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(54) **Pallet container**

(57) A container (1) for transporting and containing tanks and the like comprises a supporting pallet (2) and, fixed to this, a lateral containment cage (3) comprising a lower flange (11). Clamps (18) connected to the pallet (2) extend along the full length of its side and are engaged with the flange (11) of the cage (3) to secure the cage (3) firmly to the supporting pallet (2). The result is a container in which the supporting pallet and the lateral containment cage are firmly connected together as if they were a single item.

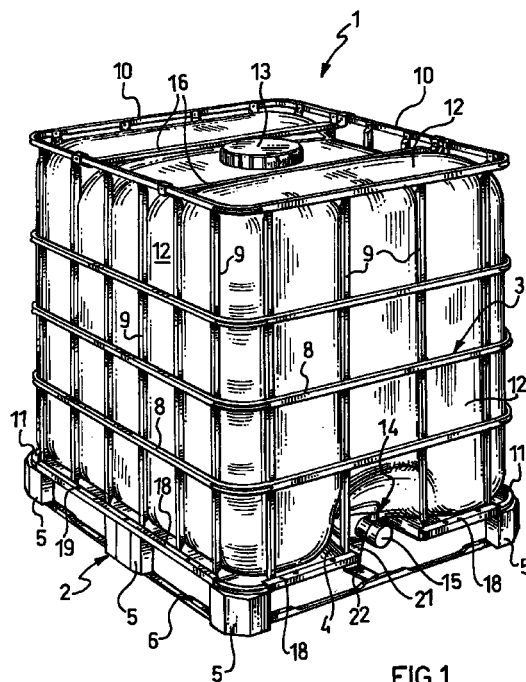


FIG.1

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Description

[0001] The present invention relates to a container for transporting and containing tanks and the like, of the type that comprises a pallet for supporting the container and a cage for the lateral containment of the tank fixed to the pallet.

[0002] As is known, containers of the type indicated are used to contain and protect the material supported by the bottom of the pallet. The pallet is designed to be easily lifted by the forks of a forklift truck, so that the container can be handled and transported easily by conventional lifting means.

[0003] In order to be able to transport liquids, a plastic tank is positioned inside the container. Because of the pressure exerted by the liquid on the side walls of the tank, the side walls of the latter deform and press against the inside of the containment cage which prevents the tank from collapsing.

[0004] There is a great need for a container in which the supporting pallet and the lateral containment cage are firmly connected together as if they were a single item. The reason for this is that, besides withstanding both the static loads of the weight of the contained product and the dynamic loads which occur during lifting and transportation, the abovementioned containers must also be capable of protecting the integrity of the tank should it be dropped or suffer an impact. Passing the drop test is in fact one of the essential requirements for obtaining approval of the container for transportation of goods or liquids classified as hazardous.

[0005] It would therefore be desirable to have a container in which the pallet and the containment cage are made in one piece. However, obvious technological problems and the manufacturing cost make this solution impracticable.

[0006] In the containers currently in use, the containment cage is connected to the underlying supporting pallet discontinuously, by means of through bolts at the supporting feet of the pallet.

[0007] It is obvious, however, that if the container is dropped or suffers a severe impact the difference in the deformation of the cage compared with that of the pallet, caused by the abovementioned discontinuity of connection, may break one or more connecting bolts and so detach the cage partly or completely from the supporting pallet. This will clearly be deleterious to the integrity of the tank.

[0008] The problem addressed by the present invention is how to devise a container of the type indicated that is capable of satisfying the abovementioned requirement, namely one in which the containment cage is fastened securely to the pallet to form a whole, and at the same time of overcoming the disadvantages cited with reference to the prior art.

[0009] This problem is solved with a container in accordance with Claim 1.

[0010] One advantage of the container according to

the invention is that the containment cage, being fastened securely to the pallet, deforms with the pallet and cooperates with the latter in absorbing the energy of an impact.

[0011] Further characteristics and advantages of the container according to the invention will become clear in the following description of a preferred example of an embodiment thereof. This is given by way of non-limiting indication with reference to the accompanying drawings, in which:

- Figure 1 shows a perspective view of a container according to the invention;
- Figure 2 shows a perspective view of the pallet of the container of Figure 1;
- Figure 3 shows a perspective view of the pallet of Figure 2 from a different viewpoint;
- Figure 4 shows a plan view of the pallet of Figure 2;
- Figure 5 shows a cross-section taken on V-V as marked in Figure 4;
- Figure 6 shows a cross-section of a detail of the container of Figure 1; and
- Figures 7 and 8 show two views of the detail shown in Figure 6 at two different moments of the assembly of the container 1.

[0012] Referring to the accompanying Figures, 1 is a general reference for a container according to the invention for containing and transporting a tank 12, which comprises a supporting pallet 2 to which is fixed a lateral containment cage 3.

[0013] The pallet 2 is a four-way pallet made of galvanised steel and comprises a roughly square platform 4 and, underneath it, a support structure 6.

[0014] The support structure 6 takes the form of a peripheral tube, preferably square-sectioned, which runs around the edges of the platform 4 to form a closed loop. The support structure 6 is preferably circumscribed within the perimeter of the platform 4.

[0015] The platform 4 and the support structure 6 are connected by a plurality of distance blocks, of which there are seven in this example, marked 5 in the Figures. The blocks 5 are positioned at each corner of the platform 4 and, except for the front side of the pallet are also positioned in the centre of the edge of the three remaining sides of the platform 4. As a consequence of this the pallet 2 is accessible to the forks of a forklift truck from all sides.

[0016] At each point where the forks of a forklift truck are inserted, the square-sectioned tube of the support structure 6 has preferably been suitably deformed to make it flat and permit easier insertion of the forks.

[0017] The blocks 5 have opposing flat end surfaces, one welded to the platform 4 and the other to the support structure 6.

[0018] With respect to the support structure 6, i.e. with respect to the peripheral square-sectioned tube, the blocks 5 protrude in the outward direction to define a

centring ledge 7 (Fig. 5) that will allow the container 1 to be stacked in a restrained manner with identical containers, as will be evident in the course of the description.

[0019] Opposite sides of the support structure 6 are connected by a stiffening cross member 22 which runs underneath the central area of the platform 4.

[0020] Advantageously, the stiffening cross member 22 includes a strut 23 that supports the platform 4 in the said central area, in order to prevent the platform 4 from deforming under the weight of the tank 12 and developing a concavity.

[0021] Preferably, the strut 23 is formed in one piece with the said stiffening cross member 22 and is produced by bending a central portion thereof.

[0022] In the example, the strut is shaped like an inverted V having an ascending arm and a descending arm joined by an apex in contact with the lower surface of the platform 4.

[0023] Advantageously, the stiffening cross member 22 extends in a transverse direction Y-Y to the front wall of the pallet 2 and along the centre line of the said wall. The stiffening cross member 22 is therefore in line with the discharge aperture and the valve means 14 of the tank 12.

[0024] The lateral containment cage 3 comprises a plurality of horizontal 8 and vertical 9 tubular metal components arranged at suitable distances from each other to form a grid. At each point of intersection between a horizontal tubular component 8 and a vertical tubular component 9, the tubular components are welded together.

[0025] The horizontal components 8 form closed loops along a perimeter roughly corresponding to that of the platform 4 of the pallet 2.

[0026] Among the horizontal tubular components 8 of the cage 3, one is a top tubular component 10 and one a base tubular component which forms a flange 11 running around the edges of the platform 4. The flange 11 rests on the platform 4 of the pallet 2.

[0027] The dimensions of the top tubular component 10 are such that two containers 1 can be stacked by inserting the support structure 6 of the upper container inside the top tubular component 10 of the lower container, until the centring ledge 7 of the upper container meets the top tubular component 10 of the lower container. Substantially, the container 1 is nestable with identical containers.

[0028] The tank 12 is made of plastic, is roughly cubical in form and is housed in the container 1 so as to be entirely contained inside it. The tank 12 rests on the platform 4 of the pallet 2, and is laterally contained by the grid structure of the cage 3.

[0029] At the top of the tank 12 is a filling aperture with a cap 13, while at the bottom a drain aperture is positioned in the middle of one of the side walls. Fitted to the drain aperture are valve means 14 for stopping the outflow, e.g. a valve or tap, in the continuation of which is

an outflow sleeve closed by a cap 15.

[0030] The tank 12 is inserted in the container 1 in such a way that its valve means 14 are towards the front wall of the pallet 2. The reason for this is that, precisely in order to prevent interference with the valve means 14, the platform 4 contains a notch 20 extending widthways over a defined central section M of the front wall of the pallet 2 and in depth over a defined section P extending from the edge of the platform 4 towards the central area of the platform 4. The notch 20 prevents interference between the platform 4 and the outflow valve means 14 of the tank 12.

[0031] In the same way the base flange 11 of the cage 3 is also interrupted at the abovementioned central section M of the front wall of the pallet 2 so as not to create interference with the valve means 14 of the tank 12.

[0032] The stiffening cross member 22 and the innermost portion 17 of the notch 20 lying above this member are joined by an inclined strap 21 which acts as a support. The strap 21 is preferably formed from a bent portion of the platform 4. During the operation of cutting the notch of the platform 4, this portion of the platform is expressly left so that it can then be bent to form the strap 21.

[0033] The platform 4 of the pallet 2 is shaped in such a way as to form a trough 24 extending in direction Y-Y away from the notch 20 and over the stiffening cross member 22. This trough is designed to receive a corresponding shaped portion of the bottom of the tank 12.

[0034] In order to secure the tank 12 inside the cage 3, the container 1 includes a plurality of upper cross members 16 extending between opposite sides of the top tubular component 10 to which they are fixed by bolt fixings.

[0035] When the tank 12 is filled with liquid the pressure exerted by the liquid deforms the side walls of the tank 12, which then press against the containment cage 3.

[0036] The cage 3 of the container 1 is advantageously fixed to the pallet 2 by means of clamps 18, of which there are five in the example, connected to the pallet 2 and able to grasp the flange 11 in order to fasten the cage 3 firmly to the pallet 2.

[0037] In the example shown in the figures, the abovementioned clamps 18 are L-shaped, are formed integrally with the platform 4 of the pallet 2 and are bent by deformation around the flange 11 of the cage 3.

[0038] In substance, the flange 11 of the cage 3 is gripped between the clamps 18 and the platform 4 of the pallet 2 as if between two jaws of a vice.

[0039] It is only necessary to point out that in order for it to be possible for the clamps 18 to be bent around the flange 11 without interfering with the vertical tubular components 9 of the cage 3, the vertical tubular components 9 are located on the inside of the closed loop formed by the base tubular component forming the flange 11, as clearly shown in Figure 7.

[0040] The clamps 18 advantageously extend all the

way along the sides of the pallet 2, except, obviously, for the abovementioned central section M of the front wall of the pallet, where the valve means 14 of the tank 12 are located.

[0041] The platform 4 of the pallet 2 is produced with the clamps 18 extended like wings along the sides of the platform 4 in an open position (Fig. 7), that is to say in a position in which they do not overlie the platform 4.

[0042] Once the lateral containment cage 3 is correctly positioned on the platform 4 of the pallet 2 (Fig. 8), the clamps 18 are deformed to bend them over the flange 11 of the cage 3 (Fig. 6), as indicated earlier.

[0043] Next, to ensure that the clamping force of the clamps 18 on the flange 11 does not weaken, fixing means 19, which in this example are screws, are fitted to connect the clamps 18, the flange 11 and, optionally, the platform 4 and the distance blocks 5.

[0044] It should be emphasised that, in contrast to the practice with containers of the prior art, in which the fixing of the lateral containment cage to the pallet is localised in a few points, the clamps 18 exert an efficient and continuous securing action extending around all sides of the flange 11.

[0045] Consequently, between the pallet 2 and the lateral containment cage 3 a strong structural connection is formed, so that the container 1 behaves, especially if bumped or dropped, as an integral whole. In particular, because the cage 3 is efficiently connected to the pallet 2, the structure of the cage 3 actively collaborates with the pallet 2 in absorbing the energy of an impact or fall of the container 1.

[0046] The stiffening cross member 22 increases the structural rigidity of the pallet 2 so as to make it less deformable even when bumped or dropped. This is particularly the case with the front wall of the pallet 2, in which the valve means 14 of the tank 12 are located.

[0047] Furthermore the strut 23 formed by the cross member 22 prevents the platform from deforming under the action of the load bearing down upon it, thus preventing it from deforming and developing a concavity.

[0048] It should also be emphasised that the inverted V configuration of the central section of the stiffening cross member 22 helps to increase the torsional rigidity of the latter.

[0049] As will be appreciated from the above account, the container according to the invention satisfies the abovementioned requirement.

[0050] The reason for this is that the clamps attached to the pallet provide an efficacious and continuous fastening action along all sides of the flange of the containment cage, so that the container behaves, particularly if bumped or dropped, as if it were a single item.

[0051] A further advantage of the container according to the invention is that it is structurally simple, meaning that its manufacture can easily be automated.

[0052] Clearly, a person skilled in the art will be able, in order to satisfy particular and specific requirements, to make numerous modifications and alterations to the

container according to the invention described above, all however coming within the scope of protection of the invention as defined in the following claims.

[0053] For example, as an alternative to the above account, the above container may be used to contain different types of goods. If necessary, the dimensions of the grid of the lateral containment cage may be modified, or the cage may be replaced with a lateral containment structure having continuous walls.

[0054] Besides screws, it is possible to use fixing means such as bolts, rivets and the like.

[0055] Moreover, the clamps do not need to be made in one piece with the pallet. For example it is conceivable to fix them to the platform by welding, bolt connections or functionally equivalent connections.

Claims

1. Container (1) for transporting and containing tanks and the like, comprising a supporting pallet (2) and a lateral containment cage (3) and means for fixing the cage (3) to the pallet (2), characterised in that the said cage (3) comprises a lower flange (11) and the said fixing means comprise clamps (18) that are connected to the pallet (2) and are engaged with the said flange (11) of the cage (3) to secure the cage (3) firmly to the supporting pallet (2).
2. Container (1) according to Claim 1, in which the said clamps (18) are formed in one piece with the pallet (2) and are bent by deformation around the said flange (11) of the cage (3).
3. Container (1) according to Claim 1 or 2, in which the said clamps (18) extend along the sides of the pallet (2).
4. Container (1) according to Claim 3, in which the said clamps (18) extend for a distance substantially equal to the length of the sides of the pallet (2).
5. Container (1) according to Claim 4, in which the said clamps (18) are L-shaped.
6. Container (1) according to Claim 1, in which the pallet (2) comprises a platform (4) and in which the said clamps (18) extend from the said platform (4) like flaps.
7. Container (1) according to Claim 1, in which the flange (11) of the said cage rests on the pallet (2).
8. Container (1) according to Claim 1, in which the clamps (18), the flange (11) and the pallet (2) are connected by fixing means (19).
9. Container (1) according to Claim 1, in which the said fixing means are screws (19), bolts or rivets.

10. Container (1) according to Claim 1, in which the pallet (2) and the cage (3) are of metallic material.
11. Container (1) according to Claim 1 or 7, in which the said flange extends along the sides of the pallet (2). 5

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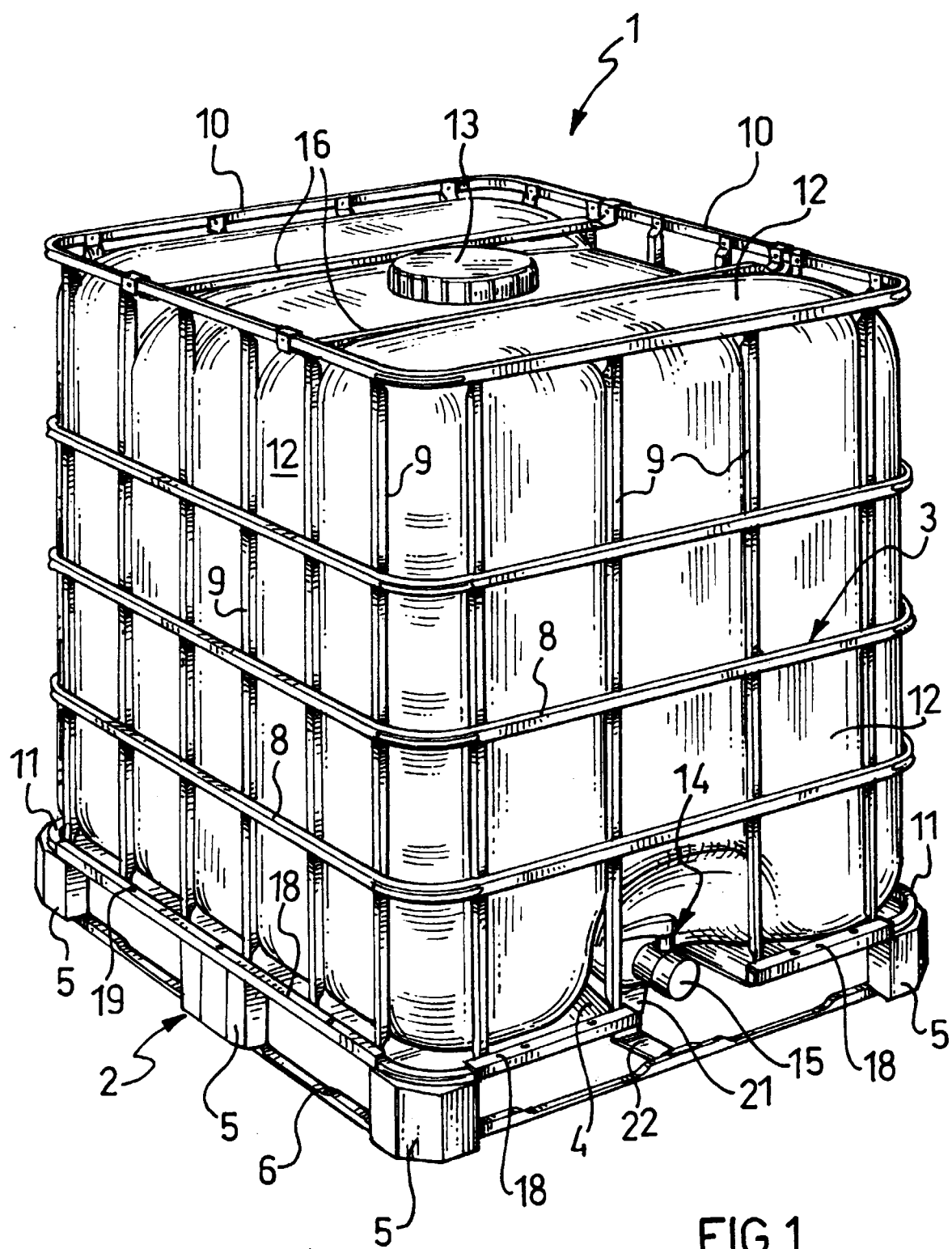
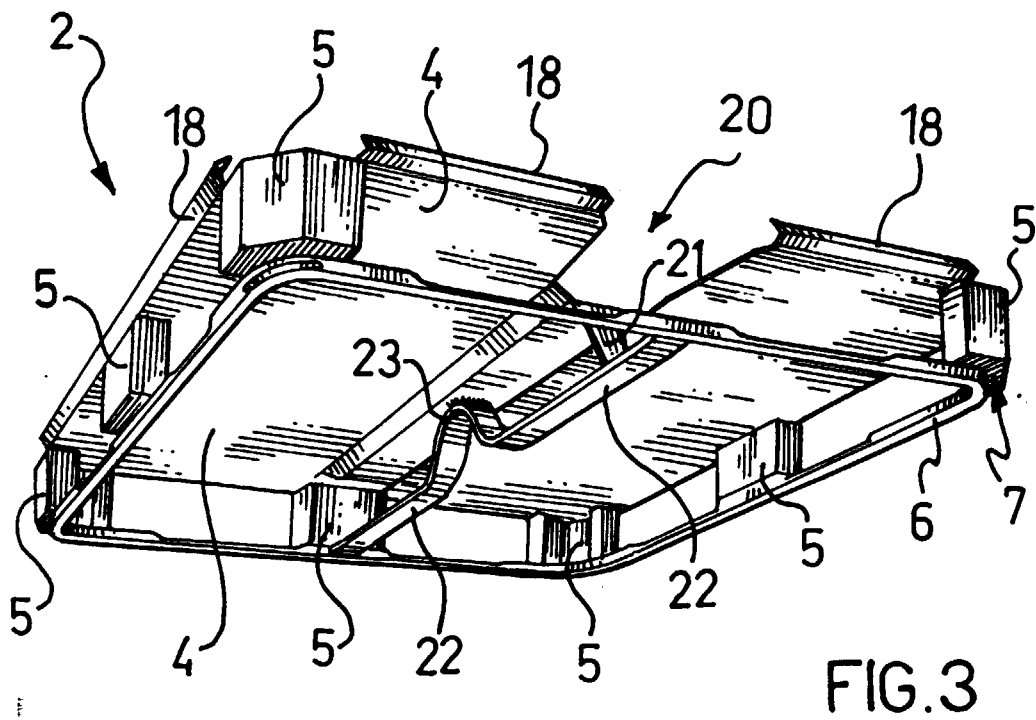
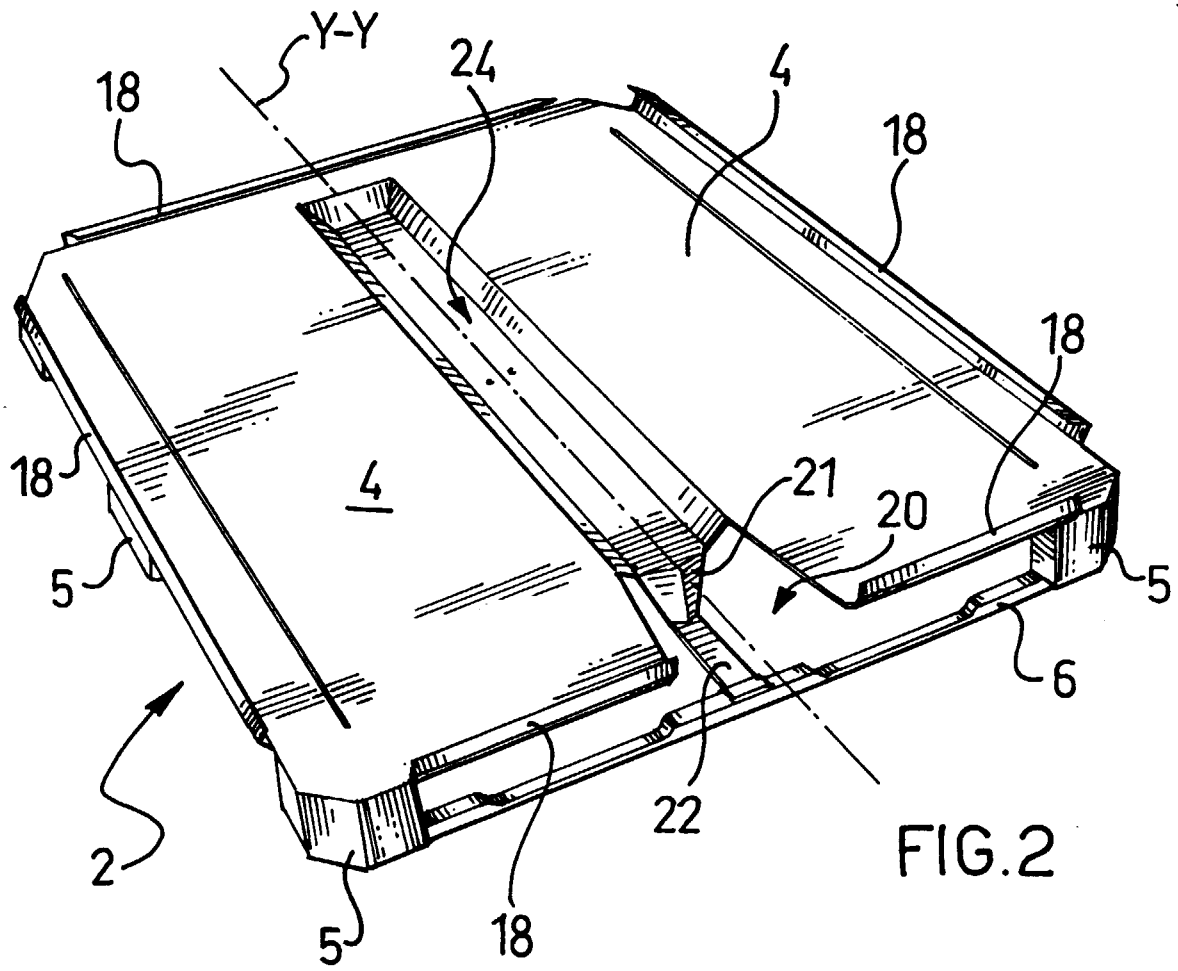
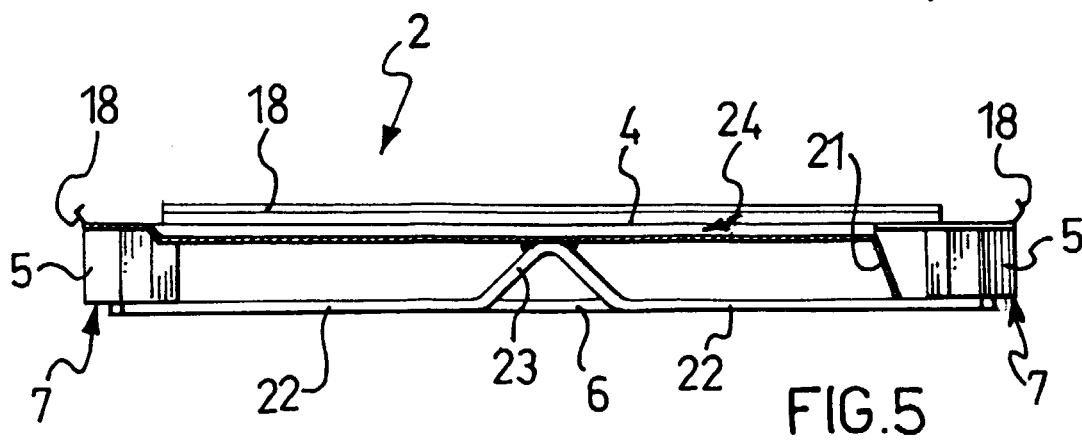
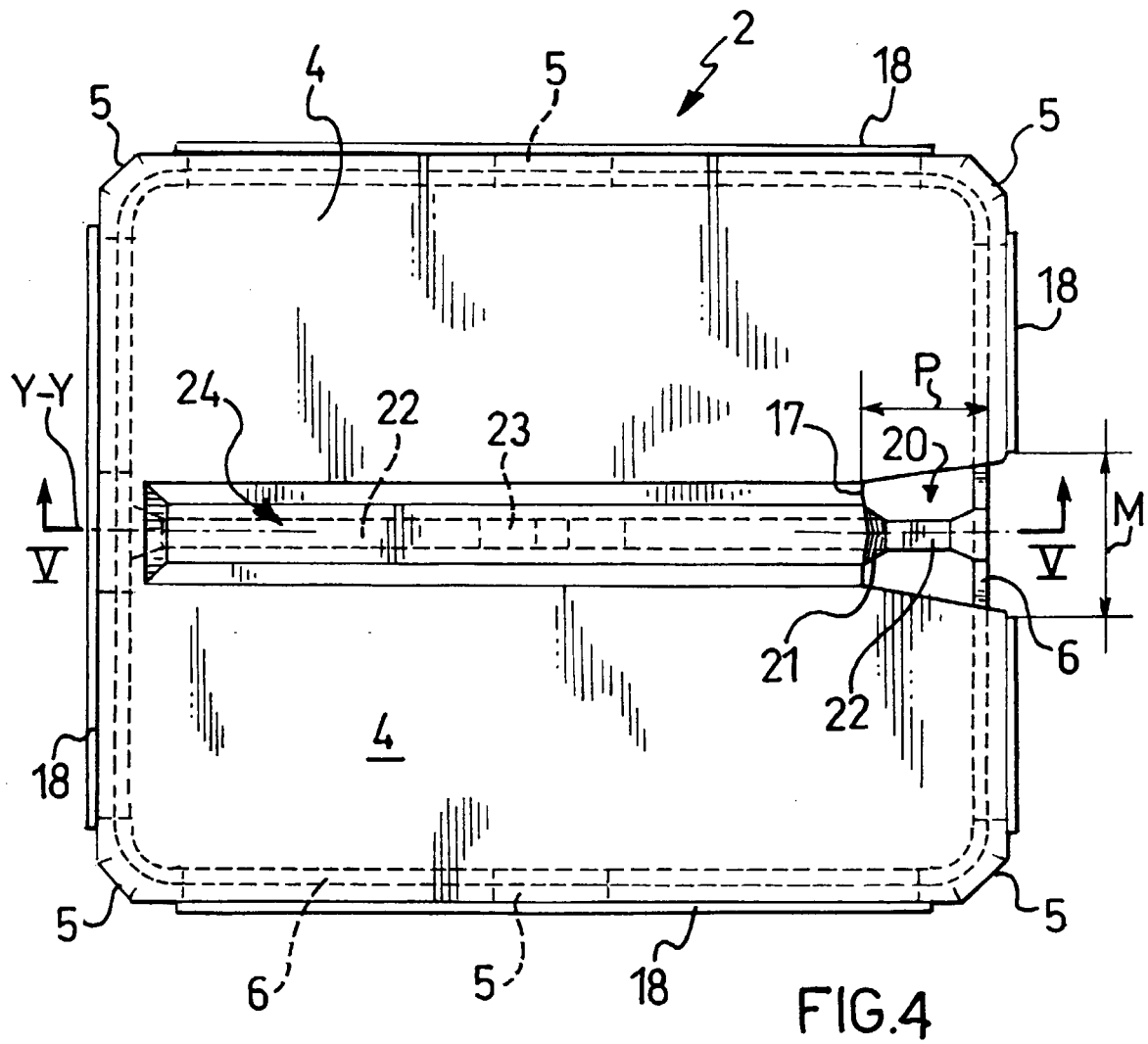


FIG.1





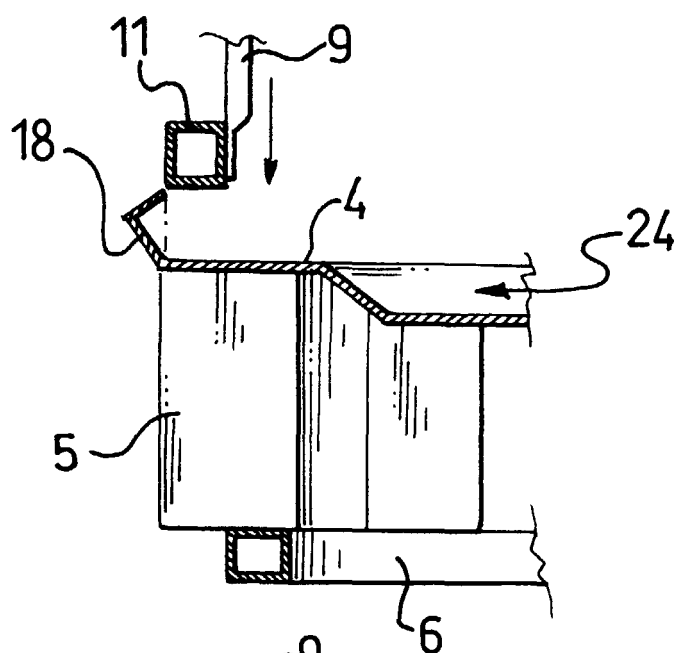


FIG. 7

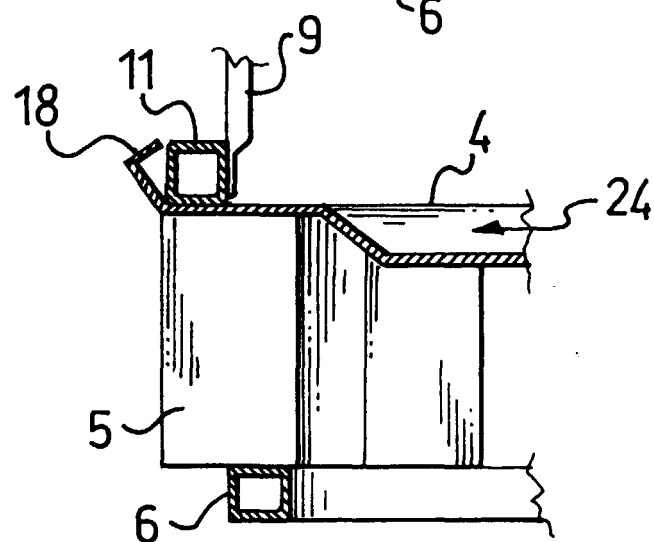


FIG. 8

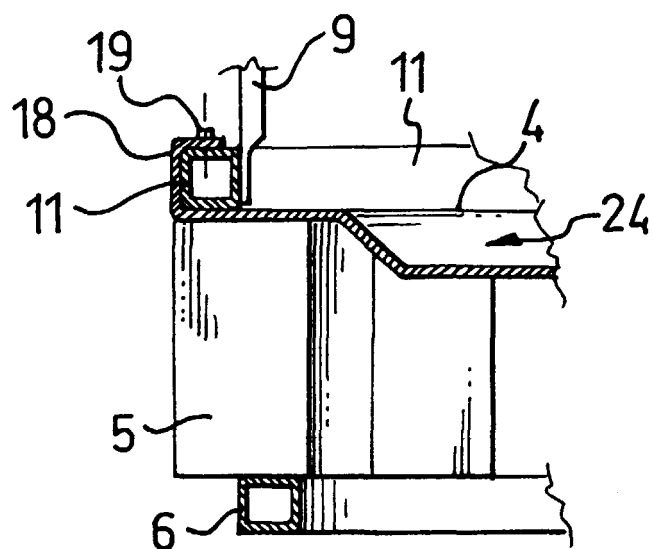


FIG. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0524

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 515 819 A (SOTRALENTZ) 2 December 1992	1-8,10,11	B65D77/06
Y	* column 4, line 43 - column 6, line 12; figures *	9	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65D
Place of search THE HAGUE		Date of completion of the search 4 March 1999	Examiner Newell, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT.
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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