

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

**EP 1 707 505 A1**

(12)

**EUROPEAN PATENT APPLICATION**

published in accordance with Art. 158(3) EPC

(43) Date of publication:

**04.10.2006 Bulletin 2006/40**

(51) Int Cl.:

**B65D 88/12** (2006.01)**B60P 3/077** (2006.01)(21) Application number: **04704730.3**

(86) International application number:

**PCT/JP2004/000574**(22) Date of filing: **23.01.2004**

(87) International publication number:

**WO 2005/070790 (04.08.2005 Gazette 2005/31)**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PT RO SE SI SK TR**(72) Inventor: **NAGURA, Mitsuo,****TAS EXPRESS CO. LTD.****Tokyo 102-0074 (JP)**(71) Applicant: **Tas Express Co., Ltd.****Tokyo 102-0074 (JP)**(74) Representative: **Kramer - Barske - Schmidtchen****European Patent Attorneys****Patenta****Radeckestrasse 43****81245 München (DE)****(54) CONTAINER**

(57) A container comprising a container main body having a pair of right and left side-wall plates (20) and a roof plate (60), a bottom plate (70), and a front door (80A) and a rear door (80B) connected to the bottom plate (70), wherein the container main body is displaceable with respect to the bottom plate (70) from a neutral position, between a front exposed position, where the front part of the bottom plate (70) is exposed to the outside of the

container main body, and a rear exposed position, where the rear part of the bottom plate (70) is exposed to the outside of the container main body. The container main body is foldable and the front door (80A) and the rear door (80B) are also foldable at the bottom plate so that the container is foldable. The front door (80A) and the rear door (80B) can also be utilized as a slope that opens to the outside for insertion/removal usage.

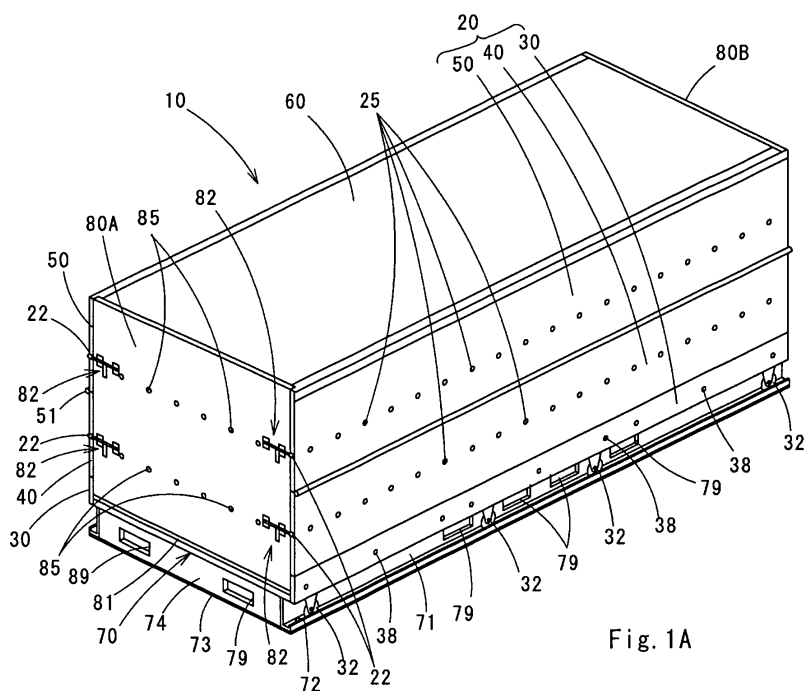


Fig. 1A

EP 1 707 505 A1

## Description

### Technical Field

**[0001]** The present invention relates to a container for housing and transporting cargo, and more particularly to a container for housing an automobile.

### Background Art

**[0002]** Cargo such as an automobile is sometimes transported while being housed in a container.

**[0003]** A container such as the following is known in the prior art. The container has a substantially rectangular parallelepiped, box shape, and wall plates on the front side and/or rear side thereof serve as a door(s).

**[0004]** The cargo is inserted and removed when the door is open, and transportation is performed when the door is closed.

**[0005]** Incidentally, when a container is transported by airplane in particular, the size (volume) of the container is preferably as small as possible in relation to the size of the cargo. Accordingly, the space between the cargo and the inner surface of the container is narrow.

**[0006]** On the other hand, it is also desirable that the cargo does not move relative to the interior of the container during transportation.

**[0007]** However, when the space between the cargo and the inner surface (inner wall surface) of the container is narrow, an operation to fix the cargo to the bottom surface of the container or the like is extremely complicated. The operation to release the cargo is similarly complicated.

**[0008]** In consideration of these operations, at least a predetermined amount of space is required between the inner surface (inner wall surface) of the container and the cargo, which leads to a corresponding increase in the volume of the container and a corresponding deterioration in the transportation efficiency of the cargo.

**[0009]** Therefore, an object of the present invention is to provide a container which can efficiently house and transport cargo such as an automobile.

### Disclosure of the Invention

**[0010]** A first invention is the container comprising: a container main body having a roof plate and a left/right pair of side wall plates, a bottom plate and a front door and a rear door which open and close a front end portion and a rear end portion of said container main body, characterized in that said container main body is relatively displaceable with respect to said bottom plate from a neutral reference position, in which said bottom plate is aligned with said container main body, between a front portion exposed position, in which a front portion of said bottom plate is exposed from said container main body, and a rear portion exposed position, in which a rear portion of said bottom plate is exposed from said container

main body.

**[0011]** With the container of this invention, when the container main body is positioned in the front portion exposed position, the front portion of the cargo is fixed to the bottom plate, and when the container main body is positioned in the rear portion exposed position, the rear portion of the cargo is fixed to the bottom plate. This applies similarly when the front portion and rear portion of the cargo are released from the bottom plate. Transportation is performed when the container main body is positioned in the neutral position.

**[0012]** Hence in the container of this invention, operations to fix and release the cargo to and from the bottom plate (container) can be performed easily. In other words, a gap between the container (container main body) and cargo for performing operations to fix and release the cargo to and from the container (bottom plate) is not required, thereby enabling a corresponding reduction in the size of the container and an improvement in the cargo transportation efficiency.

**[0013]** Note that in this invention, various aspects in which the front door and/or the rear door is (are) connected to the bottom plate or container main body, or various aspects in which neither door is connected, may be considered.

**[0014]** Further, a case in which the container main body is displaceable has been used as an aspect of this invention, but as another aspect, the bottom plate may be made displaceable.

**[0015]** A second invention is the container of the first invention, characterized in that said container main body is displaceable from said neutral position between said front portion exposed position and said rear portion exposed position.

**[0016]** More specifically, this invention is an aspect in which the "relatively displaceable" of the first invention is replaced by "displaceable".

**[0017]** With this invention, similar actions and effects to those of the first invention are obtained, and in addition, the following actions and effects are obtained.

**[0018]** In this container, the container main body is displaceable, and therefore the container main body is displaced in relation to the bottom plate from the neutral reference position between the front portion exposed position and the rear portion exposed position by displacing the container main body rather than by displacing the bottom plate. Hence with this invention, there is no need to perform a difficult operation to displace the bottom plate, particularly when a heavy object such as an automobile is carried on the bottom plate, and cargo such as an automobile can be easily housed and removed.

**[0019]** A third invention is the container of the first or second invention, characterized in that each of said pair of side wall plates comprises an upper portion side wall plate and a lower portion side wall plate rotatably connected at a rotating portion, each of said upper portion side wall plates is rotatable about said roof plate, each of said lower portion side wall plates is rotatable about

said bottom plate, said container main body is displaceable between a base state, in which each of said side wall plates is substantially vertical and said roof plate is separated from said bottom plate, and a folded state, in which each of said side wall plates is folded inward at said rotating portion such that said roof plate moves close to said bottom plate, and said front door and said rear door are displaceable between a base state, in which said front door and said rear door are substantially vertical and close said front end portion and said rear end portion of said container main body, and a folded state, in which said front door and said rear door overlap said bottom plate and/or said roof plate.

**[0020]** Here, neither "each of said upper portion side wall plates is rotatable about said roof plate" nor "each of said lower portion side wall plates is rotatable about said bottom plate" is limited to direct rotation, and also include indirect rotation. More specifically, these terms include aspects in which another member is interposed between the lower portion side wall plate and bottom plate such that, for example, the lower portion side wall plate is rotatable about the other member while the other member does not rotate about the bottom plate. This applies similarly to the relationship between the upper portion side wall plate and the lower portion side wall plate.

**[0021]** With the container of this invention, the following actions and effects are obtained in addition to the actions and effects of the container according to the first or second invention.

**[0022]** When cargo is housed in this container, the container main body is set in the base state, while the front door and rear door are also set in the base state (this will be referred to as the base state of the container).

**[0023]** On the other hand, when cargo is not housed in the container, the container main body is set in the folded state, while the front door and rear door are also set in the folded state (this will be referred to as the folded state of the container).

**[0024]** By setting the container in the folded state when no cargo is housed therein, the volume of the container is reduced, thereby leading to an improvement in transportation efficiency.

**[0025]** Note that in this invention, various aspects in which the front door and/or the rear door is (are) rotatably connected to the bottom plate or container main body, or various aspects in which neither door is connected, may be considered.

**[0026]** A fourth invention is the container of any of the first through third inventions, characterized in that said front door and/or said rear door is/are rotatably connected to said front end portion and/or said rear end portion of said bottom plate portion, and said front door and/or said rear door is/are also displaceable between said base state and an insertion/removal position, in which said front door and/or said rear door connect(s) said front end portion and/or said rear end portion of said bottom plate with a loading surface that is exterior to said bottom plate, on which surface the cargo is supported.

**[0027]** With the container of this invention, the following actions and effects are obtained in addition to the actions and effects of the container according to the first through third inventions.

**[0028]** When the cargo is to be inserted into or removed from the container, the front door or rear door is set in the insertion/removal state. Thus, in the insertion/removal state, the cargo can be easily inserted into or removed from the container through the front door or rear door. This is particularly effective when there is a step between the bottom plate and the loading surface (a surface that is exterior of the bottom plate on which the cargo is supported), such as the ground.

**[0029]** A fifth invention is the container of any of the first through fourth inventions, characterized in that said container houses an automobile as said cargo, and characterized in further comprising: a flexible fixing member having a pair of circumferential-direction linear members which are flexible, have a linear shape, and correspond to the circumferential direction of a tire of said automobile, a width-direction linear member which is flexible, has a linear shape, connects said pair of circumferential-direction linear members, and corresponds to the width direction of said tire, and a first fixing portion and a second fixing portion provided in relation to said bottom plate, a part of said circumferential-direction linear member on one side of a part which is disposed along at least an upper end portion of said tire being fixed to said first fixing portion, and a part of said circumferential-direction linear member on the other side of said part disposed along at least said upper end portion of said tire being fixed to said second fixing portion.

**[0030]** With the container of this invention, the following actions and effects are obtained in addition to the actions and effects of the container according to the first through fourth inventions.

**[0031]** With this container, the flexible fixing member is disposed along at least the upper end portion of the automobile tire, and using this as a reference, one side is fixed to the first fixing member, while the other side is fixed to the second fixing member.

**[0032]** Thus, the automobile serving as cargo is easily fixed to the bottom plate (container).

**[0033]** Note that the flexible fixing member, first fixing member, and second fixing member do not necessarily have to be provided for all of the automobile tires, and may be provided for only some of the tires. This applies similarly to the sixth and seventh inventions.

**[0034]** The circumferential-direction linear member and width-direction linear member, which are flexible and have a linear shape, may be formed by chains, belts, ropes, or the like.

**[0035]** A sixth invention is the container of the fifth invention, characterized in that the position of said first fixing portion and said second fixing portion in said front-rear direction of said bottom plate is selectable.

**[0036]** With the container of this invention, the following actions and effects are obtained in addition to the

actions and effects of the container according to the fifth invention.

**[0037]** With this container, the first fixing member and second fixing member in appropriate positions are selected in accordance with the position and size of the automobile tires. Thus, automobiles having different tire positions and/or sizes can be appropriately fixed to the bottom plate.

**[0038]** A seventh invention is the container of the fifth or sixth invention, characterized by further comprising a tensioning member which tensions a part of said circumferential-direction linear member located between said part fixed to said first fixing member and said part fixed to said second fixing member, in a direction towards said bottom plate.

**[0039]** With the container of this invention, the following actions and effects are obtained in addition to the actions and effects of the container according to the fifth or sixth invention.

**[0040]** With this container, the part of the circumferential-direction linear member between the part fixed to the first fixing member and the part fixed to the second fixing member is tensioned in a direction towards the bottom plate by the tensioning member such that tension is generated in this part. Thus, the corresponding tire can be tightly fixed to the bottom plate.

**[0041]** An eighth invention is the container of any of the fifth through seventh inventions, characterized by further comprising a wedge-shaped member disposed at a front side or a rear side of a contact portion of said tire which contacts said bottom plate.

**[0042]** With the container of this invention, the following actions and effects are obtained in addition to the actions and effects of the container according to the fifth through seventh inventions.

**[0043]** In this container, the wedge-shaped member is disposed on the front side or the rear side of a contact portion of the tire which contacts the bottom plate, and hence the tire can be prevented from moving forward or backward and can be tightly fixed to the bottom plate.

#### Brief Description of the Drawings

**[0044]** Fig. 1A is a perspective view showing a container according to an embodiment of the present invention in a base state;

**[0045]** Fig. 1B is a perspective view showing the container according to an embodiment of the present invention in a folded state;

**[0046]** Fig. 2 is a perspective view showing the container according to an embodiment of the present invention in the base state, in which a container main body is in a front portion exposed position (the bottom plate is in a front portion exposed state);

**[0047]** Fig. 3 is an exploded perspective view showing the container according to an embodiment of the present invention in the base state;

**[0048]** Fig. 4 is an exploded perspective view showing

the container according to an embodiment of the present invention in the folded state;

**[0049]** Fig. 5 is a vertical sectional view showing the container according to an embodiment of the present invention in the base state, which view is a virtual slice along a vertical plane extending in a width direction (left-right direction) of the container, as is the case in Fig. 6;

**[0050]** Fig. 6 is a vertical sectional view showing the container according to an embodiment of the present invention in the folded state;

**[0051]** Fig. 7 is a vertical sectional view showing a part of the container according to an embodiment of the present invention with the container main body in the base state, which view is a virtual slice along a vertical plane extending in a length direction (front-rear direction) of the container; the rear door in the base state is shown by a solid line, the rear door in the folded state is shown by a dot/dash line, and the rear door in the insertion/removal state is shown by a dot/dot/dash line;

**[0052]** Fig. 8A is a side view showing the container according to an embodiment of the present invention in use, in which the container main body is in the front portion exposed position (the bottom plate is in the front portion exposed state);

**[0053]** Fig. 8B is a side view showing the container according to an embodiment of the present invention in use, in which the container main body is in a rear portion exposed position (the bottom plate is in a rear portion exposed state);

**[0054]** Fig. 9 is an enlarged perspective view showing a part of the bottom plate of the container according to an embodiment of the present invention;

**[0055]** Fig. 10 is a side view showing a state in which a tire is fixed to the bottom plate of the container according to an embodiment of the present invention; and

**[0056]** Fig. 11 is a front view or a rear view showing a state in which a tire is fixed to the bottom plate of the container according to an embodiment of the present invention.

#### Best Modes for Carrying Out the Invention

**[0057]** Next, an embodiment of the present invention will be described on the basis of the drawings.

**[0058]** As shown in Figs. 1A and 3, the container comprises a container main body 10 and a bottom plate 70, and has the overall form of a hollow rectangular parallelepiped. The size (volume) of the container corresponds to the size of a single automobile.

**[0059]** As shown in Fig. 3, the container main body 10 comprises a left/right pair of side wall plates 20 and a roof plate 60.

**[0060]** The bottom plate 70 is provided with a front door 80A and a rear door 80B.

**[0061]** The bottom plate 70 has a substantially horizontal flat plate shape.

**[0062]** As shown in Figs. 3 through 6, a leg portion 71 is provided on each of the left and right edge portions of

the bottom plate 70. Each leg portion 71 is formed along the entire length of the bottom plate 70. Each leg portion 71 extends downward substantially vertically from the bottom plate 70, and a roller moving portion 72 is formed on a lower end portion thereof. The roller moving portion 72 extends outward from the lower end portion of each leg portion 71.

**[0063]** As shown in Figs. 1A, 3, and so on, a leg portion 74 is also provided on each of the front and rear edge portions of the bottom plate 70. The lower surfaces of the two leg portions 71 and the two leg portions 74 are connected by a ground-contacting plate 73.

**[0064]** A forklift insertion hole 79 is formed in each leg portion 71 and each leg portion 74. When the container is transported by a forklift truck, the forks of the forklift truck are inserted into the forklift insertion holes 79.

**[0065]** As shown in Figs. 3 and 5, each of the left and right side wall plates 20 of the container main body 10 comprises a base 30, a lower portion side wall plate 40, and an upper portion side wall plate 50, all of which extend along the entire length of the container main body 10.

**[0066]** The base 30 is shaped as a vertical band plate extending in the length direction (front-rear direction) of the container. A roller support portion 31 (Fig. 5) is formed on a lower end portion of the base 30, and a roller 32 is provided on the roller support portion 31. Thus, a plurality (four, for example) of the rollers 32 is provided on each base 30 along the length direction (front-rear direction). Each roller 32 moves along the roller moving portion 72 of the leg portion 71 on the bottom plate 70.

**[0067]** As shown in Fig. 5, a guided member 34 is connected to each base 30 of the container main body 10 by a plurality of (six, for example) bolts 33 (not shown in Figs. 1A through 4) disposed along the length direction (front-rear direction). The guided member 34 extends along the length direction of the base 30 (container main body 10) in a position further removed in the inside direction of the container main body 10 than the base 30 (the inside surface thereof), and is shaped as a substantially vertical band plate.

**[0068]** A guide portion 75 (not shown in Figs. 3 and 4) is formed on each of the left and right edge portions of the bottom plate 70. The guide portion 75 has a grooved shape with a narrowed opening portion which corresponds to the guided member 34, and extends along the length direction (front-rear direction) of the base 30 (container main body 10). The guided member 34 is fitted into the guide portion 75 in its retained state.

**[0069]** Thus, the rollers 32 can roll and move on the roller moving portion 72 of the leg portion 71 of the bottom plate 70 while the guided member 34 is being guided by the guide portion 75, and as a result, the container main body 10 can be displaced (moved) relative to the bottom plate 70 along the length direction (front-rear direction) of the two components (this displacement (movement) being performed by a user).

**[0070]** In other words, the container main body 10 can be displaced from a neutral reference position (Fig. 1A),

in which the position of the container main body 10 and the position of the bottom plate 70 match in the length direction (front-rear direction) of the two, between a front portion exposed position (Figs. 2, 8A), in which the container main body 10 is positioned rearward of the neutral position such that a front portion of the bottom plate 70 is exposed, and a rear portion exposed position (Fig. 8B), in which the container main body 10 is positioned forward of the neutral position such that a rear portion of the bottom plate 70 is exposed. When the container main body 10 is in the front portion exposed position, the bottom plate 70 will be described as being in a front portion exposed state, and when the container main body 10 is in the rear portion exposed position, the bottom plate 70 will be described as being in a rear portion exposed state.

**[0071]** As shown in Fig. 5, a plurality of (nine, for example) bolt holes 77 is provided in each of the left and right edge portions of the bottom plate 70 along the length direction thereof (this is not shown in Figs. 3 and 4). A plurality of (nine, for example) corresponding bolt holes 37 is provided in each base 30 along the length direction thereof (see also Figs. 3 and 4).

**[0072]** Hence, when the container main body 10 is in the neutral position (see Fig. 3), the container main body 10 is held (fixed) in the neutral position by screwing bolts 38 into each of the bolt holes 37 and bolt holes 77, as shown in Fig. 5 (see also Fig. 1A).

**[0073]** As shown in Figs. 5 and 6, the lower end portion of each lower portion side wall plate 40 of the container main body 10 is connected to the upper end portion of each base 30 via a hinge 41. The lower end portion of each upper portion side wall plate 50 is connected to the upper end portion of each lower portion side wall plate 40 via a hinge 51 (rotating portion). The lower portion side wall plate 40 and upper portion side wall plate 50 both have a band plate shape extending along the length direction (front-rear direction) of the container.

**[0074]** Each of the left and right end portions of the roof plate 60 is connected to the upper end portion of each upper portion side wall plate 50 via a hinge 61. The roof plate 60 has a substantially horizontal flat plate shape.

**[0075]** The container main body 10 is displaceable between a base state (Figs. 3, 5) and a folded state (Figs. 4, 6).

**[0076]** As shown in Figs. 3 and 5, when the container main body 10 is in the base state, the lower portion side wall plates 40 and the upper portion side wall plates 50 are in a substantially vertical state such that the side wall plates 20 are in a parallel, substantially vertical state and the roof plate 60 is separated from the bottom plate 70.

**[0077]** As shown in Fig. 5, when the container main body 10 is in the base state, the hinge 41 is positioned on the inside of the container main body 10, the hinge 51 is positioned on the outside of the container main body 10, and the hinge 61 is positioned on the inside of the container main body 10.

**[0078]** As shown in Figs. 4 and 6, when the container

main body 10 is in the folded state, the hinge 51 displaces towards the inside direction of the container such that the lower portion side wall plates 40 and upper portion side wall plates 50 are in a substantially horizontal state and the roof plate 60 approaches the bottom plate 70.

**[0079]** As shown in Fig. 1A and so on, a large number of fixing rings 25 is provided on each of the left and right side wall plates 20 (lower portion side wall plate 40 and upper portion side wall plate 50).

**[0080]** As shown in Figs. 5 and 6, a hanging portion 62 is formed on each of the left and right edge portions of the roof plate 60. Each hanging portion 62 is shaped as a band plate extending along the length direction of the container main body 10, extends downward from each of the left and right edge portions of the roof plate 60, and has a lower end portion which faces inward so as to contact or approach the outside surface of the upper portion side wall plate 50 (when the container main body 10 is in the base state). As a result, water is prevented from entering the interior of the container main body 10 through the gap between the roof plate 60 and upper portion side wall plate 50 when the container main body 10 is in the base state.

**[0081]** As shown in Fig. 3, the front door 80A is provided on a front end portion of the bottom plate 70, and the rear door 80B is provided on a rear end portion of the bottom plate 70. The front door 80A and rear door 80B have an identical structure and are connected to the front end portion/rear end portion of the bottom plate 70 by an identical mechanism.

**[0082]** As shown in Fig. 7, a base end portion (lower end portion) of the front door 80A/rear door 80B is connected to the front end portion/rear end portion of the bottom plate 70 via a hinge 81. The front door 80A and rear door 80B are displaceable from a substantially vertical base state (shown by the solid line in Fig. 7), which serves as a reference, between a folded state (shown by the dot/dash line in Fig. 7) and an insertion/removal state (shown by the dot/dot/dash line in Fig. 7).

**[0083]** As shown in Fig. 4, when in the folded state, the front door 80A and rear door 80B fall down towards the inside direction of the container main body 10 (base state) to become substantially horizontal, and overlap the bottom plate 70. As shown in Fig. 6, the front door 80A and rear door 80B are positioned in this state at a lower position than the upper end portion of the base 30. Hence, when the front door 80A and rear door 80B are in the folded state, the lower portion side wall plates 40 of the container main body 10 do not interfere with the front door 80A and rear door 80B, and the container main body 10 can be smoothly set in the folded state

(described above).

**[0084]** As shown in Figs. 2 and 7 through 8B, in the insertion/removal state, the front door 80A and rear door 80B fall down towards the outside direction of the container main body 10 and incline gradually downward from

the base end portion to the tip end portion thereof such that the tip end portion contacts a loading surface 300 that is exterior of the bottom plate 70 (of which the ground is a representative example), on which surface 300 the automobile is supported. Hence, in the insertion/removal state, the front door 80A and rear door 80B form a slope that allows the automobile, serving as cargo, to be driven on and off the bottom plate 70.

**[0085]** As shown in Figs. 1A and 3, in the base state, the front door 80A/rear door 80B close openings formed by the roof plate 60, the front end portion/rear end portion of the pair of side wall plates 20 of the container main body 10 and the front end portion/rear end portion of the bottom plate 70. At this time, as shown in Figs. 1A and 7, the front door 80A/rear door 80B are fitted inside the pair of side wall plates 20 and contact the front end surface/rear end surface of the roof plate 60 rather than being fitted into the lower side of the roof plate 60.

**[0086]** Hence, when the container main body 10 is in the neutral position relative to the bottom plate 70, as shown in Fig. 1A, the front door 80A is displaceable only between the base state and the insertion/removal state. This applies similarly to the rear door 80B.

**[0087]** As shown in Fig. 2, when the container main body 10 is in the predetermined front portion exposed position, the front door 80A is displaceable from the base state between the folded state and the insertion/removal state. When the container main body 10 is in the front portion exposed position, the rear door 80B can only be positioned in the insertion/removal state. This applies similarly to the other door (rear door 80B, front door 80A) when the container main body 10 is in the (predetermined) rear portion exposed position.

**[0088]** As shown in Fig. 1A, the front door 80A is provided with two pairs of door fixing members 82 on the left and right. When in the base state, the front door 80A is fixed to the side wall plates 20 (a tubular member on the front end portion thereof) by the door fixing members 82 (a rod-shaped member thereof), and hence the base state is maintained. This applies similarly to the rear door 80B.

**[0089]** The front door 80A is provided with a large number of fixing rings 85. This applies similarly to the rear door 80B.

**[0090]** When the container main body 10 is in the base state and the front door 80A and rear door 80B are also in the base state, as shown in Figs. 1A and 3, this will be referred to as the base state of the container.

**[0091]** When the front door 80A and rear door 80B are in the folded state and the container main body 10 is also in the folded state, as shown in Figs. 1B and 4, this will be referred to as the folded state of the container.

**[0092]** As shown in Figs. 3 and 9, a left and right pair of tire fixing rails 90 is respectively fixed to each of the front side part and rear side part of the upper surface of the bottom plate 70 near the left and right edge portions. As shown in Fig. 3, four pairs of the tire fixing rails 90 are provided so as to correspond to the left and right tires on

the front side and rear side of various automobiles, and the tire fixing rails 90 are disposed at intervals that correspond to the width of various tires.

**[0093]** As shown in Fig. 9, each tire fixing rail 90 extends along the length direction of the bottom plate 70 (container main body 10) in accordance with various automobiles (the position and size of the tires thereof), and has a large number of hole-shaped fixing portions 92 formed in the same direction.

**[0094]** One flexible fixing member 100 is provided for each of the four pairs of tire fixing rails 90. Each flexible fixing member 100 comprises a pair of circumferential-direction chains 102 (circumferential-direction linear members) and a plurality of (five, for example) width-direction chains 106 (width-direction linear members).

**[0095]** Each circumferential-direction chain 102 corresponds to the circumference of various tires 210 (see Fig. 10). Each width-direction chain 106 corresponds to the width of the various tires 210 (see Fig. 11) and connects the two circumferential-direction chains 102 to each other.

**[0096]** As shown in Fig. 9, a hook 103 is connected to a base end portion of each circumferential-direction chain 102. A hook 104 is detachably connected to a part of each circumferential-direction chain 102 near the tip end portion.

**[0097]** A pair of tensioning members 110 is provided for each flexible fixing member 100. Each tensioning member 110 comprises a turn buckle 111 having hooks 112a, 112b connected to the two ends thereof.

**[0098]** An auxiliary fixing device 120 may also be provided for each pair of tire fixing rails 90.

**[0099]** The auxiliary fixing device 120 comprises a base plate 121 having a flat plate shape, the length direction (front-rear direction) of which extends in the length direction (front-rear direction) of the bottom plate 70, and a plurality of (two, for example) left/right pairs of bolt holes 122 are formed in the base plate 121. On the other side, many pairs of bolt holes 78 are formed in the bottom plate 70 in order to correspond to each auxiliary fixing device 120 (the bolt holes 122 thereof). By removably screwing bolts 129 into any of the bolt holes 78 in the bottom plate 70 through the bolt holes 122, each base plate 121 (each auxiliary fixing device 120) can be fixed at a predetermined position in the length direction (front-rear direction) of the bottom plate 70.

**[0100]** A guide member 123 is fixed to each of the left and right edge portions of the base plate 121 along the entire length thereof. Each guide member 123 extends substantially vertically upward and substantially horizontally inward from an upper end portion thereof.

**[0101]** A wedge-shaped member 125 is disposed on the upper surface of the base plate 121. The wedge-shaped member 125 comprises guided portions 126 having a grooved shape that corresponds to the two guide members 123. Thus, the wedge-shaped member 125 can be moved along the length direction of the base plate 121 (the length direction of the bottom plate 70) while

being guided by the pair of guide members 123.

**[0102]** A nut 124 is fixed to the base plate 121 in the vicinity of the base end portion thereof, and a bolt 127 is screwed into the nut 124. The tip end portion of the bolt 127 is fixed to the wedge-shaped member 125, and a handle 128 is provided on the base end portion of the bolt 127. Thus, a user can cause the wedge-shaped member 125 to advance or retreat by rotating the handle 128.

**[0103]** Next, a method of using the container will be described together with the actions and effects thereof.

**[0104]** When an automobile serving as cargo is to be housed in the container, the container main body 10 is first set in the base state, as shown in Figs. 1 and 3. In other words, the two side wall plates 20 are set in a substantially vertical and parallel state and the roof plate 60 is separated from the bottom plate 70.

**[0105]** Next, the front door 80A and rear door 80B are opened outward and thereby set in the insertion/removal state (see Fig. 7).

**[0106]** Next, the bolts 38 (see Figs. 1 and 5) are removed and the container main body 10 is moved rearward from the neutral position such that the bottom plate 70 is set in the front portion exposed state, as shown in Figs. 2 and 8A.

**[0107]** After or before the above-described operation, an automobile 200 is driven onto the rear door 80B, which forms a slope, and is loaded onto the bottom plate 70, as shown in Fig. 8A.

**[0108]** In this state, the pair of front tires 210A of the automobile 200 is fixed to the bottom plate 70 in the following manner.

**[0109]** First, the auxiliary fixing device 120 is disposed directly at the front side of the front tire 210A if necessary, as shown in Figs. 8A and 10. More specifically, the base plate 121 (Fig. 9) is fixed at a predetermined position, and the handle 128 is manipulated such that the wedge-shaped member 125 contacts a part of the front tire 210A at the front side of the lower portion thereof (the contact portion with the bottom plate 70).

**[0110]** Next, as shown in Figs. 9 and 10, using the hook 103, the base end portion of each circumferential-direction chain 102 of the flexible fixing member 100 is attached to a predetermined fixing portion 92 (corresponding to a first fixing portion) of the tire fixing rail 90. Next, the flexible fixing member 100 is wrapped around the upper portion of the front tire 210A, and the base end portion of each hook 104 is attached to an appropriate location near the tip end portion of each circumferential-direction chain 102. The tip end portion of each hook 104 is then attached to a predetermined fixing portion 92 (corresponding to a second fixing portion) of the tire fixing rail 90.

**[0111]** Next, one of the hooks 112a of the tensioning member 110 is attached to a predetermined part of the circumferential-direction chain 102, and the other hook 112b of the tensioning member 110 is attached to a predetermined fixing portion 92 of the tire fixing rail 90. Next,

the turn buckle 111 of the tensioning member 110 is manipulated to reduce the distance between the two hooks 112a, 112b, thereby tightening the part of the circumferential-direction chain 102 between the hook 103 and the hook 104.

**[0112]** Thus, the pair of front tires 210A is fixed at predetermined positions on the bottom plate 70.

**[0113]** Next, as shown in Fig. 8B, the container main body 10 is moved forward such that the bottom plate 70 is set in the rear portion exposed state. In this state, the pair of rear tires 210B is fixed at predetermined positions on the bottom plate 70 in a similar manner to the pair of front tires 210A.

**[0114]** Next, as shown in Fig. 1A, the container main body 10 is returned to the neutral position and fixed at the neutral position by the bolts 38 (see also Fig. 5). The front door 80A and rear door 80B are returned to the base state and are fixed to the front end portion and rear end portion of the container main body 10.

**[0115]** In this state, the container is transported by a forklift truck and stored in the cargo storage room of an airplane or the like (not shown). The fixing rings 25, 85 and the inner surface of the cargo storage room or the like are then connected by rope such that the container is fixed to the interior of the cargo storage room.

**[0116]** When the automobile 200 serving as the cargo is to be removed from the container, a reverse operation to that described above is performed.

**[0117]** As shown in Fig. 8B, the front door 80A and rear door 80B are removed from the front end portion and rear end portion of the container main body 10 and are set in the insertion/removal state. The bolts 38 (see Figs. 1A and 5) are then removed and the container main body 10 is moved forward from the neutral position such that the bottom plate 70 is set in the rear portion exposed state. In this state, the flexible fixing member 100 (see Figs. 9 through 11) is removed from the pair of rear tires 210B of the automobile 200 such that the rear tires 210B are released from the bottom plate 70. The auxiliary fixing device 120 (see Figs. 9 and 10) is also removed from the bottom plate 70.

**[0118]** Next, as shown in Fig. 8A, the container main body 10 is moved rearward such that the bottom plate 70 is set in the front portion exposed state. In this state, the flexible fixing member 100 is removed from the pair of front tires 210A of the automobile 200 such that the front tires 210A are released from the bottom plate 70. The auxiliary fixing device 120 is also removed from the bottom plate 70.

**[0119]** In this state, the automobile 200 is driven over the front door 80A, which forms a slope, whereby the automobile 200 travels away from the bottom plate 70 and front door 80A and is removed from the container.

**[0120]** When the container is to be transported without cargo (i.e. in an empty state), the container is set in the folded state in the following manner.

**[0121]** With the bottom plate 70 in the front portion exposed state (Fig. 8A), the front door 80A is set in the

folded state (see Fig. 7). The container main body 10 is then moved forward such that the bottom plate 70 is set in the rear portion exposed state (Fig. 8B), and the rear door 80B is also set in the folded state (Fig. 7) (see Fig. 4).

**[0122]** Next, as shown in Fig. 1B, the container main body 10 is moved back into the neutral position, and in this state, the container main body 10 is fixed to the bottom plate 70 using the bolts 38 (see Figs. 1A and 5), whereby the container main body 10 is set in the folded state.

**[0123]** Thus, the container is set in the folded state and can be transported efficiently.

**[0124]** As described above, when the container is to be fixed to the bottom plate 70 (container) while housing the automobile 200 as cargo, the container main body 10 is positioned rearward of the neutral position such that the bottom plate 70 is set in the front portion exposed state, the front tires 210A are fixed to the bottom plate 70 (Fig. 8A), the container main body 10 is positioned forward of the neutral position such that the bottom plate 70 is set in the rear portion exposed state, and the rear tires 210B are fixed to the bottom plate 70 (Fig. 8B). A similar operation is performed to release the rear tires 210B and front tires 210 from the bottom plate 70.

**[0125]** Hence, the operations to fix and release the automobile 200 to and from the interior of the container are performed easily. In other words, the container main body 10 (the left and right side wall plates 20 and so on) does not cause an obstruction during operations to respectively fix and release the automobile 200 (the front tires 210A, 210B) to and from the bottom plate 70.

**[0126]** To put it another way, there is no need for a gap between the inner surface of the container (container main body 10) and the automobile 200 in order to perform operations for respectively fixing and releasing the automobile 200 to and from the container (bottom plate 70), and hence the size of the container can be reduced in correspondence thereto. As a result, the transportation efficiency of the automobile is improved.

**[0127]** Further, the container is displaceable between the base state (Fig. 1A) and the folded state (Fig. 1B) and therefore, the transportation efficiency is improved by setting the container in the folded state when no cargo is loaded (i.e. when the container is empty).

**[0128]** Note that the container described above is merely one embodiment of the present invention, and the scope of the present invention is not limited thereby.

**[0129]** The scope of the present invention is determined on the basis of the claims and the spirit thereof, and it will be evident to a person skilled in the art that various modifications and corrections can be applied within the scope of the claims as aspects of the present invention.

**[0130]** For example, one of the front door (80A) and rear door (80B) need not be displaced to the insertion/removal state. As an example of this, one of the front door (80A) and rear door (80B) may be rotatable with respect to the roof plate (60) at the upper end portion of



the door. In this case, the automobile can be inserted and removed using only the other door (which is capable of forming a slope in the insertion/removal state).

[0131] Further, both the front door (80A) and the rear door (80B) may be rotatable with respect to the roof plate (60) at the upper end portion of the door. In this case, the automobile can be inserted and removed using a separate slope-forming device as needed.

[0132] Moreover, the container does not necessarily need to be folded.

[0133] In this case, the front door (80A) and/or the rear door (80B) may be rotatably connected to either one of the left and right side wall plates (20) of the container main body.

[0134] Also at this time, one of the front door (80A) and rear door (80B) may be fixed to the substantially horizontal bottom plate (70) in a substantially right-angled state (in other words, a substantially vertical state). In this case, a special mechanism is required on the door. For example, when the front door (80A) is fixed to the bottom plate (70) in this manner, the front door (80A) must be made bendable or the like about a horizontal bending portion (hinge) at a midway position in the height direction such that the front door (80A) does not cause an obstruction when the container main body (20) is displaced toward the rear portion exposed position.

## Claims

### 1. A container comprising:

a container main body having a roof plate and a left/right pair of side wall plates;  
a bottom plate; and  
a front door and a rear door which open and close a front end portion and a rear end portion of said container main body,  
**characterized in that** said container main body is relatively displaceable with respect to said bottom plate from a neutral reference position, in which said bottom plate is aligned with said container main body, between a front portion exposed position, in which a front portion of said bottom plate is exposed from said container main body, and a rear portion exposed position, in which a rear portion of said bottom plate is exposed from said container main body.

2. The container according to claim 1, **characterized in that** said container main body is displaceable from said neutral position between said front portion exposed position and said rear portion exposed position.

3. The container according to claim 1 or claim 2, **characterized in that** each of said pair of side wall plates comprises an upper portion side wall plate and a

lower portion side wall plate rotatably connected at a rotating portion,

each of said upper portion side wall plates is rotatable about said roof plate,

each of said lower portion side wall plates is rotatable about said bottom plate,

said container main body is displaceable between a base state, in which each of said side wall plates is substantially vertical and said roof plate is separated from said bottom plate, and a folded state, in which each of said side wall plates is folded inward at said rotating portion such that said roof plate moves close to said bottom plate, and

said front door and said rear door are displaceable between a base state, in which said front door and said rear door are substantially vertical and close said front end portion and said rear end portion of said container main body, and a folded state, in which said front door and said rear door overlap said bottom plate and/or said roof plate.

4. The container according to any of claims 1 through 3, **characterized in that** said front door and/or said rear door is/are rotatably connected to said front end portion and/or said rear end portion of said bottom plate portion, and

said front door and/or said rear door is/are also displaceable between a base state, in which said front door and/or said rear door is/are substantially vertical and closes said front end portion and said rear end portion of said container main body, and an insertion/removal state, in which said front door and/or said rear door connect(s) said front end portion and/or said rear end portion of said bottom plate with a loading surface that is exterior to said bottom plate, on which surface cargo is supported.

5. The container according to any of claims 1 through 4, **characterized in that** said container houses an automobile as said cargo, and **characterized in** further comprising:

a flexible fixing member having a pair of circumferential-direction linear members which are flexible, have a linear shape, and correspond to a circumferential direction of a tire of said automobile, and a width-direction linear member which is flexible, has a linear shape, connects said pair of circumferential-direction linear members, and corresponds to a width direction of said tire; and

a first fixing portion and a second fixing portion provided in relation to said bottom plate, a part of said circumferential-direction linear member on one side of a part which is disposed along at least an upper end portion of said tire being fixed to said first fixing portion, and a part of said circumferential-direction linear member on the oth-

er side of said part disposed along at least said upper end portion of said tire being fixed to said second fixing portion.

6. The container according to claim 5, **characterized in that** a position of said first fixing portion and said second fixing portion in said front-rear direction of said bottom plate is selectable. 5
7. The container according to claim 5 or claim 6, **characterized by** further comprising a tensioning member which tensions a part of said circumferential-direction linear member located between said part fixed to said first fixing member and said part fixed to said second fixing member in a direction towards said bottom plate. 10 15
8. The container according to any of claims 5 through 7, **characterized by** further comprising a wedge-shaped member disposed at a front side or a rear side of a contact portion of said tire which contacts said bottom plate. 20

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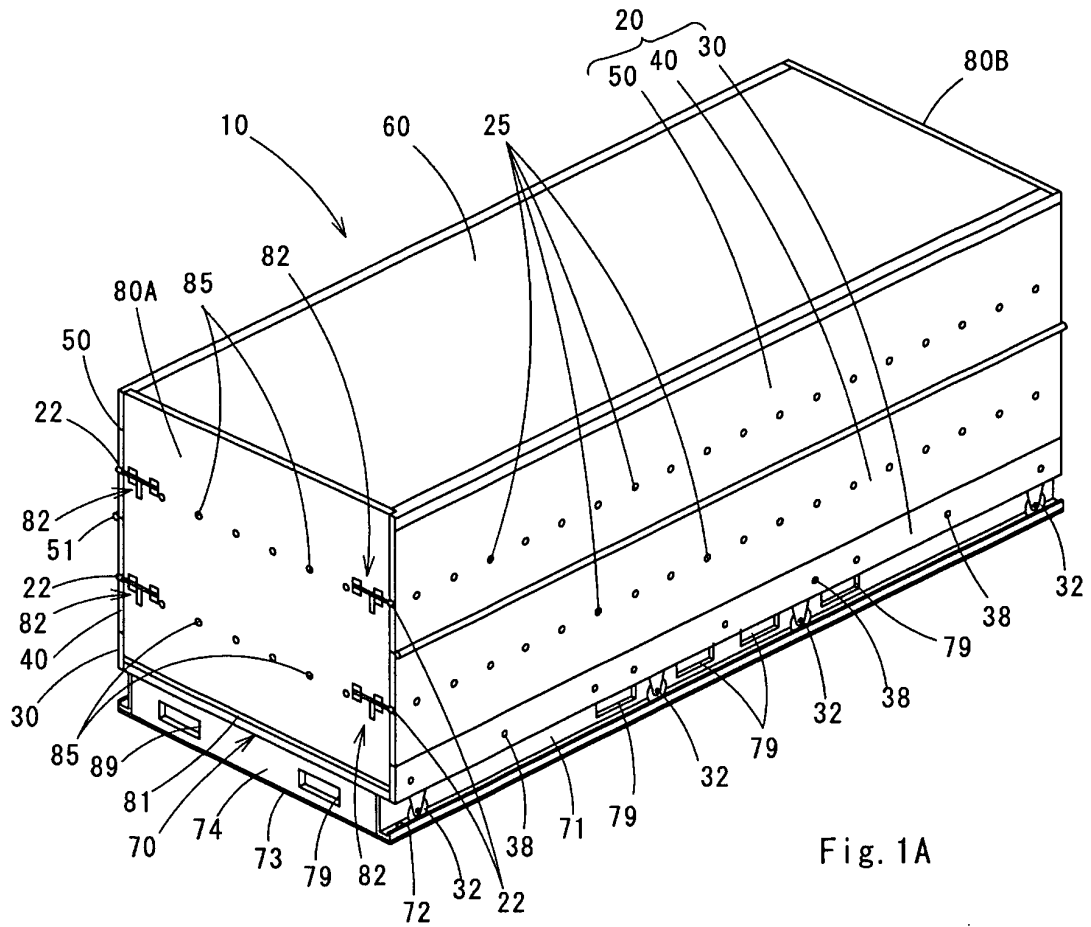


Fig. 1A

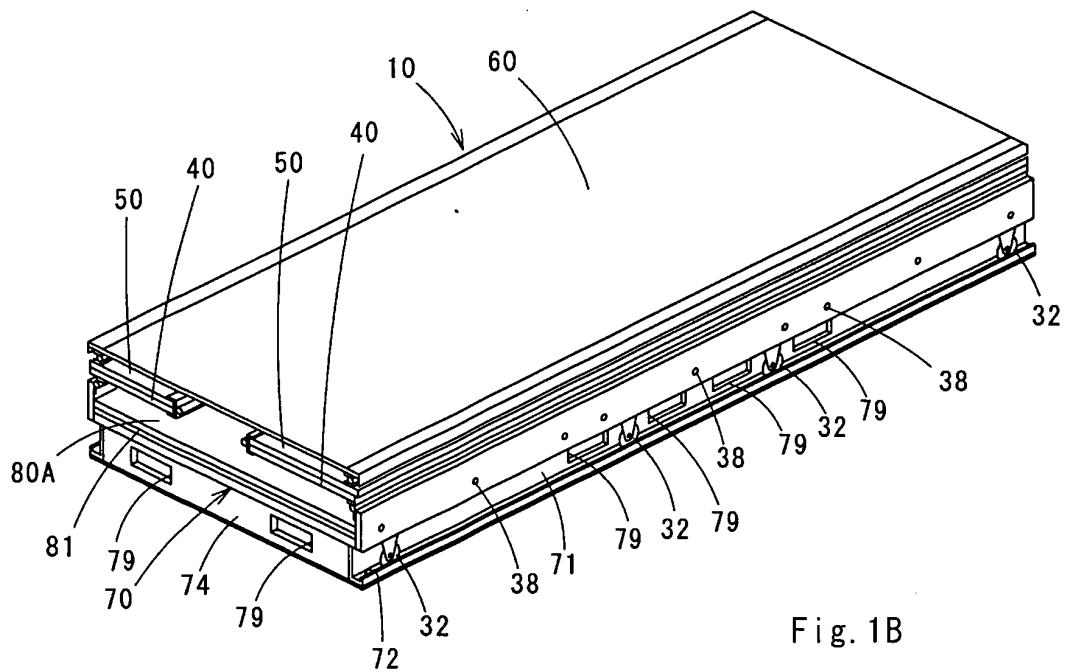
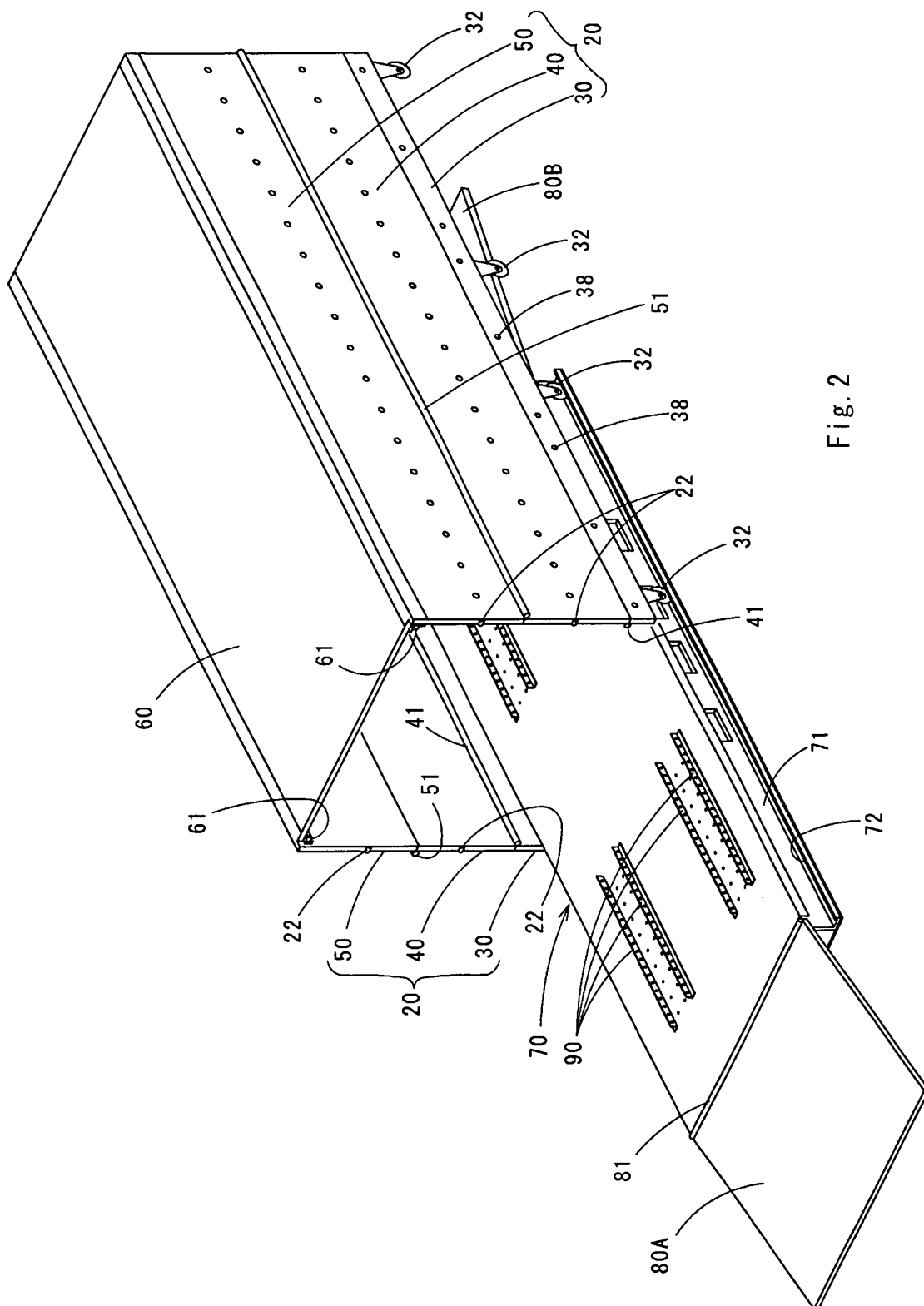


Fig. 1B



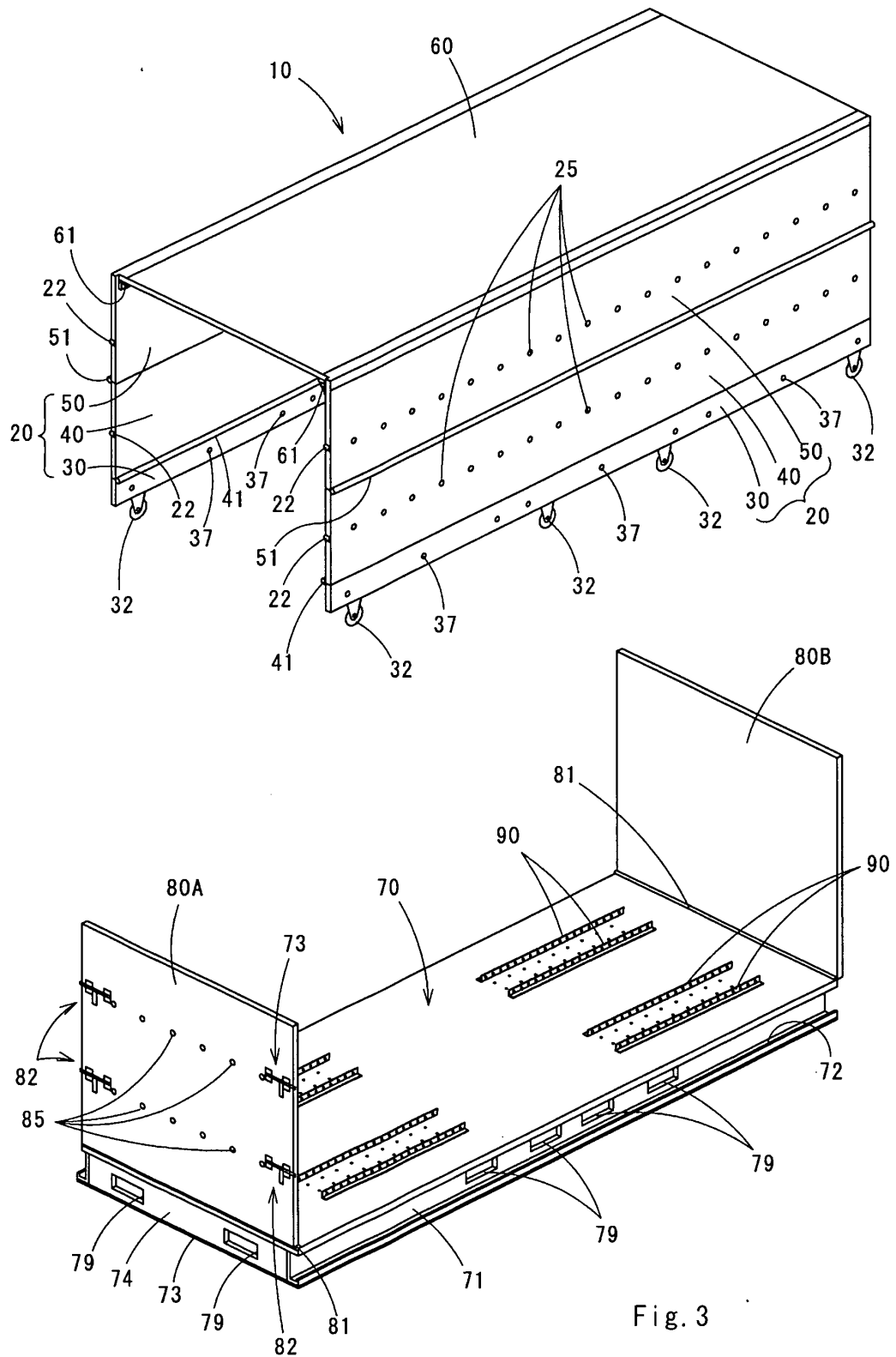


Fig. 3

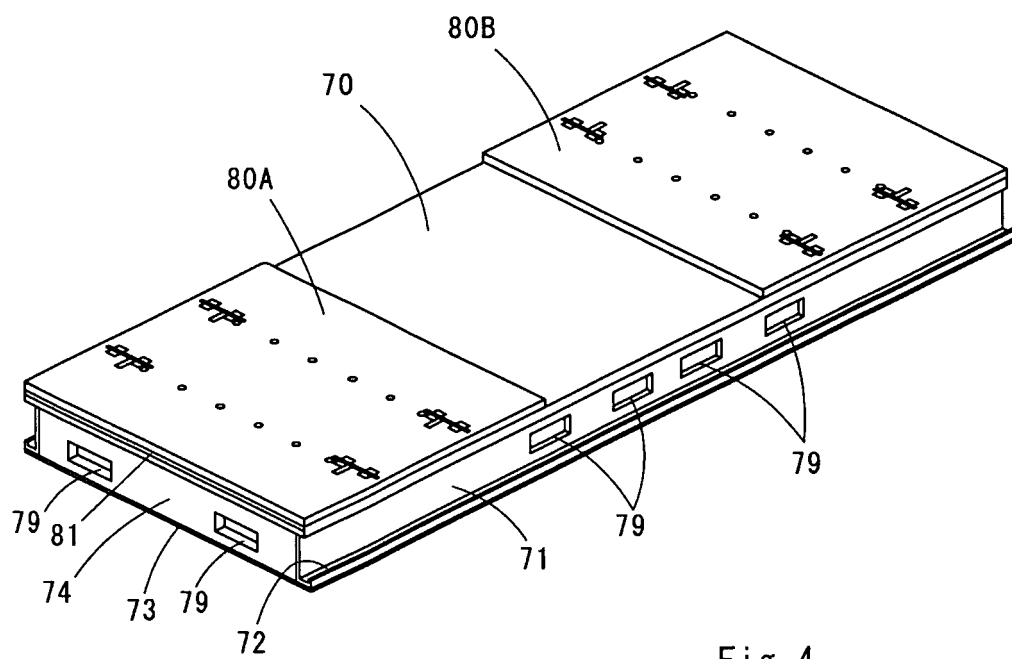
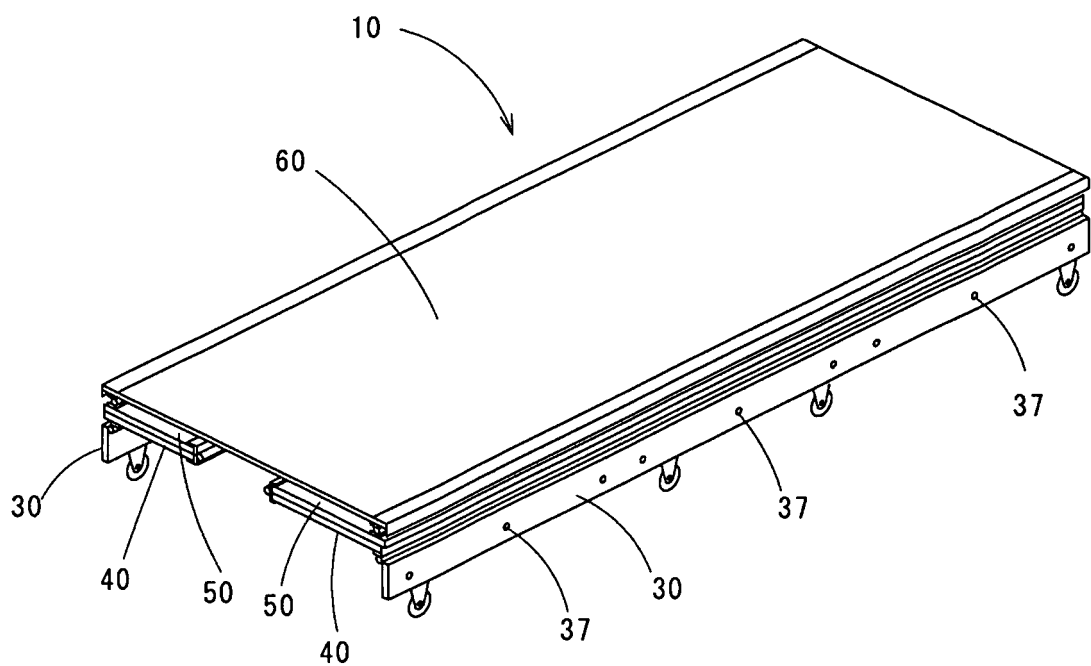


Fig. 4

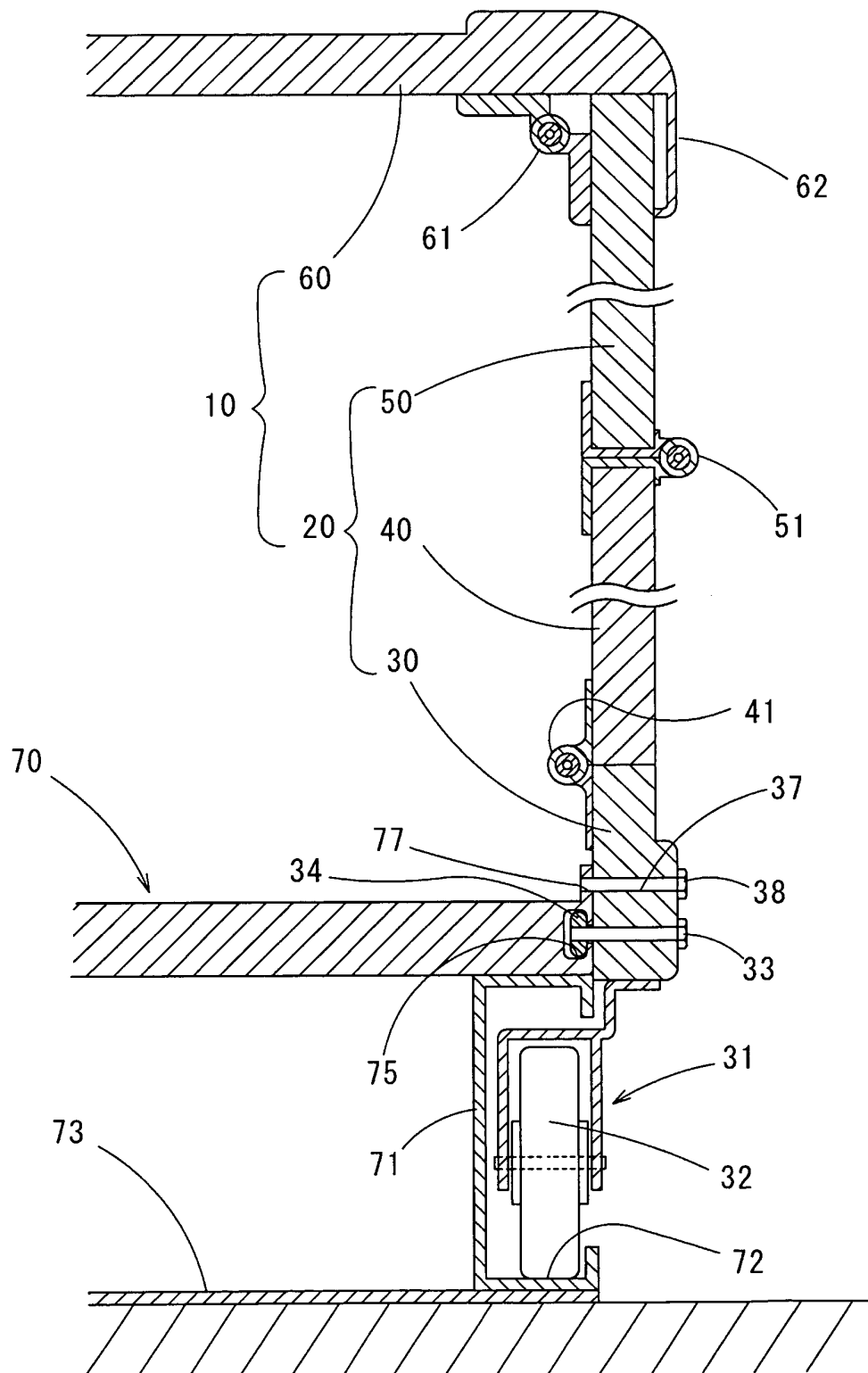


Fig. 5

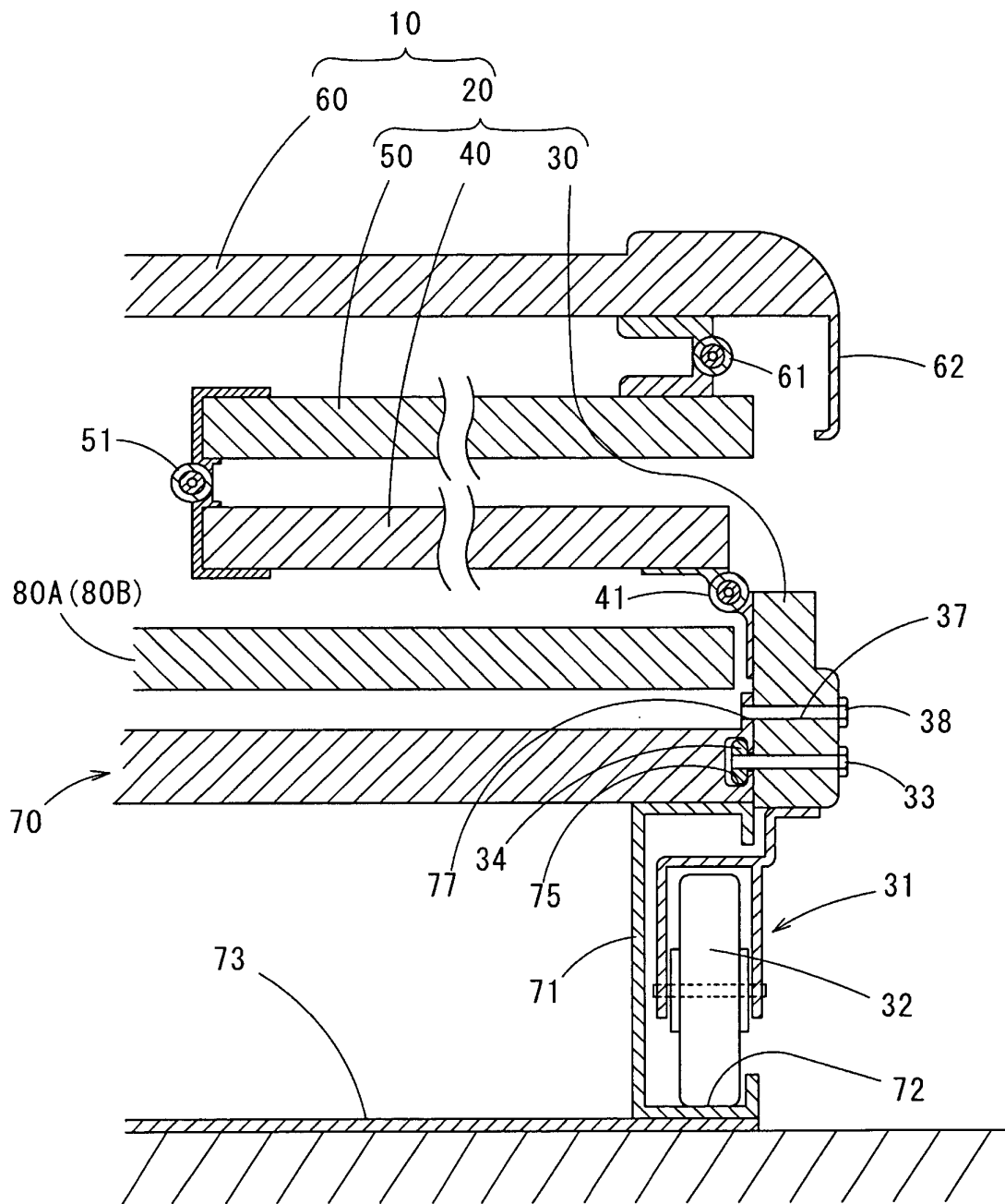


Fig. 6



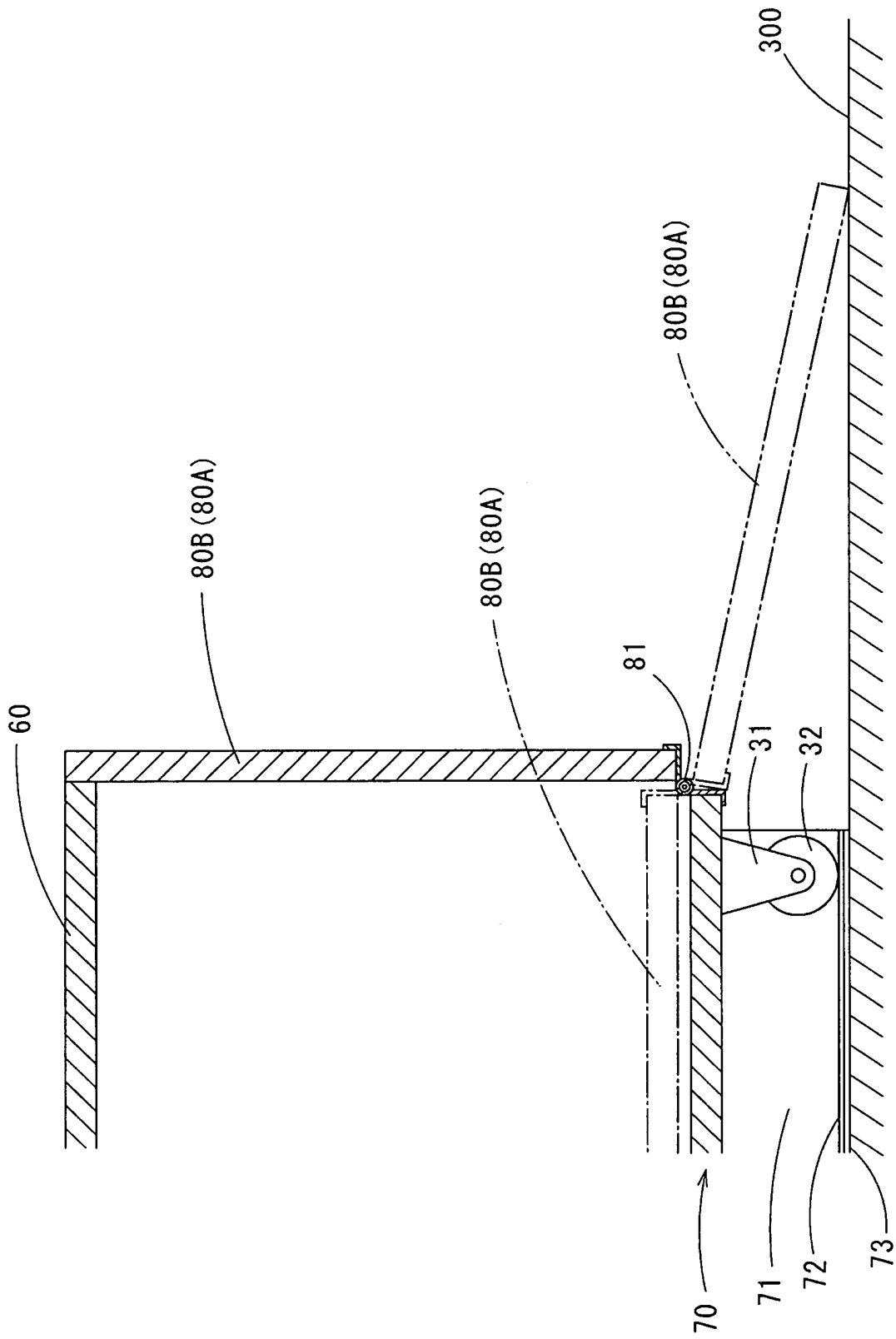


Fig. 7

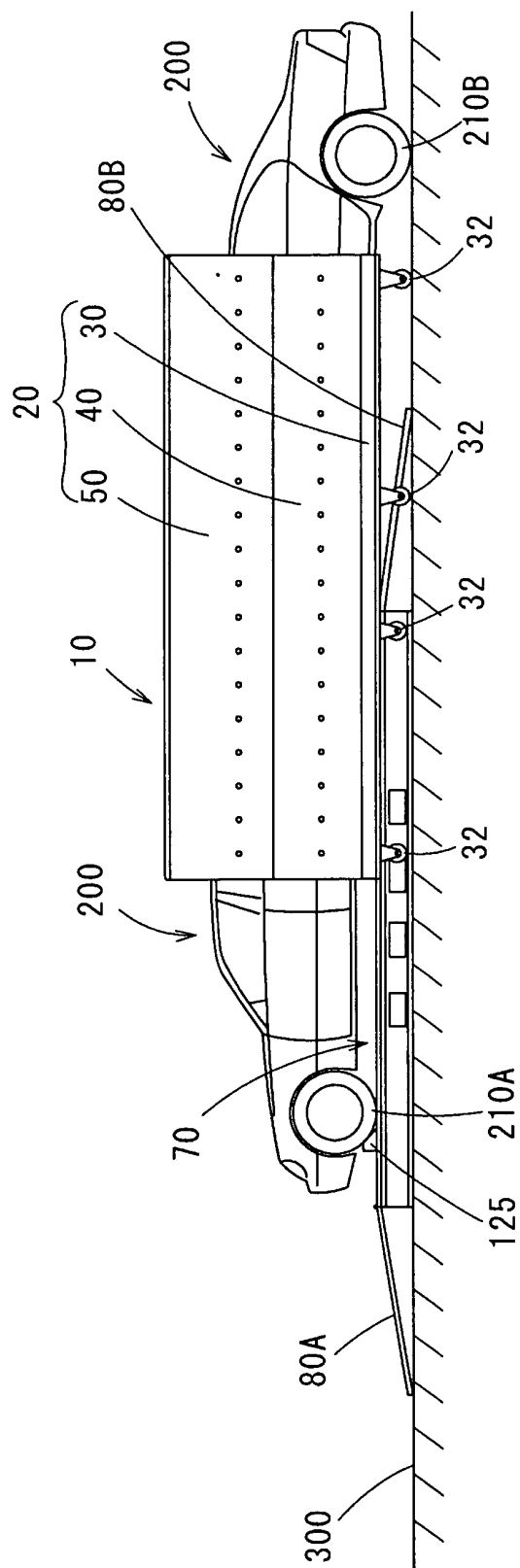


Fig. 8A

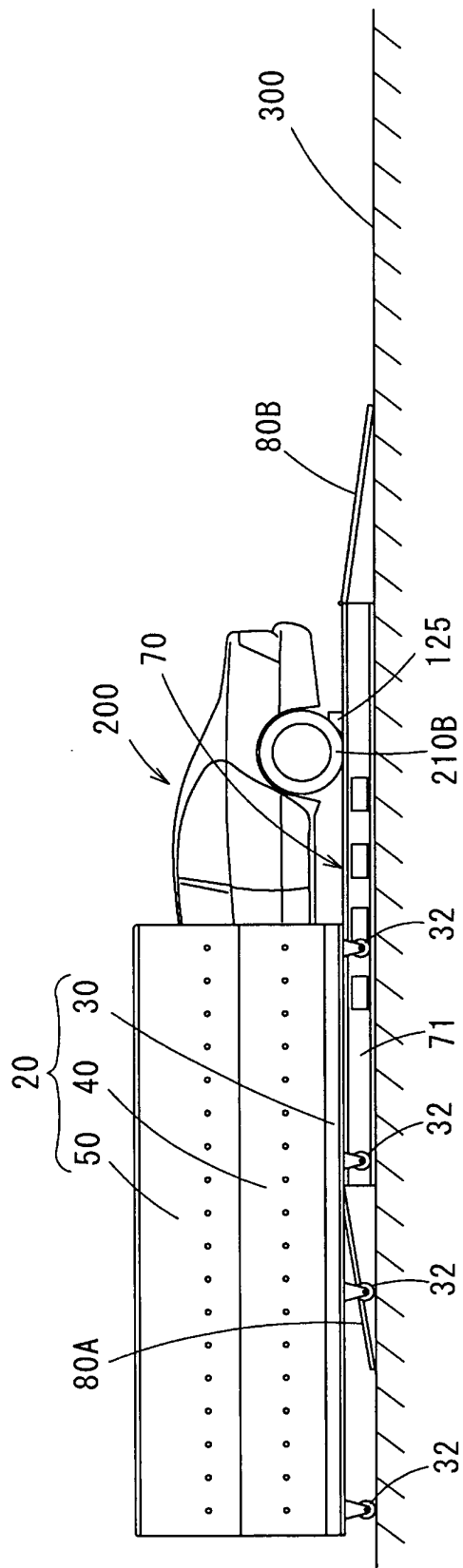


Fig. 8B

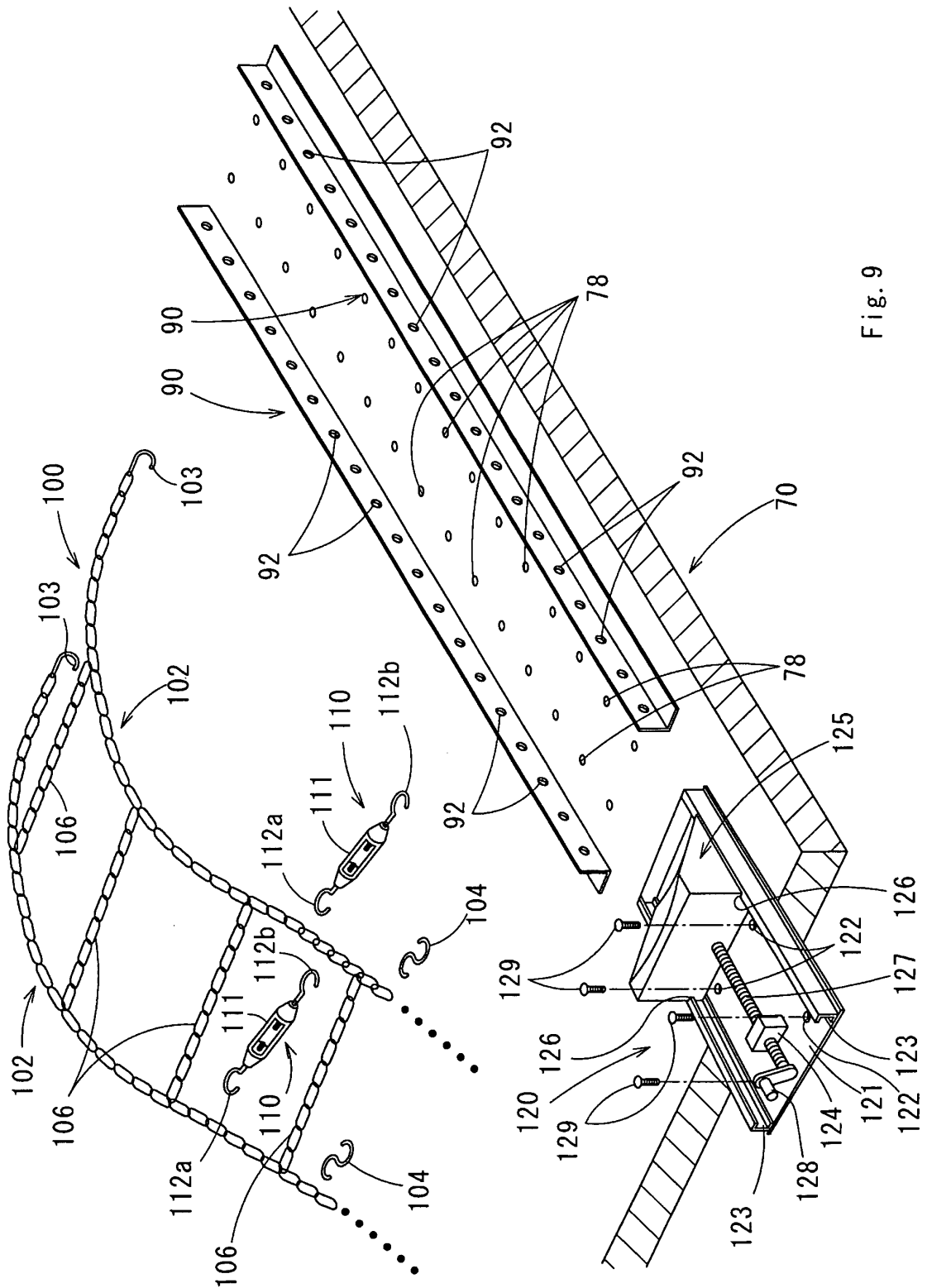


Fig. 9

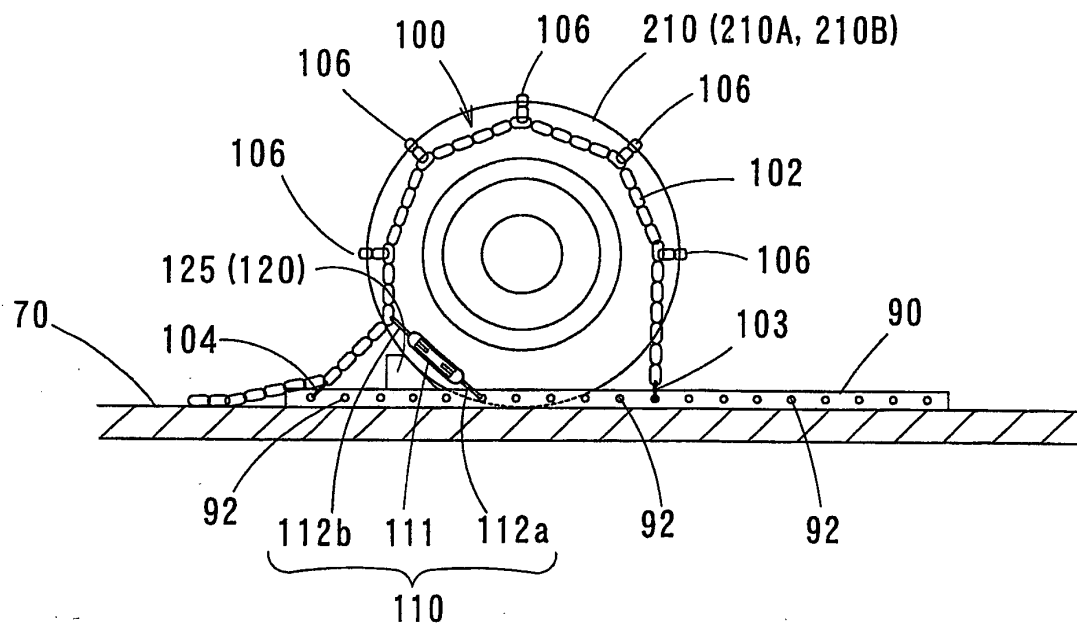


Fig. 10

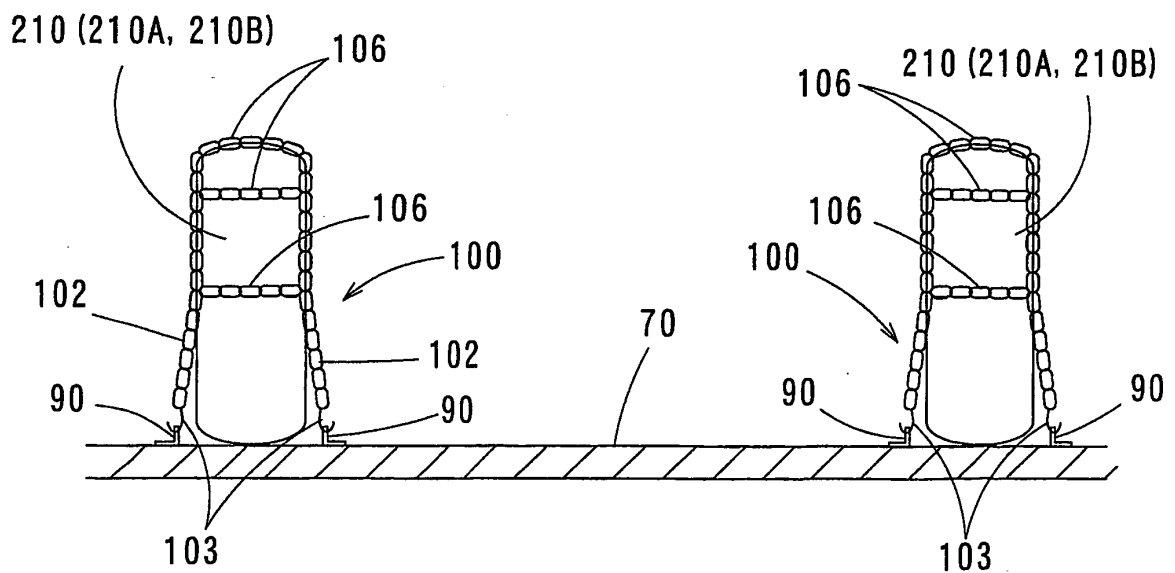


Fig. 11

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/000574

A. CLASSIFICATION OF SUBJECT MATTER Int.Cl. <sup>7</sup> B65D88/12, B60P3/077		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) Int.Cl. <sup>7</sup> B65D88/12, B60P3/07-3/079		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1926-1996 Toroku Jitsuyo Shinan Koho 1994-2004 Kokai Jitsuyo Shinan Koho 1971-2004 Jitsuyo Shinan Toroku Koho 1996-2004		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CD-ROM of the specification and drawings annexed to the request of Japanese Utility Model Application No. 072046/1993 (Laid-open No. 035397/1995) (Taihei Dengyo Kabushiki Kaisha), 27 June, 1995 (27.06.95), Full text; Figs. 1 to 3 (Family: none)	1-8
Y	JP 11-147591 A (NEC Corp.), 02 June, 1999 (02.06.99), Page 2, column 2, line 48 to page 3, column 3, line 14; Figs. 1 to 3 (Family: none)	1-8
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 05 April, 2004 (05.04.04)		Date of mailing of the international search report 20 April, 2004 (20.04.04)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (January 2004)

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/000574

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 63-178975 A (Daiwa Kakozaï Kabushiki Kaisha), 23 July, 1988 (23.07.88), Page 2, upper right column, line 13 to lower right column, line 1; page 2, lower right column, line 12 to page 3, upper left column, line 1; Figs. 1 to 9 (Family: none)	3-8
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 104813/1987 (Laid-open No. 009883/1989) (Mitsubishi Motors Corp.), 19 January, 1989 (19.01.89), Fig. 2; page 7, lines 2 to 8 (Family: none)	4-8
Y	US 4993898 A (BABCOCK INDUSTRIES INC.), 19 February, 1991 (19.02.91), (Family: none)	5-8
Y	JP 4-102576 A (Osaka Shosen Mitsui Senpaku Kabushiki Kaisha), 03 April, 1992 (03.04.92), Page 3, lower left column, line 17 to lower right column, line 7; Fig. 4 (Family: none)	7-8
A	JP 6-144096 A (Tokyo Sharyo Kabushiki Kaisha), 24 May, 1994 (24.05.94), (Family: none)	1-8

Form PCT/ISA/210 (continuation of second sheet) (January 2004)