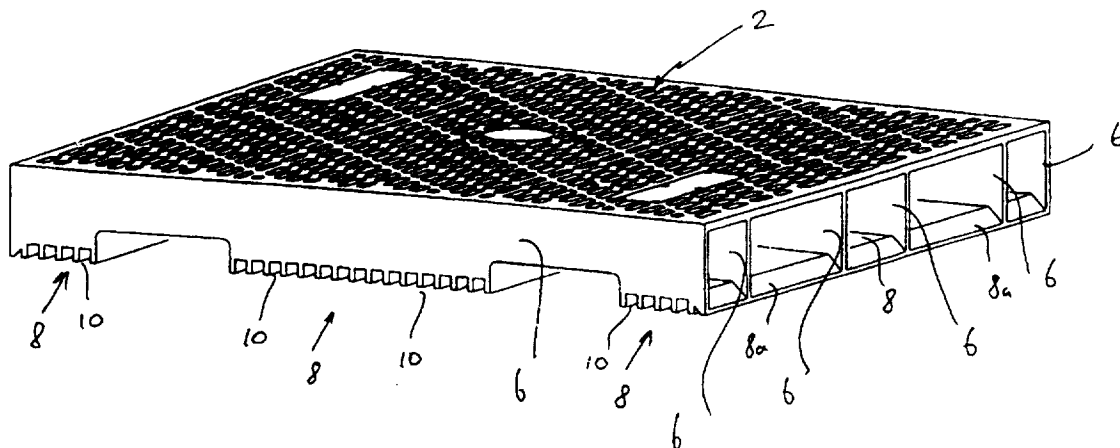




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(54) Title: PALLET WITH NON-SLIP LOAD-CARRYING AND GROUND-ENGAGING SURFACES

**(57) Abstract**

A pallet having a load-carrying surface (2) constructed of a substantially flat impervious material having a multiplicity of upstanding projections to prevent slippage on the surface while permitting cleaning of the surface. A ground-engaging part (8) of the pallet has at its underside an array of apertures so configured that when two like pallets are arranged in stacked configuration the projections on the load-carrying surface of a lower one of the pallets will engage within the apertures in the ground-engaging part of the upper of the two pallets to prevent slippage of the upper pallet relative to the lower pallet. Preferably, the ground-engaging part of the pallet includes an array of substantially parallel reinforcing ribs (10) and the apertures are defined between adjacent ribs.

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PALLET WITH NON-SLIP LOAD-CARRYING AND GROUND-ENGAGING SURFACES

The present invention relates to pallets and more particularly to pallets which can easily be cleaned.

5

Most pallets currently in use are constructed of wood, with the load-carrying platform of the pallet being defined by a series of spaced wooden planks. Conventional wooden pallets are liable to accumulate dirt and other contaminants during use which can become embedded into the surface structure of the wood with the result that it can be very difficult to properly
10 clean the pallet by a normal hosing or steam cleaning operation after use. This is unsatisfactory when the pallet is used to carry foodstuffs, pharmaceutical, or medical products or other products sensitive to contamination by dirt or bacteria.

In our International patent application No. PCT/AU95/00690 there is disclosed a pallet
15 of one-piece moulded plastics construction having a solid load-carrying platform with a plurality of upstanding projections. The projections are intended to grip onto the surface of for example a cardboard container or a shrink wrapped plastics container to prevent slippage on the platform. The projections are also so arranged on the platform as to permit thorough cleaning of the platform including the projections by hosing or steam cleaning. The underside
20 configuration of the pallet is also such as to permit ease of cleaning. Although this pallet operates effectively and is capable of being effectively cleaned, when several of the pallets are stacked one on top of another there is a risk of slippage of individual pallets of the stack when the stack is being moved, for example on the tines of a forklift truck.

25 According to the present invention, there is provided a pallet having a load-carrying surface which is constructed of a substantially flat impervious material having a multiplicity of upstanding projections to prevent slippage on the surface while permitting cleaning of the surface, and a ground-engaging part of the pallet has at its underside an array of apertures so configured that when two like pallets are arranged in stacked configuration the projections on
30 the platform of a lower one of the pallets will engage within the apertures in the ground-

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engaging surface of the upper of the two pallets whereby to prevent slippage of the other pallet relative to the lower pallet.

In the preferred embodiment of the invention the ground-engaging part of the pallet
5 is defined by two or more struts with ribs at their underside to provide reinforcement, the apertures being defined between adjacent ribs.

In the preferred embodiment the upstanding projections are defined by a series of raised lips which form a polygonal shape or a rounded shape or a mixture of rounded and
10 polygonal shapes.

In the preferred embodiment the projections are distributed uniformly throughout the load-carrying surface, and the apertures are distributed throughout the ground-engaging part.

15 An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view from one end of the pallet in accordance with a preferred embodiment of the invention;

Figure 2 is a plan view of the pallet; and

20 Figure 3 is an underneath view of the pallet.

As shown in the accompanying drawings a pallet in accordance with the preferred embodiment of the invention is constructed of plastics and has a continuous, substantially flat, load-carrying platform 2. The load-carrying platform 2 is provided with a multiplicity of
25 upstanding projections 4, uniformly distributed over its entire surface, the projections 4 being formed integrally with the platform 2. The projections 4 on the otherwise flat and smooth load-carrying platform 2 enable the projections to grip the surface of a container on the platform, for example a cardboard container or a shrink wrapped plastics container.

30 The load-carrying platform 2 is supported by an underlying support structure

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consisting of a series of parallel beams 6, the two outer beams 6 defining outside walls of the pallet. The lower edges of the beams 6 are interconnected by a series of transverse struts 8 which define the ground-engaging surface of the pallet. The beams 6 are spaced to define an access for the tines of the forklift truck from either of the two open ends of the pallet. The
5 beams 6 defining the opposed outer side walls of the pallet may be apertured to permit entry of the forklift tines from either of the two opposed sides thereby providing four-way entry for the tines. The outer edges 8a of the outermost struts 8 are inclined to define ramps to facilitate movement onto the upper surface of the struts of wheels at the underside of the tines of a hand operated forklift trolley.

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Preferably, the overall pallet consisting of the load-carrying platform 2 and the supporting structure defined by the beams 6 and transverse struts 8 is moulded in one piece in a suitable plastics, for example post-consumer recycled plastics, although other plastics may also be used.

15

The underside of each of the struts 8 is formed with a series of longitudinally-extending parallel ribs 10 to provide increased rigidity against bowing of the struts and hence bowing of the pallet in a direction transversely to the beams 6. It will be noted from Figure 3 that the adjacent ribs 10 at the underside of each strut 8 are interconnected by a series of
20 transverse webs to provide a pattern of apertures 12. It will also be noted from Figures 1 and 2 that the upstanding projections 4 on the load-carrying platform 2 define a continuous upstanding lip in the form of a four sided figure which as shown is either a parallelogram or a trapezium, the continuous lip bounding flat internal area 4a of the platform. The apertures 12 defined within the ribs 10 of the underside of the struts 8 are so configured that when two
25 like pallets are stacked one on another the upstanding lips of the projections 4 on the platform 2 of the lower pallet will engage within the recesses 12 at the underside of the struts 8 of the upper pallet, with the ribs 10 and interconnecting webs of the struts 8 lying in contact with the flat surface areas of the platform surrounding the projections 4. As a result, the two pallets are interlocked sufficiently to prevent slippage.

30

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Although as shown the upstanding lips on the platform are in the form of four sided figures of parallelogram or trapezium shape, they may be of other shape for example other polygonal shape or a rounded shape such as a circular, elliptical, or oval shape. Although as shown each of the upstanding lips is continuous it may alternatively be interrupted.

5

As will be apparent, when other shapes of lips are used on the upper surface of the platform 2, the apertures 12 defined between the ribs 10 at the underside of the struts 8 are appropriately configured to receive the differently shaped lips. It will be apparent in this regard that the apertures 12 within the ribs 10 do not have to be of the same shape as the upstanding lips but merely have to be such as to receive those lips and co-operate with them to prevent slippage. For example in the case of lips which are of circular shape, apertures within the ribs of an appropriately sized square shape can receive the circular lips of an underlying pallet and engage them at four diametrically-opposed points in order to prevent slippage.

15

In the pallet of the invention the upstanding lips on the load-carrying surface of the platform provide gripping characteristics for the surface without impeding the ability to effectively clean the surface due to the substantial flat areas of the platform which surround and lie within the individual lips. However these lips also enable a substantial non-slip stacking characteristic by co-operation with the formation of apertures incorporated within the array of reinforcing ribs at the underside of the pallet.

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The embodiment has been described by way of example only and modifications are possible within the scope of the invention.

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- 5 -

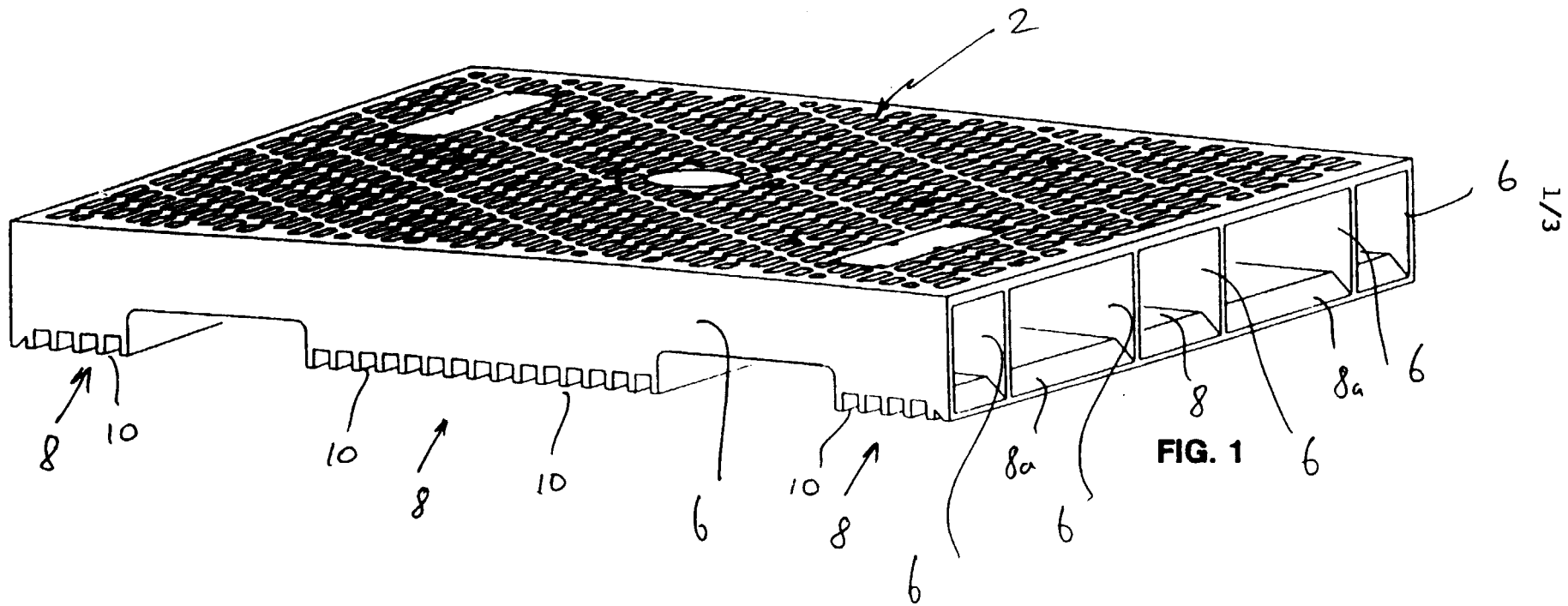
CLAIMS:

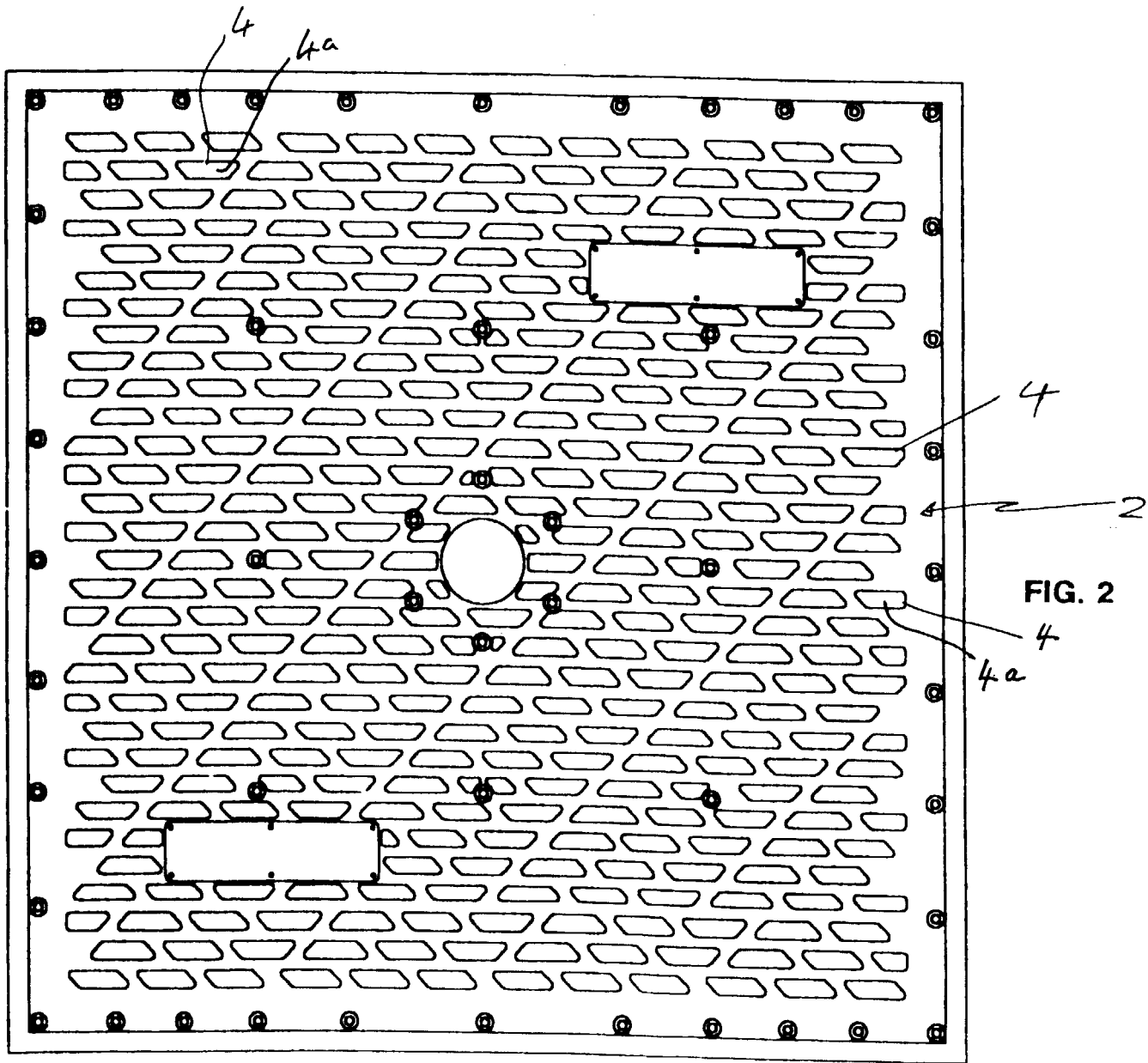
1. A pallet having a load-carrying surface which is constructed of a substantially flat impervious material having a multiplicity of upstanding projections to prevent slippage on the surface while permitting cleaning of the surface, and a ground-engaging part of the pallet has at its underside an array of apertures so configured that when two like pallets are arranged in stacked configuration the projections on the platform of a lower one of the pallets will engage within the apertures in the ground-engaging surface of the upper of the two pallets whereby to prevent slippage of the other pallet relative to the lower pallet.
2. A pallet according to claim 1, wherein the underside of the ground-engaging part of the pallet includes an array of substantially parallel ribs and the apertures are defined between adjacent ribs.
3. A pallet according to claim 2, wherein each said aperture is defined by the opposed surfaces of two adjacent ribs and by the opposed surfaces of opposed webs extending transversely between the two ribs.
4. A pallet according to claim 3, wherein the ground-engaging part of the pallet is defined by a plurality of struts reinforced by the ribs.
5. A pallet according to any one of claims 1 to 4, wherein the lips each define a substantially closed figure.
6. A pallet according to claim 5, wherein the raised lips each define a substantially closed figure of a polygonal shape or a rounded shape.
7. A pallet according to claim 5 or claim 6, wherein the area bounded within each of the raised lips is substantially flat.

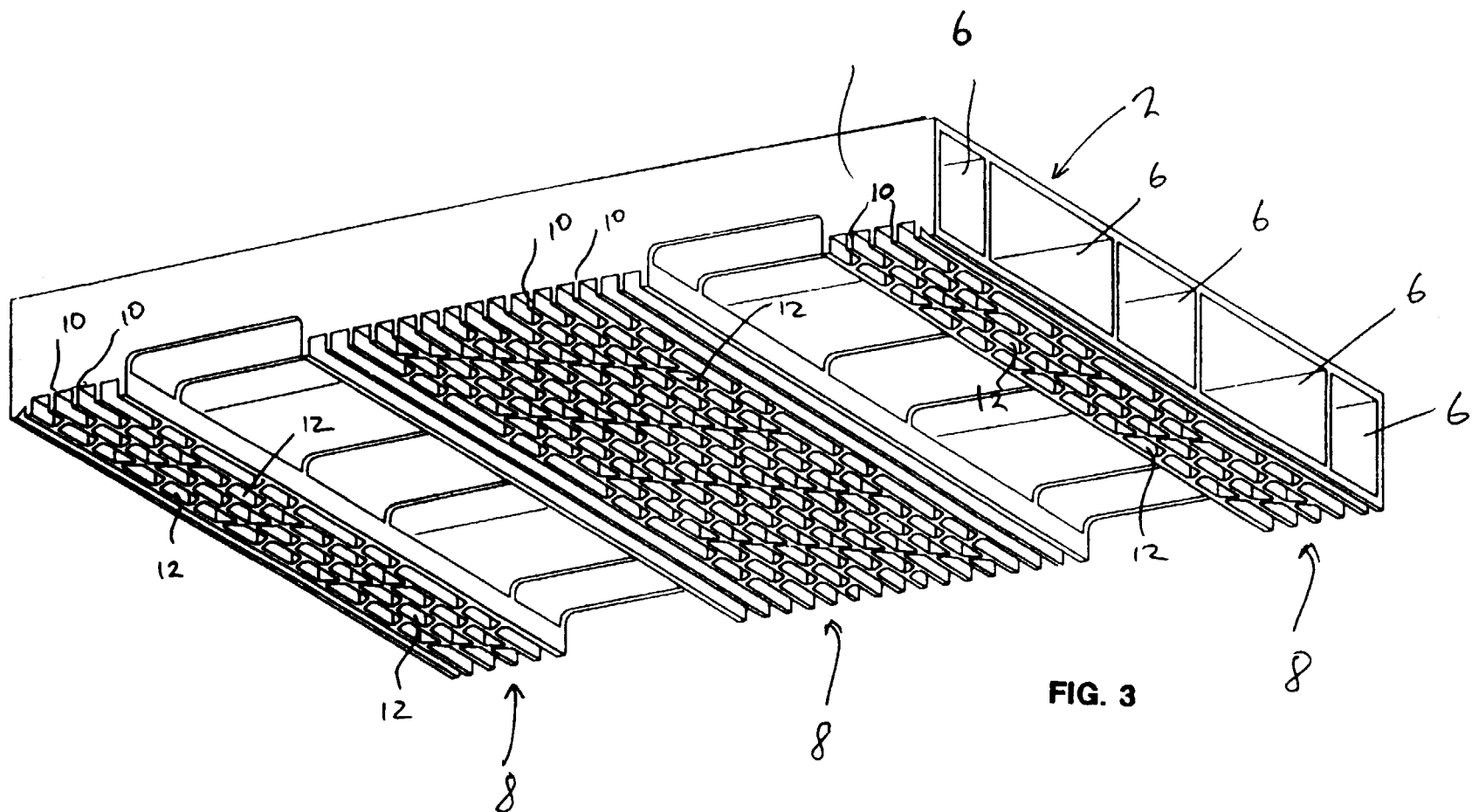
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8. A pallet according to any one of claims 1 to 7, wherein the projections are distributed throughout the load-carrying surface and the apertures are distributed throughout the ground-engaging part.

5 9. A pallet according to any one of the preceding claims, wherein the pallet is of one-piece moulded plastics construction.







A. CLASSIFICATION OF SUBJECT MATTERInt Cl⁶: B65D 19/24, 19/32, 19/38

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)

IPC: B65D 19/24, 19/32, 19/38

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT: B65D-019/IC and (non-slip: or slip: or friction:)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 2525868 A1 (S.O.L.E SpA) 23 September 1976 pages 4-7	1-9
X	Derwent Abstract Accession No. 89-198374/27, Class Q32, NL, A, 8800486 (LIET) 16 June 1989 abstract	1-9
X	DE 2733456 A1 (BRUNS) 08 February 1979 whole document	1, 2, 8, 9



Further documents are listed in the continuation of Box C



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C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 1781334 A1 (GUBELA) 03 December 1970 whole document	1, 2, 8, 9
A	WO 94/20377A1 (SALFLEX POLYMERS LTD) 15 September 1995 page 9, lines 4-33	1-9
A	DE 3806069 A1 (ALEXANDER SCHOELLER & CO AG) 15 September 1988 whole document	1-9
A	GB 1414683 A (KURODA) 19 November 1975 whole document	1-9

INTERNATIONAL SEARCH REPORT

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Information on patent family members

PCT/AU 97/00382

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
DE	2525868				
NL	8800486	NL	8702841		
DE	2733456				
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WO	9420377	CA	2157485	EP	686121
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