



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.07.2008 Bulletin 2008/27

(51) Int Cl.:
B65D 19/04 (2006.01)

(21) Application number: **07024369.6**

(22) Date of filing: **17.12.2007**

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

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(30) Priority: **20.12.2006 IT MI20062460**

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(54) **Large stackable plastic container with improved feet**

(57) A stackable container, made of plastic, with large size and high loading capacity for the storage and transport of products in general, comprising a polygonal base wall (1), lateral walls (2, 3, 4, 5), able to delimit with said base wall a compartment (6) for containing said products, feet (7, 7A, 7B) branching off at least at the angles (8) of said base wall and able to distance said base wall (1) from a bearing surface (9, 9A) of the container, and a plurality of upper elements (16) for at least partial bearing for the feet (7) of a container stacked on an underlying container, in which: said feet (7) have, at least at one outer wall (10) thereof, a split into at least two portions (11, 12), in which one of said portions (11) is recessed relative to the other (12), thereby delimiting in said at least one outer wall a recessed seat (14), said seat being open at least at one wall (21) of the foot (21) able to bear on the bearing surface (9) of the container, and said bearing elements (16) provide for each of said angular feet, a first part (19) able to serve as support for at least one segment of the lower surface 12 A, able to bear on the bearing surface (9), of said non recessed portion 12 of the foot, and a second part (17) projecting relative to the first (19), having shape and dimensions matching those of said recessed seat (14), and able to couple with said recessed seat (14), thereby preventing substantial longitudinal or transverse displacements of the container stacked relative to the underlying container.

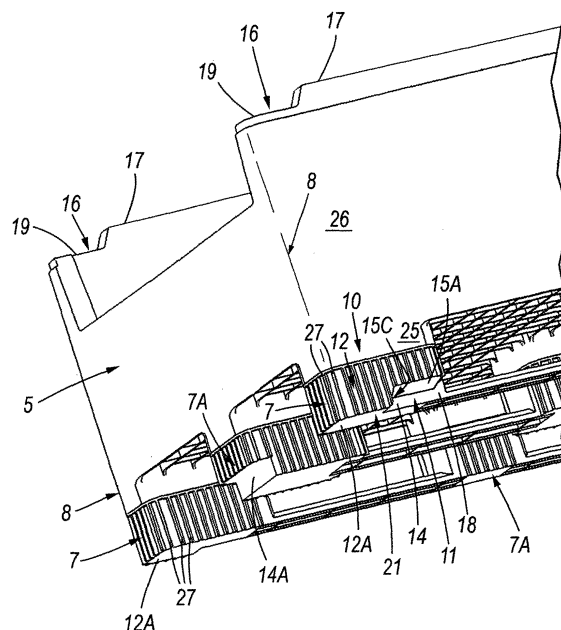


Fig. 2

Description

[0001] The present invention relates to a stackable container, made of plastic material, with large size and high loading capacity for the storage and transport of products in general, according to the pre-characterising part of the main claim.

[0002] Within the present context the term "container with large size and high loading capacity" means containers having a loading volume of at least 500 litres and able to accommodate loads of at least 500 kg.

[0003] Known containers have, at the terminal bearing part of their feet, a portion, recessed by about 20 mm, in depth, relative to the remaining portion of the foot, which develops along the segment of the lower edge of the foot that faces outwards.

[0004] When two containers are stacked, on the walls delimiting this recessed portions bear the corresponding walls of bearing elements of an underlying container, thereby achieving a male-female coupling. These bearing elements can be provided projecting from the upper edge of the lateral walls of the container or projecting from a lid of the container. Thanks to the shape coupling between the recessed portions of the feet and the projecting portions of the bearing elements, a stable bearing of a container above the other without the possibility of transverse or longitudinal movements of the upper container relative to the one that supports it.

[0005] This recessed portion of the feet of known containers creates drawbacks. It occurs that in systems for automatically moving the containers, e.g. on conveyor rollers, the devices for detecting the presence of the containers in determined positions, when they are provided in very low positions, i.e. substantially at the bearing surface of the containers, cannot "read" the presence of a container. It has been verified experimentally that this occurs often, especially when photoelectric cells are used as detecting devices.

[0006] An additional drawback is that in known conveyor systems, the continuous recessed portion along the outer lower edge of the feet causes the containers not to move smoothly.

[0007] A further drawback is that when the containers are stored on "racks" i.e. on shelves of limited dimensions whereon bears only the outer part of the feet, the bearing surface of the feet, being partly limited by the presence of the recessed portion, is not always sufficient to assure an optimal and stable housing of the container.

[0008] An object of the present invention is to provide a container which, whilst continuing to assure the possibility of a stable stacking of the containers, in particular with regard to transverse and longitudinal displacements of the stacked container relative to the supporting container, is able to overcome the drawbacks linked to the failure to detect the feet of the containers by the detecting devices, in particular by the photoelectric cells, reduces the problems of "sticking" of the containers when they are moved and assures a better and more stable posi-

tioning of the containers on the racks.

[0009] These and other objects that will be readily apparent to those skilled in the art are achieved by a container in accordance with the characterising part of the main claim.

[0010] For a better understanding of the present invention, drawings are provided by way of non limiting example, in which:

fig. 1 shows a schematic perspective bottom view of a container according to the invention, fig. 2 shows an enlarged view of a detail, figs. 3, 4 and 5 show respectively plan, bottom, and lateral views thereof,

fig. 6 shows a partial, enlarged, schematic lateral view of a container on a rack. The aforementioned figures show a stackable container according to the invention, made of plastic material, with large size and high loading capacity for the storage and transport of products in general. The container, as is conventional for those skilled in the art, comprises a polygonal base wall 1, lateral walls 2, 3, 4, 5, able to delimit with said base wall a compartment 6 for containing the products, feet 7 branching off at the angles 8 of said base wall and additional feet 7A, 7B provided centrally along the perimeter of the base 1 and at the centre thereof, able to distance said base wall 1 from a bearing surface 9 (fig. 5) of the container, and a plurality of upper step-shaped angular elements 16 for at least the partial bearing of the feet 7 in a container stacked on an underlying container.

[0011] The feet 7 of the container shown in the figures are of the type shaped as cross-members, i.e. with conventional elongated elements 20 that mutually connect the feet along the greater side of the container and that are removably associated in snap-in fashion in conventional seats (not shown, but conventional for those skilled in the art) provided in the feet themselves 7. However, the invention as shall be clarified below, is applicable both in containers with feet lacking cross members and in containers with cross members, as well as in containers comprising feet only at the angles 8 of the base 1. A similar situation also holds true for the conformation of the lateral walls 2-5 that in the example shown are constructed in a single piece with the base 1 but which, as is conventional for those versed in the art, could be associated to the base 1 by means of hinges, thereby being able to be lowered on the base 1 itself, in order to save space when the container is not to be used. A container of the type described above is known and will therefore not be further described.

[0012] According to the invention, the feet 7 provided in the angles 8 of the base 1 have, at the greater side of the container and at their outer wall 10 (fig. 2) a split in two portions 11, 12, in which one (11) of said portions is recessed relative to the other (12) thereby delimiting a recessed seat 14 in said outer wall 14. This seat is de-

limited only by three walls 15A, B, 18 in such a way as to be open at the face or wall of the foot 21 oriented towards the bearing surface 9 of the container, a the lateral outer face or wall 10 of the foot and at a wall 22 (fig. 1) oriented towards the interior of the base of the container, i.e. towards the other angular foot of the cross member 20. The recessed seat 14 preferably has a contour in the shape of a right angle trapezoid thereby favouring the penetration of the bearing elements 16 when two containers are stacked. The bearing elements 16 comprise for each angular foot, a first part 19 (fig. 5) able to serve as a support for the lower surface 12A (fig. 4) of said not recessed portion 12, and a second part 17 projecting relative to the first (19), having a shape and dimensions matching those of the seat 14, and able to engage in said recessed seat, in contact with the walls 15A 15B and 18 which delimit it, thereby preventing substantial longitudinal or transverse displacements of the stacked container relative to the underlying container.

[0013] The recessed seat 14 is provided in the area of the foot able to come in contact with the bearing surface and it preferably has a maximum height h (fig. 5) equal to about $1/3$ of the height H of the foot, a maximum width 1 equal to about $1/2$ of the width L of the foot and a maximum depth p (fig. 4) equal to about $1/3$ the depth P of the foot in the case of containers with dimensions 1200X800 mm, and about $1/5$ in the case of containers with larger dimensions.

[0014] Thanks to the particular shape of the foot, described above, the containers according to the invention are always detected by the detection devices of the related conveying systems, because even if said devices are pointed to a height corresponding to the one where the seat 14 is provided, at said height the container has a portion 12 of the foot lacking recesses, i.e. a portion that has a wall 27 (fig. 2) that is substantially continuous with: the visible surface of the foot itself, the corresponding surface 25 of the base 1 and the surface 26 of the parts 2, 4. This shape of the foot 7 together with the fact that the recessed seat 14 is provided only on one of the outer faces of the foot, preferably the face of the greater side of the container, also assures a reduced risk of sticking of the containers when they are moved on conveying systems, e.g. of the roller type.

[0015] Moreover, as shown in figure 6, thanks to the fact that the recessed seat 14 does not extend, as in traditional containers, also at the angle to the foot 7, the bearing surface of the feet is larger and when the containers are housed on shelves of limited size i.e. racks 9A, the containers are housed in a more stable manner on said racks.

[0016] Lastly, it should be repeated that the embodiment illustrated hitherto is provided purely by way of example and that numerous variants are possible without departing from the same inventive concept. Thus, for example, the seat 14 could be provided in a different position, e.g. more central relative to the one shown, and have only two openings, one at the outer face 10 of the

foot and one at the face 21 (fig. 2) that bears on the bearing surface 9, said variant would also entail obvious modifications of the upper edge 9 of the container.

[0017] Alternatively, the seat could also have only one opening at the face 12A that bears on the bearing surface, but it should be noted that since the seat 14 has to be copenetrated by the projecting parts 17 provided on the upper edge of the lateral walls of the container the latter variant would limit the dimensions of this male-female coupling reducing the stability of the stacking in case of containers with very large dimensions or loads.

[0018] According to another variant, the bearing elements 16 could be provided on the edge of a convention lid (not shown) able to close the container.

[0019] According to an additional variant if the container, in addition to feet 7 provided in the angles of the base 1 also provides additional feet provided for example in central positions of the perimeter of said base or at its centre (indicated as 7A and 7B in fig. 19) these additional feet can have either a recessed seat 14A (fig. 1) that extends over the entire length of the foot (as in the case of the peripheral central feet 7A) or as shown previously for the angular feet 7 a seat 14B that extends only for a portion of said length (as in the case of the seats of the central foot 7B).

[0020] An additional variant pertains to the outer surface of the feet lacking the recessed seat 14 which can be smooth or, as shown in the drawings, can have a plurality of vertical fins 27 for protecting the feet themselves.

Claims

1. A stackable container, made of plastic, with large size and high loading capacity for the storage and transport of products in general, comprising a polygonal base wall (1), lateral walls (2, 3, 4, 5), able to delimit with said base wall a compartment (6) for containing said products, feet (7, 7A, 7B) branching off at least at the angles (8) of said base wall and able to distance said base wall (1) from a bearing surface (9, 9A) of the container, and a plurality of upper elements (16) for at least partial bearing for the feet (7) of a container stacked on an underlying container, **characterised in that:**

said feet (7) have, at least at one outer wall (10) thereof, a split into at least two portions (11, 12), in which a first of said portions (11) is recessed relative to the other (12), thereby delimiting in said at least one outer wall a recessed seat (14), said seat being open at least at one wall (21) of the foot (21) able to bear on the bearing surface (9) of the container, **in that** the second of said portions (12) of said outer wall (10) has its continuous segment, not interrupted by said recessed seat (14), extending to the lower edge

- of the foot,
and **in that** said bearing elements (16) have for each of said angular feet (7), a first part (19) able to serve as a support for at least one segment of the lower surface (12A), able to bear on the support surface (9) of said second non recessed portion (12) of the foot, and a second part (17) projecting relative to the first (19), having shape and dimensions that match those of said recessed seat (14), and able to achieve a male-female shape coupling with said recessed seat (14), thereby preventing substantial longitudinal or transverse displacements of the stacked container relative to the underlying container.
2. Container as claimed in claim 1 **characterised in that** the seat (14) is provided in an area of the foot that is distanced from the one branching off from the angles (8) of the base wall (1) of the container, in such a way that the angular area of the feet has a substantially continuous bearing surface (12A), without recessed parts.
 3. Container as claimed in claim 1 **characterised in that** the recessed seat (14) is provided in the low part of the foot, able to come in contact with the bearing surface (9) for the container, and it has a maximum height (h) equal to about 1/3 of the height (H) of the foot.
 4. Container as claimed in claim 1 **characterised in that** the recessed seat (14) is provided in the low part of the foot, able to come in contact with the bearing surface (9) for the container, and it has a maximum length (l) equal to about 1/2 of the height (L) of the foot.
 5. Container as claimed in claim 1 **characterised in that** the recessed seat (14) is provided in the low part of the foot, able to come in contact with the bearing surface (9) for the container, and it has a maximum depth (p) of between about 1/2 and 1/5 of the depth (P) of the foot.
 6. Container as claimed in claim 1 **characterised in that** the recessed seat (14) is delimited only by three walls (15 A, B, 18) and it is open also at the outer wall (10) and at a wall (22) oriented towards the interior of the base of the container.
 7. Container as claimed in claim 1 **characterised in that** the recessed seat (14) has a contour in the shape of a right angle trapezoid.
 8. Container as claimed in claim 1 **characterised in that** the bearing elements (16) are provided along the upper edge of the lateral walls (2, 3, 4, 5) of the container or along the peripheral edge of a lid of said container.
 9. Container as claimed in claim 1 **characterised in that** the recessed seat (14) has only two openings, one at the outer face (10) of the foot and one at the face (21) that bears on the bearing surface (9).
 10. Container as claimed in claim 1, **characterised in that**, in addition to having feet (7) provided in the angles of the base wall (1) also provides additional feet (7A, 7B) provided in central positions of the perimeter of said base wall or at its centre.
 11. Container as claimed in claim 10 **characterised in that** the additional feet (7A, 7B) have one of the two types of recessed seats: a recessed seat (14A) that extends over the entire length of the foot, a seat (14B) that extends only over a portion of this length.
 12. Container as claimed in claim 1 **characterised in that** the outer surface of the feet (7) lacking the recessed seat (14) has a plurality of vertical fins (27) for protecting the feet.
 13. Container as claimed in claim 1 **characterised in that** the recessed seat (14) is provided only on the face of the foot provided at the larger side of the container.
 14. Container as claimed in claim 1 **characterised in that** the recessed seat (14) is provided only on the face of the foot (7) that is substantially coplanar to the lateral wall (2, 4) with greater extension of the container.
 15. Container as claimed in claim 1 **characterised in that** it has a load volume of at least 500 litres and to be able to accommodate loads of at least 500 kg.

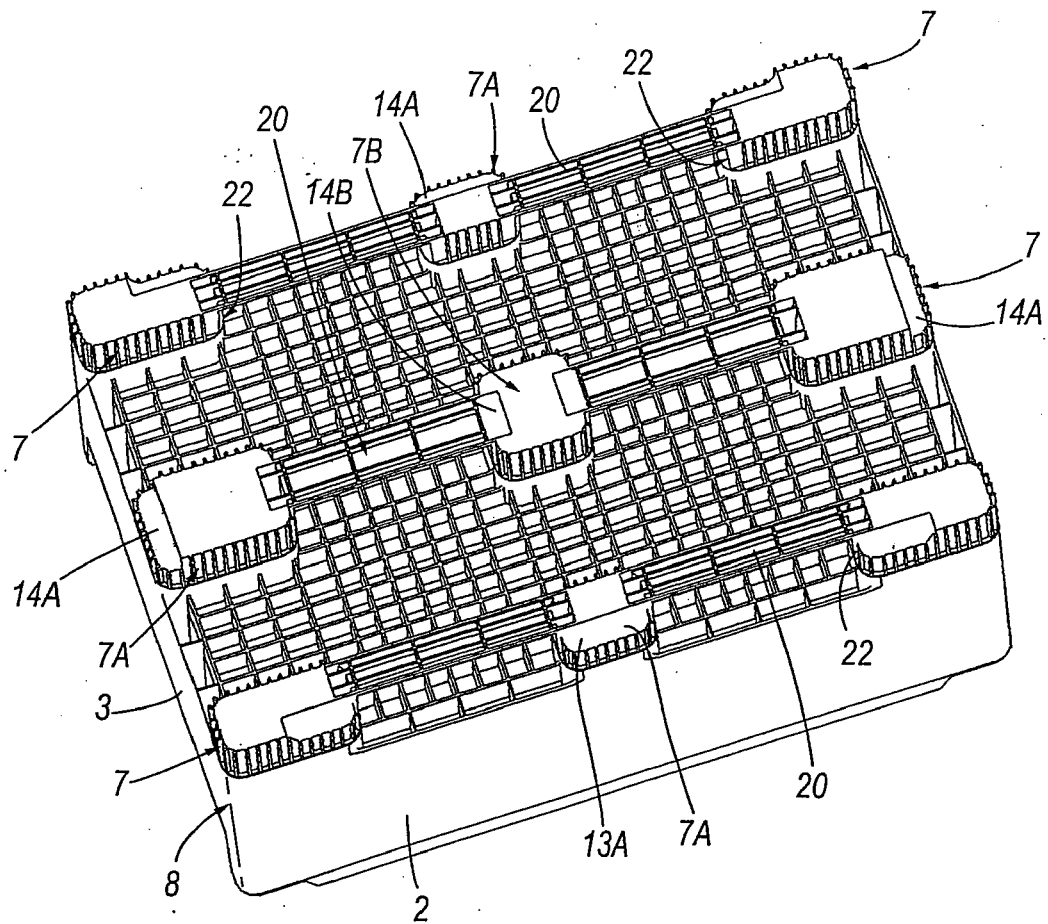


Fig. 1

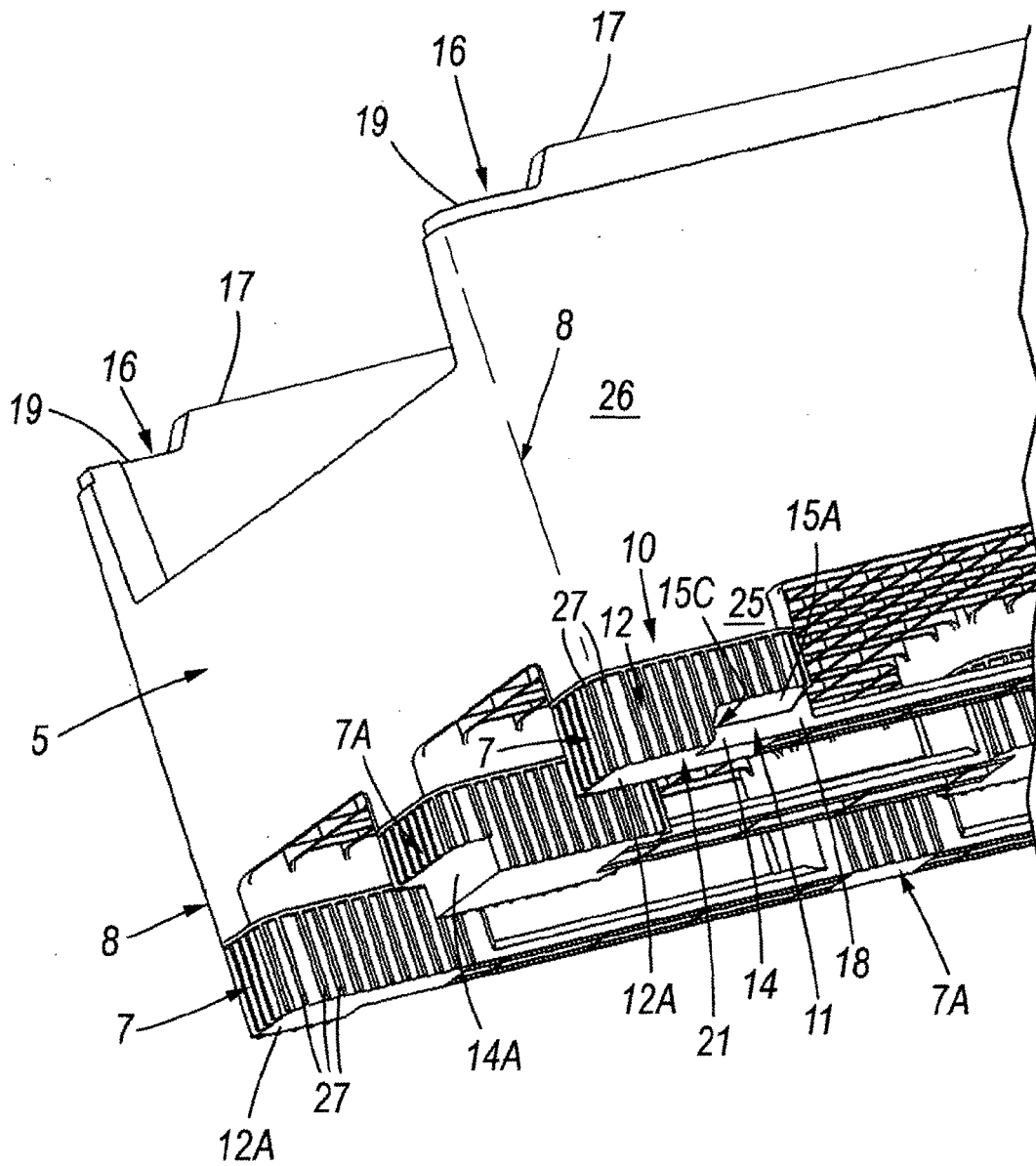


Fig. 2

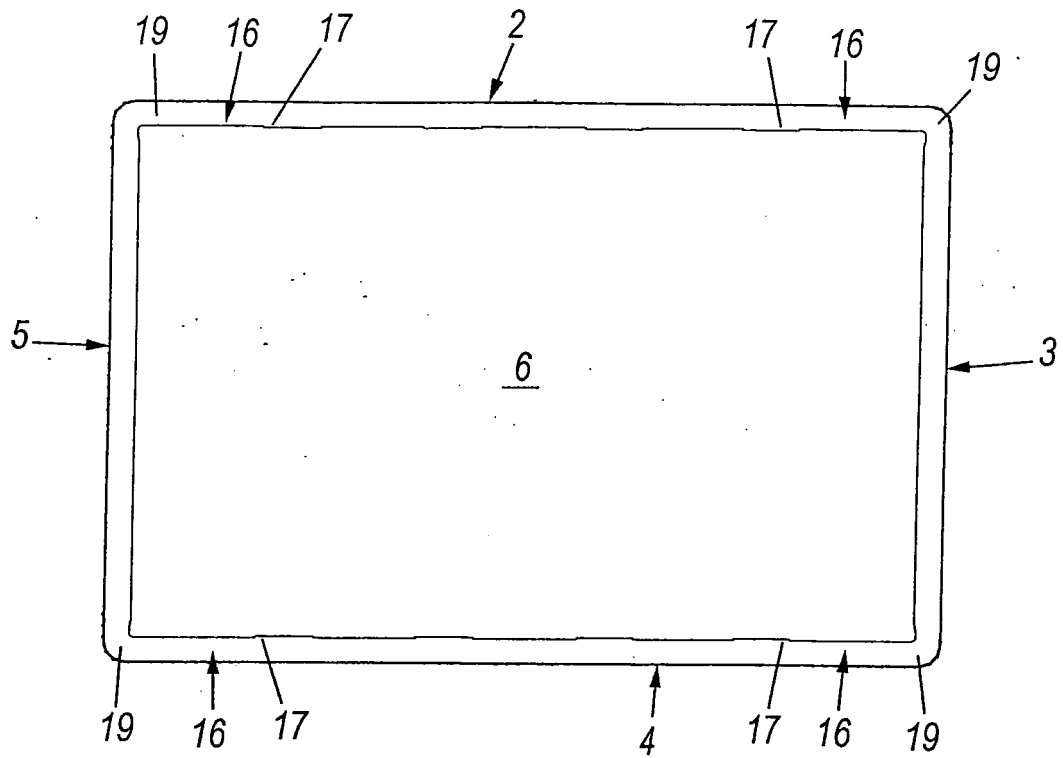


Fig. 3

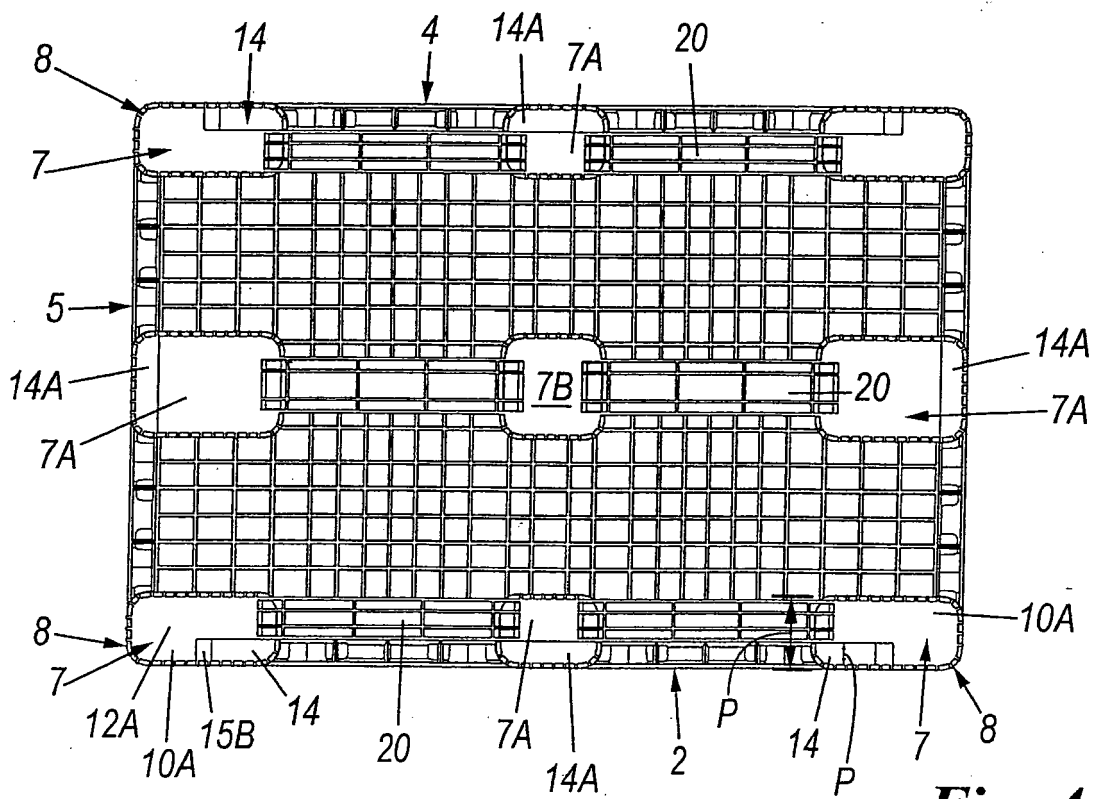


Fig. 4

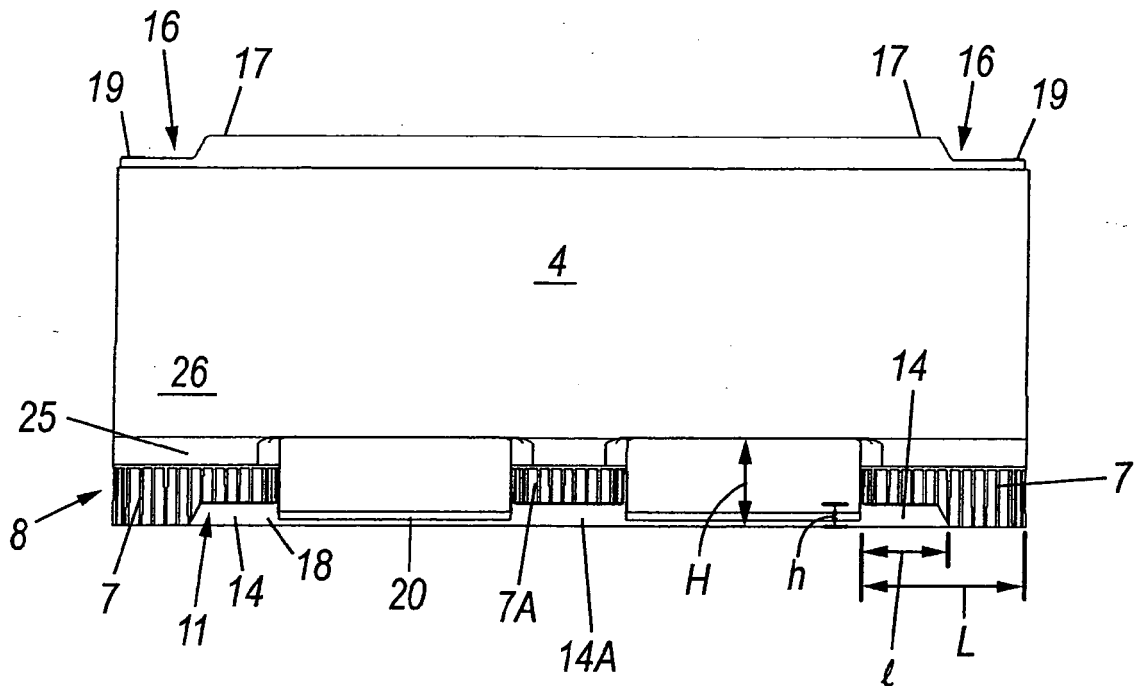


Fig. 5

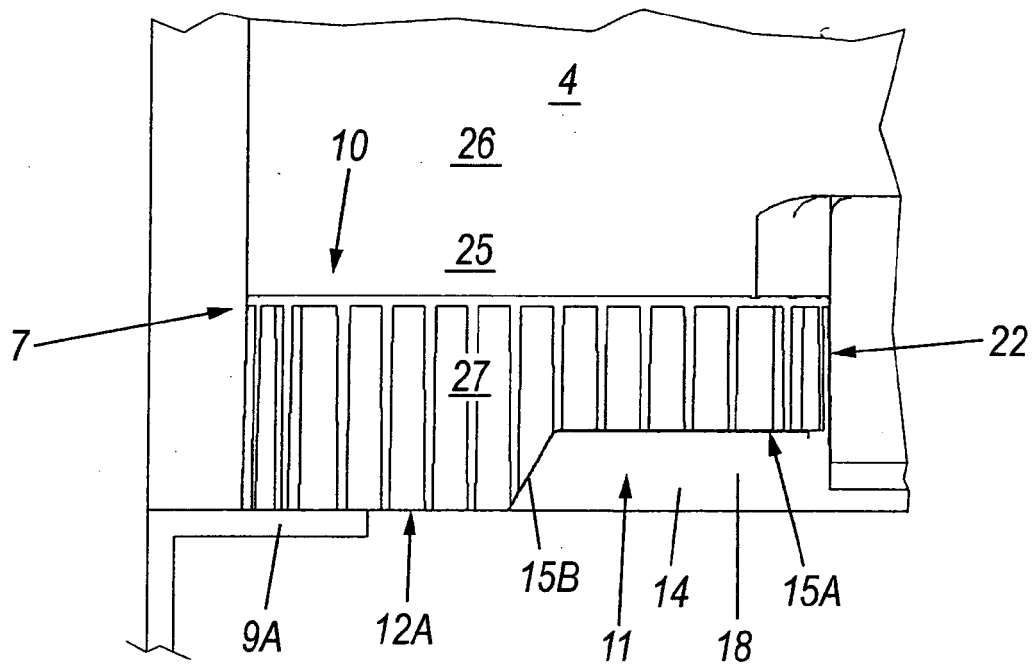


Fig. 6