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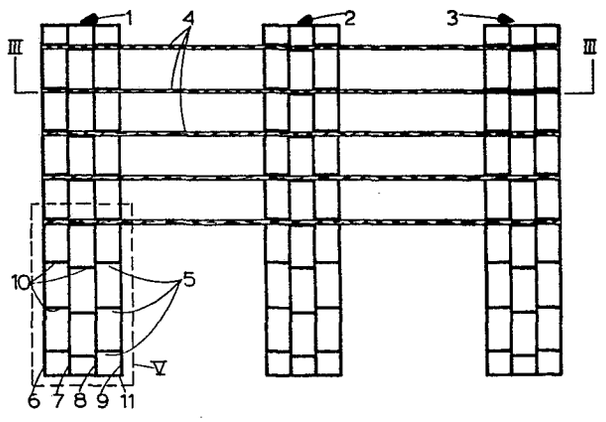
(71) Applicant: **STAMICARBON B.V., Postbus 10, NL-6160 MC Geleen (NL)**

(72) Inventor: **Alfrink, Cornelis Maria, Wieenbroek 8, NL-6121 HE Born (NL)**
Inventor: **Minkhorst, Jan Hendrik Karel, Geleenstraat 38, NL-6151 EZ Munstergeleen (NL)**

(74) Representative: **Hoogstraten, Willem Cornelis Roeland et al, OCTROOIBUREAU DSM Postbus 9, NL-6160 MA Geleen (NL)**

(54) Pallet.

(57) Pallet, the stringers (1, 2, 3) of which consist of a number of vertical, parallel plates (6, 7, 8, 9) joined by transverse partitions (10). The deck surface is formed by deck elements (4) perpendicular to the stringers and fitting into recesses (5) on the upper side of the stringers. The stringers can be manufactured of plastic by injection moulding. The deck elements consist of rigid material such as wood.



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PALLET

The invention concerns a pallet consisting of a number of parallel stringers and a deck surface formed by deck elements fitted at right angles to the stringers at distances one from the other.

A pallet of this kind is generally known and is described in, for example, Dutch patent application no. 7201117. This is a pallet made entirely of aluminium, with stringers and deck elements fastened to the latter. Versions of similar structure but made of wood are also known. A particular type is described in Dutch patent application no. 291343.

Efforts to design a pallet which complies simultaneously with a multiplicity of requirements specified by users have meant that the market has been flooded in the last few decades with a great variety of pallet versions each of which satisfies more or less of those requirements.

Experience shows that in large sectors of the market compliance with the following three main criteria is still insisted on. In the first place the pallet has to be inexpensive, preferably so inexpensive that it can be used as a one-way or expendable pallet. Secondly, the pallet has to be light with a view to ease of handling and because of transport costs. In the third place it must have a loading capacity such that fairly heavy loads of, for example, 1000 kg are possible without causing the deformation of the pallet to increase beyond acceptable limits. A large number of other requirements specified can usually also be met without much difficulty. The dimensions can be altered as desired or measures can be taken to enable the pallet to be used for a particular application.

The invention concerns a pallet which satisfies the three main conditions mentioned, while at the same time, on the basis of the original form of the pallet, the use of present-day technical possibilities enables an entirely new and surprising pallet design to be offered.

In accordance with the invention this is obtained by the fact that the stringers are constructed of at least two rectangular plates arranged predominantly vertically, which are joined to each other by transverse partitions, and have recesses at their top into which the deck elements fit closely .

By designing the stringers of the pallet in this way great rigidity combined with low weight can be obtained. The stringers with the transverse partitions and recesses will preferably be made of plastic in one piece by injection moulding. The thickness of the material and the sizes of the plates and partitions can be adjusted as desired, as also can the plastic to be selected. With regard to the length of the stringers the requirement to be met can be easily satisfied by making use of an adjustable mould. The number of stringers will depend on the size of the pallet but is usually three. Smaller pallets can be made with only two stringers.

It is an advantage that vertically arranged transverse partitions should extend over the whole height of the plates to ensure that the plates do not buckle under a load. These transverse partitions will be preferably located immediately beside the recesses, thereby making it possible to fasten the deck elements to be inserted in the recesses to the transverse partitions and hence to the stringers with glue or staples or with the aid of snap-in fastenings. There can be transverse partitions on either side of the recesses. In the case of stringers consisting of more than two plates the transverse partitions may, with a view to saving material, but also in order to make fastening of the deck elements on two sides possible, be fitted alternately to opposite sides of the recesses in adjacent spaces between the plates. Greater stability of the deck elements is thus obtained.

The deck elements may be supported by all the stringers. It is, however, also possible for a deck element to span fewer stringers. The first version is preferable for reasons of stability and production.

A stringer consisting of four plates with a number of alternately arranged transverse partitions alongside the recesses is in many cases of sufficient strength to take usual loads.

In a preferred embodiment of the invention the deck elements are of rectangular cross-section and are arranged so that their narrow sides form the load-bearing surface of the pallet.

As already stated, the pallets with recesses in them can be

made of plastic integrally with the transverse partitions by injection moulding. The deck elements, however, will, be preferably made of another material possessing greater rigidity. The chief materials in mind are wood and board, of which wood deserves preference because of its deflection properties and the fact that wood is more resistant than board to the effects of moisture.

It is an advantage to have the deck elements project somewhat above the stringers. In this way it is chiefly the deck elements which are subject to wear and, if necessary, they can be replaced.

In some cases it may be advisable to fit the underside of the pallet with two or three stacking strips perpendicular to the stringers.

To make the pallet suitable for four-way approach by a fork-lift truck holes can be made in the long sides of the stringers in which the fork of a fork-lift truck can be inserted. It will be clear that there is ample space between the stringers for this purpose on the other side of the pallet.

The invention will now be further explained with reference to an example of embodiment in the drawing. In the drawing:

Fig. 1 is a top view of a pallet according to the invention in which some deck elements have been omitted;

Fig. 2 is a front view of the pallet in fig. 1;

Fig. 3 is a section along III-III in fig. 1;

Fig. 4 is a side view of the pallet in fig. 1; and

Fig. 5 is a detail, on a larger scale, of a stringer with deck element as shown in the outlined part V in fig. 1.

Fig. 1 shows stringers marked 1, 2 and 3 of a pallet and deck elements marked 4. To bring out the recesses more clearly in the drawing some deck elements have been omitted. Every stringer consists of four rectangular plates 6, 7, 8 and 9, arranged predominantly vertically, with recesses 5 made in their upper sides; see figs. 1 and 4. Beside the recesses transverse partitions 10 are fitted over the full height of the plastics plates. The ends of the stringers are fitted with end plate 11. Transverse partitions 10 are fitted in such a way that they are located in gaps 12, 13 and 14, alternately immediately next to one of the sides of the recesses. The deck elements inserted in the recesses are thus better supported on both sides.

The wooden deck elements which have a rectangular cross-

section are placed so that their narrower sides form the load-bearing surface of the pallet. This means that the fullest possible advantage is taken of the rigidity properties of the material of which the load-bearing (deck) elements consist. These load-bearing elements may be completely recessed into the stringers or project slightly above them.

The load-bearing elements are fastened to the stringers by stapling them to the adjacent transverse partitions as shown by 15 in fig. 5.

As indicated in fig. 4 the long sides of the plates have openings 16 and 17 to make entry by the fork of the fork-lift truck possible.

It can be seen from figs. 2 and 3 that the position of plates 6, 7,8 and 9 is not completely vertical. That, however, is desirable in order to obtain the necessary draft for the dies in an injection-moulding mould.

Example

In a pallet produced in accordance with the description and drawing the stringers were made of low-density polyethylene. The plates and transverse partitions were 3 mm thick. Wooden deck elements with cross-section dimensions of 32 x 10 mm were placed in the recesses. The dimensions of the pallet were 1200 x 800 mm. The total weight of the pallet was 5.8 kg, of which 1.4 kg was accounted for by the wood.

The pallet was tested using a fork-lift truck for lifting and laying, with DIN 32600 as guideline, the width of the truck forks being 100 mm and the centre distance between the forks 575 mm. The load was 600 kg, distributed evenly over the pallet. The deflection in the middle and at the outsides of the pallet was found to be 3.5 mm.

In a load test in which the pallet, standing on a flat base, was subjected to an evenly distributed load of 1200 kg (= 2-high stacking), a deflection of 1.5 mm was found to have occurred in the middle between the stringers after 24 hours. The tests were carried out at an ambient temperature between 25 and 30 ^{o}C.

CLAIMS

1. A pallet consisting of a number of parallel stringers and a deck surface formed by deck elements fitted at right angles to the stringers at distances one from the other, in which the stringers are constructed of at least two rectangular, parallel plates arranged predominantly vertically, which are joined to each other by transverse partitions and have recesses at their top into which the deck elements fit closely.
2. A pallet as claimed in claim 1, in which the deck elements are of rectangular cross-section and are fitted into the recesses in such a way that the narrow sides of the deck elements form the top surface of the pallet.
3. A pallet as claimed in claim 1 or 2, in which the transverse partitions are arranged vertically and extend over the entire height of the plates.
4. A pallet as claimed in any of claims 1 to 3, in which transverse partitions are fitted immediately beside the recesses.
5. A pallet as claimed in any of claims 1 to 4, in which transverse partitions are fitted on either side of the recesses.
6. A pallet as claimed in any of claims 1 to 5, in which, in the case of stringers made up of more than two plates, the transverse partitions are fitted alternately on either side of the recesses, in adjacent spaces between the plates.
7. A pallet as claimed in any of claims 1 to 6, in which each deck element is supported by all the stringers.
8. A pallet as claimed in any of claims 1 to 7, in which each stringer is made up of four plates.
9. A pallet as claimed in any of claims 1 to 8, in which the pallet is made entirely of plastic.
10. A pallet as claimed in any of claims 1 to 8, in which the stringers are made of plastic and the deck elements of wood.
11. A pallet as claimed in any of claims 1 to 10, in which the deck elements project partly above the top surface of the stringers.
12. A pallet as claimed in any of claims 1 to 11, in which the deck elements are fastened to the stringers by stapled, glued or snap-in fastenings at the transverse partitions.

13. A pallet as claimed in any of claims 1 to 12, in which openings are provided in the long sides of the stringers for the insertion of the forks of a fork-lift truck.

14. A pallet as claimed in any of claims 1 to 13, in which two or more stacking strips are fitted perpendicular to the stringers on the underside of the pallet.

15. A pallet as substantially described in the description and/or drawing.

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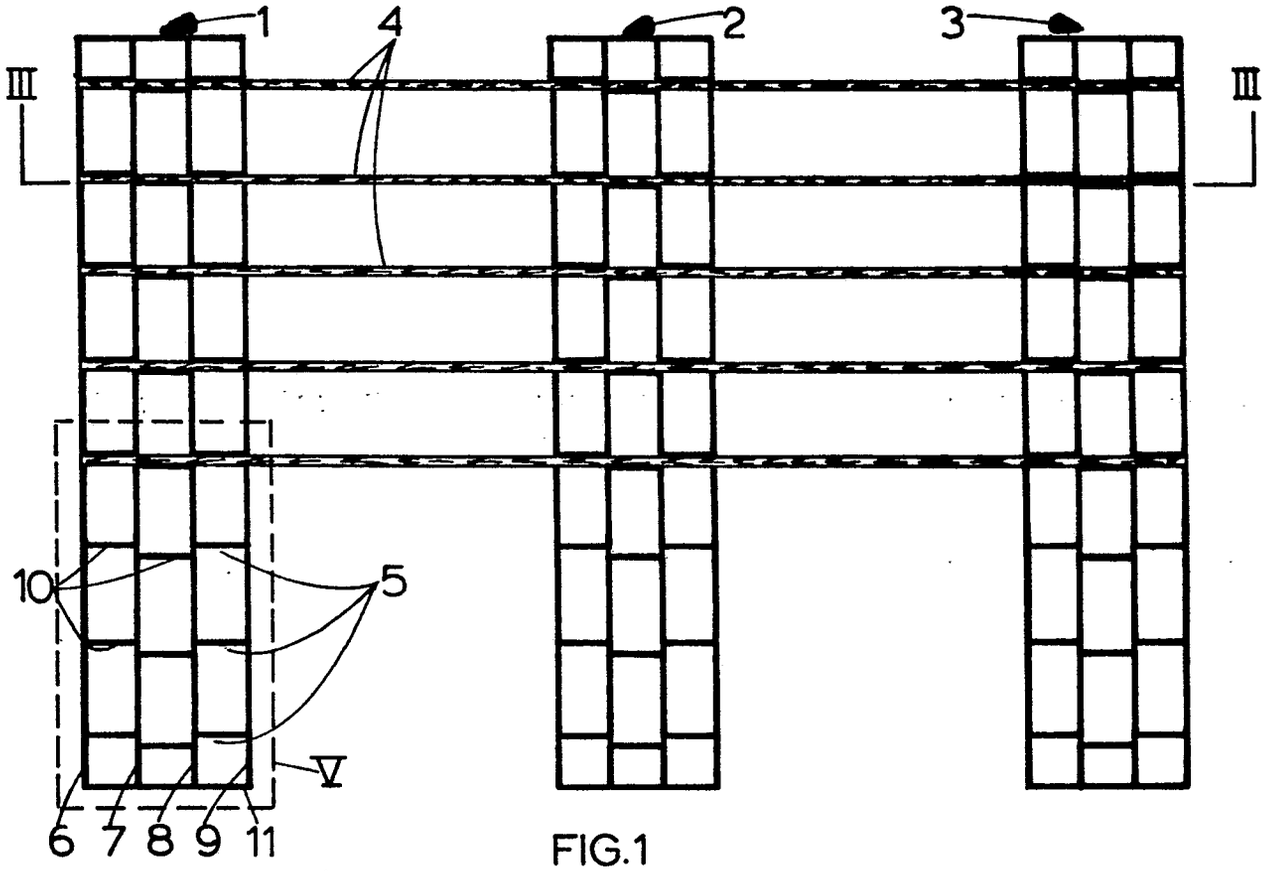

FIG.1

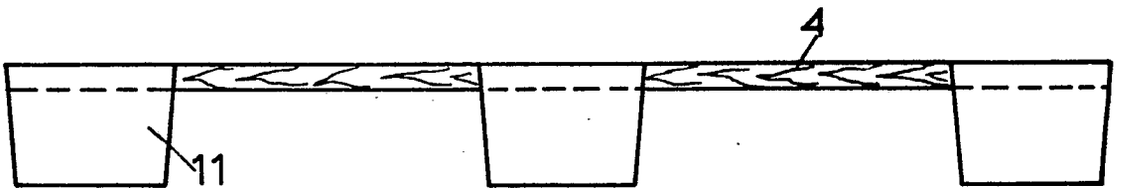

FIG.2

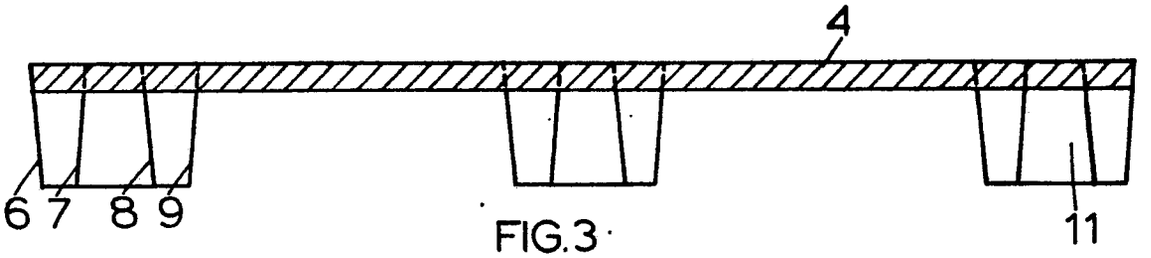

FIG.3

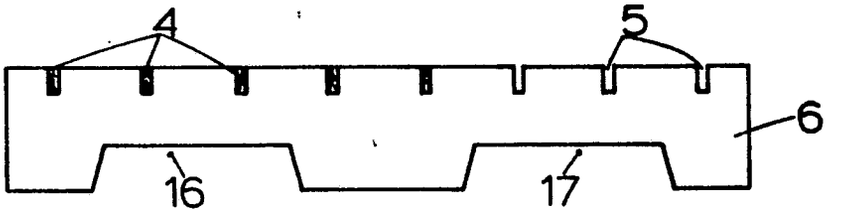

FIG.4

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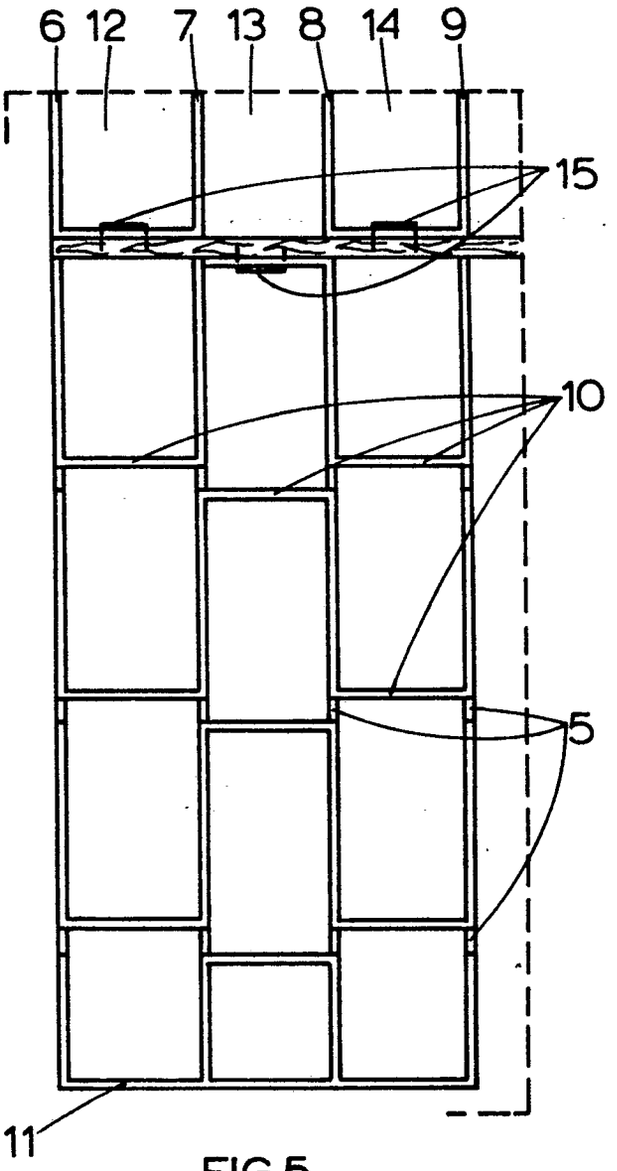

FIG.5

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Application number

EP 80 20 0329

European Patent Office

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	NL - A - 71 04847 (FORSTER) * Patent application *	1,7,12, 13,15
	US - A - 3 058 709 (VAN MOSS) * Patent specification *	1,2,7, 12,13, 15
	DE - A - 2 032 220 (ENGELS) * Patent application *	1,2,7, 9,11, 12,15
	FR - A - 2 072 439 (SOLERI) * Patent specification *	1,3,7, 9,13, 15

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 65 D 19/26

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 65 D

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22-07-1980	VANTOMME