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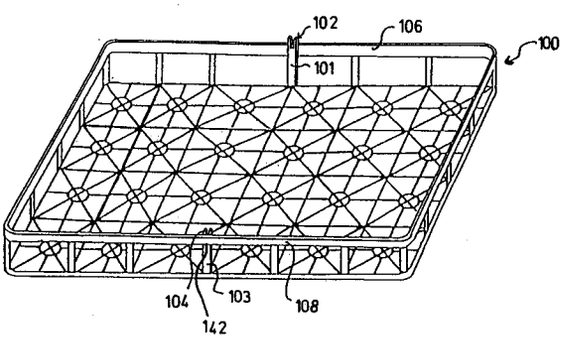
(54) Nestable tray with laterally stable side walls in nested position.

(57) A tray (1) for supporting a plurality of items such as beverage containers is disclosed and includes means for restricting the lateral movement between vertically stacked or nested trays. The tray of the invention generally comprises a base (50) for supporting the items with at least one, and preferably four side walls (10,20,30,40) extending around the perimeter of the base. A projecting member (101,103) extends upwardly from at least one of the side walls and a downwardly opening recess (140) is positioned to receive an upwardly projecting (131,121) member of a second similarly constructed tray located below and adjacent to the first tray. This mating of the upwardly projecting members and the downwardly opening recesses of two vertically adjacent trays prevents the trays from moving laterally with respect to each other.

Fig.10



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The present invention is directed to a carrier tray for supporting items such as beverage containers and more particularly to a tray designed to prevent relative movement between adjacent trays when two or more trays are aligned vertically, e.g., when they are stacked or nested.

Carrier trays are widely used in the beverage industry to ship consumer products such as beverage cans. In order to facilitate transporting and storage of empty trays, a large number of trays are typically nested together in stacks. The substantial weight of large stacks of trays tends to cause the walls of the lower trays to be pushed laterally causing the tray to "flower" or deform. Such deformation of the lower trays can make the stack of trays unstable and can cause permanent damage to the trays. Furthermore, when a stack of nested trays is moved, the flowering problem can be exacerbated as the person moving the stack tends to tilt the entire stack, placing even greater weight on certain walls of the lower trays.

Another problem associated with carrier trays relates to deformation of the underside (i.e., "doming") of a beverage can stored on the tray, which may render it unsalable because the subsequent leaning, denting or abrasion of adjacent cans by a domed can could destroy the domed can or its "neighbors". If such doming or abrasion or denting results in spilling beverage, all remaining cans under certain regulations could become unsalable, causing severe loss to merchants.

Current beverage container carriers have not adequately addressed how to create a carrier which will prevent deformation of the lower trays or will prevent doming of deformable containers stored on the tray.

Examples of prior art carriers include US-A-2 314 198 (De Reamer) which discloses a device for use in packing cans. The device has upwardly projecting ribs on the bottom of each can socket which prevent either end of one can from shifting laterally to engage its neighbors and prevent denting due to the jarring action experienced by the filled container in transport or other handling. The De Reamer patent does not contemplate a feature which would prevent the doming of the underside of cans.

US-A-3 281 010 (Moore) shows an article carrying case in which the bottom section of each receptacle area has raised ridges which helps position the bottles in the cells and to strengthen the case, but not to prevent doming.

US-A-4 040 517 (Torokvei) describes a stacking case with upwardly projecting support members for carrying a number of bottles in each section of the case. These support members center the bottle in the cell and provide support for the bottles.

US-A-3 333 729 (Rabb) describes a bottle carrier with dividers in which the bottom side of each section extends upwardly creating a protrusion which fits under the similarly shaped underside of the bottom of the bottle stacked above it and houses the cap area of the stacked bottles below it. This patent also does not address "doming" prevention.

US-A-3 283 947 (Cornelius) reveals improvements to a bottle carrier for transporting, handling and storing crowned-cap beverage bottles in a container molded from suitable plastic material such as high-density polyethylene. Figure 5 shows each cell of the carrier having a "centrally upwardly offset, preferably circular portion 19 connected with the normal plane of the base wall by means of a reinforcing offset tapered generally annular flange 20". Like the Torokvei and Rabb patents, this patent does not address "doming" prevention.

US-A-3 203 583 (Amberg) shows a tray for cups filled with drinks, in which the compartment portions have "upward protruding portions" 22 at the underside of each cup receiving socket. The purpose of such protruding portions is to "permit air passage" to underlying stacked drink cups and presumably to prevent excessive lateral movement of the cups.

US-A-4 142 634 (Leff) is directed to a separator for supporting stacked layers of containers having a plastic section with a honeycombed pattern embossed on its top surface for rigidity. The separators include "interior portions" which centrally position spools of yarn 15, 16.

US-A-4 095 693 (Killy) is directed to a carton for packaging various articles having "chimes" formed at one end of the carton. A series of ribs formed on one of the panels of the carton abut a portion of the chimes to protect the exterior of the carton "from being disfigured by the chimes of the multiple articles packaged within making circular indentations on the interior face and coming through to the exterior portion of the carton whenever several cartons are stacked on top of each other". This patent is directed to preventing deformation of the carrier and not preventing deformation or doming of the stored or carried article.

It is an object of the present invention to create a carrier tray that will remain laterally stable when two or more trays are stacked or nested together.

It is also an object of the present invention to create a can-carrying carrier designed to prevent doming of the underside of cans.

Yet another object of the invention is to create a can-carrying carrier which will also prevent abrasion of the can or neighboring cans.

A further object of the invention is to construct a can-carrying carrier which will prevent denting

of the can or neighboring cans.

An additional object of the invention is to impede leaning of a can against a neighboring can or against a carrier wall.

Still another object of the invention is to create a carrier of sufficient strength to carry a large number of cans without cracking, breaking, or deforming.

A tray for supporting a plurality of items such as beverage containers includes a base having a surface for supporting the items and at least one side wall extending around a substantial portion of the perimeter of the base. The side wall has upper and lower spaced surfaces, each of the surfaces of the side wall substantially parallel to the surface of the base. The tray includes a projecting member extending from one of the surfaces of the side wall, and a recess formed in the other of the surfaces of the side wall, the recess positioned to receive a projecting member of a second similarly constructed tray located vertically adjacent to the first tray.

This mating of the projecting member and the recess of two vertically adjacent trays prevents the walls of the trays from moving laterally with respect to each other, thereby preventing the weight of the stack from causing the lower trays to flower or deform, reducing damage to the trays and preventing the stack of trays from becoming unstable.

In the preferred embodiments, the tray includes four side walls and the base is substantially rectangular. The tray includes two projecting members, each of which extends upwardly from one of the side walls, and two downwardly opening recesses positioned to receive each of the two upwardly projecting members of a second similarly constructed tray located below and adjacent to the first tray.

The base comprises a plurality of areas, each of which is designed to support one deformable container, and an upwardly projecting member extending from each of the areas on the base, each member downwardly tapered to conform to the shape of the bottom surface of a container supported on each area, thereby preventing the container from deforming. Each area also includes a second upwardly projecting member intersecting and substantially perpendicular to one of the first members.

Each of the side walls of the preferred tray comprises an upper rail and a plurality of ribs extending from the base to the upper rail, with the projecting members extending upwardly from one of the ribs. The tray also comprises an upwardly projecting ridge extending from the base and positioned to be against the outer perimeter of a container supported on the base to prevent leaning of the container.

In the accompanying drawings:

FIGURE 1 is a perspective view of a first embodiment of the beverage container carrier of the invention;

FIGURE 2 is a plan view of part of the carrier base shown in FIG.1, showing particularly the relative position of the anti-doming feature;

FIGURE 3 is a perspective view of the anti-doming elements of the carrier of FIG.1;

FIGURE 4 is a cross-sectional view of the anti-doming feature shown in FIG.3;

FIGURE 5 is a plan view of a section of the upper part of the wall of the carrier of FIG.1;

FIGURE 6 is a perspective view of a stem of the carrier of FIG.1 which extends from the base to the wall;

FIGURE 7 is a perspective view of another embodiment of the carrier tray of the invention having an additional anti-leaning feature;

FIGURE 8 is a cross-sectional view along cross-sectional lines A and B of FIG.7 depicting the anti-leaning feature against a beverage container;

FIGURE 9 is a plan view of the anti-leaning feature shown in FIGS.7 and 8;

FIGURE 10 is a simplified perspective view of a third embodiment of the invention;

FIGURE 11 is a perspective view of a portion of the tray shown in FIG.10; and

FIGURE 12 is a second perspective view of the portion of the tray shown in FIG.11.

Referring now to the figures wherein like numerals represent like elements throughout the several views, Figure 1 shows carrier 1 generally comprising base 50 circumscribed along its periphery by side walls 10, 20, 30 and 40. The side walls generally include a uniform series of upwardly projecting ribs or stems 11. As seen in Figure 6, each stem 11 comprises three segments, including extreme segments 12, 13 which are shaped in a curved fashion to conform to the shape of the containers which are to be transported in carrier 1. Positioned between extreme portions 12, 13 is central portion 15. The walls 10, 20, 30 and 40 also include curved portions 21 between straight portions 200 (see Figure 5) between adjacent stems 11 to thereby conform to cylindrical items such as cans which are to be placed in carrier 1.

A portion of base 50 of carrier 1 is depicted in Figure 2, and generally comprises north/south ribs 51 and east/west ribs 52 defining rectangular areas 53. The transported containers 70 (see dashed outline in Figure 2) are centrally positioned on each rectangular area 53. Each area 53 has, in each of its four corners, circular "disks" 54, 55, 56 and 57 and an inner ring 58. Intermediate north/south ribs 59 and east/west ribs 60 are respectively perpendicular to east/west ribs 52 and north/south ribs

51, and extend from the center of the edge of each rectangular area 53 into inner ring 58. Diagonal ribs 61 extend from each corner of each rectangular area to inner circle 58.

Upwardly projecting segments 62 and 63 perpendicularly bisect inner circle 58 along the lines of diagonal ribs 61 and are contained in each inner circle 58. Referring to Fig.3, each segment 62 and 63 has three zones, including a rectangular zone 66 and tapered zones 64 and 65. The rectangular zone 66 and the tapered zones 64, 65 create arc-like structures which fit underneath beverage containers such as cans to prevent doming of the underside of the cans. Preventing doming helps eliminate leaning of the cans, subsequent abrasions, additional denting or deformation of the domed can or the same with respect to its neighbors. Absence of the anti-doming feature could result in unsightly and unsalable product and beverage loss.

In another embodiment of the invention, as depicted in Figures 7-9, a half-moon structure 80 is built on carrier base 50 as a part of inner ring 58 to help prevent leaning of the beverage container in the carrier 1. The half-moon structure 80 may be used independently of the anti-doming segments 62, 63 or in conjunction with them. When a delivery person attempts to remove the top carrier 1 from a stack of carriers, there is normally a tendency to tilt the container 70 (See Fig.8) on the leading edge creating a force in the direction of force line F on the edge of the top of the cans in the next lower tray(s). That force is frequently sufficient to displace the can from the lower tray, particularly if the tray is a low depth type. The half moon 80 will prevent this occurrence by creating a reactive force in the direction of line R.

A third embodiment of the invention is illustrated in Fig.10, which depicts a carrier tray 100 that is generally similar to carrier tray 1 shown in Fig.1. However, carrier tray 100 has two side wall stems 101, 103 that each include an upwardly projecting member 102, 104 respectively. Projecting members 102, 104 extend beyond the upper surface of side walls 106 and 108, respectively.

As is more clearly seen in Fig.11, which illustrates a segment of side wall 106, stem 101 has an integrally formed upwardly projecting member 102 that is generally U-shaped, and includes a pair of upwardly projecting points 121 and 131 that extend beyond the upper surface 109 of side wall 106.

Fig.12 is a view of the side wall segment shown in Fig.11 from the opposite direction. Side wall 106 also includes a downwardly extending recess 140 which is formed between the rear surface 112 of side wall stem 101 and the inner surface of side wall 106.

Side wall stem 103 and upwardly projecting member 104 are constructed similarly to side wall stem 101 and upwardly projecting member 102 illustrated in Figs.11-12. Similarly, a second downwardly opening recess 142 (see Fig.10) is formed between stem 103 and the inner surface of side wall 108.

When two trays constructed in accordance with the tray shown in Figs.10-12 are nested together such that they are aligned vertically, the upwardly projecting members 102, 104 of the lower tray are received within the downwardly opening recesses 140, 142 of the upper tray. This mating of the upwardly projecting members and the downwardly opening recesses of two vertically adjacent trays prevents the walls of the trays from moving laterally with respect to each other. When many trays are stacked together, this feature will prevent the weight of the stack from causing the lower trays to flower or deform, reducing damage to the trays and preventing the stack of trays from becoming unstable.

While the preferred embodiments of the invention have been illustrated in detail, modifications and adaptations to such embodiments will be apparent to those skilled in the art. For example, while the preferred embodiment has been described with the projecting member extending upwardly from the side wall of the tray and the recess opening downwardly, the location of these two elements could be easily reversed. In other words, the tray of the invention could be constructed such that the recess in an upwardly opening recess, and the projecting members 102 and 104 can extend from the underside of a surface of the side wall. Furthermore, an upwardly projecting member and corresponding recess can be included in each of the four side walls.

Accordingly, it is to be expressly understood that such modifications and adaptations are within the spirit and scope of the present invention as set forth in the appended claims.

Claims

1. A tray for supporting a plurality of items, such as beverage containers, said tray comprising:
a base for supporting said items;
at least one side wall extending around a substantial portion of the perimeter of said base;
a projecting member extending upwardly from said side wall; and
a downwardly opening recess positioned to receive an upwardly projecting member of a second similarly constructed tray located below and adjacent to said first tray, such that the relative lateral movement between said

trays is restricted.

2. The tray of claim 1 wherein said tray comprises four side walls and wherein said base is substantially rectangular.

3. The tray of claim 2 wherein a second of said side walls comprises a second projecting member, said tray further comprising a second downwardly opening recess, each said recess positioned to receive an upwardly projecting member of a second similarly constructed tray located below and adjacent to said first tray, such that the relative lateral movement between said trays is restricted.

4. The tray of claim 1 wherein said base comprises: a plurality of areas, each of said areas designed to support one deformable container; and
an upwardly projecting member extending from each of said areas on said base, each said member on said base being downwardly tapered to conform to the shape of the bottom surface of a container supported on each said area, thereby preventing said container from deforming.

5. The tray of claim 4 further comprising a second upwardly projecting member extending from each of a plurality of said areas, each of said second members intersecting one of said first members.

6. The tray of claim 5 wherein each of said second members is substantially perpendicular to one of said first members.

7. The tray of claim 1 wherein each of said side walls comprises:
an upper rail; and
a plurality of ribs extending from said base to said upper rail, said projecting member extending upwardly from one of said ribs.

8. The tray of claim 1 further comprising an upwardly projecting ridge extending from said base and positioned to be against the outer perimeter of a container supported on said base to prevent leaning of the container.

9. A tray for supporting a plurality of items, such as beverage containers, said tray comprising:
a generally rectangular base for supporting said items;
a plurality of side walls extending around a substantial portion of the perimeter of said base;
a projecting member extending upwardly from one of said side walls; and
a downwardly opening recess positioned to receive an upwardly projecting member of a second similarly constructed tray located below and adjacent to said first tray, such that the relative movement between said trays is restricted.

10. The tray of claim 9 further comprising:
a second projecting member extending upwardly from a second side wall; and
a second downwardly opening recess positioned to receive a second upwardly projecting member of a second similarly constructed tray located below and adjacent to said first tray.

11. A tray for supporting a plurality of items, such as beverage containers, said tray comprising:
a base including a surface for supporting said items;
at least one side wall extending around a substantial portion of the perimeter of said base, said side wall having upper and lower spaced surfaces, each of said surfaces of said side wall being substantially parallel to said surface of said base;
a projecting member extending from one of said spaced surfaces of said wall; and
a recess formed in the other of said surfaces of said side wall, said recess positioned to receive a projecting member of a second similarly constructed tray located vertically adjacent to said first tray such that the relative lateral movement between said trays is restricted.

12. The tray of claim 11 wherein said tray comprises four side walls and wherein said base is substantially rectangular.

13. The tray of claim 12 wherein a second of said side walls comprises a second projecting member, said tray further comprising a second recess, each said recess positioned to receive a projecting member of a second similarly constructed tray located vertically adjacent to said first tray, such that the relative lateral movement between said trays is restricted.

14. The tray of claim 11 wherein said base comprises:
a plurality of areas, each of said areas designed to support one deformable container; and
an upwardly projecting member extending from each of said areas on said base, each said member being downwardly tapered to

conform to the shape of the bottom surface of a container supported on each said area, thereby preventing said container from de-forming.

15. The tray of claim 11 wherein each of said side walls comprises:
an upper rail; and
a plurality of ribs extending from said base to said upper rail, said projecting member extending from one of said ribs.

Fig.1

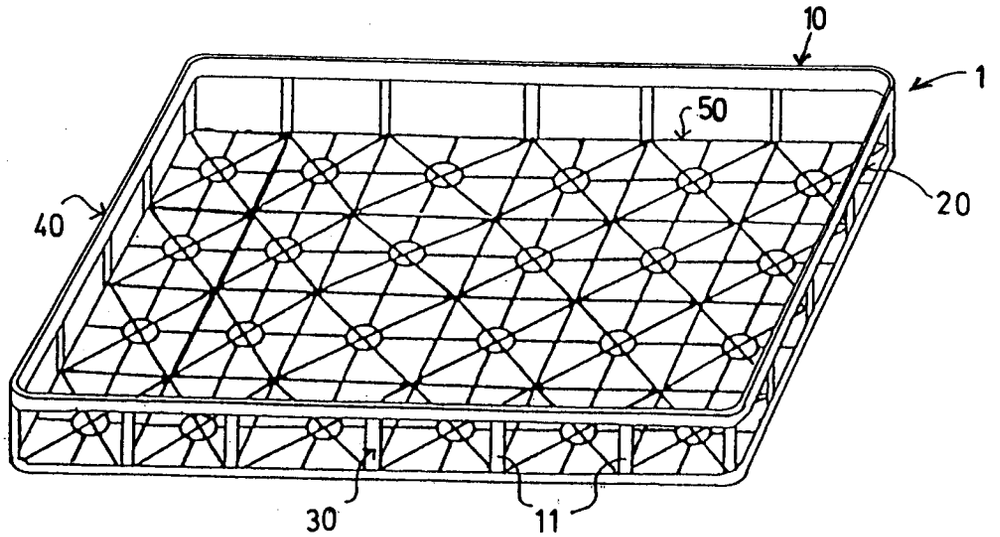


Fig.10

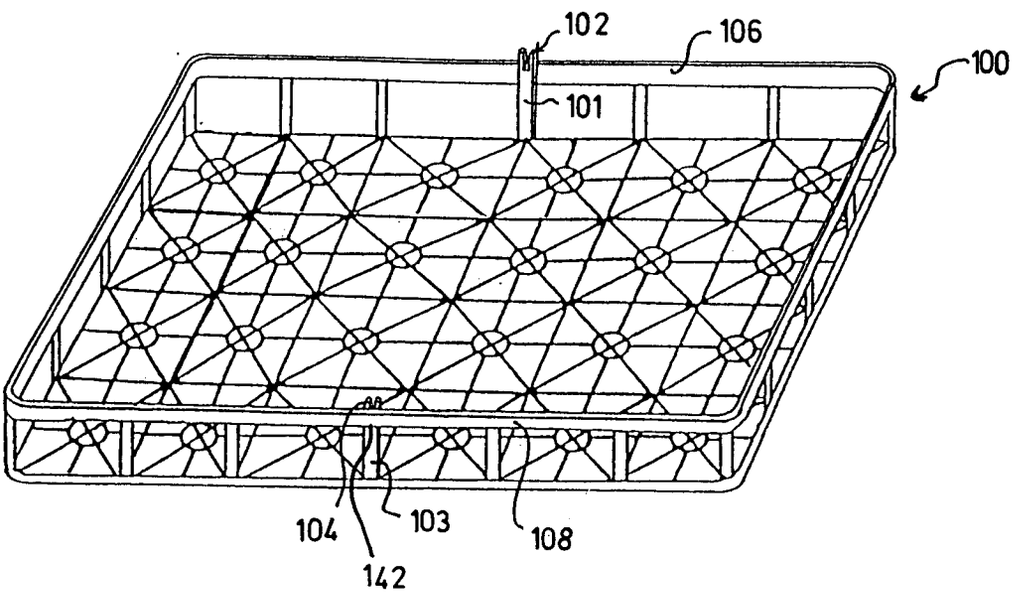
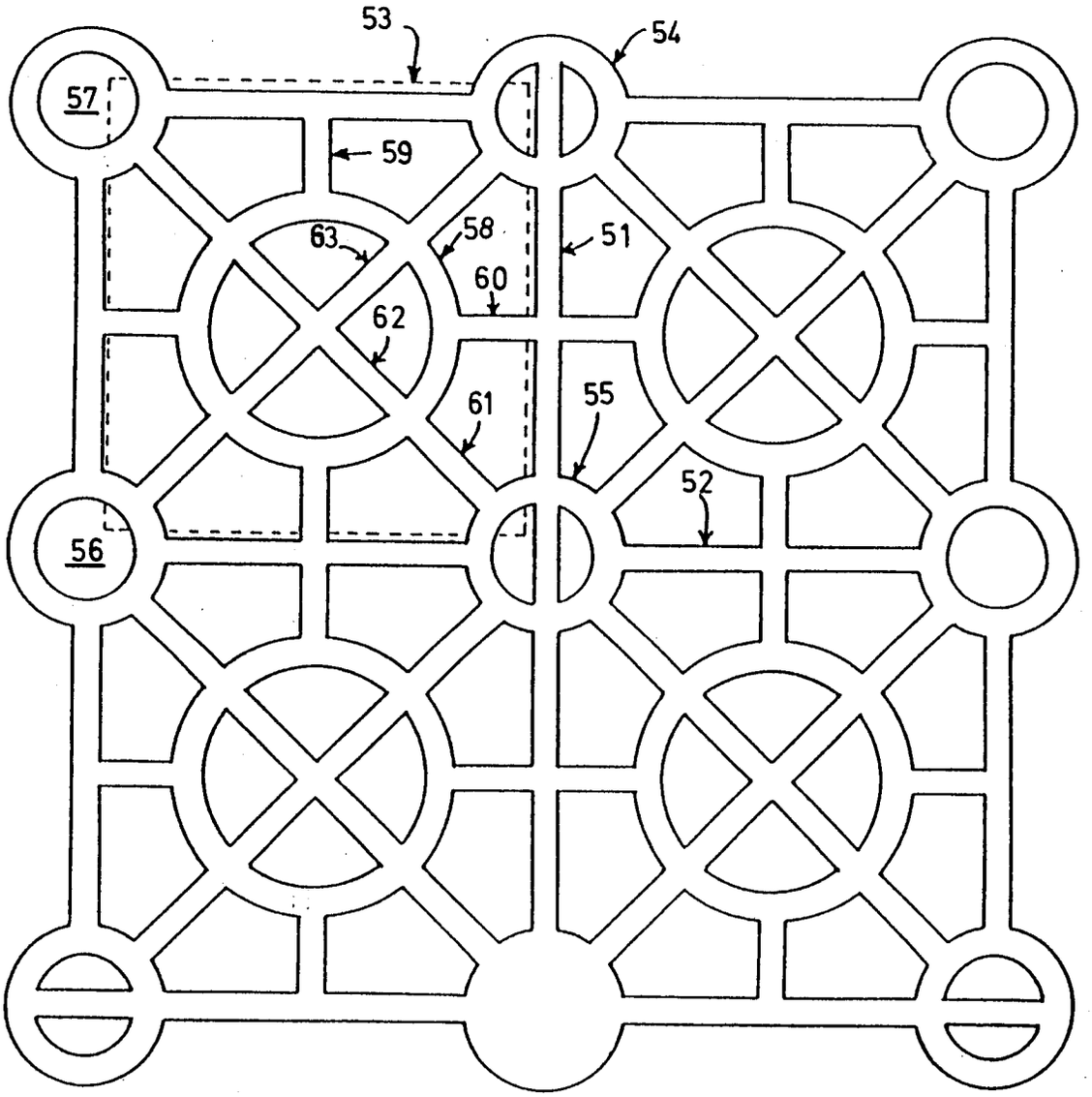


Fig.2



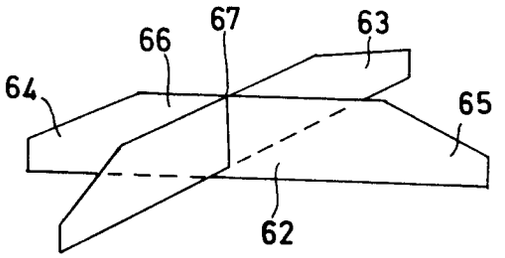


Fig.3

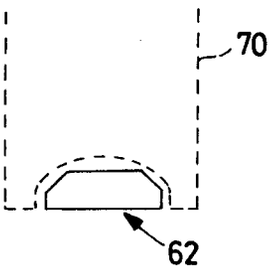


Fig.4

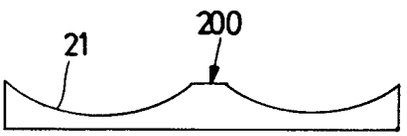


Fig.5

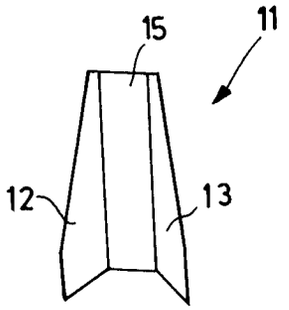


Fig.6

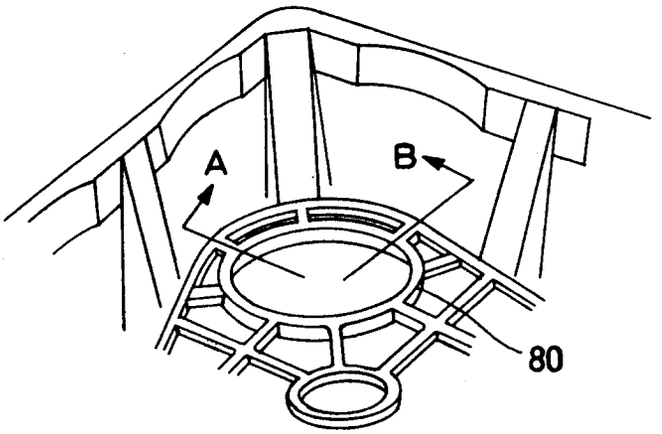


Fig.7

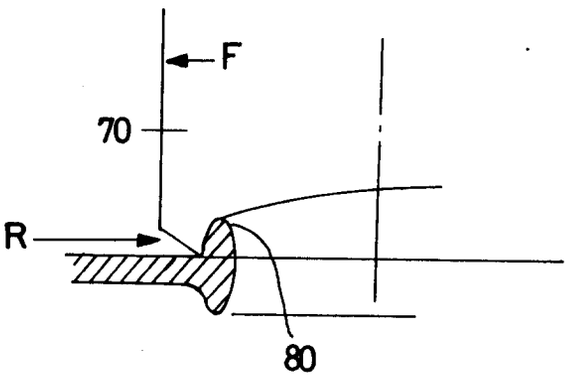


Fig.8

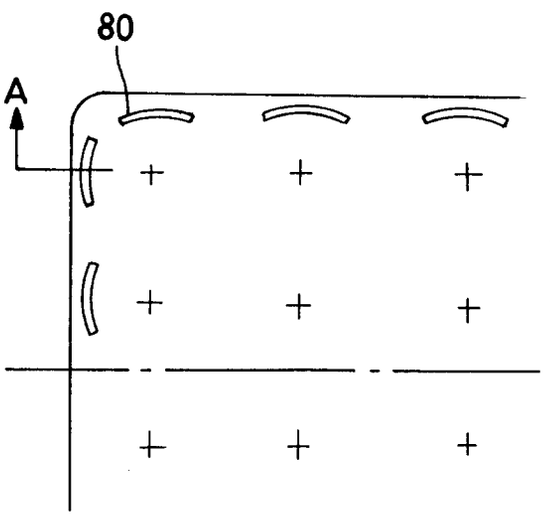


Fig.9

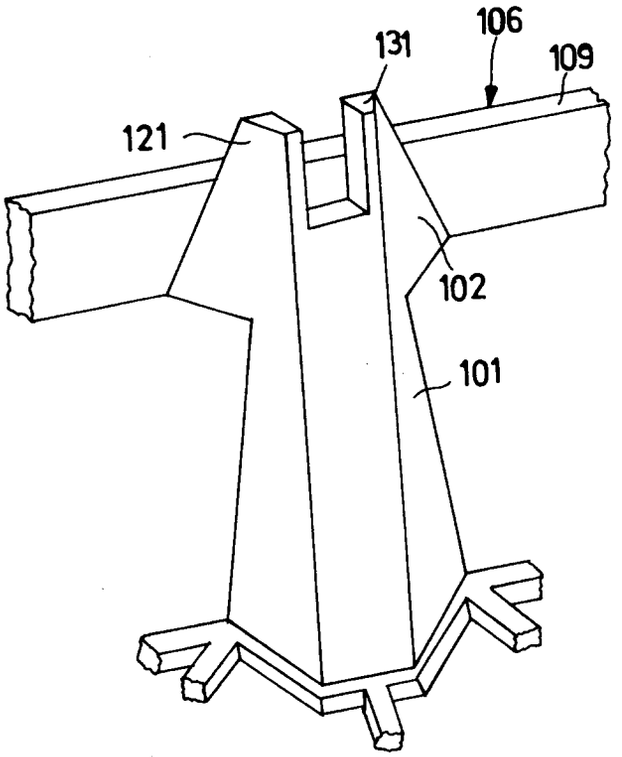


Fig.11

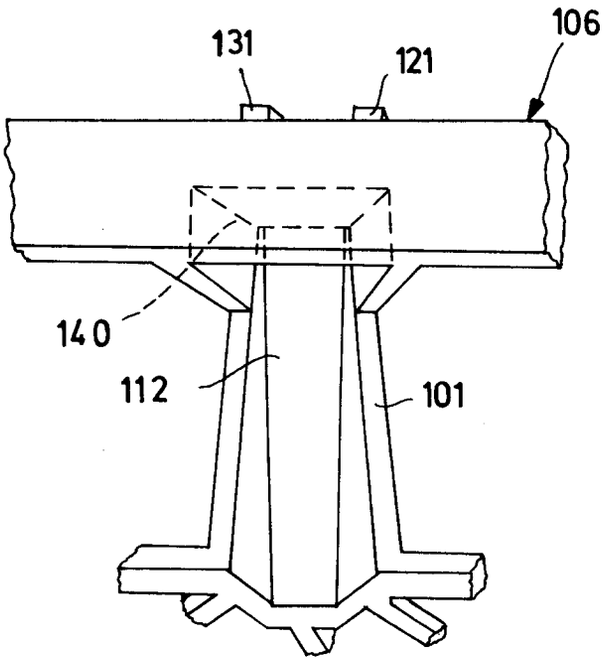


Fig.12

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 20 3127

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	WO-A-9 015 758 (REHRIG-PACIFIC) * the whole document * ---	1,2,4,7, 9,11,12, 14,15	B65D21/02
A	US-A-3 547 309 (PUSY ET AL) * the whole document * -----	1-3, 7-13,15	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 FEBRUARY 1993	LEONG C.Y.

CATEGORY OF CITED DOCUMENTS

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