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(71) Applicant(s)

Honda Giken Kogyo Kabushiki Kaisha

(Incorporated in Japan)

1-1 Minami-aoyama 2-chome, Minato-ku, Tokyo, Japan

Kabushiki Kaisha Honda Express

(Incorporated in Japan)

7754-1 Kou-Cho, Suzuka-Shi, Mie-Ken, Japan

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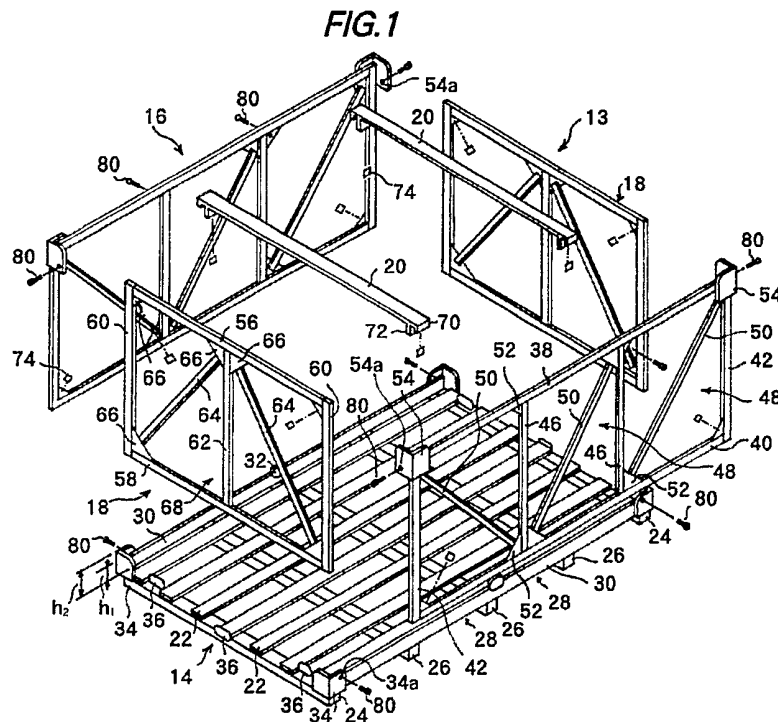
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PC3X PK4 PK6 PK7
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(72) Inventor(s)
Nobutoshi Hasegawa
Hisato Fukuda
Makoto Tani

(74) Agent and/or Address for Service
Haseltine Lake & Co
Hazlitt House, 28 Southampton Buildings, Chancery Lane, LONDON, WC2A 1AT, United Kingdom

(54) **Returnable case**

(57) A returnable case which may be disassembled when empty comprises pairs of rectangularly formed major frames 16 and minor frames 18 mounted vertically along longer and shorter edges of a skid 14. One or a pair of guard members 20 are horizontally, removably attached on the top of the frames, and a pair of headers 30 are disposed along either side of the skid 14. All components of a disassembled case are packed in a space having a height of not exceeding that of the headers 30.



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FIG. 1

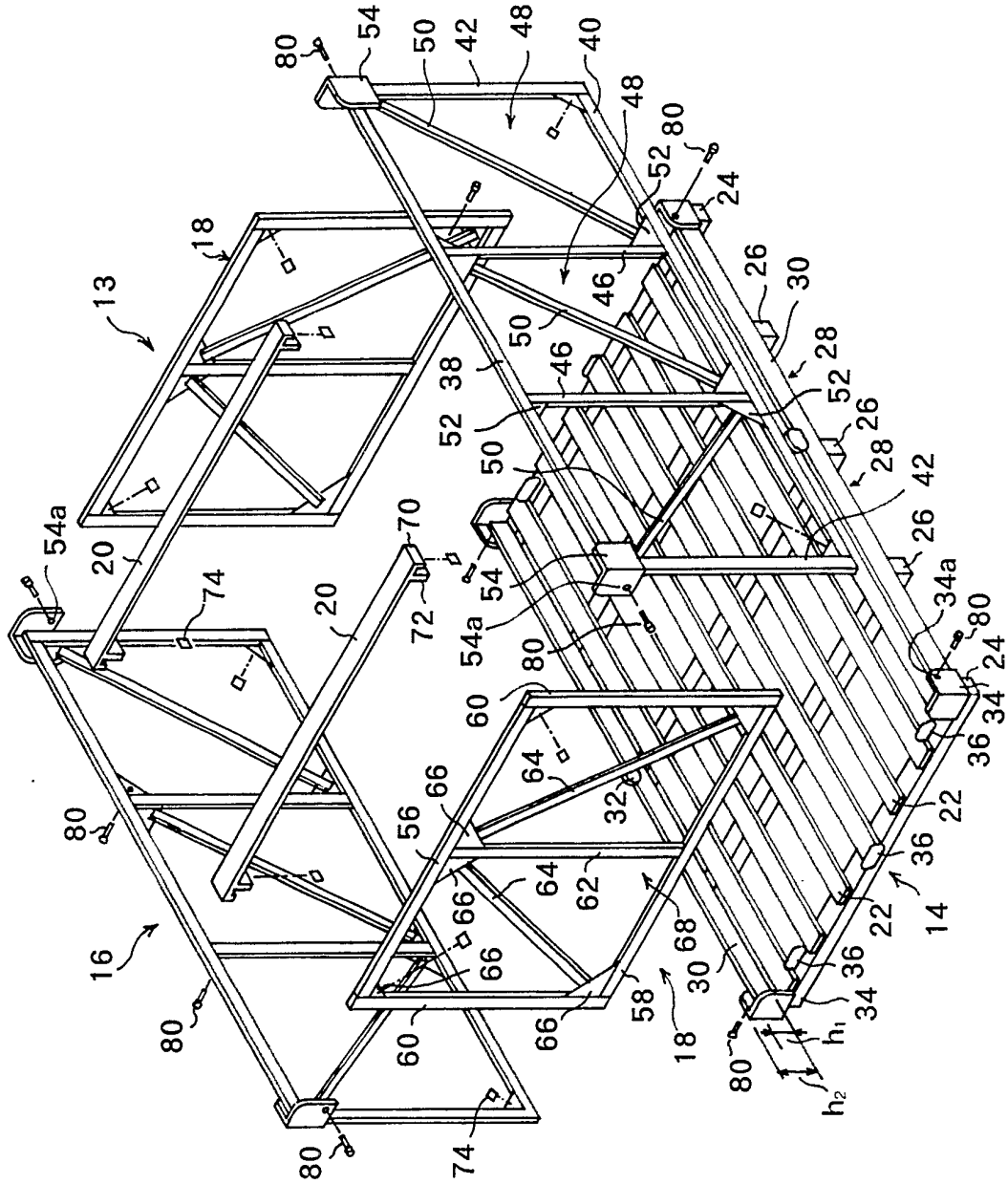


FIG.2

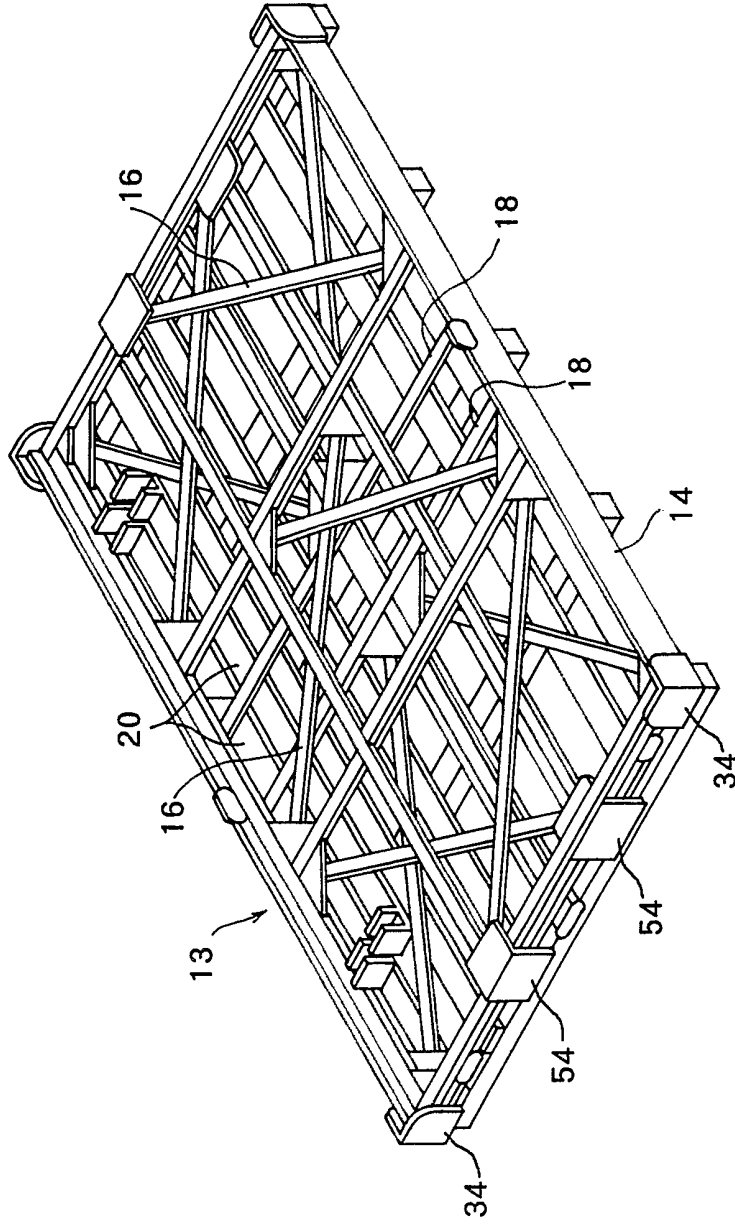


FIG. 3

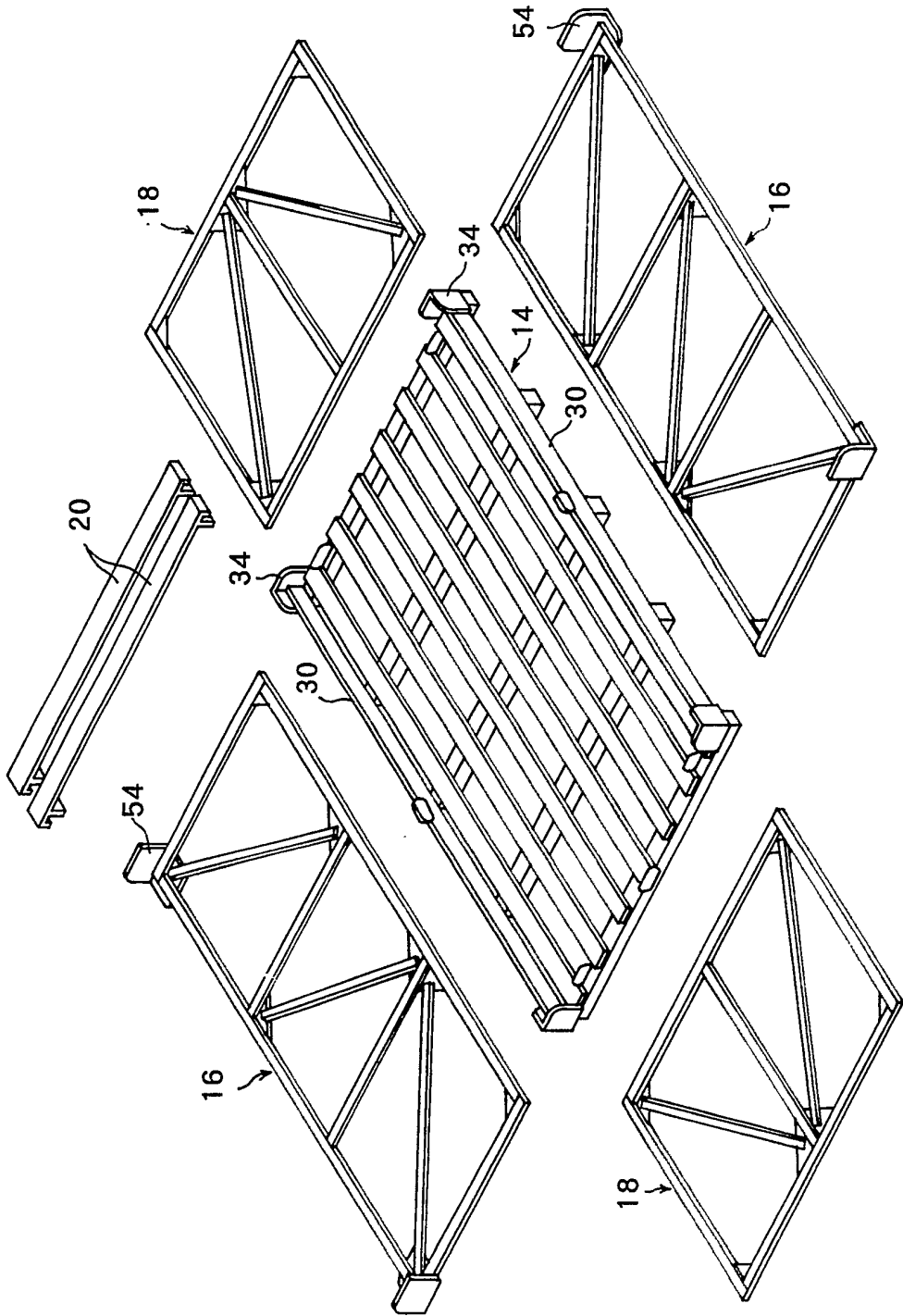


FIG.4

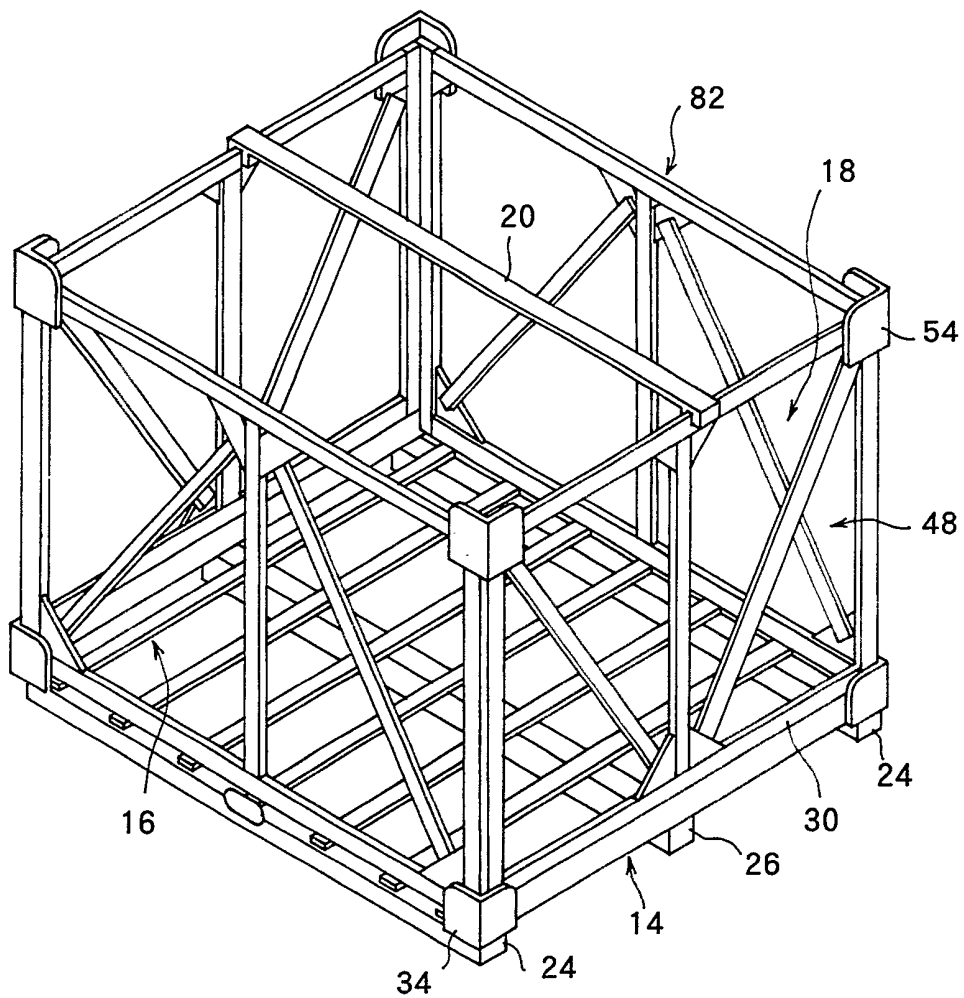


FIG. 5

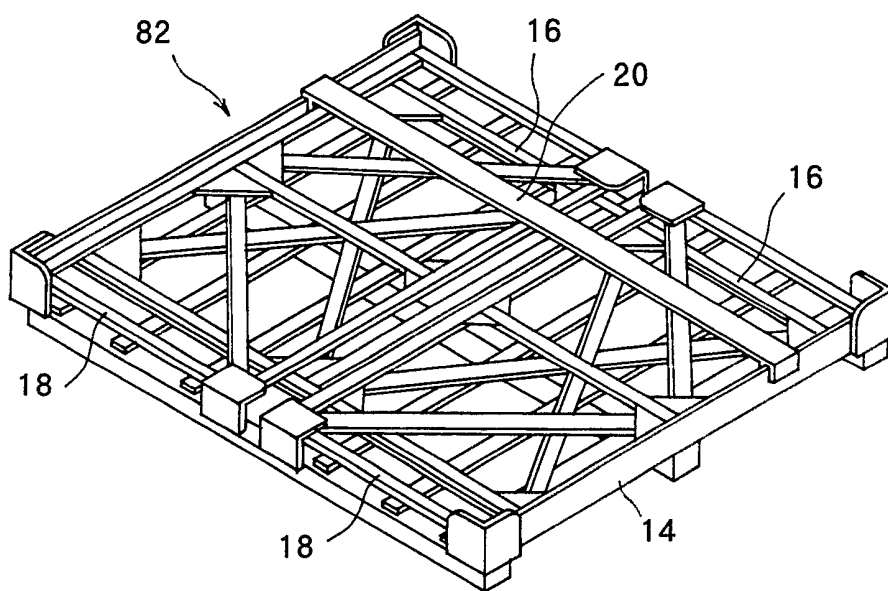


FIG. 6

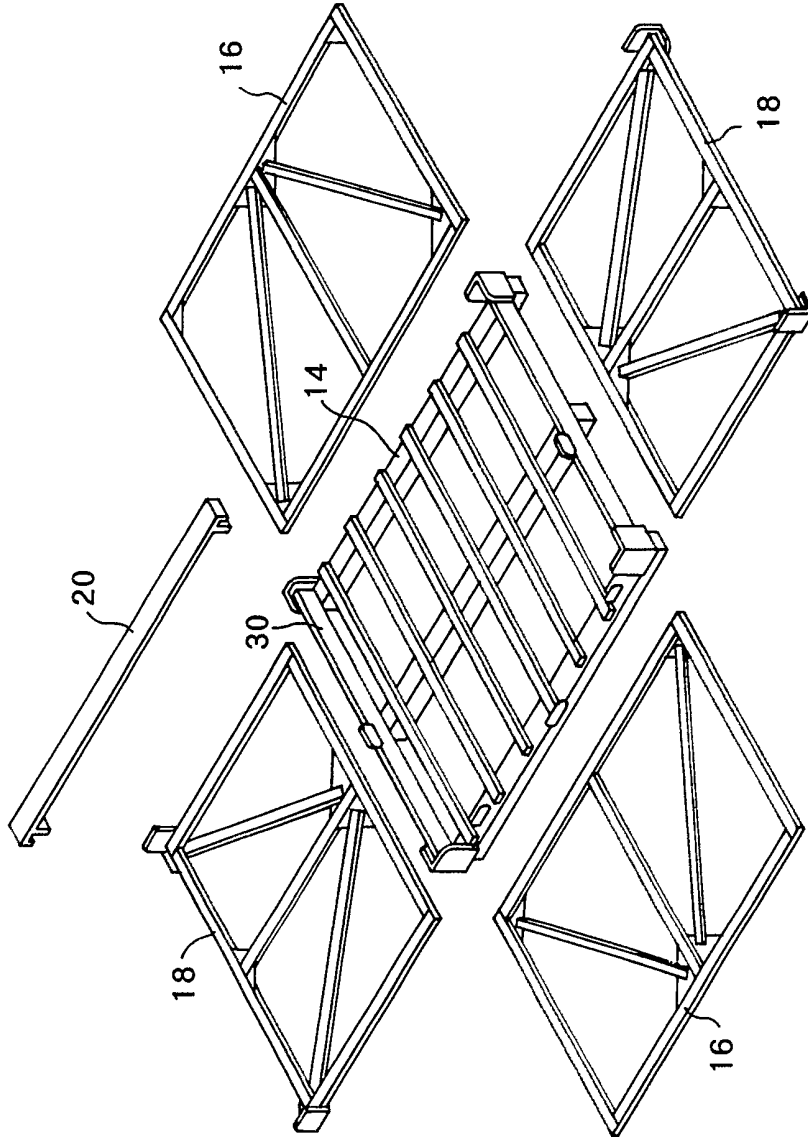


FIG. 7

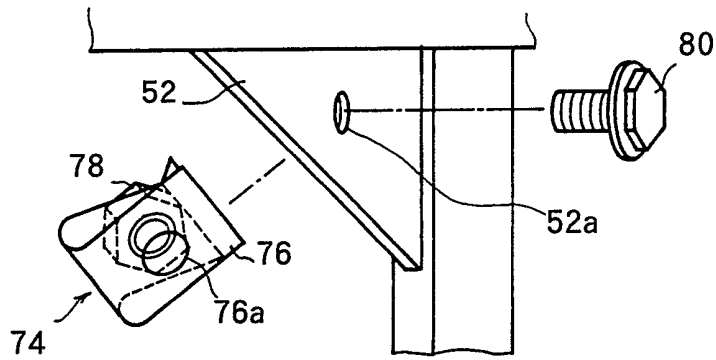
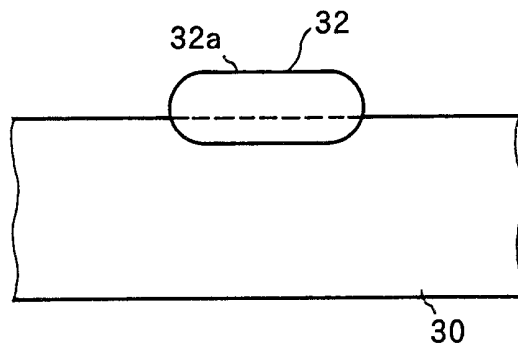


FIG. 8



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FIG.9

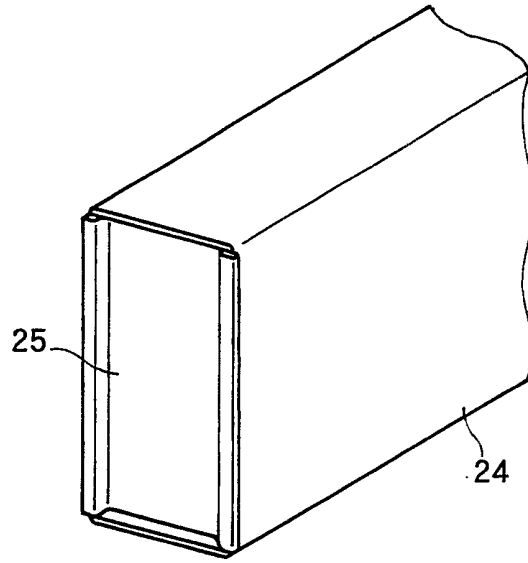
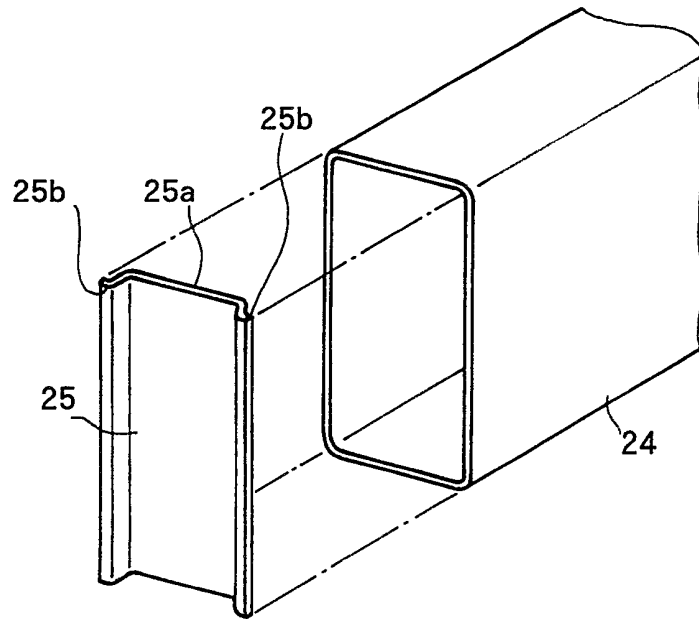


FIG.10



RETURNABLE CASE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a returnable case capable of assembled and disassembled in use for transportation of the packaged freight.

2. Brief Description of the Prior Art

An example of the conventional returnable cases which is disassembled as necessary comprises a skid as a bottom plate, support frames disposed in front and rear edges of the skid, side frames disposed on the left and right edges of the skid, a top frame connected to each of the side frames. Such a returnable case is normally assembled at a packaging site by securing all components to each other with bolts.

In the conventional returnable cases, when loaded in a container or the like at returning time, each member cannot be enclosed in compact, and therefore it was difficult to place a number of cases without occupying a large space.

Also, in conventional cases, nuts to be fastened to bolts were welded on each retaining portion. In case that the threads were erased, this would have caused the case impossible to be reassembled.

Some of conventional returnable cases, in which

wooden or steel materials were employed for the bottom, were not satisfactory in strength, and therefore not reused or required much labor for disassembly and reassembly. Another example of a case, which included a hinged connection between frames and a skid, also had a disadvantage to have not so lowered height of the case when being packed.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a returnable case capable of space saving upon disassembly and easily assembled and disassembled.

An object of the present invention, such as defined in claim 1, is to provide a returnable case comprising a rectangular skid; a respective pair of major frames and minor frames vertically, removably mounted along a respective longer and a shorter edge of the skid; guard members removably bridged on the top of the frames; and headers secured to the skid, and all components of a disassembled case are packed within a space having a minimized height.

Another object of the present invention is to provide a returnable case provided with an L-shaped corner guide higher than that of a header is secured in each of corners of headers to provide higher safety during stacking operation.

A further object of the present invention is to pro-

vide a returnable case comprising a plurality of frames each provided with spaced vertical supports and diagonal trusses, each truss having welded at its joint position through a patch for improving mechanical strength and preventing deformation of components of the case.

A still another object of the present invention is to provide a returnable case including corner guides secured to the corner of the header and either one pair of frames are fastened together by means of bolts, and corner guides secured to the upper corner of the frames and the other pair of frames are also fastened by bolts for facilitating assembly and disassembly.

A still further object of the present invention is to provide a returnable case in which a clip having an opening and a clip nut having a nut concentrically attached therewith are provided at each joint position between the skid and the major frame or minor frame, and also between the major frame and minor frame for facilitating the replacement of nuts.

A further object of the present invention is to provide a returnable case in which major frames, minor frames, and foot members attached below the bottom of the skid are formed of a hollow material having a rectangular section, and each free end of the foot members is closed by a cap member for providing the case with a light weight and a suf-

efficient mechanical strength.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG.1 is an exploded perspective view of an embodiment according to the present invention;

FIG.2 is a perspective view of a disassembled and packed returnable case of FIG.1;

FIG.3 is an extended perspective view of a disassembled returnable case of FIG.1;

FIG.4 is a perspective view of another embodiment of the present invention;

FIG.5 is a perspective view of a disassembled and packed returnable case of FIG.4;

FIG.6 is an extended perspective view of a disassembled returnable case of FIG.4;

FIG.7 is an enlarged view of a clip nut;

FIG.8 is a view illustrating a retainer patch attached to a header;

FIG.9 is a perspective view illustrating an end of a foot member of a skid ; and

FIG.10 is also a perspective view of a foot member of FIG.9 with a cap separated.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, a returnal case 13 ac-

According to the present invention is constructed as comprising a rectangular skid 14 formed as a bottom plate; a pair of major frames 16 each vertically, removably mounted along a longitudinal edge of skid 14; a pair of minor frames 18 each vertically, removably mounted along a shorter edge of skid 14; and a pair of guard members 20 removably attached on the top of the skid in the horizontal direction.

The skid 14 is formed of a plurality of skid members 22 spaced with a predetermined distance therebetween, and is provided with an elongated end foot member 24 along each end edge, and spaced foot members 26 disposed between the end foot members 24. Between each of adjacent foot members 24 and 26, a predetermined space 28 is formed below the skid 14.

As shown in FIG.10, foot members 24 are formed of hollow bars having rectangular sections, the free ends thereof being closed, as shown in FIG.9, by cap members 25 welded thereon formed as having a flat surface 25a recessed from the end edges 25b. Cap members are also welded on foot members 26.

A pair of headers 30 formed of a hollow bar having a rectangular section are secured to the skid 14 at each edge of which a major frame 16 is to be placed, and are provided with retainer members 32 each being formed of a pair of parallel plates 32a as shown in FIG.8.

L-shaped corner guides 34, secured on each corner of header 30, are formed to have their lower ends flush with the lower ends of headers 30, and formed in height h_2 higher than the height h_1 of header 30. Each of corner guides 34 is formed with an opening 34a through its one edge for being retained by a bolt. A plurality of retainer patches 36 are staggered on the top of the side foot member 24 for positioning shorter frame 18, and are formed in the same structure as the aforementioned retainer patches 32.

A major frame 16 is formed by joining an upper bar 38, bottom bar 40, and corner strut 42 in a rectangular shape. Between the upper bar 38 and bottom bar 40, a plurality of reinforcing strut 46 are secured in parallel to corner strut 42. Between an upper bar 38 and a bottom bar 40 is secured a plurality of reinforcing supports 46, defining a plurality of rectangles 48, to each of which a diagonal truss 50 is mounted. To each truss 50 at each end is welded a trapezoidal patch 52 by way of MIG welding. A corner guide 54, welded on the top of the corner strut 42, has its one surface formed of an opening 54a for receiving a retainer bolt. Further, at each corner of two rectangles formed including both end struts 46 of a frame 16 is welded a patch 52.

A minor frame 18 is also formed in a similar manner as the major frame 16, including an upper bar 56, a bottom

bar 58, corner struts 60, and reinforcing support 62 bridged between the upper bar 56 and bottom bar 58, and a diagonal truss 64 mounted on each rectangle 68 defined by struts 64. To each truss 64 at each end is welded a trapezoidal patch 66 for connecting each corner of the rectangle to each end of the truss 64. Further, at each of the two upper corners of rectangles of a frame 16 is welded a patch.

Guard members 20, also formed of a hollow bar as the above-described foot member 24, may be formed of a bulk bar.

An engagement means for the upper bar 38 and a mounting plate 72 for the patch 52 are integrally formed at each end of the guard member 20. Each position on which two guard members 20 are to be disposed is defined as that between two foot members 26, and these guard members 20 are designed to be positioned to each other with a space identical to that between two forks provided on a vehicle such as a forklift in use for transportation of the cases 13.

In the present invention, clip nuts 74 shown in FIG. 7 are typically used with bolts for joining the components. Such a clip nut 74 comprises a clip 76 having an opening 76a and a nut 78 concentrically joined therewith. The opening 76a at the nut side is formed to have a diameter slightly larger than that of nut 78, but smaller than that of the entire profile of nut 78. Instead, the opening formed in opposite to the nut 78 has a diameter larger than that of

the opening 76a above. The clip nut 74 is secured to be concentrically with the opening 52a against resiliency of the clip 76, and a bolt 80 is tightened thereon.

All the components, including skid members 22, bars 38, 40, 56 and 58, corner struts 42 and 60, struts 46 and 62, and trusses 50 and 64, are formed of a rectangular hollow material, thereby providing a returnable case having a minimized weight. Also, the hollow material is used in the form that the minor thickness is in the vertical direction when the components are packed, thereby to reduce the packing space.

The above-mentioned headers 30 may be also secured along the direction of the shorter edges of skid 14, instead of placing the headers 30 along the longer edges of skid 14, for securing all frames 16 and 18 on skid 14. In such an alternative case, corner guides 54 are disposed on the upper corners of minor frames 18, instead of the major frames 16. Also, guard members 20 may be bridged between minor frames 18.

In assembly of the case 13: first, a major frames 16 with their bottom bars 40 being positioned on the retainer patch 32, and bolts 80 are tightened to secure the lower corners.

In the next step, minor frames 18 are mounted such that the bottom bars 58 are received between the staggered

retainer plates 36, and the upper corners are retained to the corner guides 54 by means of bolts 80.

As stated above, after one major frame 16 and both opposed minor frames 18 have been mounted, the freight such as cardboard packages are stacked on the skid 14.

Thereafter, the other major frame 16 is mounted, and two guard members 20 are secured on the predetermined positions in parallel to minor frames 18 by tightening the bolts 80. After being assembled, the returnable cases 13 are stacked by a forklift or the like in a container and transported.

Thus the returnable cases 13 are stacked, each of two blades of a forklift is inserted into the space 28 so that each blade is positioned almost just below each of guard members 20, and the skid 14 is raised upwardly. In this manner, when two returnable cases 13 are stacked on each other, the two blades are prevented from entering the upper portion of the case 13 by engaging with the edge of guard member 20, and the freight such as cardboard cases are completely prevented from being damaged.

The assembled returnable case 13 is easily disassembled in the opposite sequence by releasing each joint position. After disassembled, the returnable case 13 is received in a container through the following steps.

On the skid 14, first a pair of disassembled minor

frames 18 are placed along the shorter edge of skid 14 so as not to be superposed, and two guard members 20 are placed on skid 14 in parallel to the shorter or longer edge thereof.

Then, as shown in FIG.2, a pair of major frames 16 are placed along the longer edge of skid 14 so that the upper corner guide 54 would not upwardly extend, where the upper corner guide 54 serves as preventing movement of minor frames 18. The thickness of each component and height of the header 30 are designed so as not to exceed the height of each component placed on the skid 14. In the case that the upper corner guide is secured to the upper corner of minor frames 18, a pair of major frames 16 may be placed beneath a pair of minor frames 18, or guard members 20 may be placed on the highest position.

In such a manner, all components are collected on the skid 14, a plurality of skids being stacked and received in a container, and the returnable cases 13 are returned.

FIGS.4, 5 and 6 illustrate another embodiment of the returnable case, each illustrates the case 82 of assembled, disassembled and each of components thereof. Reference numerals for the same components are identical to those in FIGS.1 to 3.

The smaller sized returnable case 82 illustrated in FIGS.4 to 6 includes two rectangular elements 48, foot members 24 and 26 which are in parallel to each of bars 38 and

40, and a single guard member 20. The upper corner guides 54 are secured to minor frames 18. In the enclosing step after disassembled, a pair of minor frames 18 are placed upon a pair of major frames 16 as shown in FIG.5.

Such a returnable case 82 is assembled in the same manner as the returnable cases 13 as follows. One minor frame 18 is placed on one header 30 of skid 14 and fastened by means of bolts, and each of major frames 16 is fastened to corner guides 54 by means of bolts. The freight such as cardboard packages are stacked on the skid 14, and the other minor frame 18 and guard members 20 are fastend by bolts.

The assembled returnable case 82 is easily disassembled in the opposite sequence by releasing the bolts. Then, major frames 16, minor frames 18 and guard members 20 are placed on the skid 14.

In the returnable cases 13 and 82 of the invention, all the disassembled components of the frames are stacked within a small space having a height of header 30, which effects saving of space necessary for packing. Bolts may be tightened at only 4 positions including those between the lower corner guides 34 and corner patches on the lower edge of the frame, and another 4 positions including those between the upper corner guides 54 and corner patches on the upper edge of the frame, that is, only 8 positions are required as the fewest number. Even both ends of guard

members 20 are added, very few positions are required.

Corner guides 34 at the four corners of skid 14, having the height h_2 and extending upwardly beyond the headers 30, would effectively receive the foot members 24 of skids 14 which are stacked thereon at the returning step. This serves stability of stacked skids and safety of labor.

The upper L-shaped corner guides 54, to be fastened by bolts when assembled, engage with the sides of skid 14 having no headers 30 in disassemble step and serve as retainer for preventing components from sliding out of these sides. In the case of full size case 13 as FIG.1, corner guides 54 are let extend upwadly to be engaged with foot member 24. On the other hand, in the case of the half size 82, guides 54 are not let extend upwadly for preventing possible trouble caused by being stacked with a full size case 13.

Reinforced by support members 46, 62 and diagonal trusses 50, the frames 16 and 18 are provided with sufficient mechanical strength without any deformation, even formed of a light weight hollow beam material.

Clip nuts 74 conveniently employed for being tightened with bolts are easily replaced in case their threads are damaged. For preventing escapement of nuts 74, corner patches of frames 16 and 18 are disposed inside the outer surface of the frames as shown in FIG. 7.

Retainer patch 32 provided on header 30 serves to prevent lateral movement of frames 16 and 18. Also, foot members 24, closed by cap members 25 at their both ends, are provided with sufficient strength.

What is claimed is:

1. A returnable case comprising:
 - a rectangular skid formed as a bottom plate;
 - a pair of major frames each vertically, removably attached to said skid along a longitudinal edge thereof;
 - a pair of minor frames each vertically, removably attached to said skid along a shorter edge thereof;
 - removable guard members disposed over either one pair of said major frames and minor frames in parallel to a longer edge or shorter edge of the skid; and
 - a pair of headers secured on said skid at each location where said major frames and minor frames are placed;
 - all components of disassembled major frames, minor frames and guard members are enclosed within the height of said headers.
2. A returnable case according to claim 1, wherein
 - an L-shaped corner guide having a dimension higher than that of the header is secured in each of corners of headers secured to the skid.
3. A returnable case according to claim 1 or 2, wherein
 - each of said major frames and minor frames is provided with spaced vertical supports and diagonal trusses, each of said trusses having welded at its joint position through a corner patch.

4. A returnable case according to claim 1 to 3, wherein one pair within said major frames and minor frames having each end thereof attached with a corner guide, but the other pair of frames being without corner guide;

a corner guide attached to an end of a header is secured to a corner patch attached to a lower end of said one of frames by means of bolts ; and

a corner guide attached to an upper end of said one of frames is secured together with a corner patch attached to an upper end of said other frame having without corner guide.

5. A returnable case according to claim 1 to 4, wherein

a clip having an opening and a clip nut having a nut concentrically attached therewith are provided at each joint position between said skid and said major frame or minor frame, and also between said major frame and minor frame.

6. A returnable case according to claim 1 to 5, wherein

said major frames, minor frames, and foot members attached below the bottom of said skid are formed of a hollow material having a rectangular section, and each free end of the foot members is closed by a cap member.

7. A returnable case substantially as hereinbefore described with reference to the accompanying drawings.

Relevant Technical Fields

- (i) UK Cl (Ed.M) B8P (PC3A, PC3B, PC3C, PC3D, PC3E, PC3X, PK4, PK6, PK7)
- (ii) Int Cl (Ed.5) B65D

Search Examiner
 MIKE HENDERSON

Date of completion of Search
 23 MAY 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
 1-7

(ii) ONLINE DATABASE: WPI

Categories of documents

- X:** Document indicating lack of novelty or of inventive step. **P:** Document published on or after the declared priority date but before the filing date of the present application.
- Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category. **E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A:** Document indicating technological background and/or state of the art. **&:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2086351 A (TOPPAN CONTAINERS CO LTD) whole specification relevant	1
X	GB 1567942 (W O ALDERSON LTD) whole specification relevant	1
X	US 4546896 (REID) whole specification relevant	1
X	US 4177907 (FUNAIOLI et al) whole specification relevant	1

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