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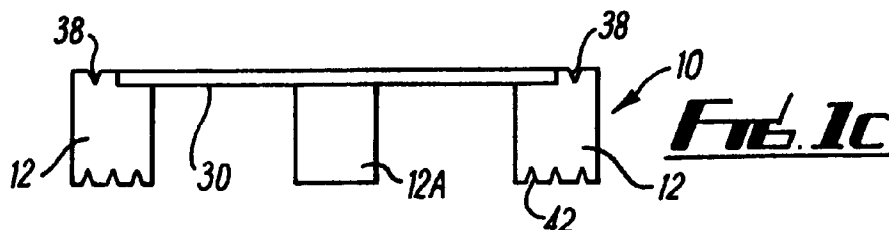
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(54) **Pallets**

(57) A pallet (10) has three hollow, closed elongate main blocks (12,12A) in a spaced parallel relation, each having transverse through openings (14,15). Planks (30,31) extend laterally across the aligned blocks (12,12A) and locate in aligned ones of recesses on upper faces thereof. Each of the planks (30,31) is con-

nected to the respective block (12,12A) by a plurality of plastics plugs. Strengthening grooves (38-40,42) are formed in the blocks (12) to enhance the ability of the plastics pallet to resist bending under applied loads.



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Description

This invention is concerned with improvements in or relating to pallets, and is particularly but not exclusively concerned with pallets made of materials such as plastics, carbon, glass fibre or polycarbonate. Reference hereinafter to "plastics" is intended to embrace such materials. The invention is also particularly but not exclusively concerned with pallets which are designed to be handled by forklift trucks and have a product support surface and a ground engagable surface between which are defined spaces within which the forks of a forklift truck can be inserted for lifting of the pallets, with or without products supported thereon, for movement of the pallets or the products as desired.

Previously proposed designs of plastics pallets have had the disadvantage of being subject to bending under applied loads.

According to the present invention there is provided a pallet comprising a plurality of first elongate components arranged in a spaced parallel relation, each first component having a plurality of recesses in at least one longitudinal outer face, a plurality of second elongate components, each being provided to extend laterally across the first components and locate in aligned ones of the respective recesses therein, and means for connecting the second components to the first components, whereby to provide the structure with a load support surface, and strengthening means provided on at least one of the first components.

Preferably each of the first components is provided with a plurality of through transverse openings.

Preferably also the strengthening means comprises at least one strengthening formation. The strengthening means may comprise a plurality of the strengthening formations, and the or each strengthening formation may extend substantially over the length of the respective first component. The or each strengthening formation may have the form of a groove, and the groove may have a V-shaped cross-section. Alternatively, the or each strengthening formation may have the form of a raised rib.

In one embodiment, three of said first elongate components may be arranged in a spaced parallel relation with respective outermost first components defining the ends of the pallet, the plurality of recesses in each of the outermost first components opening inwardly of the pallet but terminating short of an outer edge thereof. The strengthening formation, or one of the strengthening formations, may be formed along an upper edge of each of the outermost first components between the recesses therein and the outer edge thereof. Further ones of the strengthening formations may be formed in the upper edge of each of the outermost first components to extend between the recesses therein. Additional ones of the strengthening formations may be formed on lower edges of the outermost first components. Further additional ones of the strengthening formations may be formed on internal faces of one or each

of the plurality of through transverse openings in said one first component.

In a further embodiment, two of said first elongate components may be arranged in a spaced parallel relation with one thereof defining an end of the pallet, the plurality of recesses in said one first component opening inwardly of the pallet but terminating short of an outer edge thereof.

Preferably, in a further embodiment, a further first elongate component may be added to the pallet of the second embodiment, the further component being arranged in a spaced parallel relation with said two first elongate components and being an outermost component defining the other end of the pallet, the plurality of recesses in the other outermost component opening inwardly of the pallet but terminating short of an outer edge thereof.

Embodiments of the present invention will now be described by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1A is a top plan view of a first embodiment of a pallet according to the invention;
 Fig. 1B is a view on B-B of Fig. 1A;
 Fig. 1C is a view on B-B of Fig. 1A;
 Fig. 1D is a cross-section on D-D of Fig. 1B;
 Fig. 2A is a top plan view of a second embodiment of a pallet according to the invention;
 Fig. 2B is a view on B-B of Fig. 2A;
 Fig. 2C is a view on C-C of Fig. 2A;
 Fig. 3A is a top plan view of a third embodiment of a pallet according to the invention;
 Fig. 3B is a view on B-B of Fig. 3A; and
 Fig. 3C is a view on C-C of Fig. 3A.

Referring to Figs. 1A to 1D of the drawings, a pallet 10 is formed from a plurality of interconnected components, each preferably formed from a plastics material.

These components include two hollow, elongate main blocks 12, arranged in a spaced parallel relation to define opposite ends of the pallet. Each of the blocks 12 is formed with a through opening 14 extending transversely thereof, and effectively providing a first or end section 16 connected to a second section 18 by upper and lower webs 20, 22 respectively. The latter extend beyond the section 18 to effectively define an open sided opening 15 extending transversely of the block 12. When the blocks 12 are aligned, the openings 14, 15 are also respectively aligned to receive the forks of a fork lift truck (not shown).

An intermediate block 12A is provided centrally of and parallel with, the blocks 12. The intermediate block 12A has openings corresponding to the openings 14, 15 of the blocks 12A, to be in alignment therewith.

Each of the main blocks 12 is formed with four recesses 26 in the upper edge thereof, the recesses 26 (Fig. 1D) opening onto the inwardly facing sides of the blocks 12 whereby to define seats 27 and upstanding base walls 29, for a purpose hereinafter described.

Respective ones of the recesses 26 also open onto respective ends of the blocks 12 and the recesses are equispaced along the blocks 12, the length of the end opening recesses being less than the length of the intermediate recesses. The block 12A is formed with corresponding recesses in its upper edge, such recesses extending across the width of the block 12A. When the blocks 12, 12A are aligned, respective recesses 26 are aligned with each other and with the corresponding recesses in the block 12A.

The components further include a plurality of planks interconnecting the aligned blocks 12, 12A. Planks 30 locate respectively in the aligned end recesses 26 in the blocks 12 and the corresponding recesses in the block 12A, while planks 31 locate respectively in the aligned intermediate recesses 26 of the blocks 12 and the corresponding recesses of the blocks 12A. Each of the planks 30, 31 is dimensioned to locate on the seats 27 of the recesses 26 with end edges in abutment with the base walls 29 of the recesses 26, and the planks 30, 31 present an upper planar surface 32 flush with the upper edges of the blocks 12, 12A. The co-planar upper edges form a load support surface of the pallet 10.

To connect each of the planks 30, 31 to the respective blocks 12, 12A, there are provided a plurality of plugs (not shown), each preferably formed of a plastics material. Each plug has a main body and a flange at one end thereof, a pair of resiliently deformable spaced apart jaws extending from the other end of the main body and being formed with respective lugs on their outwardly facing surfaces. The main body has an axial through bore in which a pin is movably located.

In use, the plug is located through a stepped bore (not shown) in the respective plank, the bore having a first diameter part to enable the main body to locate therethrough, and a second smaller diameter part of the same diameter as a corresponding hole (not shown) in the respective block 12, 12A, whereby when the jaws enter the smaller diameter parts they are deformed inwardly to enable the lugs to pass therethrough. Thereafter the jaws regain their original form and the lugs prevent the jaws from being withdrawn. The flange engages in a rebate (not shown) in the outer surface of the plank 30, 31 whereby to lie flush therewith. When located in position, the pin, which until then projects outwardly from the flange, can be manually forced through the bore between the jaws to thereby deflect the latter apart and further enhance the locking of the plug in position. A secure connection is thereby provided between the respective plank 30, 31 and the respective block 12, 12A.

The upper edge of each of the blocks 12, outwardly of the recesses 26, has strengthening means in the form of a groove 38 of V-shaped cross-section, extending the length thereof. A further pair of strengthening grooves 39 of V-shape cross-section are formed in the upper edge of each block 12 to extend between the recesses 26. A pair of similar strengthening grooves 40

are formed on the upper surface of each of the openings 14, 15 in the blocks 12 and the corresponding openings of the block 12A, while three similar strengthening grooves 42 are formed on the lower edge of each of the blocks 12.

Referring to Figs. 2A to 2C, a further embodiment provides a pallet 110 again formed from a plurality of interconnected components, each preferably formed from a plastics material.

In this embodiment, a hollow, elongate first block 112 is arranged in a spaced parallel relation with a second hollow elongate block 114. Each of the blocks 112, 114 is formed with a pair of transverse through openings 116 which open onto the lower edge of the respective block and which are spaced apart, whereby to effectively define a pair of end sections 118 connected with a central section 120 by means of webs 122. When the blocks 112, 114 are aligned, the openings 116 are also aligned to receive the forks of a forklift truck (not shown).

The block 112 is formed with five recesses 126 in the upper edge thereof, the recesses 126 opening onto the inwardly facing side of the block 112 whereby to define seats 127 and upstanding base walls 129. Respective ones of the recesses 126 also open onto respective ends of the block 112, the length of the end opening recesses and of the central one of the recesses being greater than the length of the intermediate recesses. The block 114 is formed with corresponding recesses in its upper edge, such recesses extending across the width of the block 114. When the blocks 112, 114 are aligned, the recesses 126 are aligned with the corresponding recesses in the block 114.

The components further include a plurality of planks interconnecting the aligned blocks 112, 114. Planks 130 locate respectively in the aligned end recesses and the central recess in the block 112 and the corresponding recesses in the block 114, while planks 131 locate respectively in the intermediate recesses of the block 112 and the corresponding recesses of the block 114. The planks 130, 131 each extend beyond the block 114 to present an overhang. Each of the planks 130, 131 is dimensioned to locate on the seats 127 of the recesses 126 with end edges in abutment with the base walls 129 of the recesses 126, and the planks 130, 131 present an upper planar surface flush with the upper edges of the blocks 112, 114. The co-planar upper edges form a load support surface of the pallet 110.

The block 112 is also formed with three recesses 134 in the lower edge thereof, similar to the recesses 126, respective ones of the recesses 134 opening onto respective ends of the block 112. The block 114 is also formed with three corresponding recesses in its lower edge, extending across the width of the block.

Further ones of the planks 130 locate respectively in the aligned lower edge recesses 134 in the block 112 and the corresponding lower edge recesses in the block 114, in a similar way to the other planks 130 as described above, and also extend beyond the block 114

to the same extent as the upper ones of the planks 130.

Strengthening means in the form of strengthening grooves 138, 139 and 142 are formed in the upper and lower edges of the block 112, such grooves being of similar form to the corresponding grooves described in relation to the first embodiment. Similar strengthening grooves are formed on the upper surface of each of the openings 116 in the block 112 and in the block 114.

In the embodiment of Figs. 3A to 3C, a pallet 210 has substantially the same configuration as that of the embodiment of Figs. 2A to 2C, and similar reference numerals are used to denote similar components. Upper and lower planks 130 extend beyond the block 114 to seat in recesses formed in a further hollow, elongate block 212 which has the same form as the block 112. The block 114 is located substantially centrally between the blocks 112, 212.

In each of the embodiments of Figs. 2A to 2C and Figs. 3A to 3C, the planks are connected to the respective blocks by plugs similar to those described in relation to the first embodiment.

Various modifications may be made without departure from the invention. For example, it will be appreciated that the dimensions of the various components of each embodiment can be whatever is suitable, with the relative dimensions possibly being different from those described and shown. Also it should be appreciated that the strengthening means may be other than strengthening grooves. For example, the strengthening means may be in the form of raised ribs on the surfaces of the respective blocks.

Claims

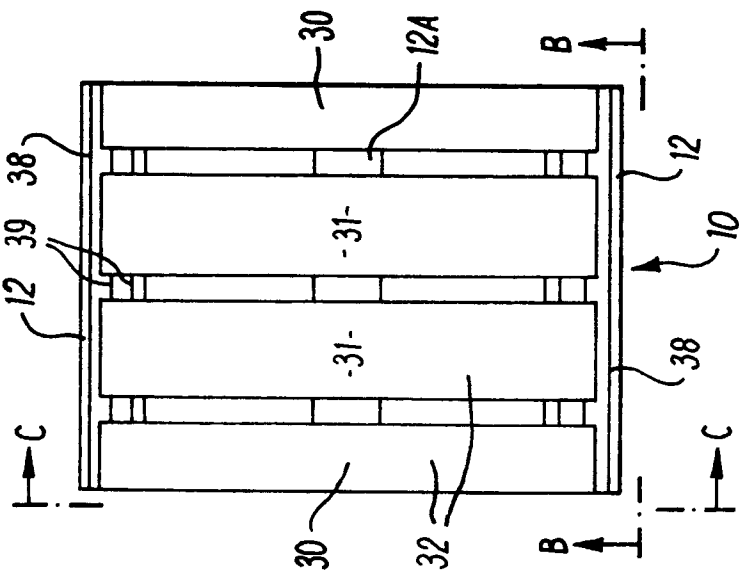
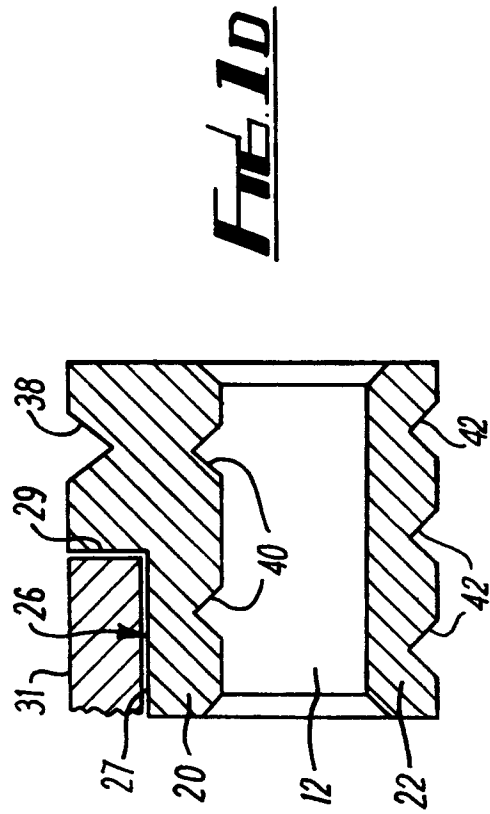
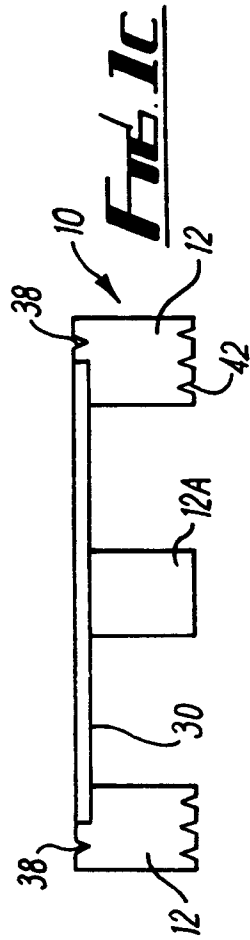
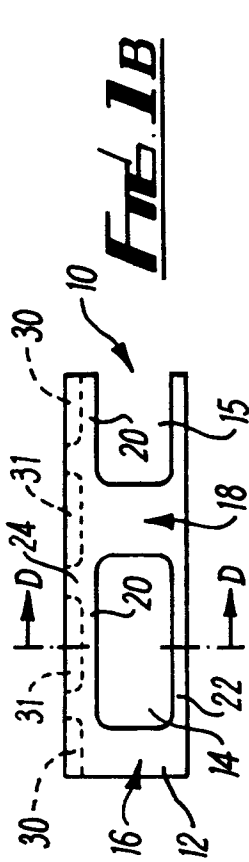
1. A pallet comprising a plurality of first elongate components arranged in a spaced parallel relation, characterised by each first component having a plurality of recesses in at least one longitudinal outer face, and a plurality of second elongate components, each being provided to extend laterally across the first components and locate in aligned ones of the respective recesses therein, means for connecting the second components to the first components, whereby to provide the structure with a load support surface, and strengthening means provided on at least one of the first components.
2. A pallet according to any of the preceding Claims, characterised in that each of the first components is provided with a plurality of through transverse openings.
3. A pallet according to Claim 1 or 2, characterised in that the strengthening means comprises at least one strengthening formation.
4. A pallet according to Claim 3, characterised in that the strengthening means comprises a plurality of the strengthening formations.
5. A pallet according to Claim 3 or 4, characterised in that the or each strengthening formation extends substantially over the length of the respective first component.
6. A pallet according to any of Claims 3 to 5, characterised in that the or each strengthening formation has the form of a groove.
7. A pallet according to Claim 6, characterised in that the groove has a V-shaped cross-section.
8. A pallet according to any of Claims 3 to 5, characterised in that the or each strengthening formation has the form of a raised rib.
9. A pallet according to any of the preceding Claims, characterised in that three of said first elongate components are arranged in a spaced parallel relation with respective outermost first components defining the ends of the pallet, the plurality of recesses in each of the outermost first components opening inwardly of the pallet but terminating short of an outer edge thereof.
10. A pallet according to Claim 9, when dependent on any of Claims 3 to 8, characterised in that the strengthening formation, or one of the strengthening formations, is formed along an upper edge of each of the outermost first components between the recesses therein and the outer edge thereof.
11. A pallet according to Claim 10, characterised in that further ones of the strengthening formations are formed in the upper edge of each of the outermost first components to extend between the recesses therein.
12. A pallet according to Claim 10 or 11, characterised in that additional ones of the strengthening formations are formed on lower edges of the outermost first components.
13. A pallet according to any of Claims 10 to 12, when dependent on Claim 2, characterised in that further additional ones of the strengthening formations are formed on internal faces of one or each of the plurality of through transverse openings in said one first component.
14. A pallet according to any of Claims 1 to 7, characterised in that two of said first elongate components are arranged in a spaced parallel relation with one thereof defining an end of the pallet, the plurality of recesses in said one first component opening inwardly of the pallet but terminating short of an outer edge thereof.
15. A pallet according to Claim 14, when dependent on

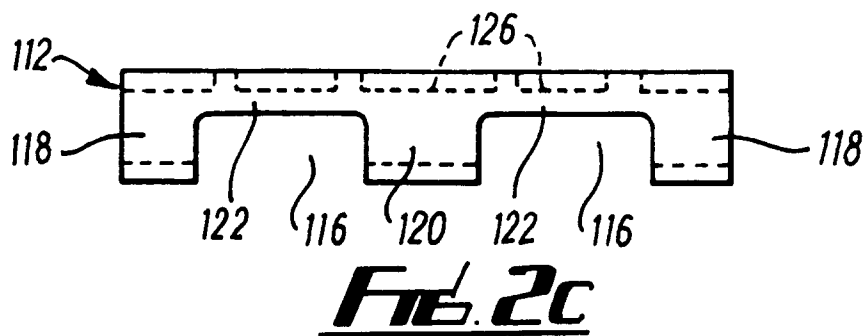
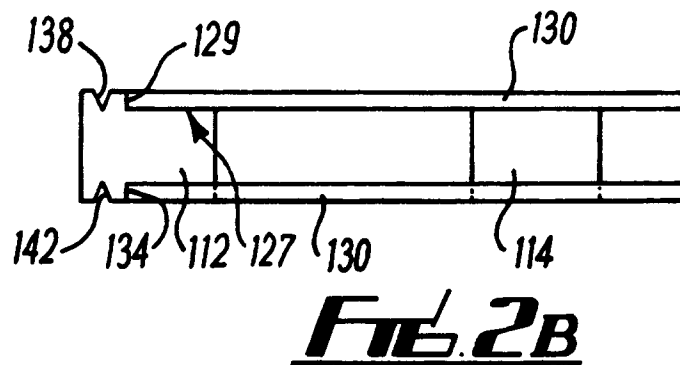
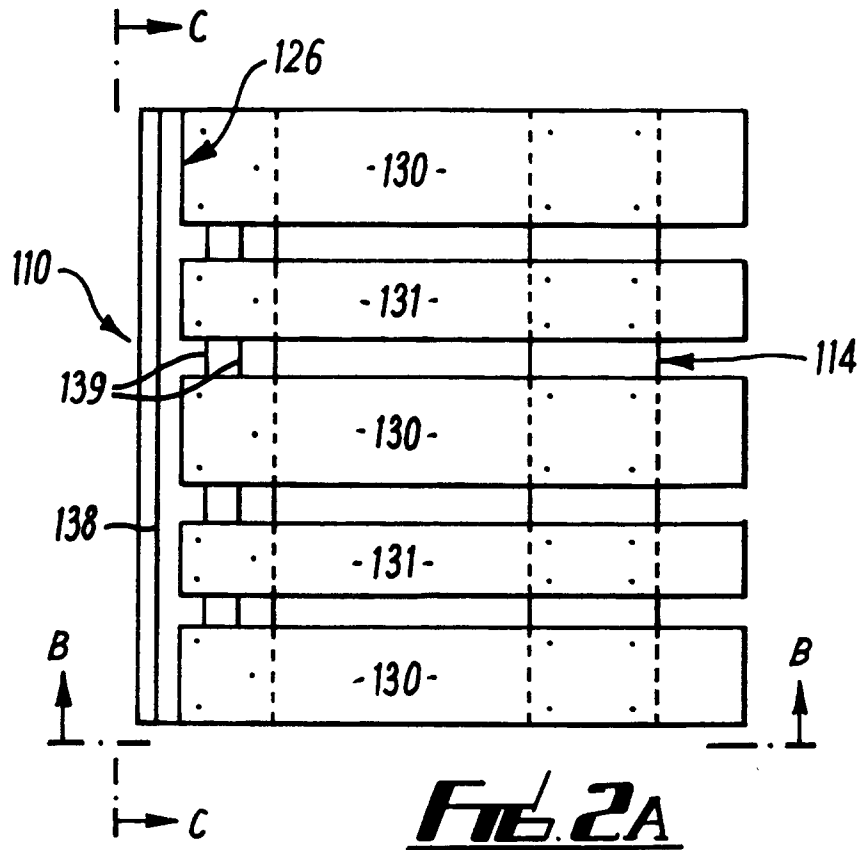
any of Claims 3 to 8, characterised in that the strengthening formation, or one of the strengthening formations, is formed along an upper edge of said one first component between the recesses therein and the outer edge thereof.

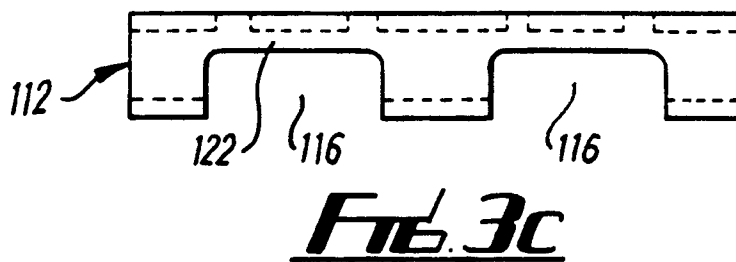
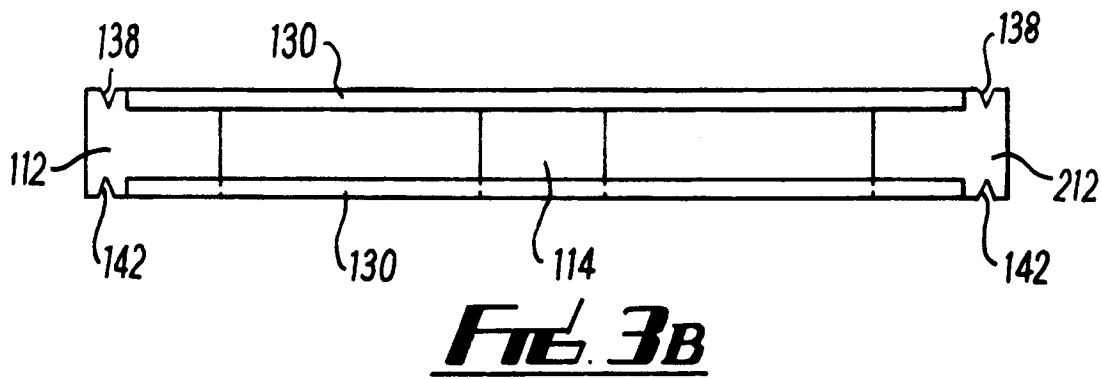
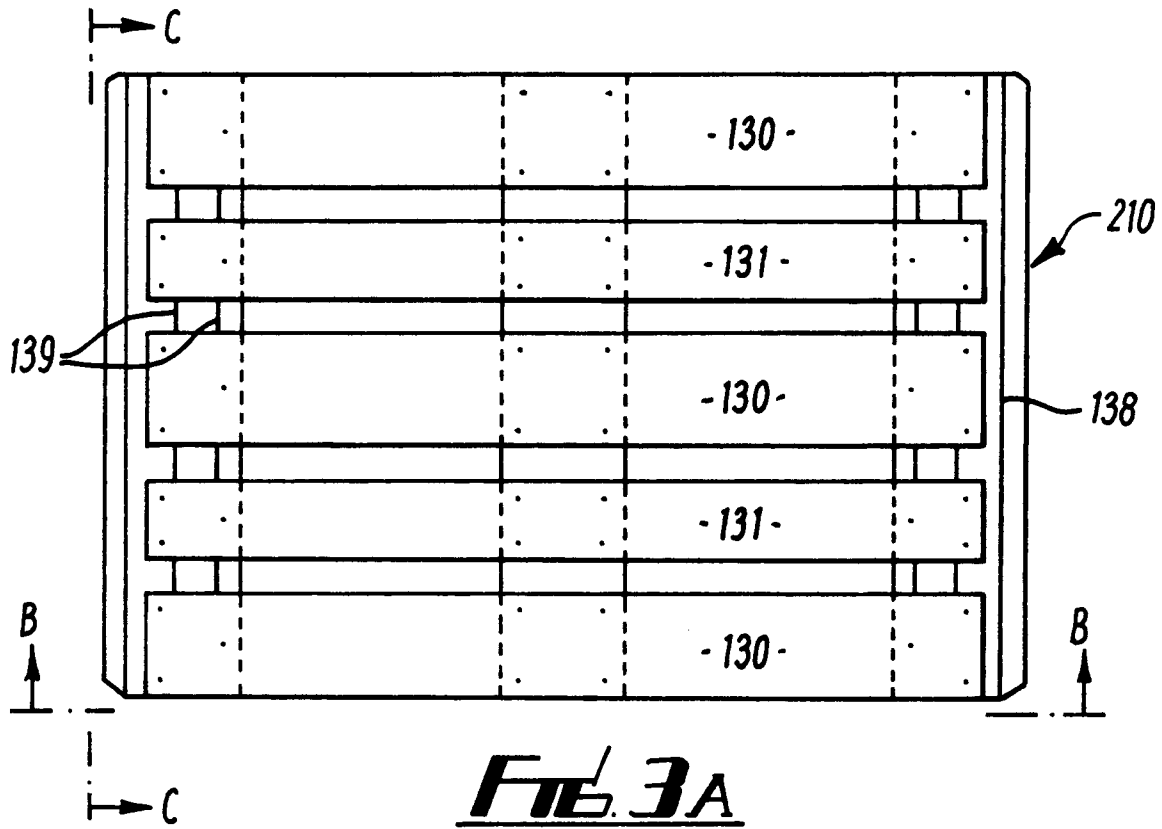
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16. A pallet according to Claim 15, characterised in that further ones of the strengthening formations are formed in the upper edge of said one first component to extend between the recesses therein. 10
17. A pallet according to Claim 15 or 16, characterised in that additional ones of the strengthening formations are formed on a lower edge of said one first component. 15
18. A pallet according to any of Claims 15 to 17, when dependent on Claim 2, characterised in that further additional ones of the strengthening formations are formed on internal faces of one or each of the plurality of through transverse openings in said one first components. 20
19. A pallet according to any of Claims 14 to 18, characterised in that a further first elongate component is arranged in a spaced parallel relation with said two first elongate components and is an outermost component defining the other end of the pallet, the plurality of recesses in the other outermost component opening inwardly of the pallet but terminating short of an outer edge thereof. 25 30
20. A pallet according to Claim 19, when dependent on any of Claims 3 to 8, characterised in that one of the strengthening formations is formed along an upper edge of said further first component between the recesses therein and the outer edge thereof. 35
21. A pallet according to Claim 20, characterised in that further ones of the strengthening formations are formed in the upper edge of said further first component to extend between the recesses therein. 40
22. The pallet according to Claim 20 or 21, characterised in that additional ones of the strengthening formations are formed on a lower edge of said further first component. 45
23. A pallet according to any of Claims 20 to 22, when dependent on Claim 2, characterised in that further additional ones of the strengthening formations are formed on internal faces of one or each of the plurality of through transverse openings in said further first component. 50

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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 8315

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.6)
X	US-A-3 678 868 (HIROTA) * the whole document * ---	1-5, 9, 14, 19	B65D19/32
A	WO-A-94 20377 (SALFLEX POLYMERS) * page 6, line 25 - page 7, line 37; figure 1 * ---	1, 8	
A	US-A-3 878 796 (MORRISON) * figures * ---	1	
A	US-A-4 869 179 (SAMMONS ET AL) * figures * ---	1	
A	LU-A-65 935 (SICOPAL) * figures * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D
Place of search		Date of completion of the search	Examiner
BERLIN		3 May 1996	Spettel, J
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