



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
30.03.2005 Bulletin 2005/13

(51) Int Cl.7: **B65D 85/48**

(21) Application number: **02790739.3**

(86) International application number:
PCT/JP2002/013027

(22) Date of filing: **12.12.2002**

(87) International publication number:
WO 2004/000692 (31.12.2003 Gazette 2004/01)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SI SK TR
Designated Extension States:
AL LT LV MK RO

(30) Priority: **19.06.2002 JP 2002178560**

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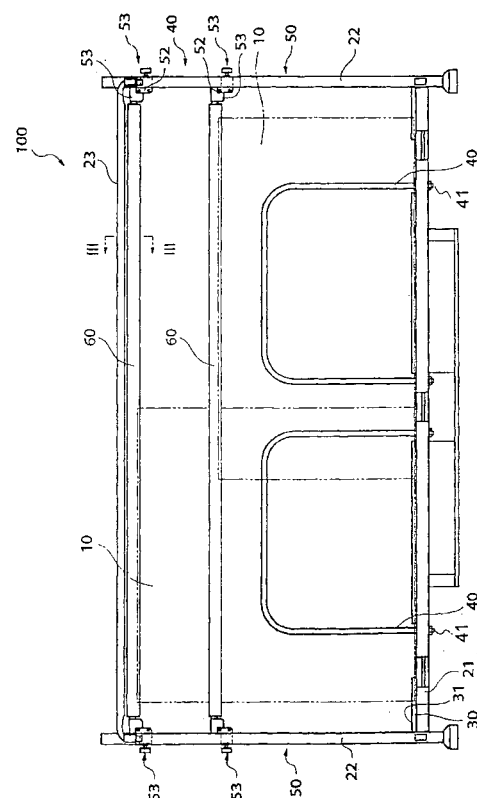
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(54) **PLATE-LIKE OBJECT CONVEYING EQUIPMENT**

(57) A plate-shaped article carrier that enables vibration/movement of plate-shaped articles during carriage to be reliably prevented. A glass plate carrier 100 is comprised of a frame 20 comprised of a floor plate frame 21 and supporting pillars 22, partitioning beams 40 erected on the floor plate frame 21 such that glass plates 10 can be stored therebetween, a pair of end panel frames 50 erected between the supporting pillars 22, and upper beams 60 that restrain upper edges of the stored glass plates 10. Each of the end panel frames 50 is comprised of eight pipes 51 arranged vertically, sliding guides 52, and stoppers 53 fixed to the sliding guides 52. Each of the upper beams 60 is laid horizontally over the upper edge of the corresponding glass plate 10, and is fixed to a pair of the pipes 51 that face one another. During carriage of the glass plates 10, the upper beams 60 are placed on the upper edges of the glass plates 10, and the upper beams 60 are supported by the frame 20 via the end panels 50.

FIG. 2



Description

Technical Field

[0001] The present invention relates to a plate-shaped article carrier, and in particular to a plate-shaped article carrier in which plate-shaped articles are vertically loaded.

Background Art

[0002] Glass plates are carried using, for example, a glass plate carrier 80 having a substantially L-shaped cross section as shown in FIG. 8. This glass plate carrier 80 is comprised of a floor plate 81, and a back receiving portion 82 provided standing up perpendicularly from a rear edge of the floor plate 81. A plurality of glass plates 83 are stored on the floor plate 81 so as to be parallel to the back receiving portion. The stored glass plates 83 are fastened with a cushioning material or the like to protect the stored glass plates 83 during carriage.

[0003] Moreover, instead of such a glass plate carrier 80, a glass plate transporting container in which panels can be stored individually in grooves has also been proposed (Published Japanese Translation of PCT Application (Kohyo) No. 2000-501052). As shown in FIG. 9, this glass plate transporting container 90 has a floor portion 91, a rear wall 92 that stands upright intersecting the floor portion 91 substantially perpendicularly, and groove units 94 in which are lined up substantially perpendicularly to each other a plurality of grooves of a shape and dimensions so as to be able to receive edge portions of panels 93, and also has elastic restraining means comprised of stretched elastic restrainers such as stretchable cords 95 each of which contacts a panel 93 and elastically pushes that panel 93 toward a line of intersection between the floor portion 91 and the rear wall 92. A plurality of the panels 93 are erected on the floor portion 91 so as to be perpendicular to the rear wall 92. To protect the panels 93 stored between the groove units 94 during carriage of the panels 93, each of the stretched stretchable cords 95 is made to extend in the plane of the corresponding panel 93 from the rear wall 92 above the floor portion 91 to the floor portion 91 in front of the rear wall 92, and is made to contact an upper front corner portion of the panel 93, whereby the stored panels 93 are fastened.

[0004] However, according to the glass plate carrier 80 described above, a cushioning material or the like is used to protect the stored glass plates 83, and in the case that the glass plates 83 are of a special type such as vacuumed glass, a cushioning material of a special material or shape is required; the material and shape of the cushioning material must thus be changed as appropriate in accordance with the type of the glass plates 83.

[0005] Moreover, according to the transporting container 90 described above, even though the panels 93

are fastened using elastic restrainers such as stretchable cords 95, because the elastic restrainers are stretchable, the fastening of the panels 93 cannot be sufficiently carried out, and hence vibration/movement of the panels 93 during carriage cannot be sufficiently prevented.

[0006] It is an object of the present invention to provide a plate-shaped article carrier enabling vibration/movement of plate-shaped articles during carriage to be reliably prevented.

Disclosure of the Invention

[0007] To attain the above object, according to the present invention, there is provided a plate-shaped article carrier comprising a floor portion, at least two partitioning members (partitioning beams) erected parallel to one another on an upper surface of the floor portion such that a plate-shaped article can be stored therebetween, vertical members erected on the floor portion, and an upper member (upper beam) that can be attached to the vertical members and restrains an upper edge of the stored plate-shaped article.

[0008] Preferably, the upper member is freely slidable along the vertical members.

[0009] Preferably, the plate-shaped article carrier comprises fixing means for fixing the upper member to the vertical members.

[0010] Preferably, the upper member has substantially an inverted U-shaped cross-sectional shape.

[0011] Preferably, each of the partitioning members is made of piping.

[0012] Preferably, the upper surface of the floor portion is covered with an elastic member at a portion of contact with the plate-shaped article.

[0013] Preferably, the elastic member is a non-slip member.

[0014] Preferably, each of the partitioning members is covered with an elastic member at a portion of contact with the plate-shaped article.

[0015] Preferably, the elastic member is made of a material selected from the group consisting of resins and rubbers.

[0016] Preferably, each of the partitioning members has a height greater than a height of center of gravity of the plate-shaped article.

[0017] Preferably, the floor portion has the partitioning members detachably fixed thereto.

[0018] Preferably, each of the vertical members is detachably fixed to the floor portion.

[0019] Preferably, the vertical members are disposed such that when detached from the floor portion, the vertical members can be placed on the floor plate such as to be fitted around the partitioning members.

Brief Description of the Drawings

[0020]

FIG. 1 is a perspective view of a plate-shaped article carrier according to an embodiment of the present invention;
 FIG. 2 is a side view of FIG. 1;
 FIG. 3 is a sectional view taken along line III-III in FIG. 2;
 FIG. 4 is a front view of a variation of an upper beam 60;
 FIG. 5 is a front view of a variation of the glass plate carrier 100 of FIG. 1;
 FIG. 6 is a sectional view taken along line VI-VI in FIG. 5;
 FIG. 7 is a perspective view of the glass plate carrier 100 of FIG. 1 in a dismantled state;
 FIG. 8 is a side view of a conventional glass plate carrier; and
 FIG. 9 is a perspective view of a conventional glass plate carrier.

Best Mode for Carrying Out the Invention

[0021] A plate-shaped article carrier according to an embodiment of the present invention will now be described with reference to the drawings.

[0022] FIG. 1 is a perspective view of a plate-shaped article carrier according to an embodiment of the present invention, and FIG. 2 is a front view of the plate-shaped article carrier of FIG. 1.

[0023] In FIGS. 1 and 2, a glass plate carrier 100, as a plate-shaped article carrier in which glass plates 10 (plate-shaped articles) are carried, is comprised of a frame 20 comprised of a floor plate frame 21 (floor portion) having, for example, a width of 2340mm and a depth of 420mm and, for example, four supporting pillars 22 (vertical members) having, for example, a height variable between 730 and 1200mm, horizontal rectangular floor plates 30 (floor portion) that are disposed on the floor plate frame 21 and are made, for example, of 12mm-thick plywood, partitioning beams 40 each made of piping having an inverted U-shape erected on the floor plate frame 21, a pair of end panels 50 (vertical members) having, for example, a maximum height of 820mm that are each erected between, for example, two of the supporting pillars 22 above the floor plate frame 21, and upper beams 60 that are laid horizontally between the pair of end panels 50.

[0024] The frame 20 further has a pair of detachable joining bars 23 that are each laid horizontally between a pair of the supporting pillars 22 on which the pair of end panels 50 are uprightly provided. Moreover, the frame 20 has provided therein holes for the forks of a forklift truck; the forks of the forklift truck are inserted into these holes, and then the forklift truck moves the glass plate carrier 100 in which the glass plates 10 are

loaded.

[0025] Each rectangular floor plate 30 has stuck (covered) on an upper surface thereof a cushioning plate 31 having, for example, a thickness of 3mm made of rubber (an elastic member) or the like as a non-slip member designed with consideration given to the coefficient of friction with the glass plates 10. Because the rectangular floor plates 30 are each made with an elastic member, the glass products such as glass plates 10 can be prevented from being damaged, and because the elastic members are non-slip members, vibration/movement of the glass plates 10 during carriage can be reliably prevented.

[0026] The partitioning beams 40 are provided, for example, in two rows parallel to a front edge of the floor plate frame so that the glass plates 10 can be stored vertically therebetween. The partitioning beams 40 in the two rows are parallel to each other, and, for example, nine partitioning beams 40 are provided in each row. For each pair of mutually facing partitioning beams 40 in the two rows, the two partitioning beams 40 are positioned in the same plane. Because the partitioning beams 40 are each made of piping having substantially an inverted U-shape, the partitioning beams 40 can be made light in weight.

[0027] The partitioning beams 40 are each comprised, for example, of SGP piping having fitted therearound a polyethylene hose (elastic member) having, for example, a thickness of approximately 3mm, and, for example, nine of the partitioning beams 40 are detachably provided on the floor plate frame 21 via fixing fittings 41 such as nuts and bolts. As a result, the partitioning beams 40 can be arranged in accordance with the size of the glass plates 10 to be carried, and moreover in accordance with the type or structure (e.g. vacuumed glass, double glazing glass unit, single plate glass) of the glass plates 10.

[0028] Moreover, the partitioning beams 40 are set to be higher than the height of center of gravity of the glass plates 10 to be carried. As a result, the partitioning beams 40 can support each of the glass plates 10 at a position higher than the center of gravity thereof, and hence the glass plates 10 can be prevented from being subjected to excessive loads and hence can be prevented from being damaged, and moreover the stored glass plates 10 can be prevented from falling over even if the end panels 50 are detached from the supporting pillars 22 when the upper beams 60 are not restraining upper edges of the glass plates 10.

[0029] The pair of end panels 50 are each comprised of, for example, eight pipes 51 (vertical members) arranged vertically so as to form an end panel. The pipes 51 further have thereon sliding guides 52 that are freely slidable along the pipes 51, and stoppers 53 that are fixed to the sliding guides 52 and fix the upper beams 60 in position. The pipes 51 are constructed so as to be able to be detachably fixed to the end panels 50. Each of the eight pipes 51 is fixed in a position in the depth

direction of the floor plate frame intermediate between two out of the nine partitioning beams 40. As a result, the pipes 51 can be made to correspond to the positions in which the glass plates 10 are placed, and moreover the end panels 50 can be fitted between the partitioning beams 40 after dismantling has been carried out as described later.

[0030] The end panels 50 are constructed so as to be detachable from the supporting pillars 22. As a result, during, for example, an outward journey when glass products such as glass plates 10 are not being carried, the glass plate carrier 100 can be made compact. Moreover, stored glass plates 10 can be prevented from falling over inadvertently when the end panels 50 have been detached from the supporting pillars 22 in the case that the upper beams 60 are not restraining the upper edges of the glass plates 10.

[0031] The upper beams 60 are, specifically, each laid horizontally between a pair of mutually facing pipes 51, and are each fixed by slide stoppers 52 that have been slid along the pipes 51 via the sliding guides 52 in accordance with the height of the upper beam 60. In FIGS. 1 and 2, two upper beams 60 are shown as an example. The upper beams 60 can be freely slid along the pipes 51 via the sliding guides 52, and hence can be made to restrain each of the glass plates 10 independently.

[0032] FIG. 3 is a sectional view of an upper beam 60 taken along line III-III in FIG. 2.

[0033] For the upper beam 60 shown in FIG. 3, a base portion of an inverted U-shaped portion, i.e. a portion that contacts a glass plate 10, has stuck thereon rubber 61 as a non-slip member of, for example, thickness 2mm designed with consideration given to the coefficient of friction with the glass plates 10. Alternatively, each upper beam 60 may be covered with elastic members 62 made of a polypropylene resin having, for example, a thickness of 1.6mm as non-slip members designed with consideration given to the coefficient of friction with the glass plates 10 (FIG. 4). As a result, the upper edges of the glass plates 10 can be prevented from being damaged, and moreover because the elastic members are non-slip members, vibration/movement of the glass plates 10 during carriage can be reliably prevented.

[0034] A variation of the glass plate carrier 100 will now be described with reference to FIGS. 5 and 6.

[0035] FIG. 5 is a front view of a variation of the glass plate carrier 100 of FIG. 1.

[0036] In FIG. 5, the glass plate carrier 100 has partitioning beams 40', each of the partitioning beams 40' having substantially a T-shape rather than substantially an inverted U-shape, and being fixed to the floor plate frame 21 and a supporting pillar 22.

[0037] As shown by a sectional view taken along line VI-VI in FIG. 5 (FIG. 6), for each upper beam 60, an inner surface of an inverted U-shaped portion, i.e. a portion that contacts a glass plate 10, has stuck thereon rubber 61' having, for example, a thickness of 2mm as a non-slip member designed with consideration given to the

coefficient of friction with the glass plates 10. Because the inner surface of the inverted U-shaped portion has the rubber 61' stuck thereon, the upper edges of the glass plates 10 can be prevented more reliably from being damaged. Alternatively, the upper beams 60 may be covered with elastic members 62 as with the upper beam 60 shown in FIG. 4.

[0038] Moreover, the member stuck onto the inner surface of each upper beam 60 has been made to be rubber 61 or 61' having, for example, a thickness of 2mm, but this member may be an elastic member made of a resin or the like, and moreover the thickness is not limited to being 2mm. Through the elastic members, the glass plates 10 to be carried can be prevented from being damaged. Moreover, the rubber 61 or 61', or the resin or the like used as each elastic member is preferably a non-slip member designed with consideration given to the coefficient of friction with the glass plates 10, whereby vibration/movement of the glass plates 10 during carriage can be prevented more reliably.

[0039] A method of carrying glass plates 10 using the glass plate carrier 100 of FIG. 1 will now be described.

[0040] First, the frame 20 is assembled, the partitioning beams 40 are fixed to an upper surface of the floor plate frame 21, and for example two glass plates 10 are stored on the cushioning plates 31 between the fixed partitioning beams 40. Next, an upper beam 60 is placed on the upper edge of each of the stored glass plates 10. The sliding guides 52 are slid along the pipes 51 fixed to the end panels 50 erected between the supporting pillars 22, the upper beams 60 are fixed in position using the stoppers 53 fixed to the sliding guides 52, and the stoppers 53 are fixed to the pipes 51 via the sliding guides 52. An upper beam 60 is thus placed on the upper edge of each of the glass plates 10, and the upper beams 60 are supported by the frame 20 via the end panels 50, and hence vibration/movement of the glass plates 10 during carriage can be reliably prevented.

[0041] Next, the forks of a forklift truck are inserted into the fork pockets provided in the floor plate 21, and the glass plate carrier 100 is moved or the like using the forklift truck, thus carrying the glass plates 10 loaded on the floor plate 21.

[0042] Moreover, for an outward journey, the glass plate carrier 100 is dismantled using the opposite operation to that described above. As a result, the glass plate carrier 100 can be made compact. In particular, the glass plates 10 can be taken out merely by releasing the restraining by the upper beams 60, and hence an unpacking operation can be easily carried out.

[0043] After the glass plates 10 have been taken out, regarding the dismantled joining bars 23, end panels 50 and upper beams 60, as shown in FIG. 7, the joining bars 23 are placed on a lower portion of the frame 20, the upper beams 60 are placed on an upper surface of the cushioning plates 31 between the partitioning beams 40, and the end panels 50 are placed on the upper surface of the cushioning plates 31 such as to be

fitted around the partitioning beams 40. Moreover, the supporting pillars 22 are fixed at their minimum height of 730mm. Furthermore, in the case that there are a plurality of dismantled glass plate carriers 100, the second and subsequent glass plate carriers 100 may be joined to the first glass plate carrier 100 via the supporting pillars 22 so as to form second, third and subsequent tiers on top of the first glass plate carrier 100. It is thus configured such that the end panels 50 can be placed on the floor plate frame 21 such as to be fitted around the partitioning beams 40 after having been detached from the supporting pillars 22, and hence the efficiency of storage of the glass plate carrier 100 when glass plates 10 are not being stored therein can be improved.

[0044] In FIG. 7, the end panels 50 are fitted around the two rows of partitioning beams 40, but the end panels 50 may be fitted around one row of partitioning beams 40.

[0045] In the embodiment described above, the partitioning beams 40 have substantially an inverted U-shape or substantially a Γ -shape, but the partitioning beams 40 may be plate-like. Moreover, the partitioning beams 40 are each comprised of SGP piping having a polyethylene hose fitted therearound, but the partitioning beams 40 may each be comprised wholly of an elastic member, and may have a structure such that the glass plates 10 can each be supported independently even when the restraining by the upper beams 60 has been released, consideration here being given to the mass of the glass plates 10. If the partitioning beams 40 are each comprised wholly of an elastic member, then the glass plate carrier 100 can be made yet lighter in weight.

[0046] Moreover, in the embodiment described above, it is configured such that the upper beams 60 are placed on the upper edges of the glass plates 10 and the upper beams 60 are supported by the frame 20 via the end panels 50, but to support the glass plates 10, instead, for example, each glass plate 10 may be urged by rubber 61 or springs provided on the inner surface of the corresponding upper beam 60, or each glass plate 10 may be urged by rubber or springs provided on inner surfaces of mutually facing partitioning beams 40.

[0047] Furthermore, in the glass plate carrier 100 according to the present embodiment, the width and depth of the floor plate frame 21 are 2340mm and 420mm respectively, the height of the supporting pillars 22 is 730 to 1200mm, and the height of the end panels 50 is 820mm; however, there is no limitation to these sizes, but rather, in accordance with the size of the glass plates 10, the above may be any sizes so long as the glass plates 10 can be loaded on the glass plate carrier 100.

Industrial Applicability

[0048] As described in detail above, according to the plate-shaped article carrier of the present invention, an upper member restrains an upper edge of each plate-

shaped article stored between at least two partitioning members. As a result, vibration/movement of each plate-shaped article during carriage can be reliably prevented. Moreover, each plate-shaped article can be fastened regardless of the type of the plate-shaped article and without a rack being a hindrance. Moreover, in the case that there are a plurality of plate-shaped articles, restrictions on the order in which the plate-shaped articles are stored between the partitioning members can be eliminated.

[0049] According to the plate-shaped article carrier of the present invention, each upper member can be installed so as to be freely slidable along the vertical members. As a result, each upper member can restrain the corresponding plate-shaped article regardless of the dimensions of the plate-shaped article. Moreover, in the case that there are a plurality of stored plate-shaped articles, restrictions on the order in which the plate-shaped articles are restrained by the upper members can be eliminated.

[0050] According to the plate-shaped article carrier of the present invention, each upper member is fixed to the vertical members. As a result, each plate-shaped article can easily be fastened.

[0051] According to the plate-shaped article carrier of the present invention, each upper member has substantially an inverted U-shaped cross-sectional shape. As a result, each upper member can reliably restrain the upper edge of the corresponding plate-shaped article from above.

[0052] According to the plate-shaped article carrier of the present invention, each of the partitioning members is made of piping. As a result, the weight can be reduced.

[0053] According to the plate-shaped article carrier of the present invention, the upper surface of the floor portion is covered with an elastic member at a portion of contact with each plate-shaped article. As a result, each plate-shaped article can be prevented from being damaged.

[0054] According to the plate-shaped article carrier of the present invention, each elastic member is a non-slip member. As a result, vibration/movement of each plate-shaped article during carriage can be prevented yet more reliably.

[0055] According to the plate-shaped article carrier of the present invention, each of the partitioning members is covered with an elastic member at a portion of contact with a plate-shaped article. As a result, each plate-shaped article can be prevented from being damaged.

[0056] According to the plate-shaped article carrier of the present invention, each elastic member is made of a resin or a rubber. As a result, each plate-shaped article can be reliably prevented from being damaged.

[0057] According to the plate-shaped article carrier of the present invention, each of the partitioning members has a height greater than the height of center of gravity of each plate-shaped article. As a result, the partitioning

members can support each plate-shaped article at a position higher than the center of gravity of the plate-shaped article, and hence each plate-shaped article can be prevented from being subjected to excessive loads and can be prevented from being damaged.

[0058] According to the plate-shaped article carrier of the present invention, the floor portion has the partitioning members detachably fixed thereto. As a result, each plate-shaped article can be loaded on the plate-shaped article carrier in accordance with the thickness of the plate-shaped article.

[0059] According to the plate-shaped article carrier of the present invention, each of the vertical members is detachably fixed to the floor portion. As a result, the plate-shaped article carrier can be made compact, and moreover each stored plate-shaped article can be prevented from falling over inadvertently when the vertical members have been detached from the floor portion in the case that each upper member is not restraining the upper edge of the corresponding plate-shaped article.

[0060] According to the plate-shaped article carrier of the present invention, the vertical members are disposed such that when detached from the floor portion, the vertical members can be placed on the floor portion such as to be fitted around the partitioning members. As a result, the efficiency of storage of the plate-shaped article carrier when plate-shaped articles are not being stored therein can be improved.

Claims

1. A plate-shaped article carrier comprising a floor portion, at least two partitioning members erected parallel to one another on an upper surface of said floor portion such that a plate-shaped article can be stored therebetween, vertical members erected on said floor portion, and an upper member that can be attached to said vertical members and restrains an upper edge of the stored plate-shaped article.
2. A plate-shaped article carrier as claimed in claim 1, wherein said upper member is freely slidable along said vertical members.
3. A plate-shaped article carrier as claimed in claim 1, comprising fixing means for fixing said upper member to said vertical members.
4. A plate-shaped article carrier as claimed in claim 1, wherein said upper member has substantially an inverted U-shaped cross-sectional shape.
5. A plate-shaped article carrier as claimed in claim 1, wherein each of said partitioning members is made of piping.
6. A plate-shaped article carrier as claimed in claim 1,

wherein the upper surface of said floor portion is covered with an elastic member at a portion of contact with the plate-shaped article.

7. A plate-shaped article carrier as claimed in claim 6, wherein said elastic member is a non-slip member.
8. A plate-shaped article carrier as claimed in claim 1, wherein each of said partitioning members is covered with an elastic member at a portion of contact with the plate-shaped article.
9. A plate-shaped article carrier as claimed in claim 6, wherein said elastic member is made of a material selected from the group consisting of resins and rubbers.
10. A plate-shaped article carrier as claimed in claim 1, wherein each of said partitioning members has a height greater than a height of center of gravity of the plate-shaped article.
11. A plate-shaped article carrier as claimed in claim 1, wherein said floor portion has said partitioning members detachably fixed thereto.
12. A plate-shaped article carrier as claimed in claim 1, wherein each of said vertical members is detachably fixed to said floor portion.
13. A plate-shaped article carrier as claimed in claim 1, wherein said vertical members are disposed such that when detached from said floor portion, said vertical members can be placed on said floor portion such as to be fitted around said partitioning members.

FIG. 1

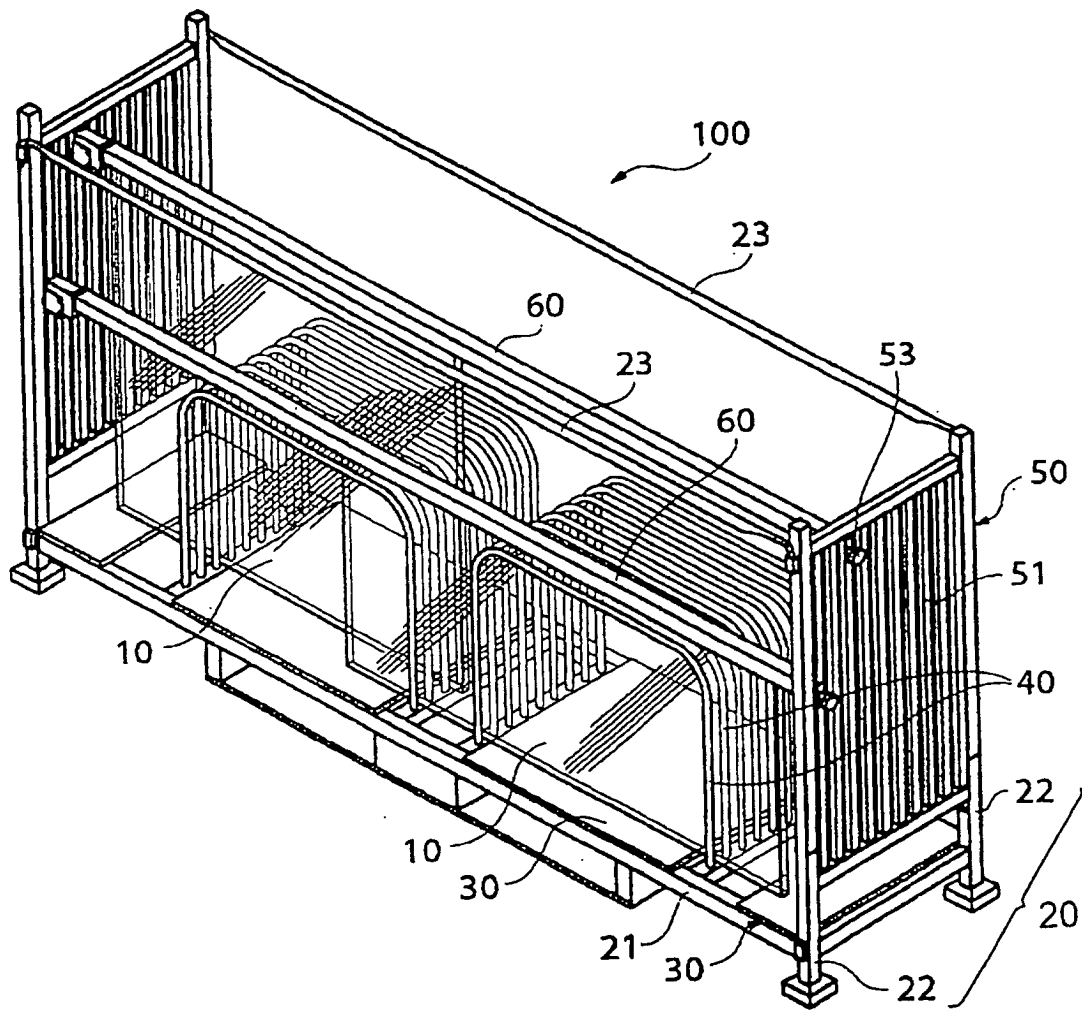


FIG. 2

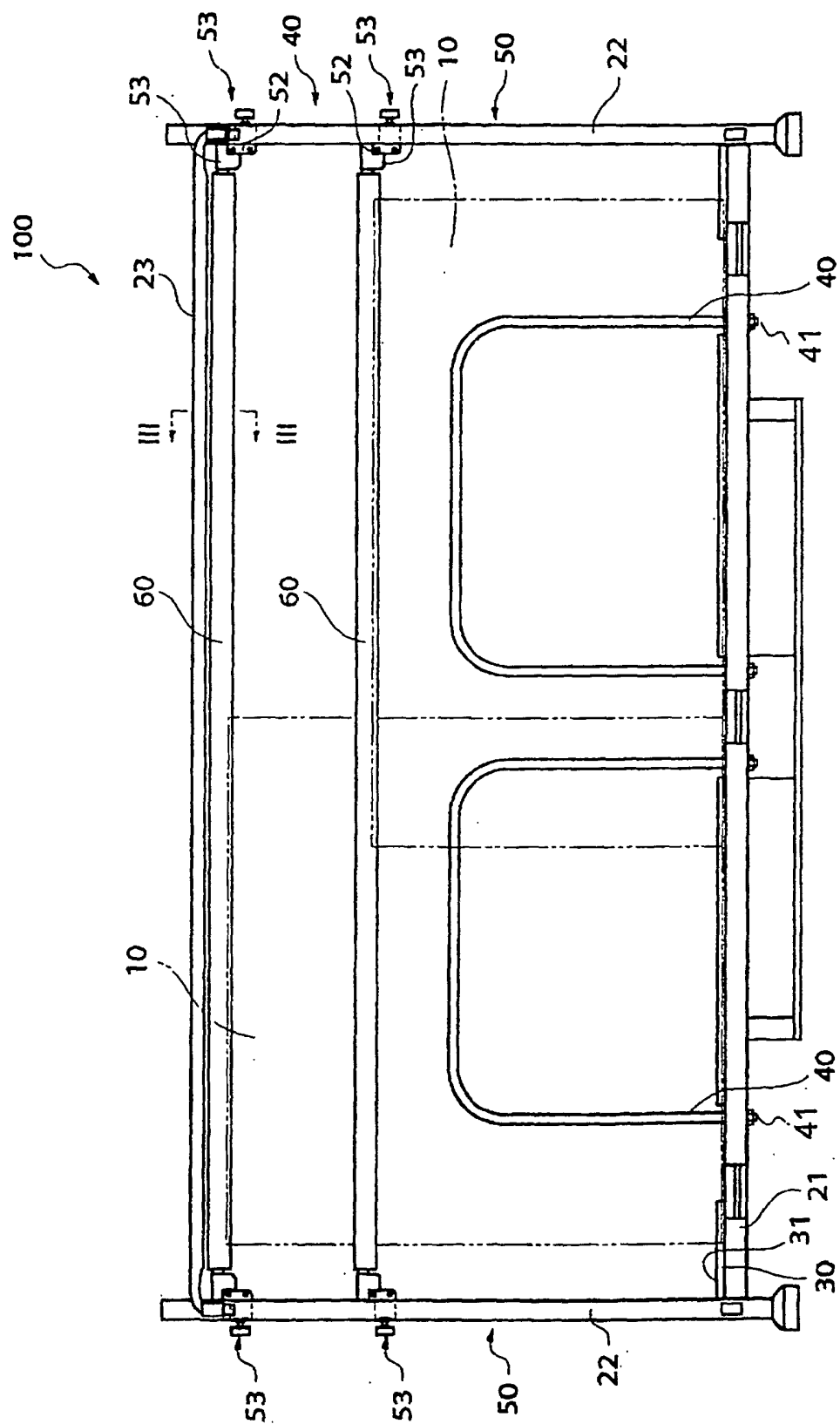


FIG. 3

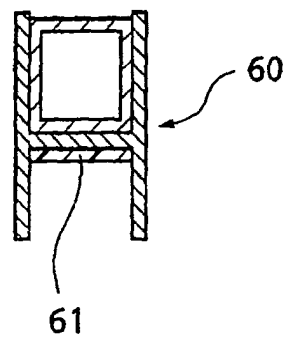


FIG. 4

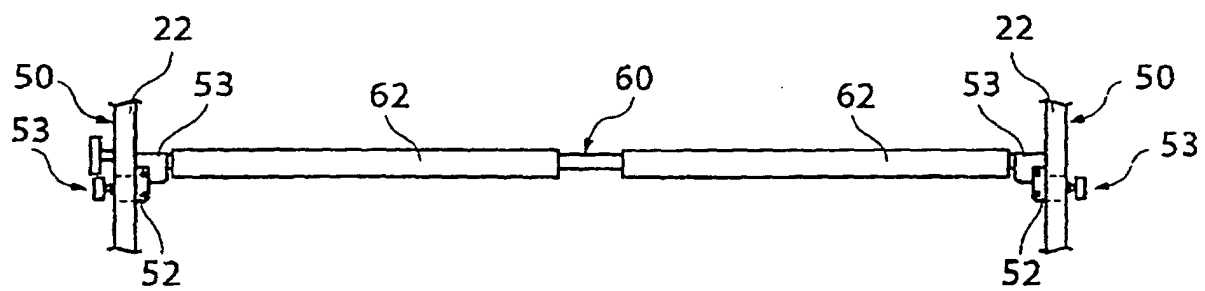


FIG. 5

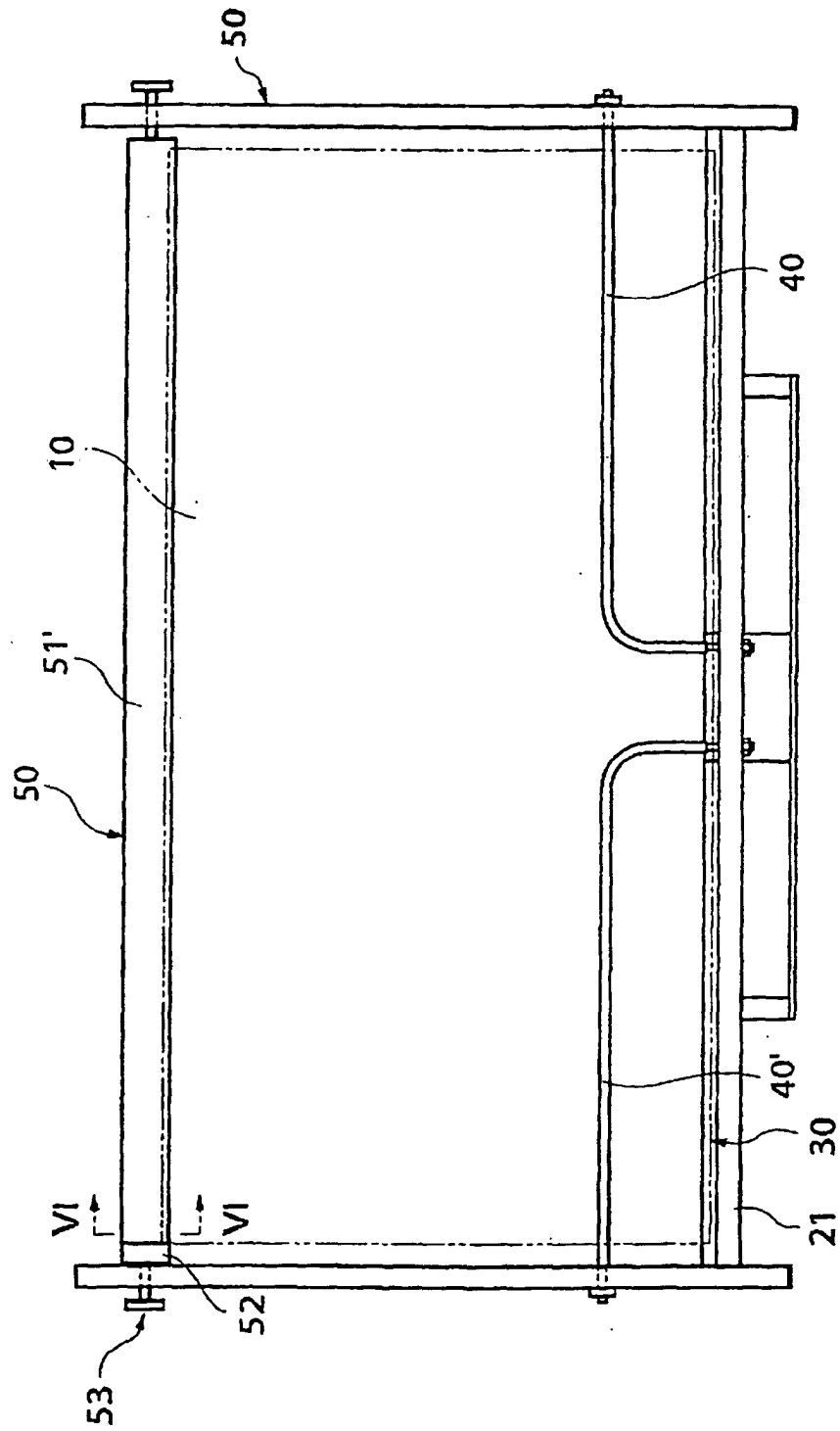


FIG. 6

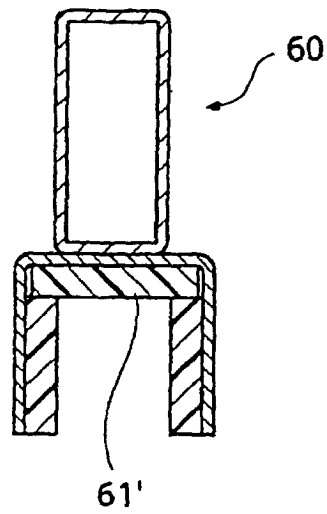


FIG. 7

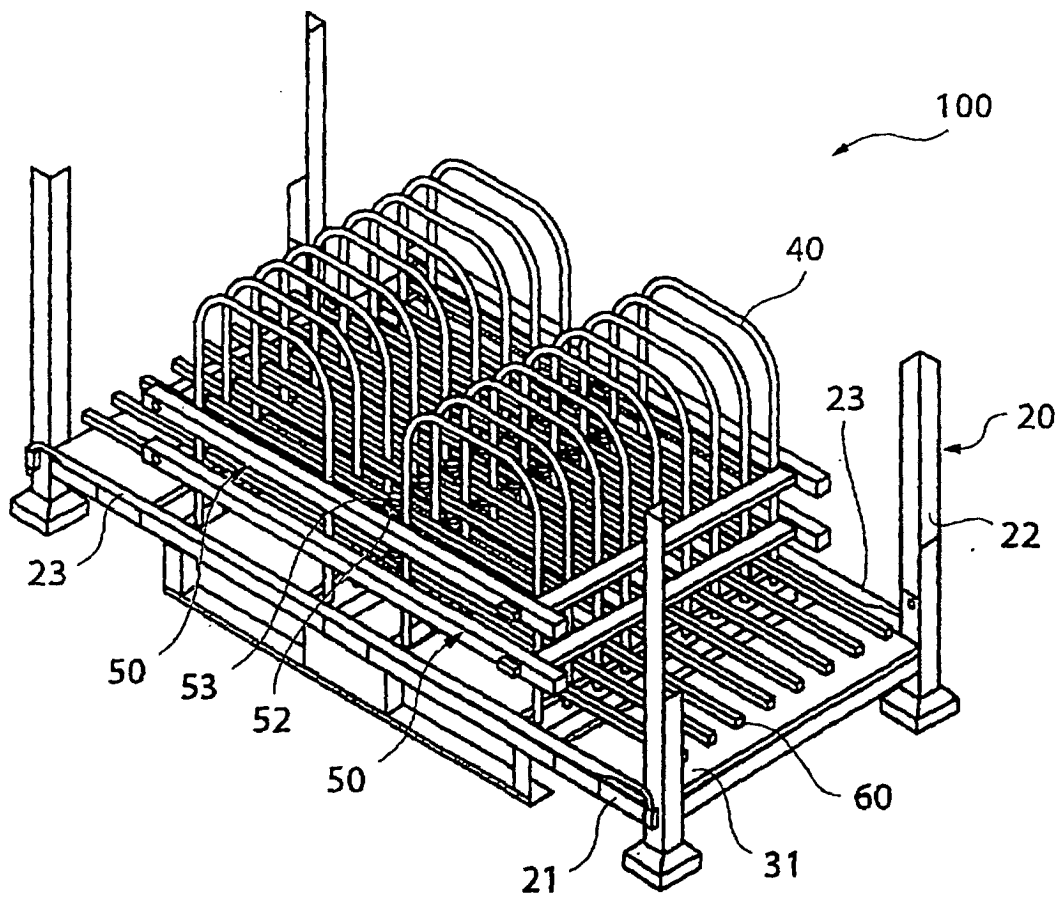


FIG. 8

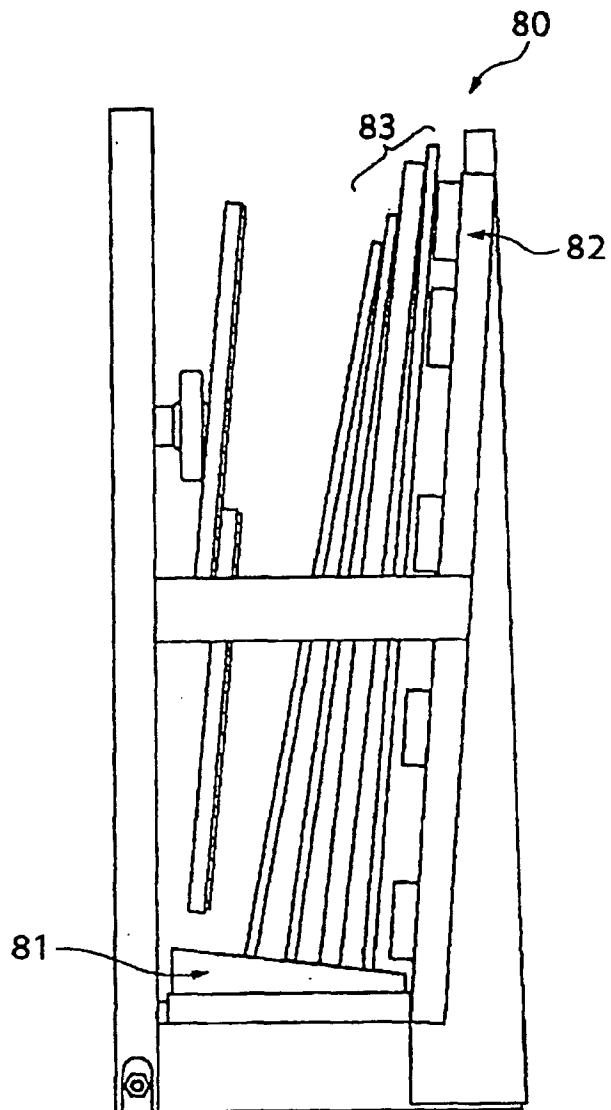
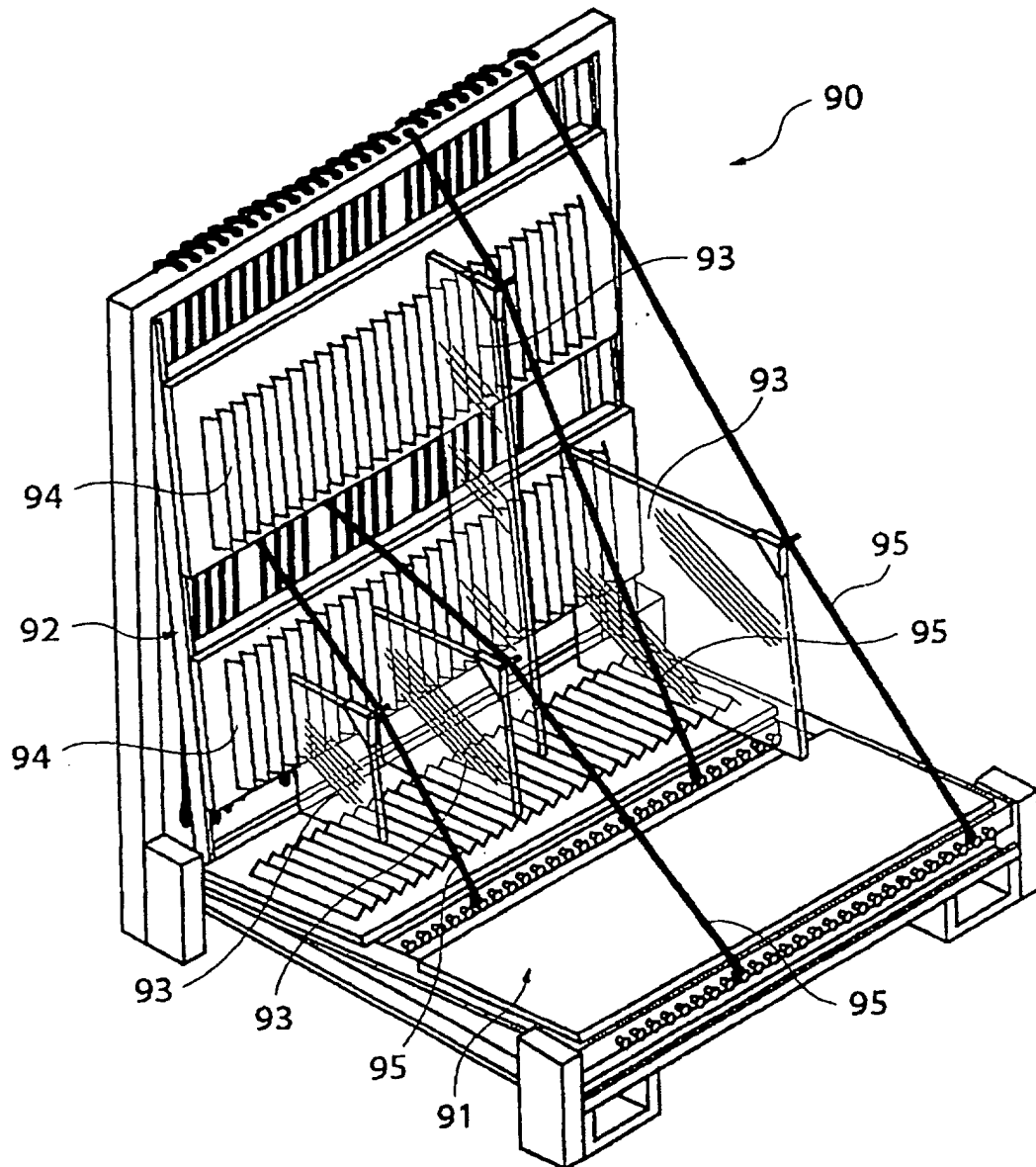


FIG. 9



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP02/13027

A. CLASSIFICATION OF SUBJECT MATTER Int.Cl ⁷ B65D85/48		
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 ⁷ B65D85/48		
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 1994-2003 Kokai Jitsuyo Shinan Koho 1971-2003 Jitsuyo Shinan Toroku Koho 1996-2003		
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	JP 11-192953 A (Nippon Sheet Glass Co., Ltd., Nippon Ekon Kentetsu Kabushiki Kaisha), 21 July, 1999 (21.07.99), Full text; Figs. 1 to 9 (Family: none)	1-13
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 125578/1976 (Laid-open No. 45165/1978) (Nippon Steel Corp.), 18 April, 1978 (18.04.78), Full text; Figs. 1 to 5 (Family: none)	1-13
☒ Further documents are listed in the continuation of Box C. ☐ 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 document 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 11 March, 2003 (11.03.03)		Date of mailing of the international search report 25 March, 2003 (25.03.03)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP02/13027

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 2000-191067 A (Asahi Glass Co., Ltd.), 11 July, 2000 (11.07.00), Par. Nos. [0010] to [0013]; Fig. 1 (Family: none)	5, 8, 10, 11

Form PCT/ISA/210 (continuation of second sheet) (July 1998)