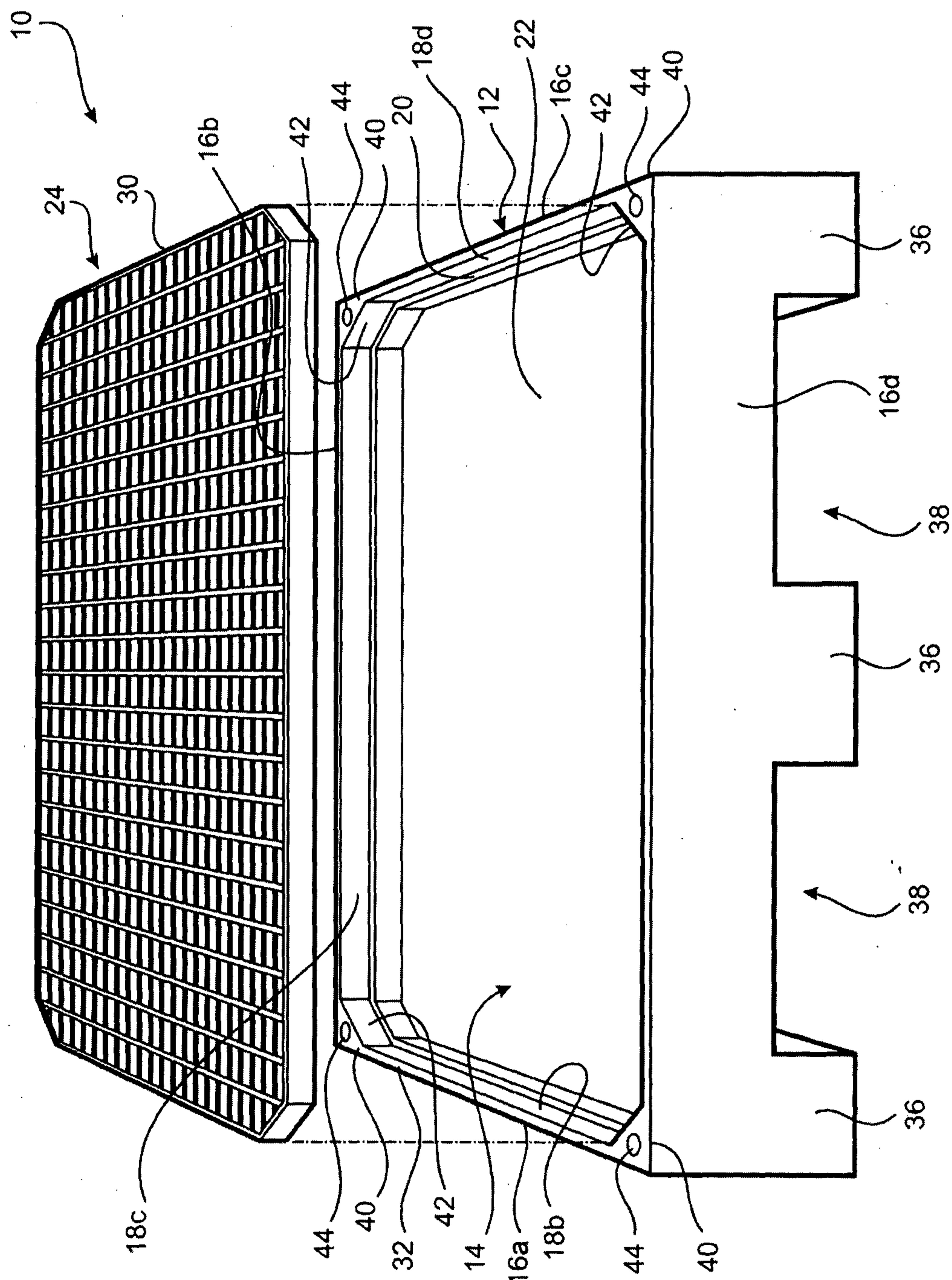
21. The panel system according to any one of claims 1 – 20 wherein each panel is pivotally coupled to at least one of: (a) another panel; and (b) the pallet.

25 22. The pallet system according to any one of claims 19 – 21 wherein the base comprises: a receptacle in which liquid falling onto the pallet drains.

23. The pallet system according to claim 12 or 22 wherein the pallet comprises has a 30 support grate overlying the receptacle.

24. The pallet system according to claim 23 comprising an absorbent pad disposed in the receptacle.

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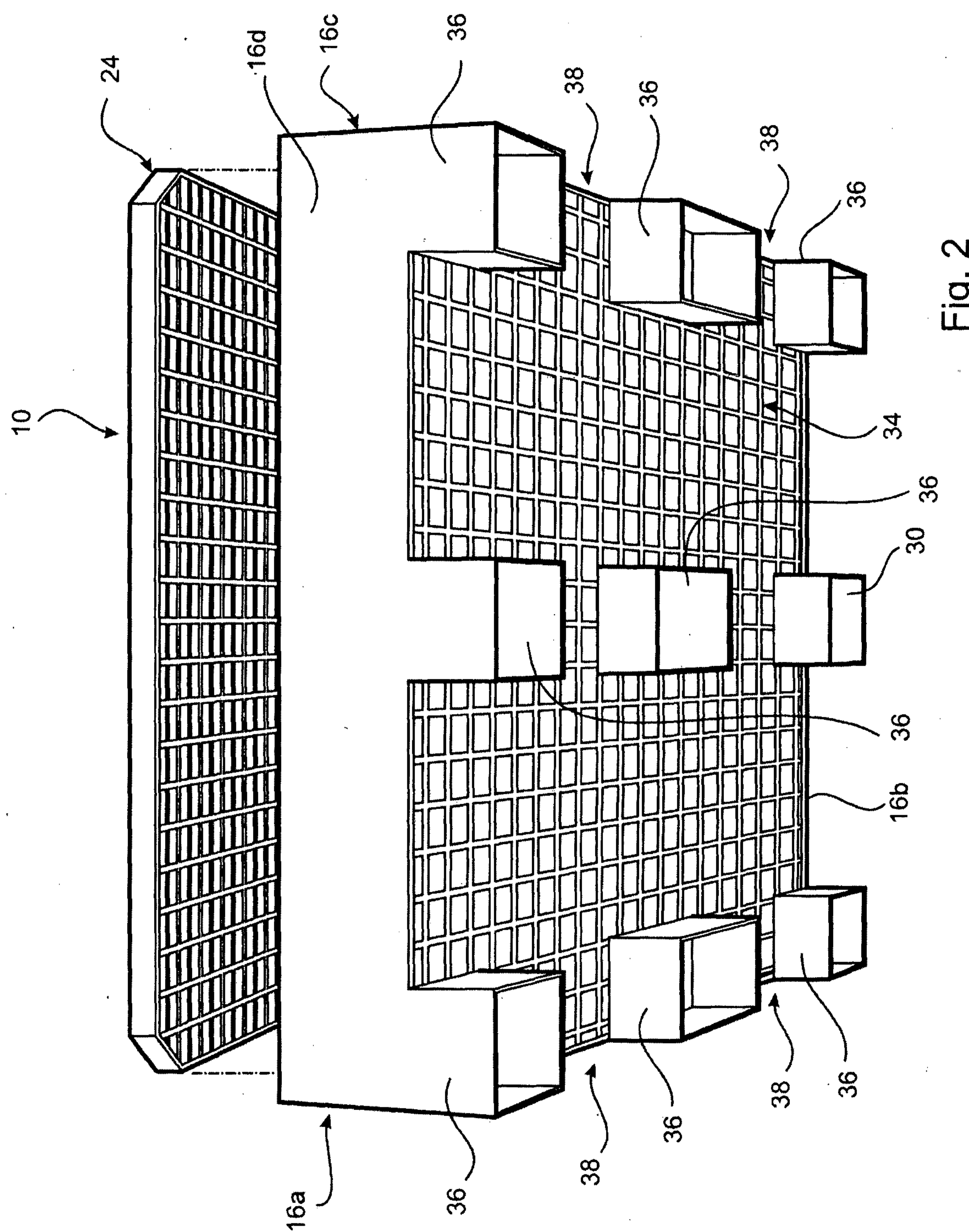


Fig. 2

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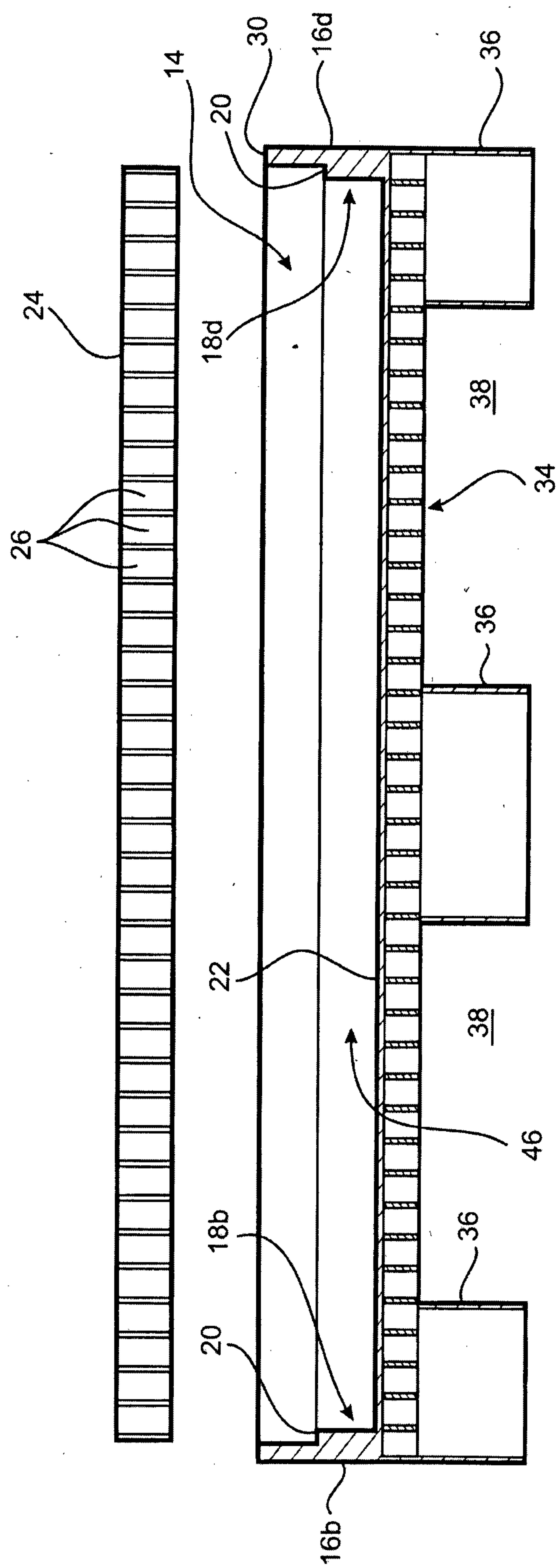


Fig. 3

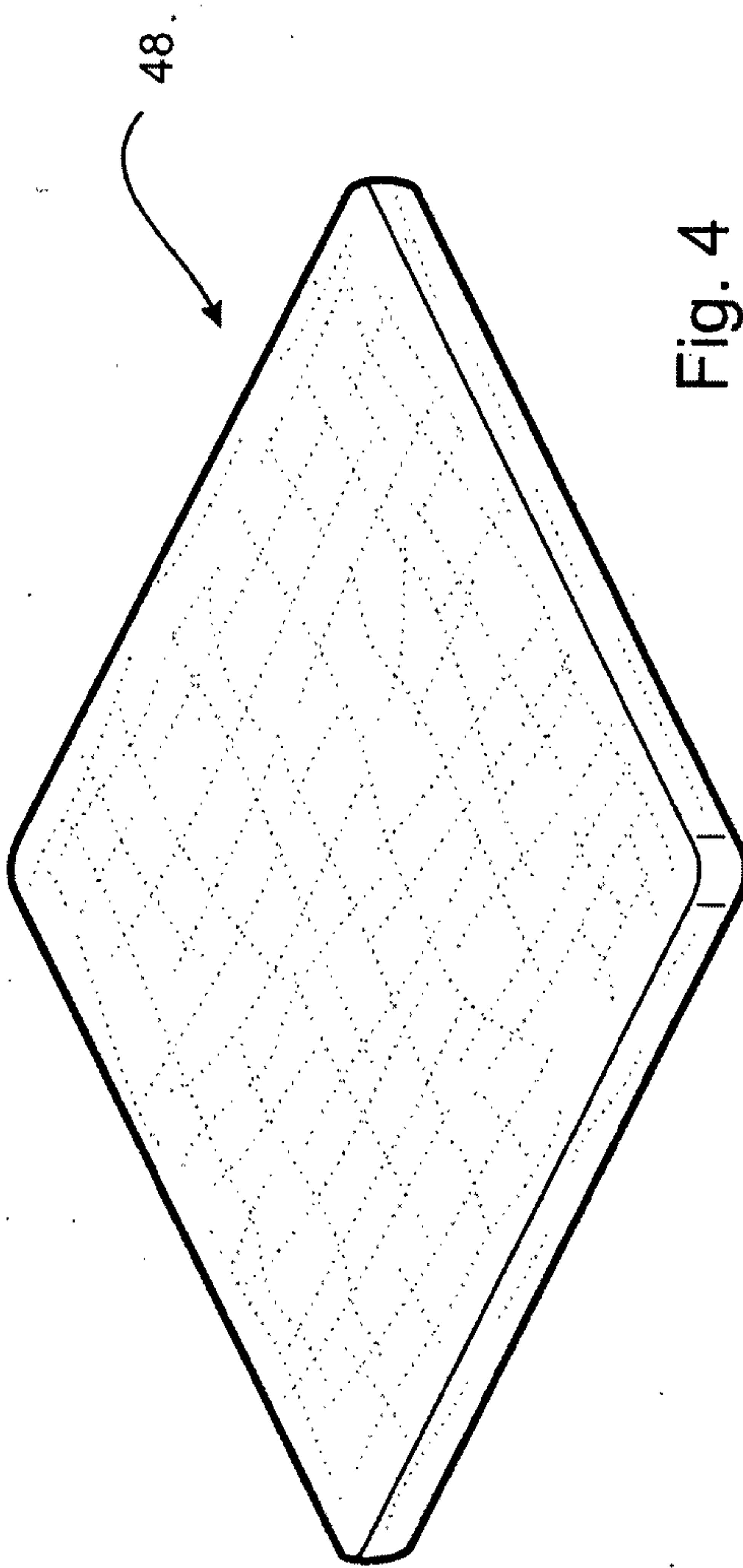
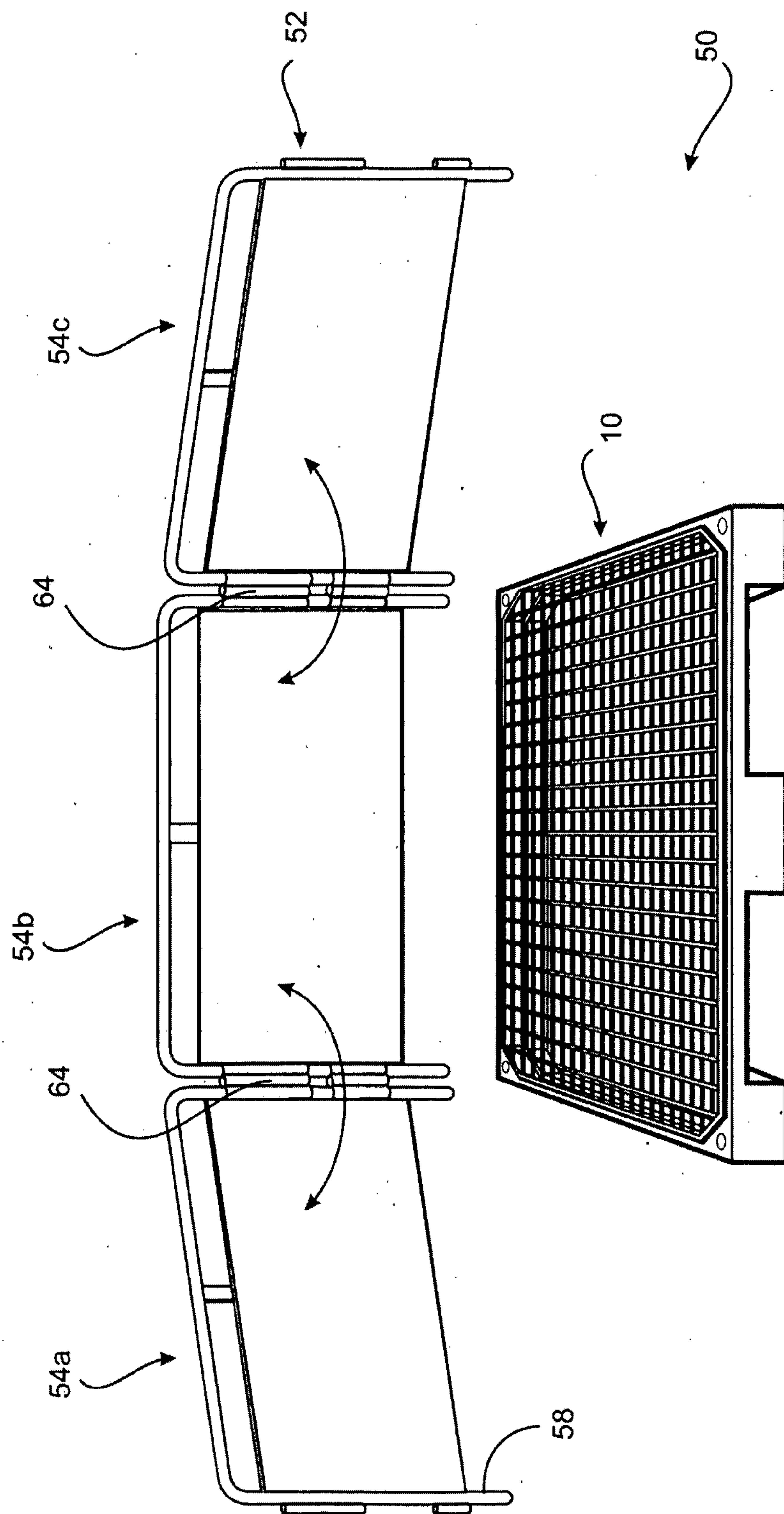


Fig. 4



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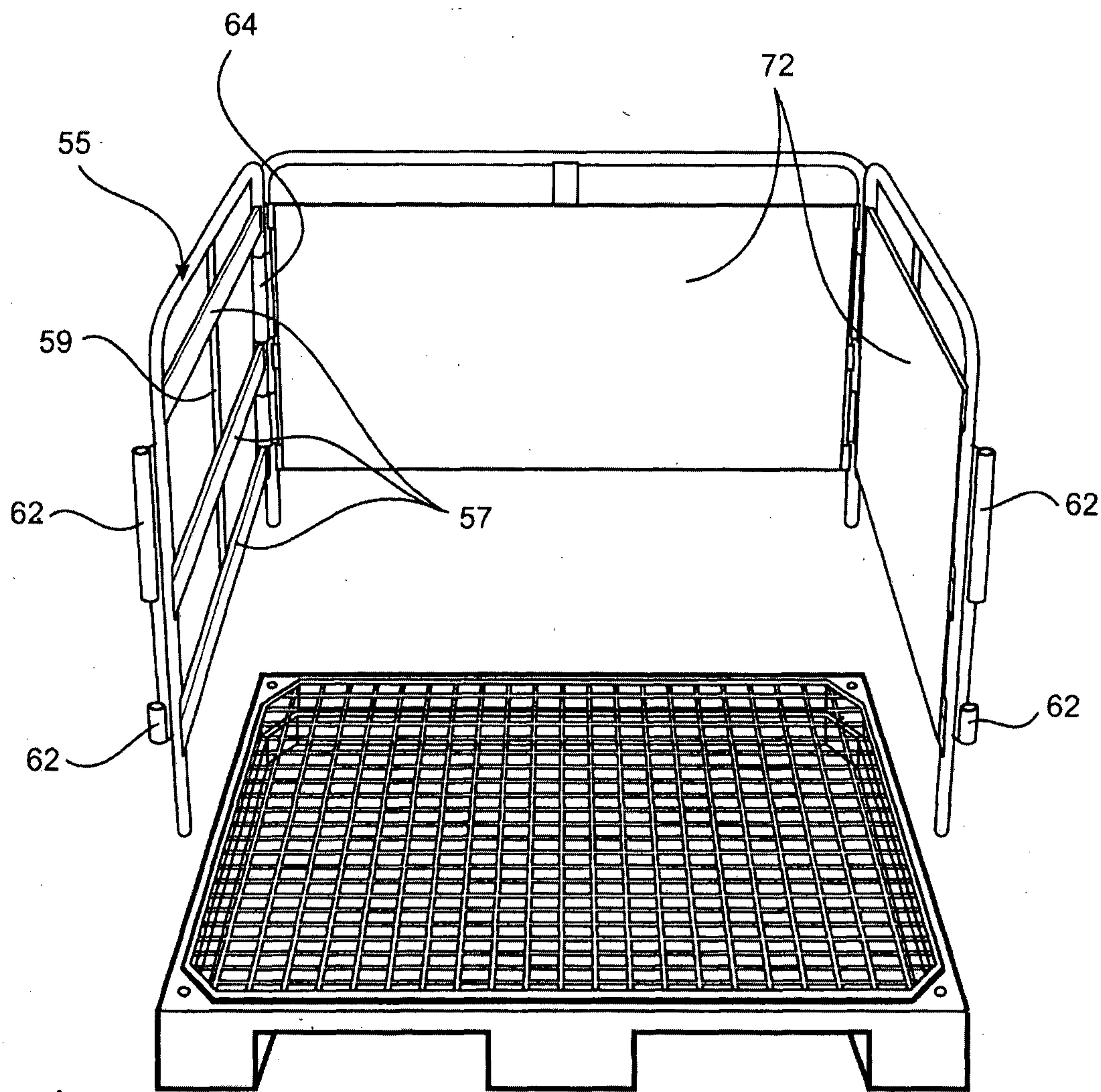


Fig. 6

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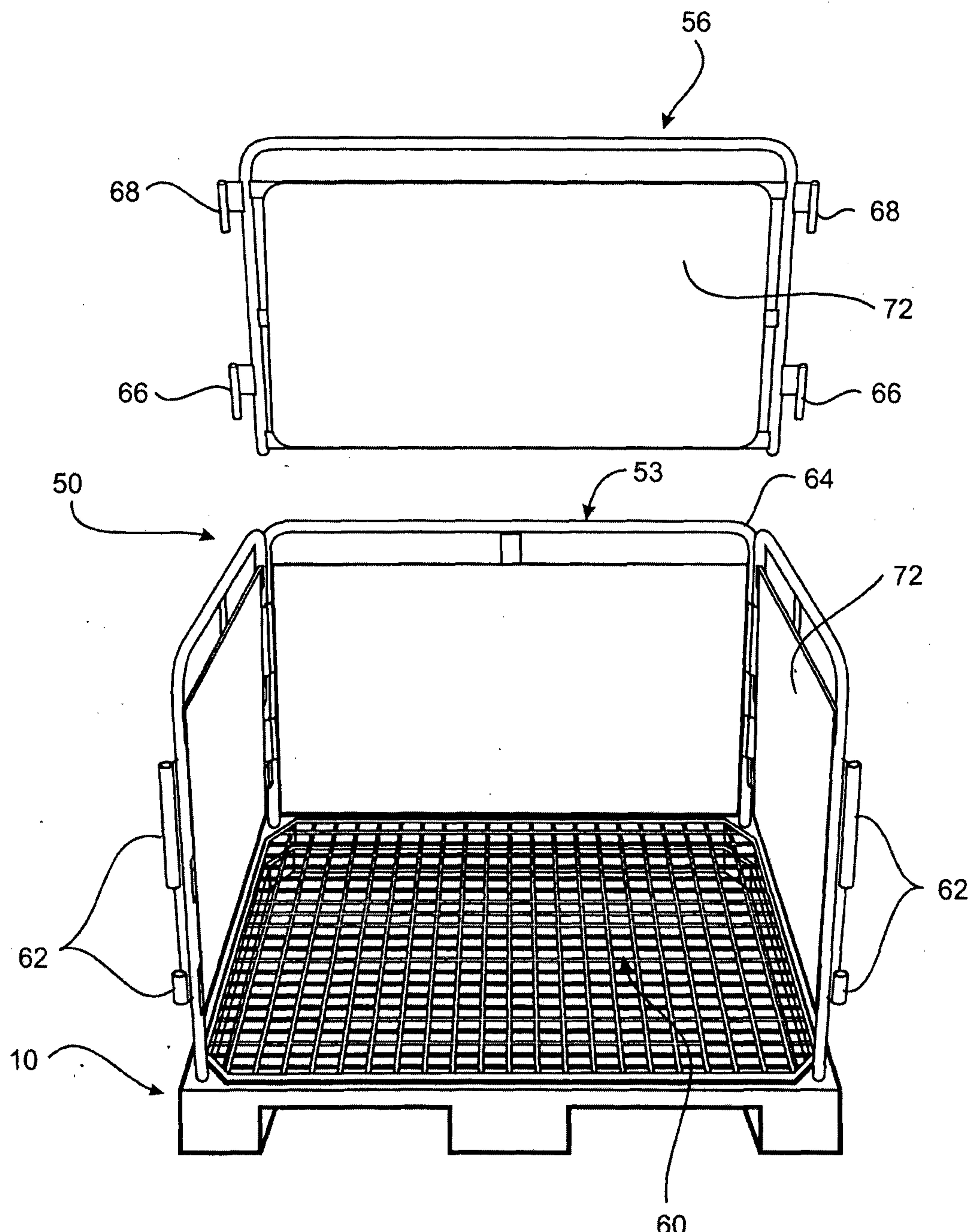


Fig. 7

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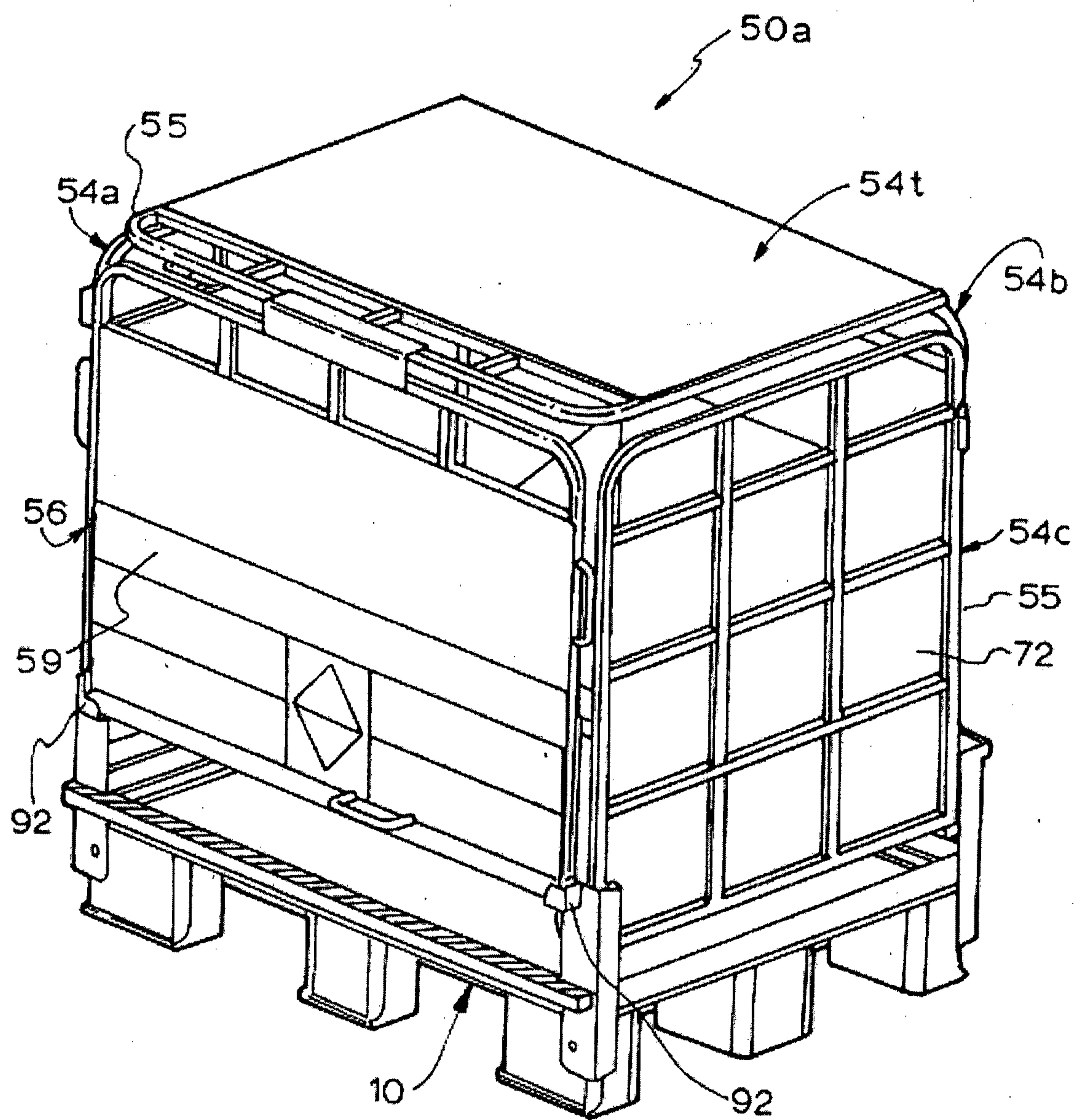


Fig.8

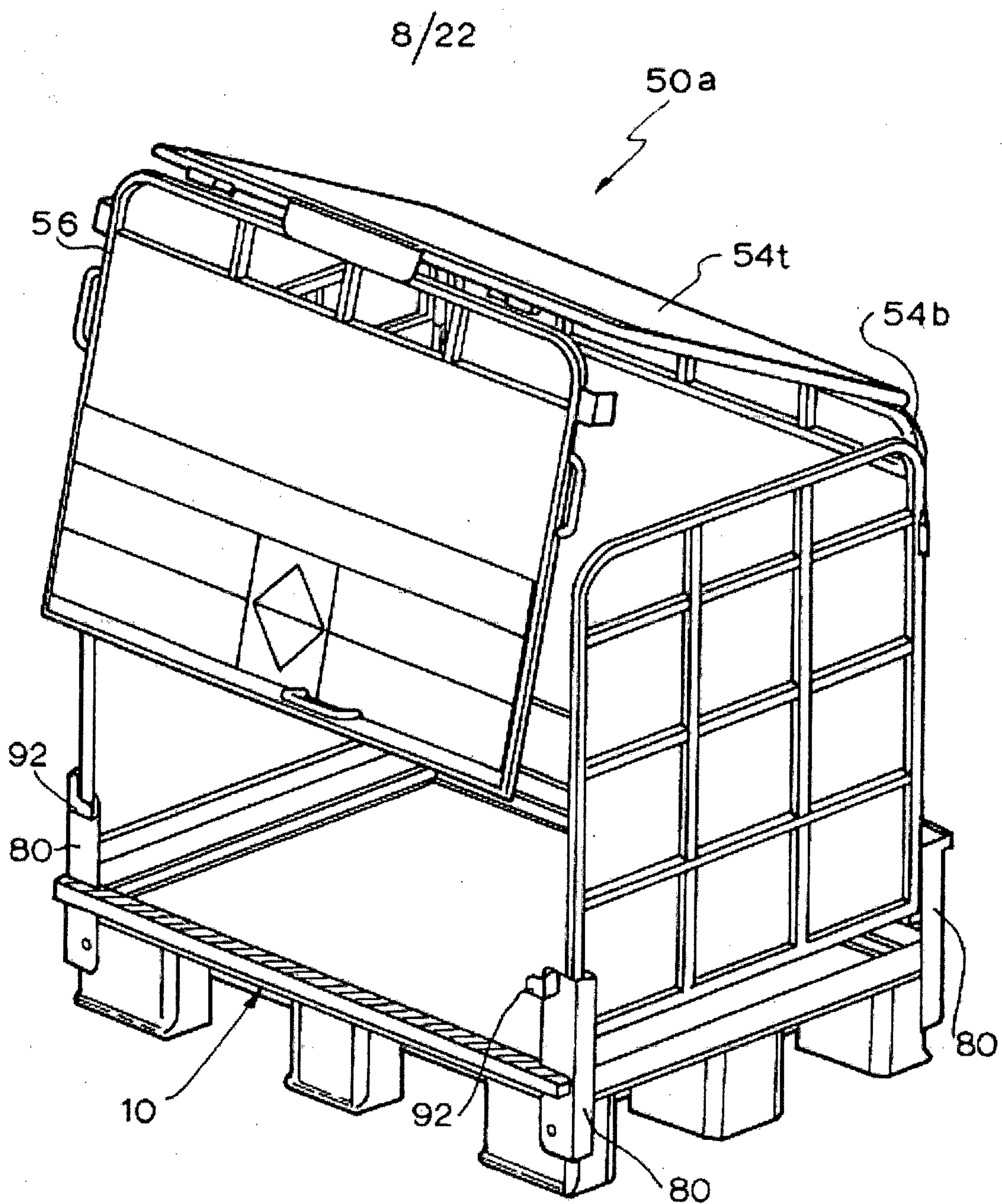


Fig.9

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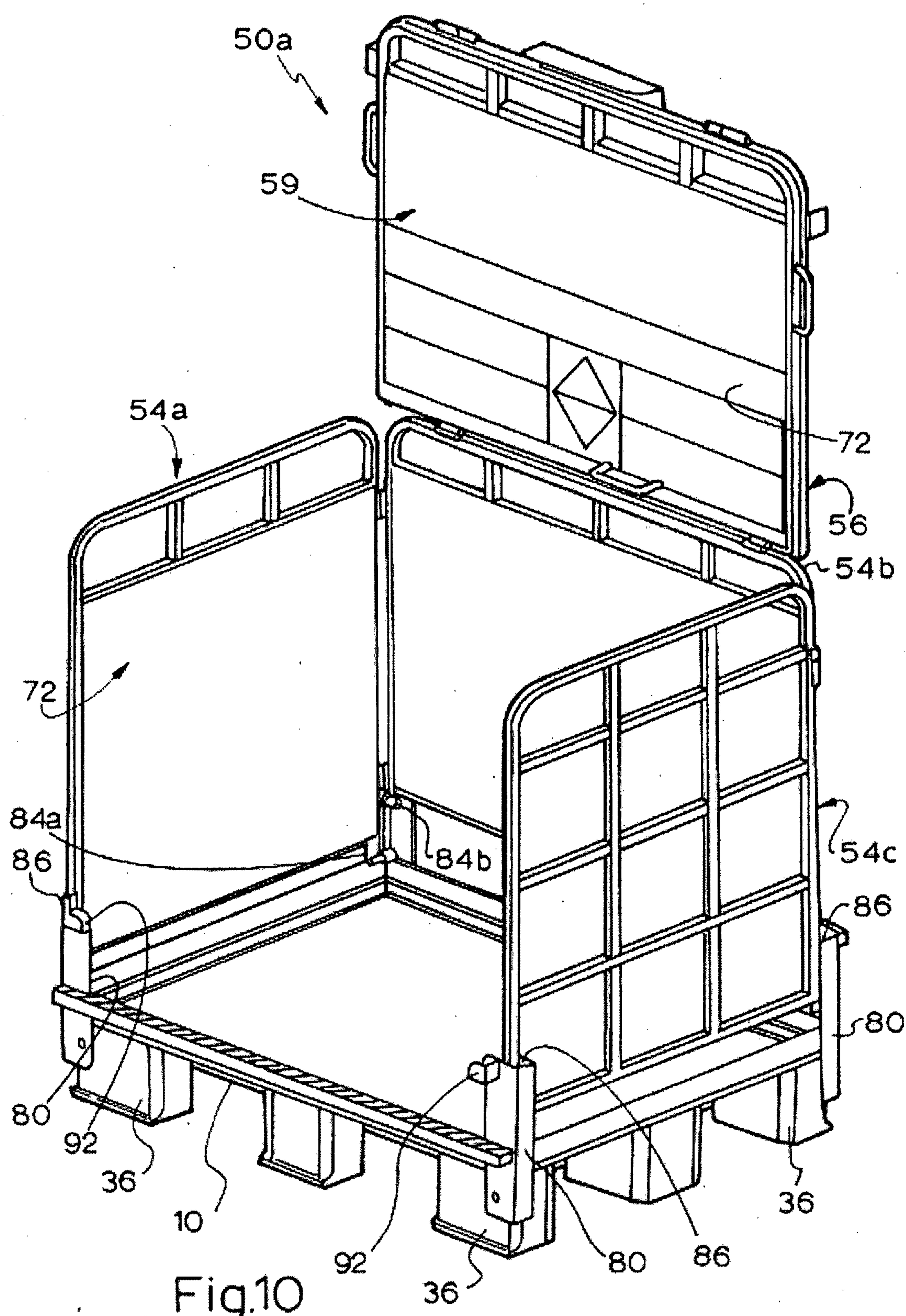


Fig.10

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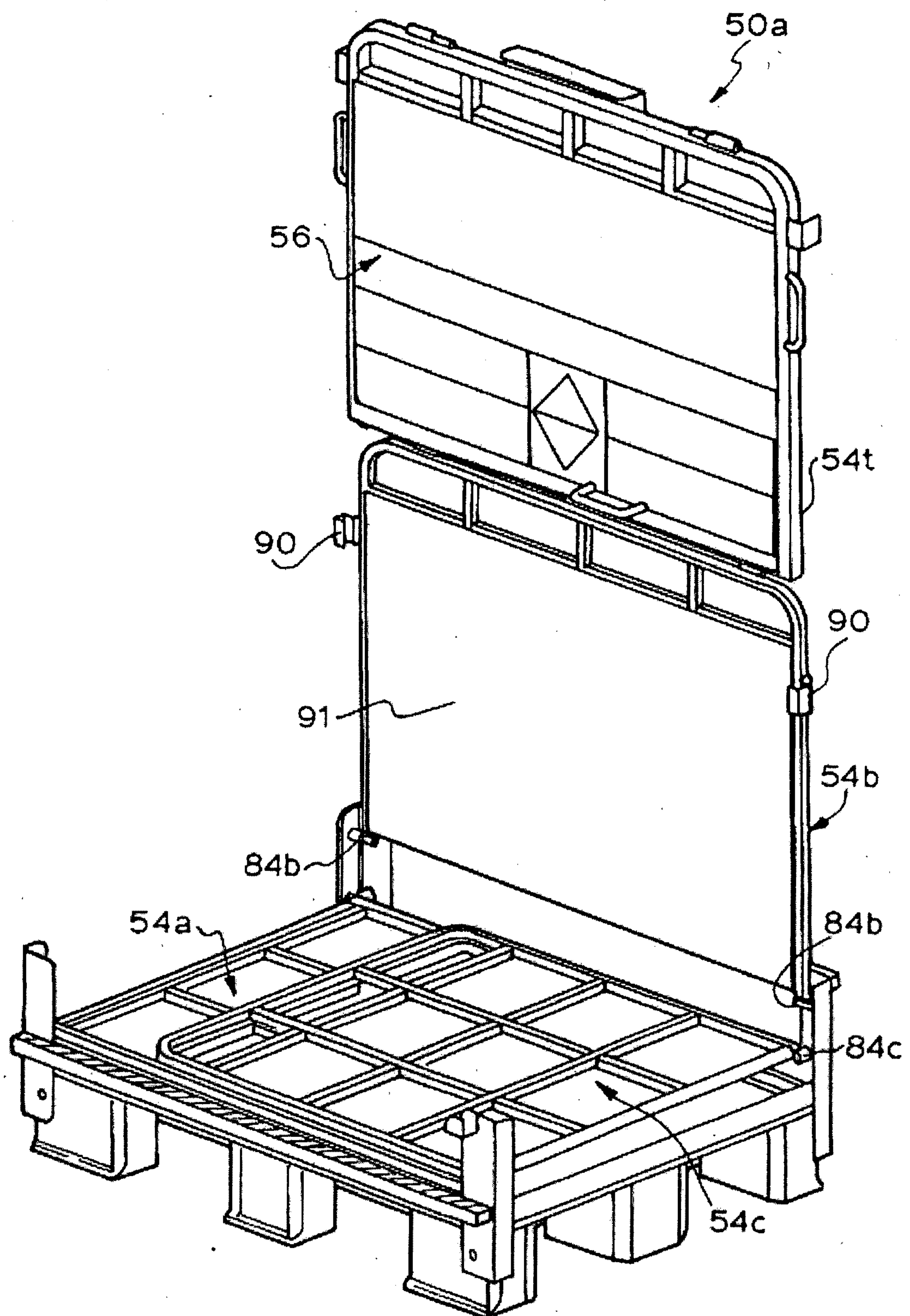


Fig.11

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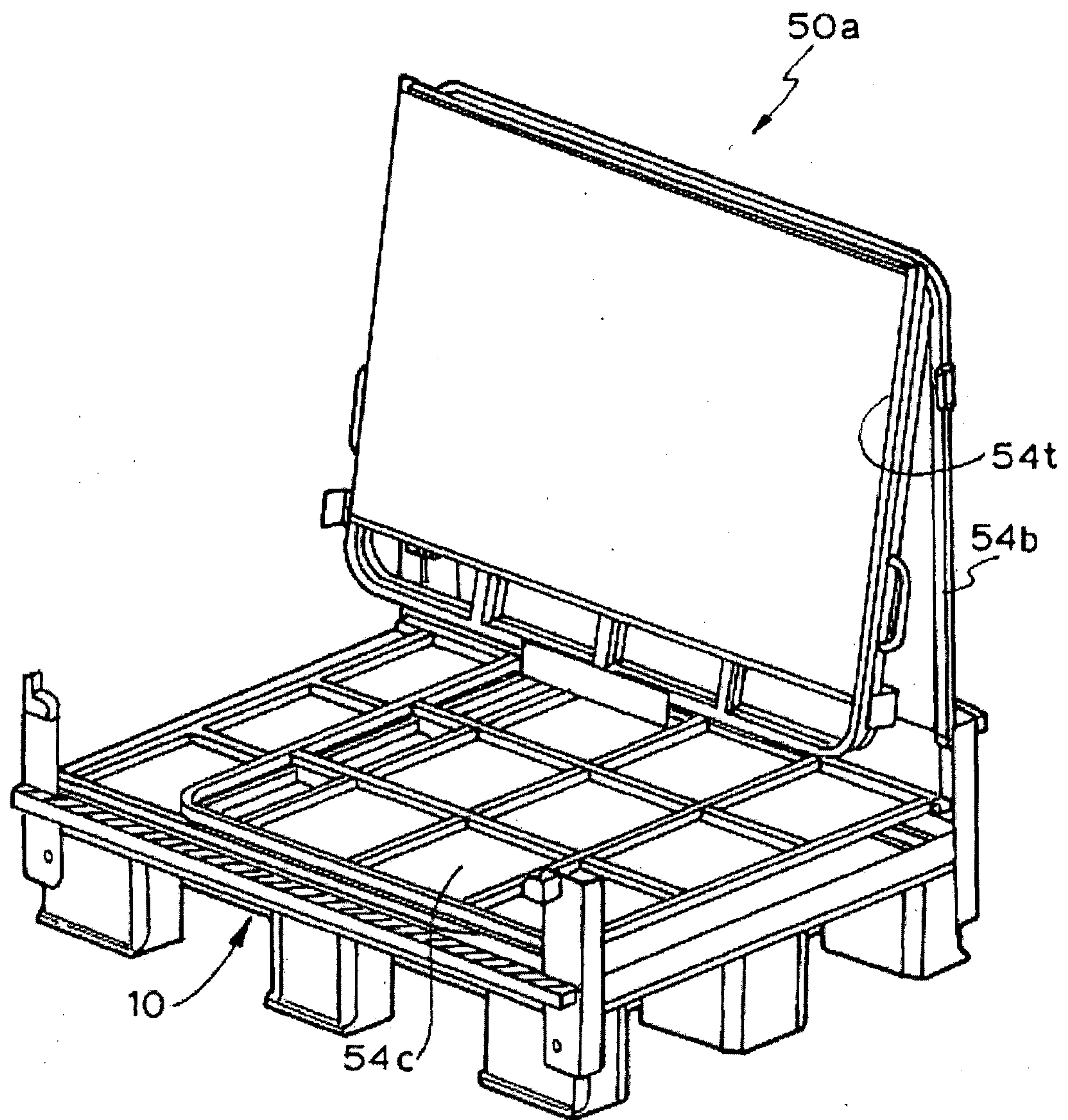


Fig.12

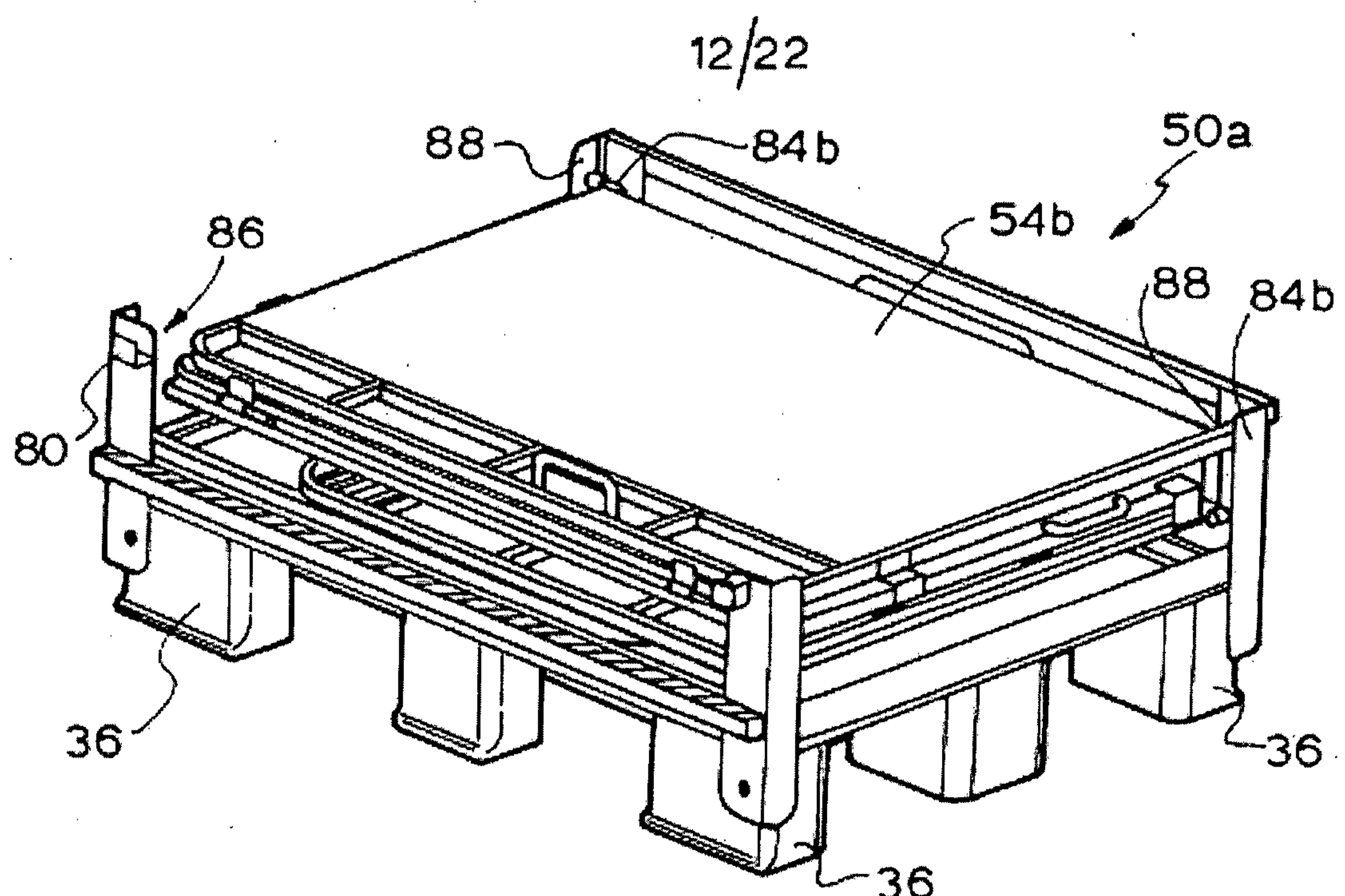


Fig.13

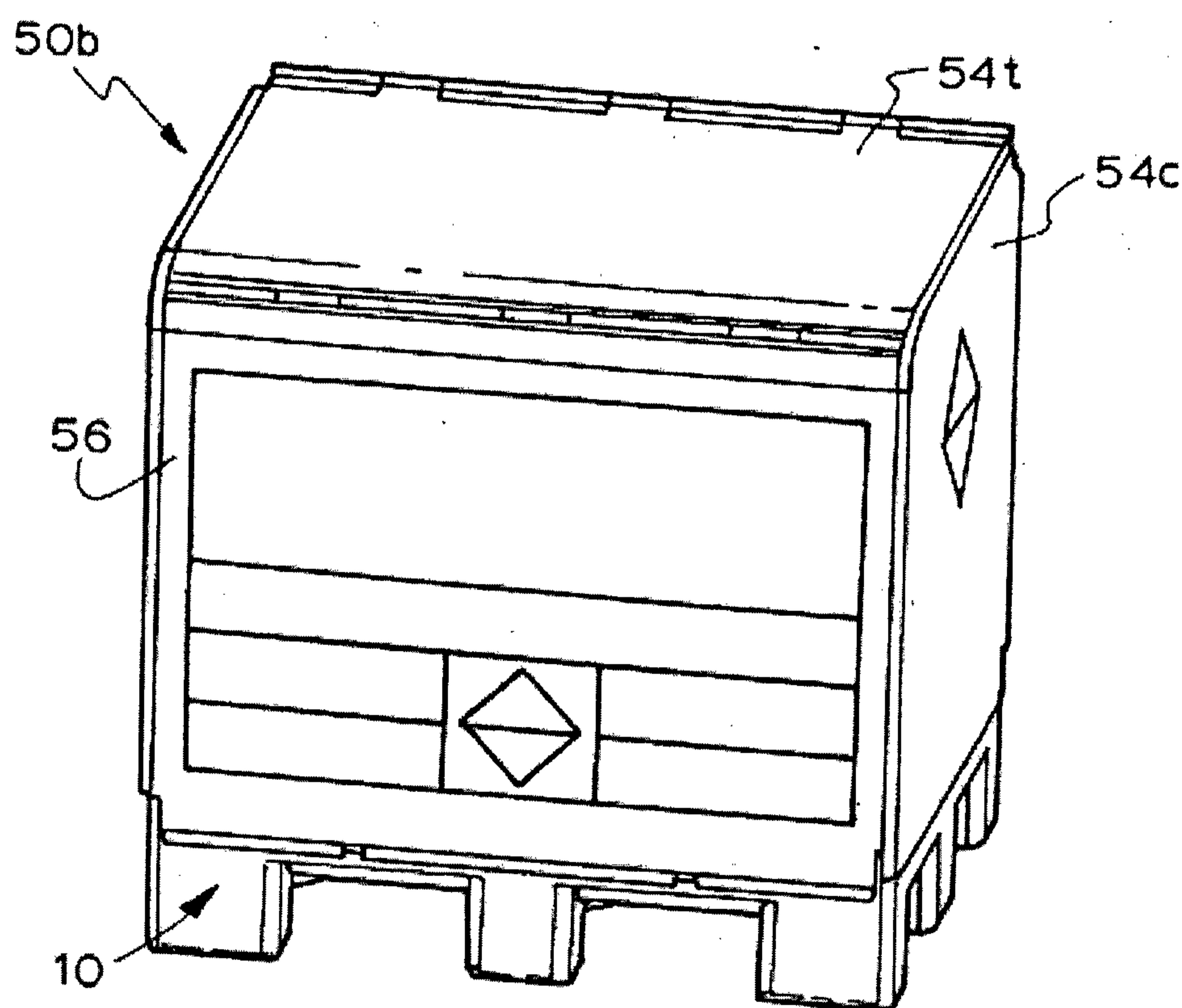
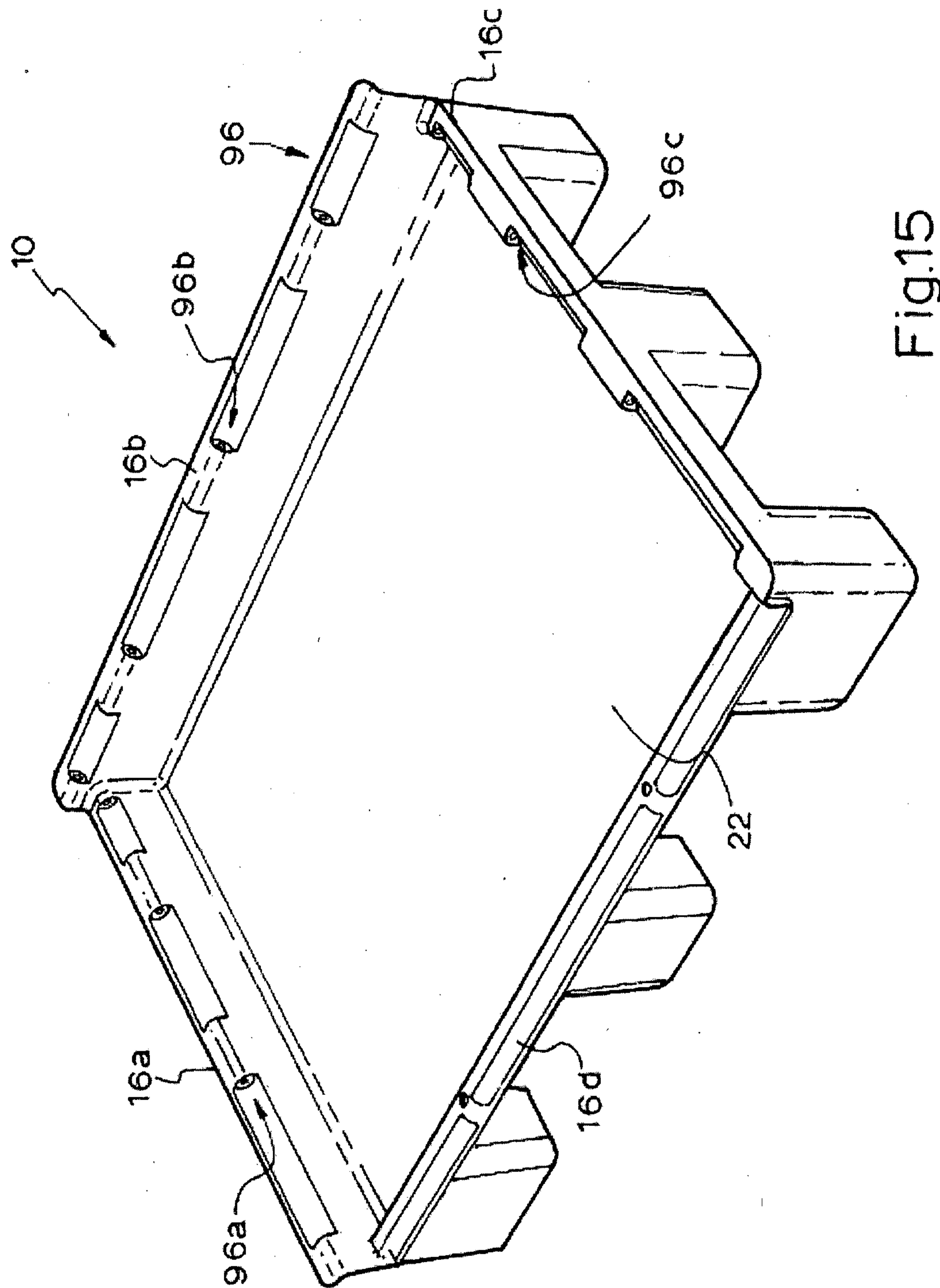


Fig.14

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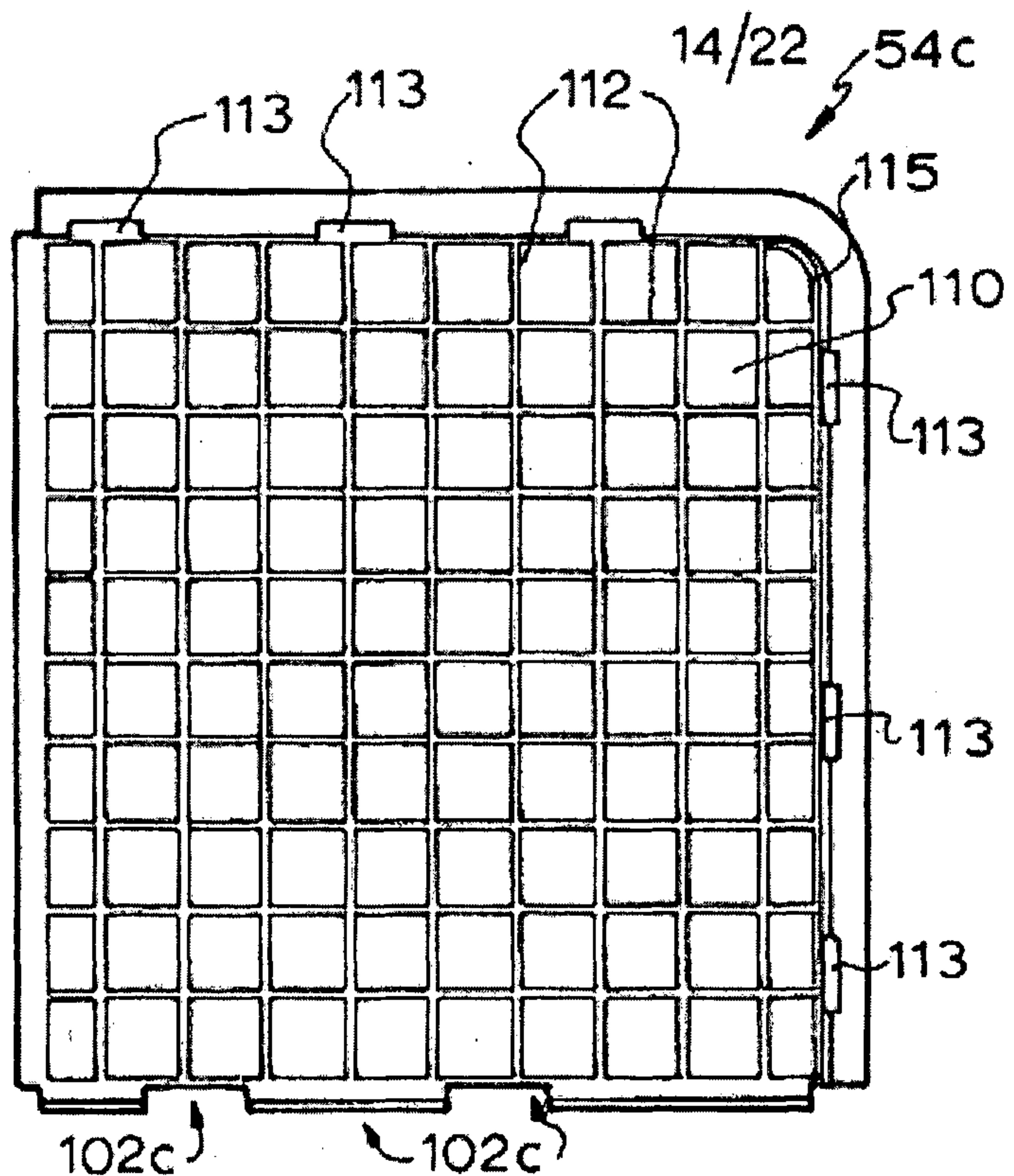


Fig.16a

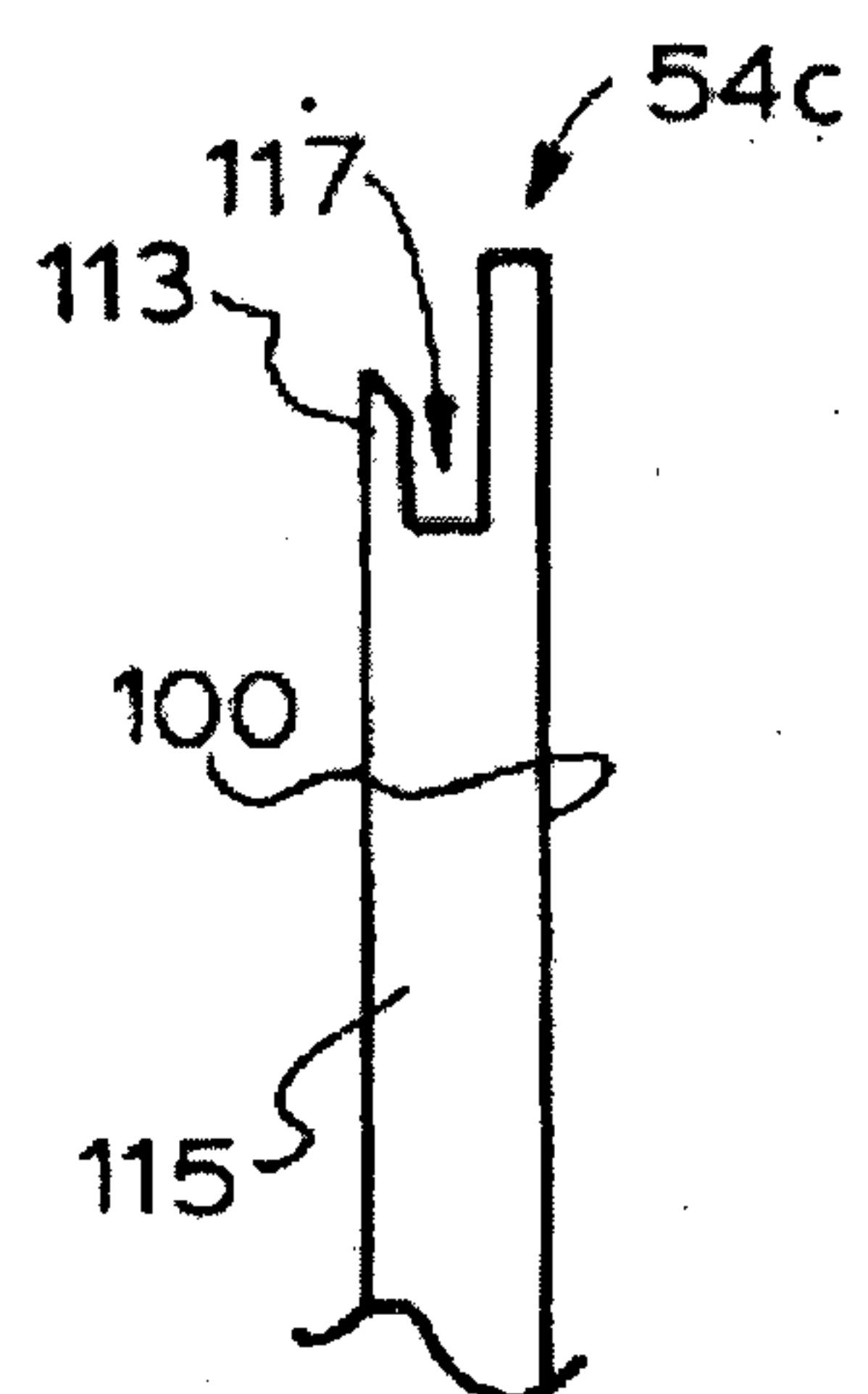


Fig.16c

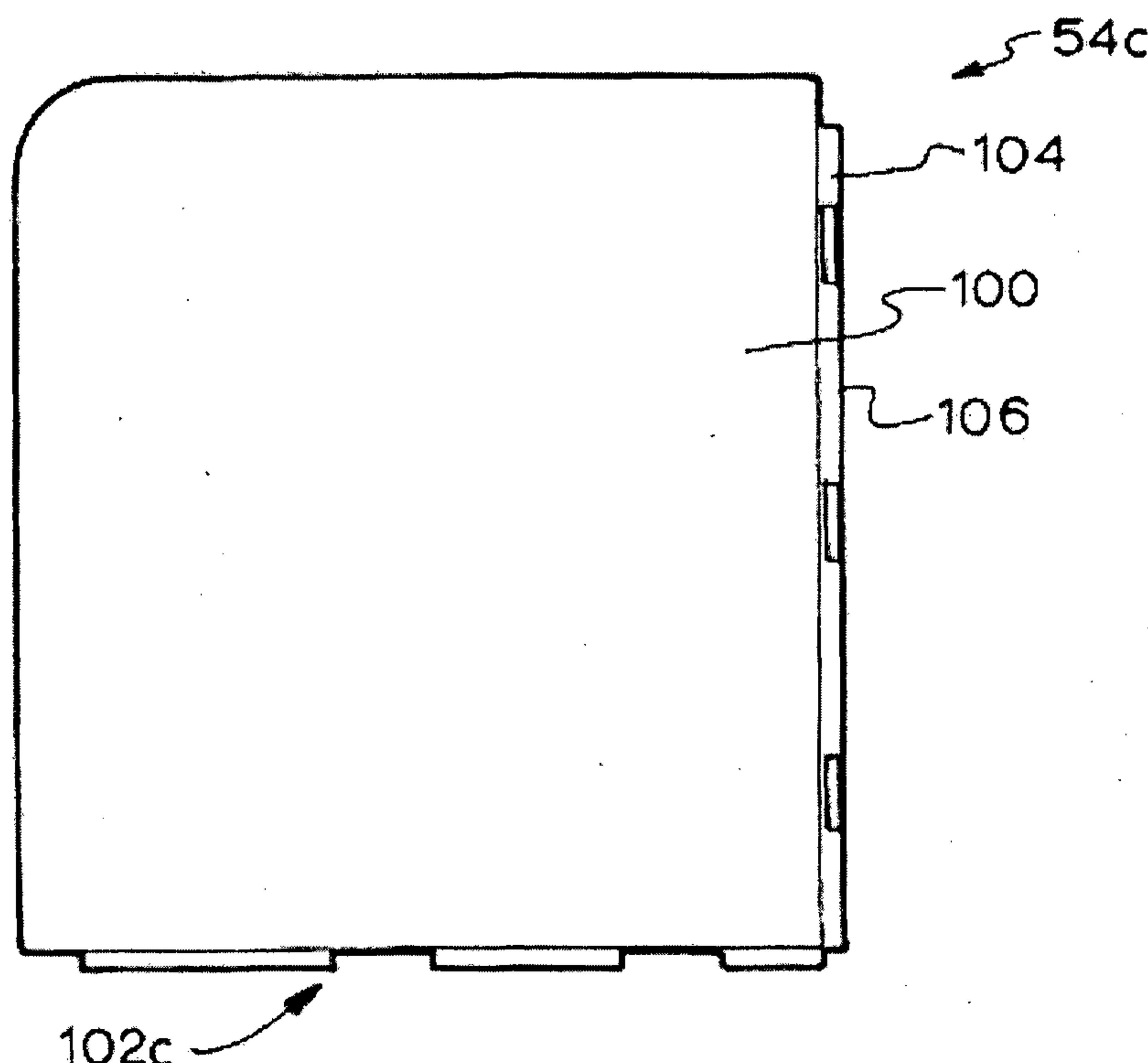


Fig.16b

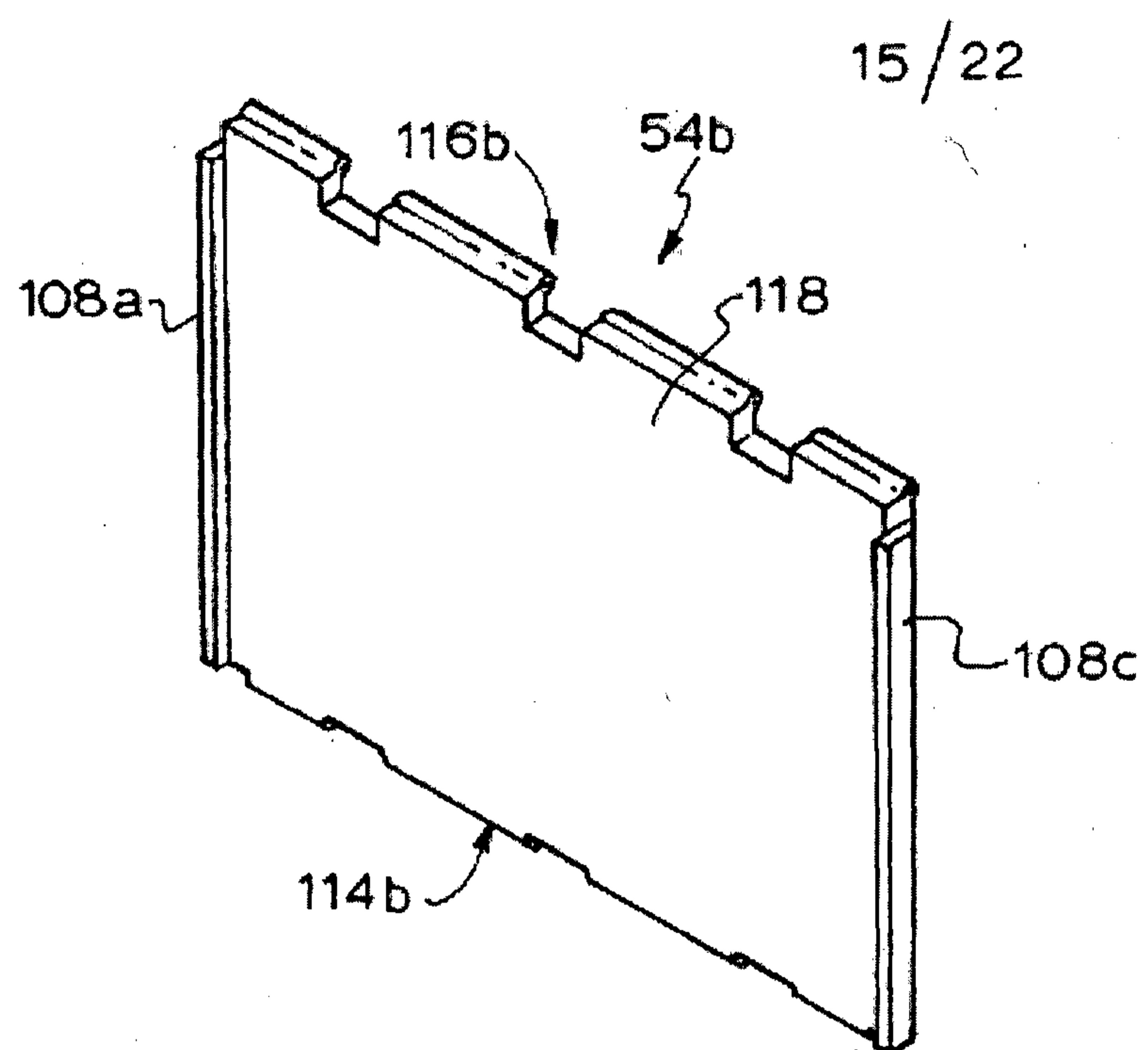


Fig.17

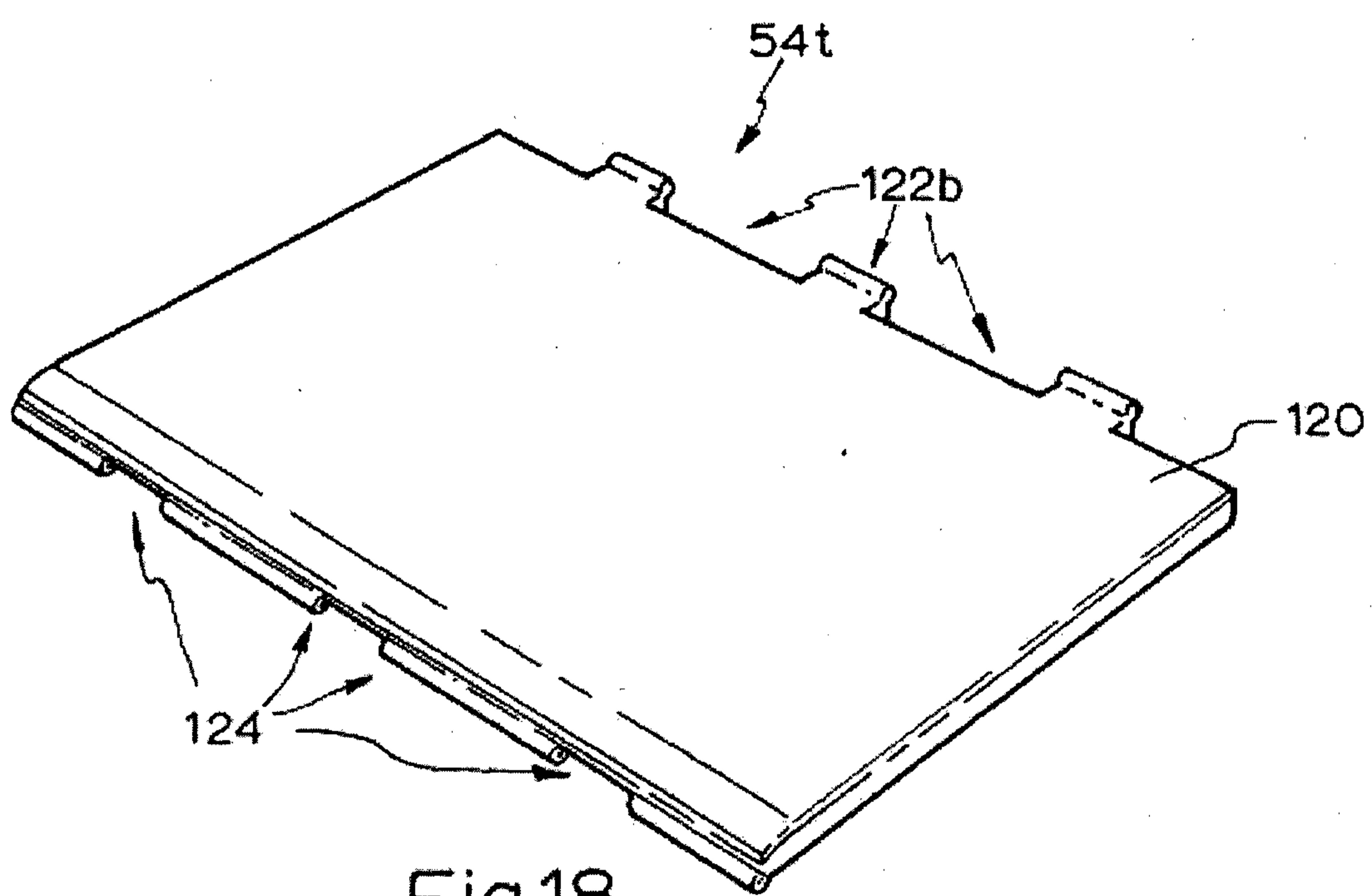


Fig.18

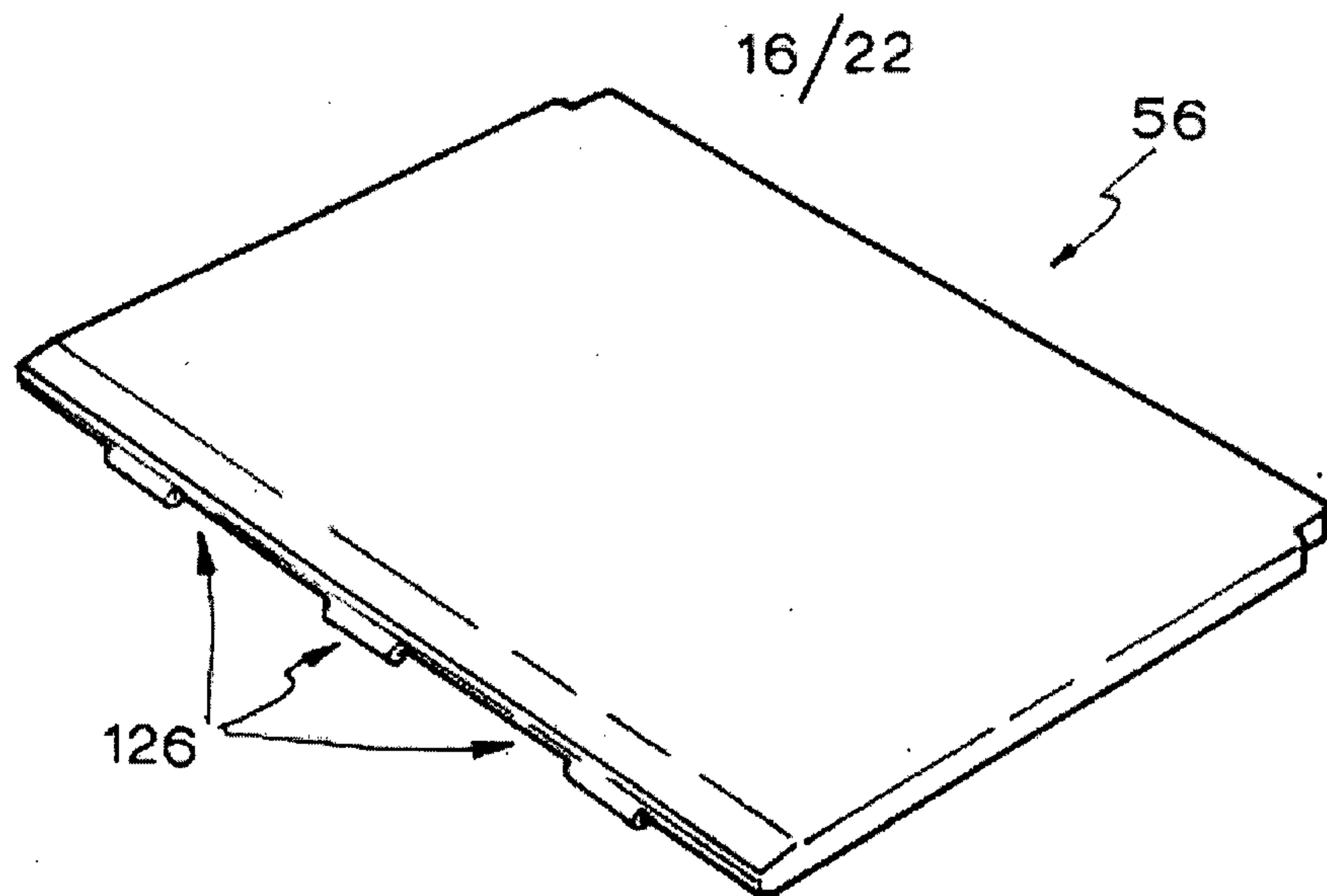


Fig.19

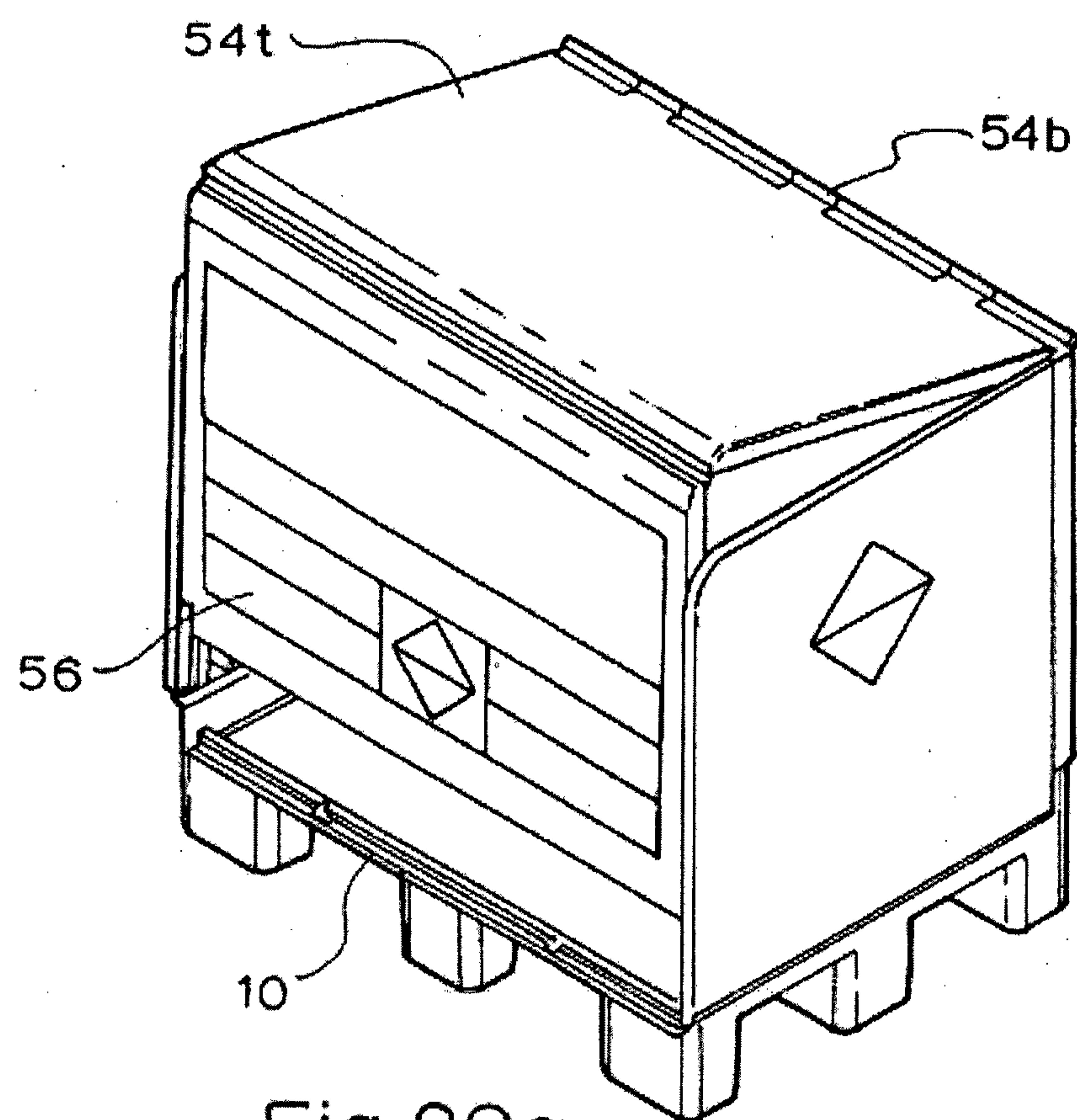


Fig.20a

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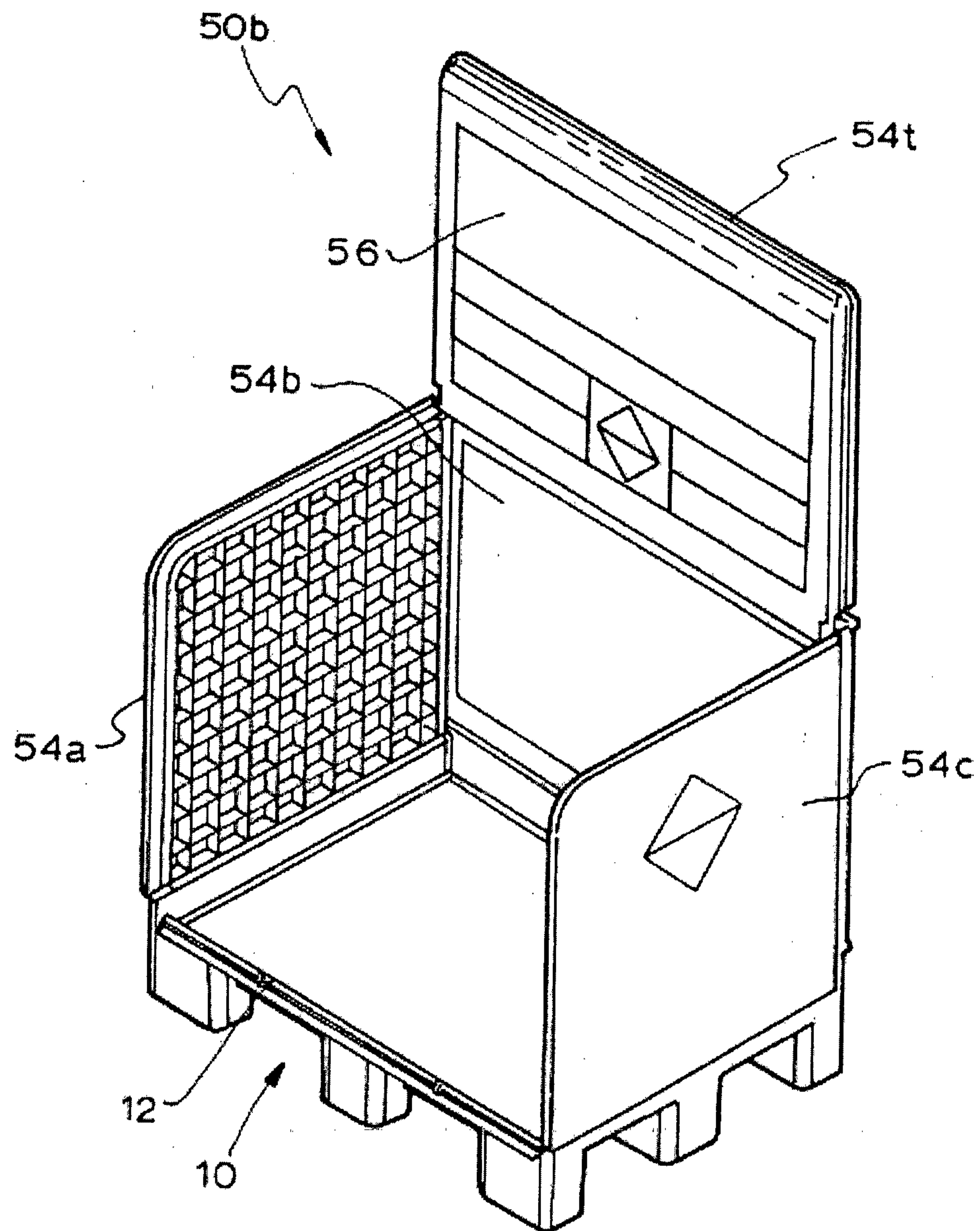


Fig.20b

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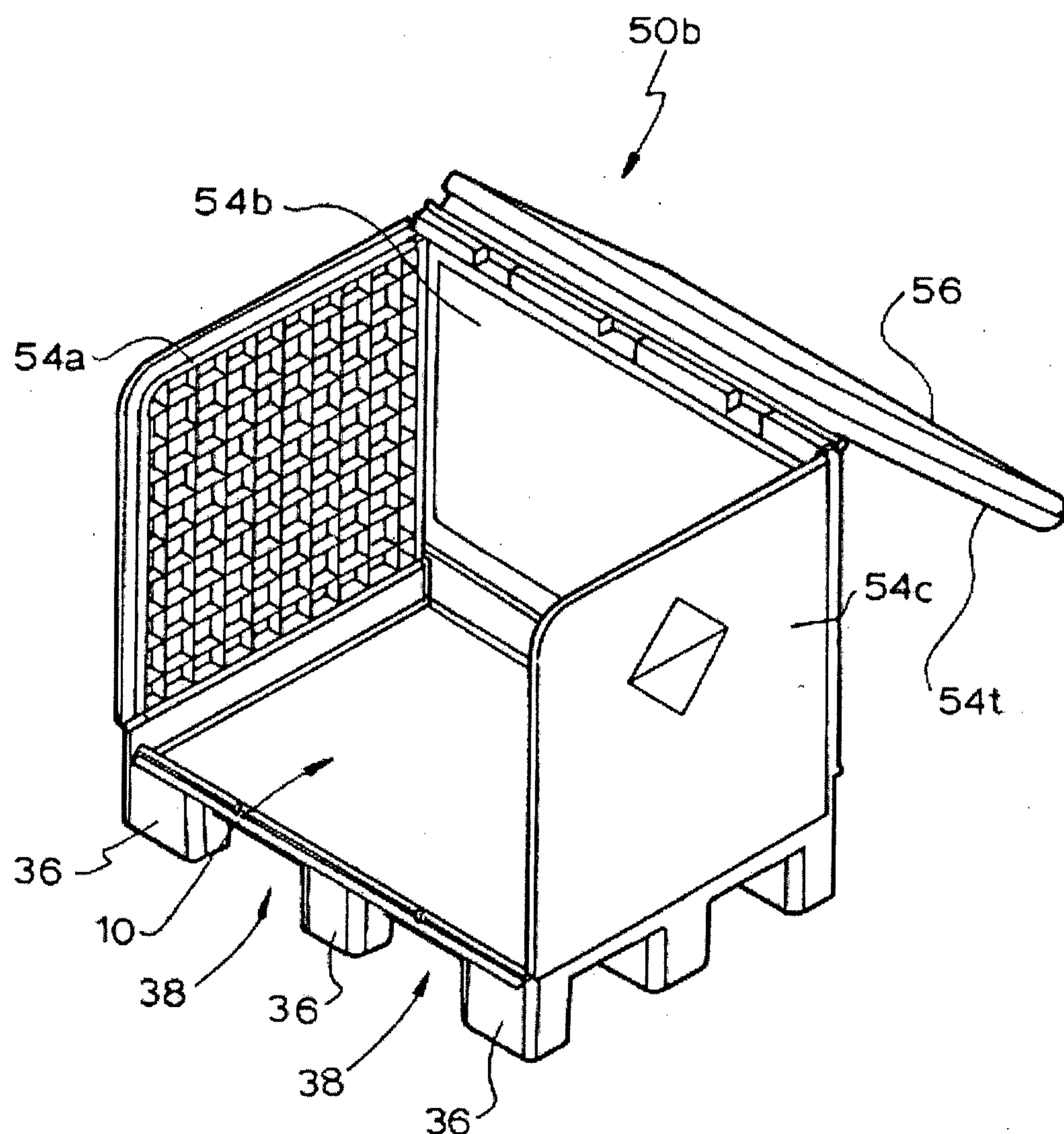


Fig.20c

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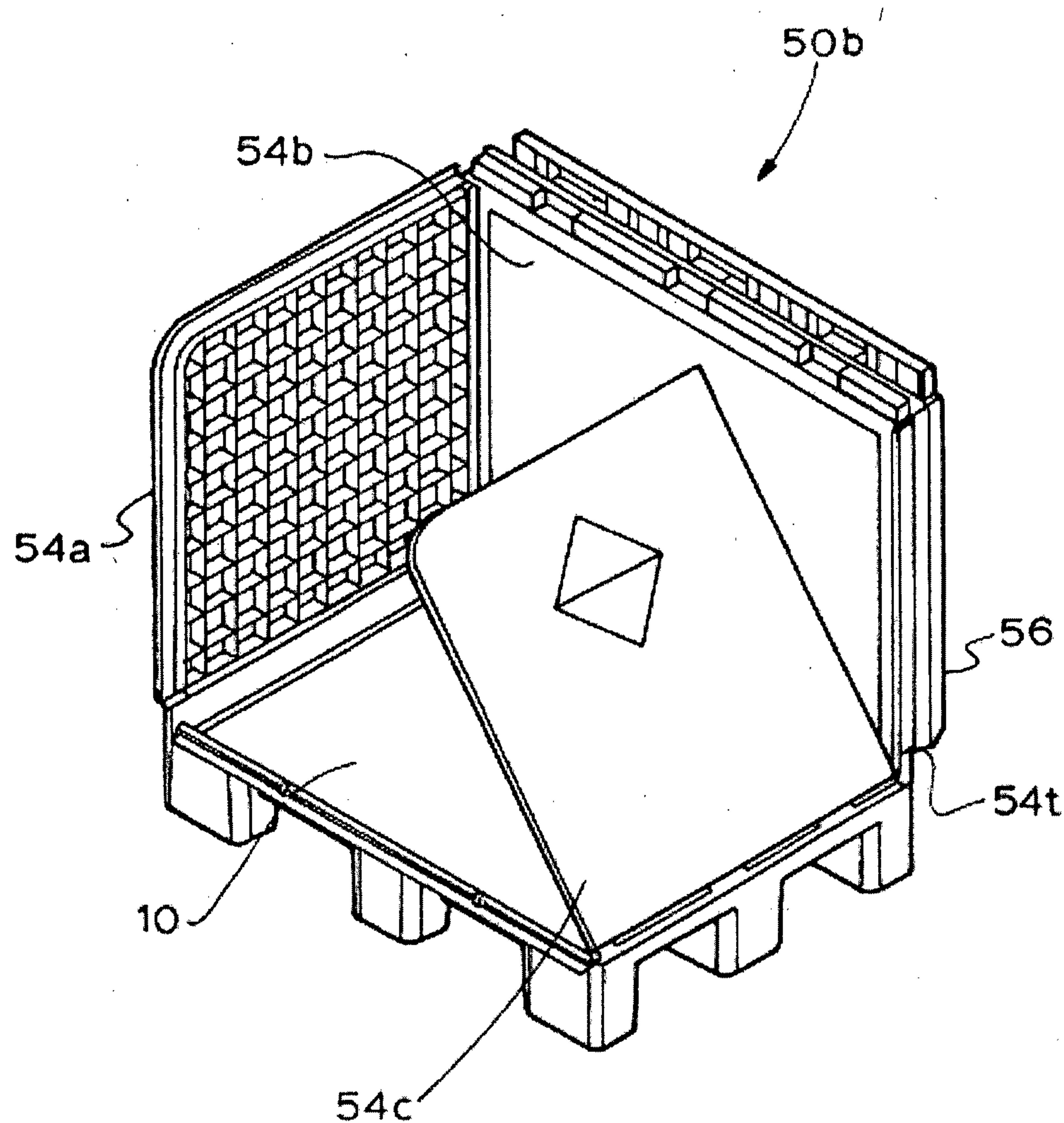


Fig.20d

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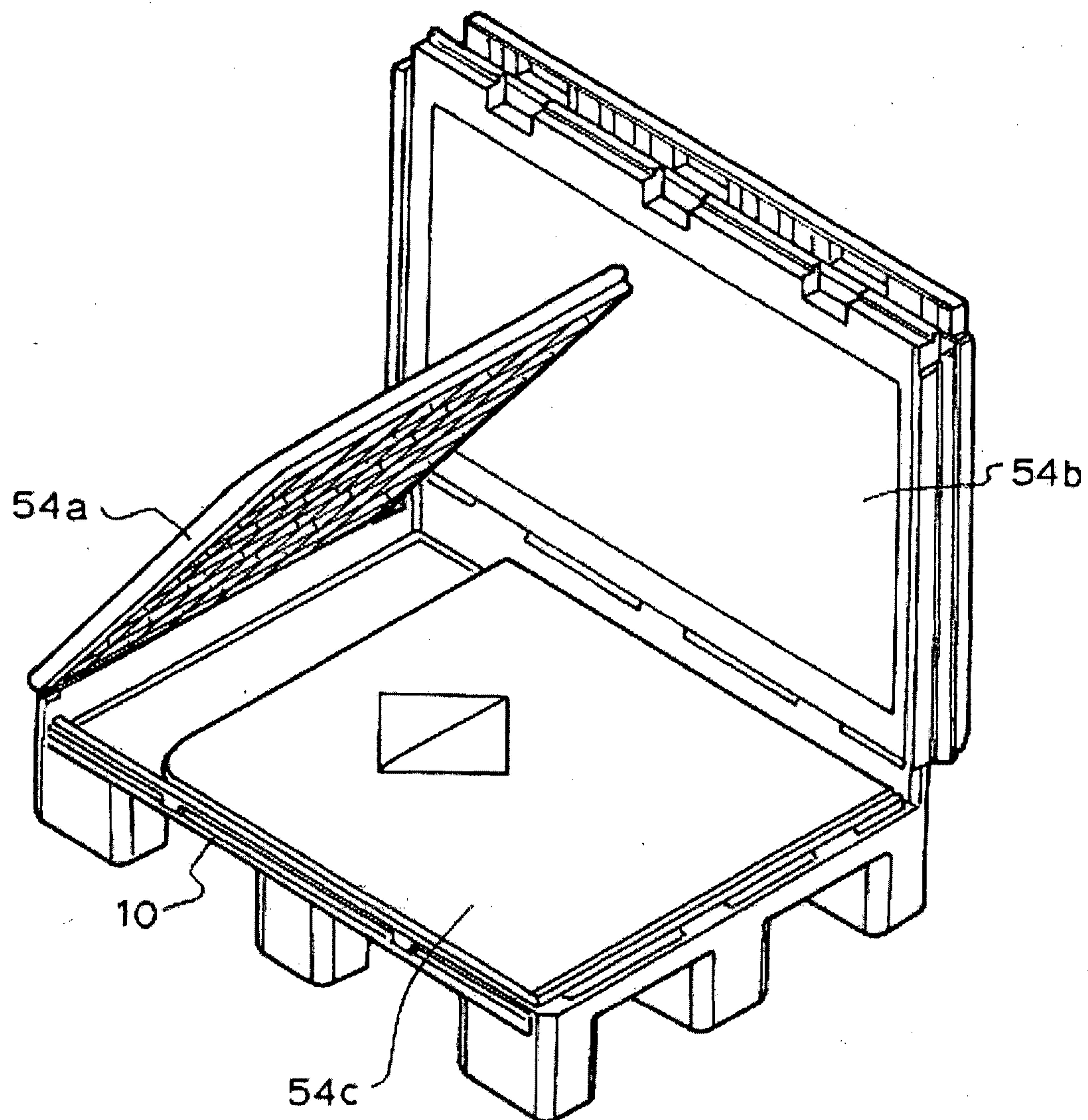


Fig.20e

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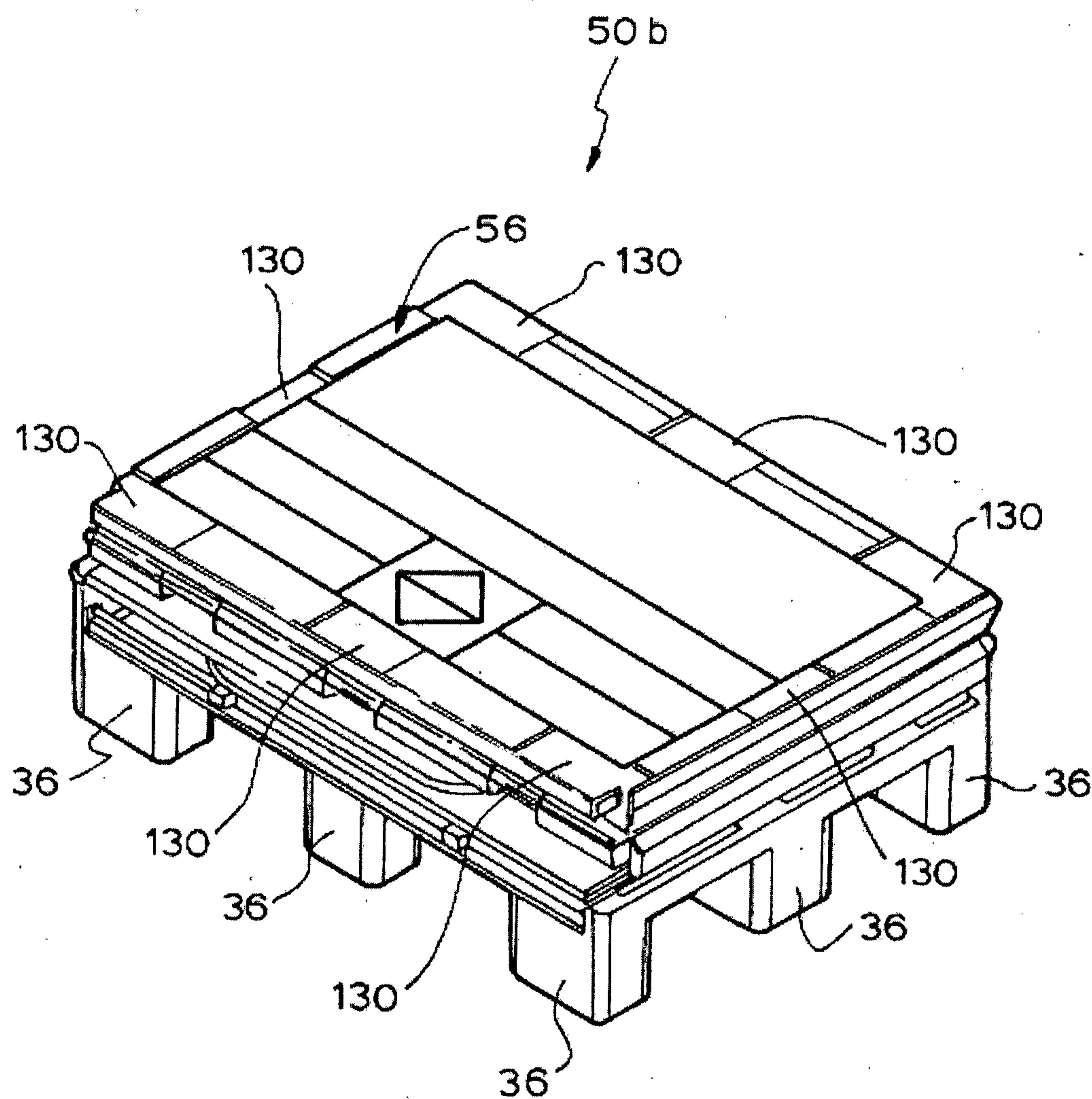


Fig.20f

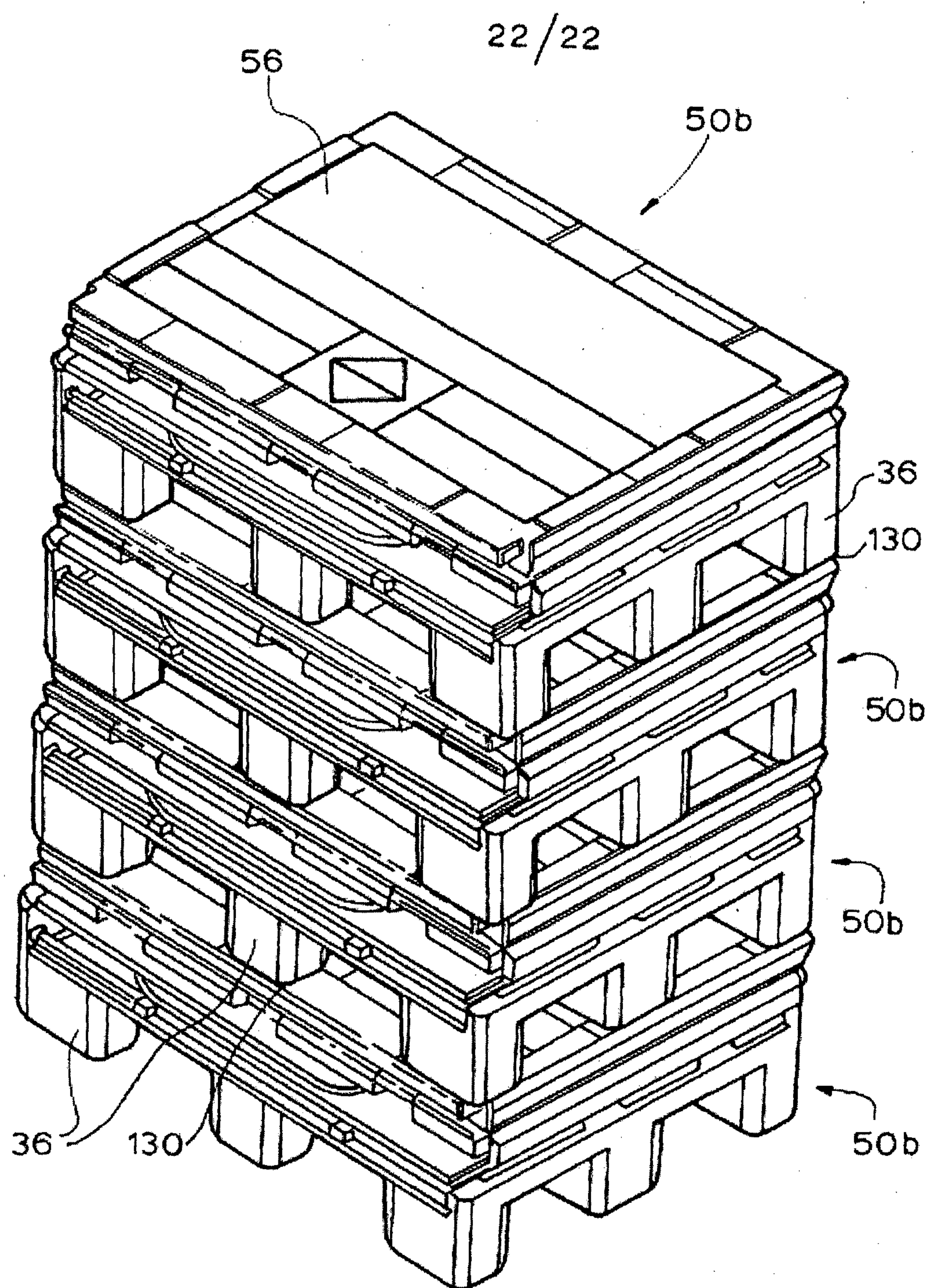


Fig. 20g

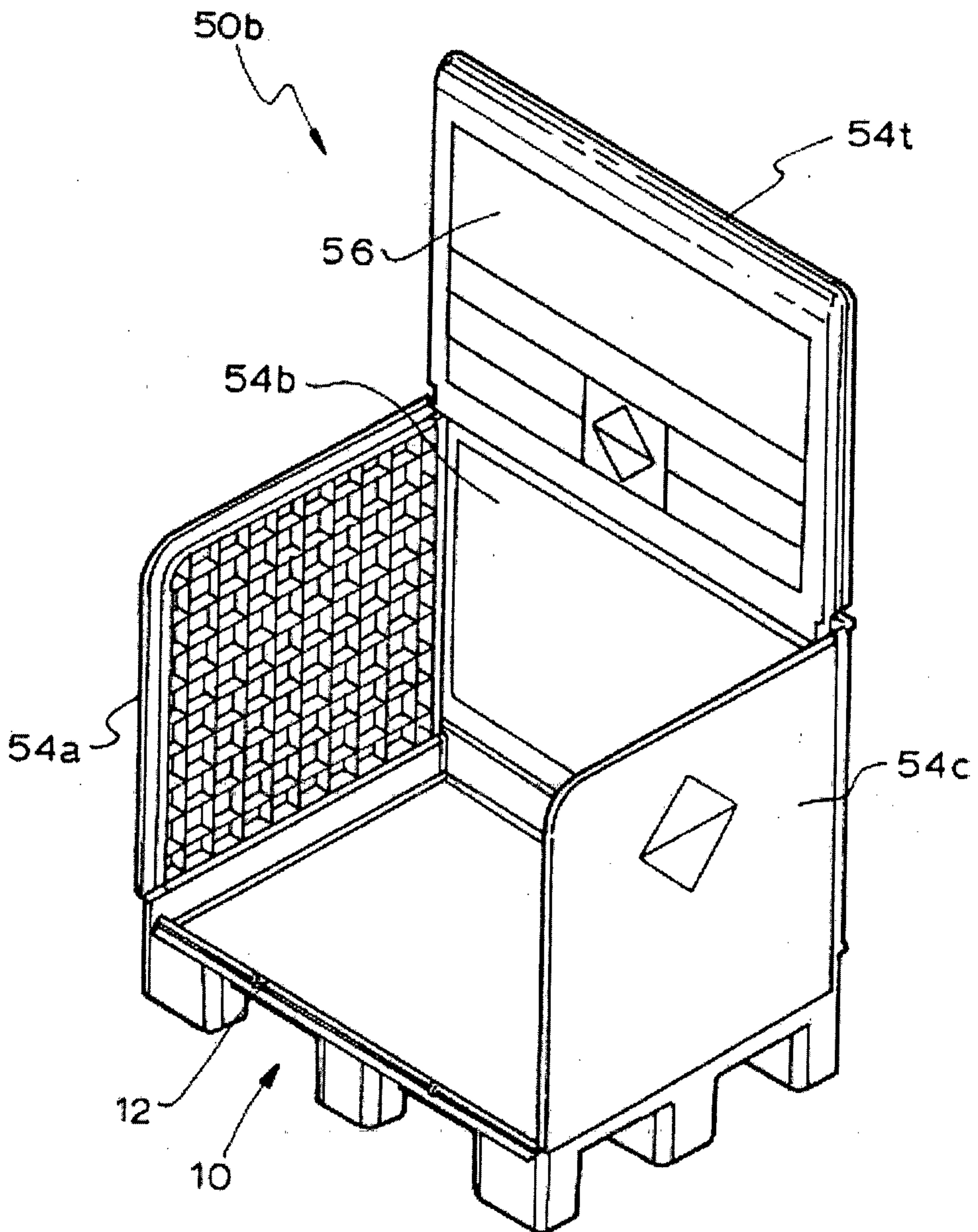


Fig. 20b