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(54) System for realizing pallets in cardboard sheets

(57) A pallet system is described, consisting of corrugated or waved board layers and a method for its execution, said pallets comprising a first cardboard layer (5) forming the pallet loading plane and a second cardboard layer (6) glued to said first cardboard layer, and at least three spacing feet (7) between the pallet loading plane and the floor to form a throughway for the insertion of lifting and handling mechanical means for such a pallet. According to the present invention, said feet are glued to said first carboard layer, and said second cardboard layer has throughholes (8) for the insertion and fastening of the feet.

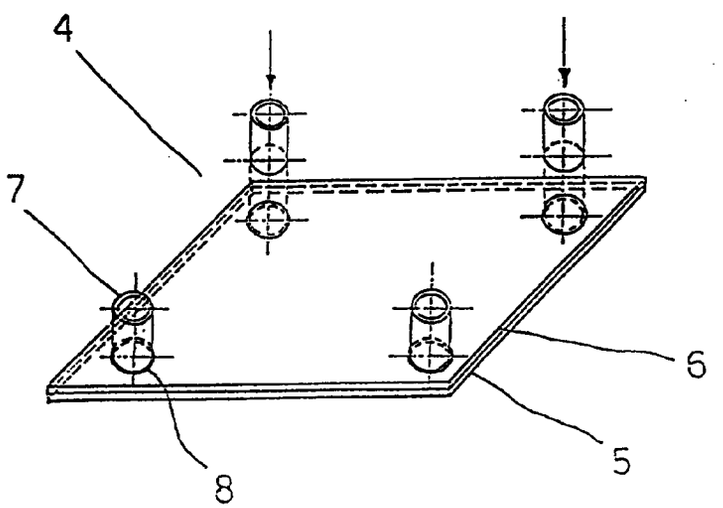

FIG. 2

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Description

The present invention refers to pallet system consisting of corrugated board layers, and a method for its execution.

As it is known, in order to facilitate transportation and handling of packed products, wooden pallets are used for heavy products, or cardboard pallets for lightweight products, on which said products are supported.

In this way, more products can be displaced or moved simultaneously with the use of mechanical means, such as fork trucks, saving time and fatigue.

Generally, cardboard pallets consist of a corrugated board layer or sheet whose dimensions and composition are determined as a function of the use required of the pallet, to which cross members are glued on the pallet lower side, to obtain a space between the floor surface and the cardboard layer whereupon products are laid.

By so doing, a free space can be obtained to insert the forks of a fork truck for the handling of the pallet.

As disclosed by the Italian patent applications TO95A000456 and TO95A000940, in the name of the present applicant, which describe a pallet system made of corrugated board and a method to manufacture such pallets, it is known that said pallets consist at least of a cardboard layer forming the pallet loading plane and at least of three cardboard feet forming the spacers between the floor and the loading plane, glued under the loading plane of the pallet itself

However, whenever such feet are subject to strong side stresses, they may tear the paper sheet forming the cardboard layer they are glued to, and nullify the function they are provided for, i.e. to act as spacers for the insertion of the truck forks used for pallet handling and/or support of the loading plane.

In order to improve feet resistance it is also known to make some round crown shaped depressions on the lower side of the loading plane, whose diameter is equal to the foot diameter and whose width is equal to the foot wall thickness.

Said depressions are obtained by punching the first paper sheet forming the cardboard and depressing the following cardboard waving or corrugation.

The foot is then inserted in such a depression and glued.

However, if also in this instance the feet are subject to strong side stresses they may come off since the foot is glued to the surface of the first paper layer of the round crown, which is no longer integral with the remaining part of the sheet, that has been punched to obtain the depression of the corrugation and form the round crown seat for the foot.

It is the object of this invention to provide a pallet system consisting of corrugated board layers, that does not cause the inconveniences of the known state of the art, but offers advantages in operation, strength and easy assembly.

A further purpose of the present invention is to provide a method for manufacturing in a simple way pallets made of corrugated board layers.

For attaining such aim, the present invention has as its object a pallet system consisting of corrugated board layers and a method for its execution, where said pallets comprise a first cardboard layer forming the pallet loading plane and a second cardboard layer glued to said first cardboard layer and at least three spacing feet between the pallet loading plane and the floor so as to form a throughway for the insertion of lifting and handling mechanical means for said pallet, characterized in that said feet are glued to said first cardboard layer, whereas said second cardboard layer has throughholes for the insertion and fastening of the feet.

Further objects and advantages deriving from the present invention will become apparent from the following detailed description and annexed drawings, only supplied by way of a non limiting example, wherein:

- Fig. 1 shows a perspective view of a corrugated board pallet according to the known state of art, being turned upside down for simplicity's sake;
- Fig. 2 shows a perspective view of a pallet system made of corrugated board layers, according to the present invention, turned upside down for convenience's sake;
- Fig. 3 shows a section of a pallet made of corrugated board according to the present invention;
- Fig. 4 shows a perspective view of a possible variant embodiment of a corrugated board pallet, according to the present invention, turned upside down for convenience's sake;
- Fig. 5 shows a partial section of the cardboard pallet represented in Fig. 4.

In Fig. 1, where a perspective view of a corrugated board pallet according to the present state of art, turned upside down for convenience's sake is shown, reference number 1 indicates the pallet as a whole, number 3 a cardboard layer forming the pallet loading plane, number 2 the resting feet for the loading plane 3 on the floor.

In Fig. 2, where a perspective view of a manufacturing system of a pallet consisting of several corrugated board layers according to the provisions of this invention, turned upside down for convenience's sake is shown, number 4 indicates the pallet as a whole, number 5 a first layer of corrugated board performing as a supporting plane for the products, number 6 a second sheet of corrugated board glued to the first cardboard layer 5.

Both board layers 5 and 6 are glued to each other with their relevant corrugation or waving being perpendicular to each other, in order to increase the strength of the resting plane, so that a cardboard layer hinders a possible distortion along the corrugation of the other cardboard layer.

Number 7 indicates the spacing feet of the resting plane 5 with respect to the floor or another underlying plane.

Feet 7 are tubular elements made of recycled paper inbond glued to the resting plane 5, whose diameter and thickness is suitable to bear the carrying capacity of the pallet 4.

Said spacing elements 7 are obtained cutting them at the required usage height from a paper tube having the required diameter and thickness.

The number of said spacing elements, at least three, may vary depending on the pallet size and load to be carried. A main factor concerning manufacture of spacers 7 is that said tubular elements work inbond and confer a higher resistance to the squashing which could be caused by the weight to be carried.

To make it possible for the feet 7 to be glued to said first cardboard layer 5, said second cardboard layer 6 has throughholes 8 to let them through.

In Fig. 3, where a section of a corrugated board pallet according to the present invention is shown, number 5 indicates the first layer of corrugated board, whereas number 6 indicates the second layer of corrugated board glued to said first corrugated board layer, where the direction of the corrugation is perpendicular to each other as previously said.

Number 7 indicates a spacing foot inbond glued to the cardboard layer 5; number 8 indicates a throughhole on the cardboard layer 6, to let the foot 7 go through and be glued on the layer 5.

Said throughholes 8 have a similar and/or slightly larger diameter than the diameter of feet 7. It should be noted that the edge of hole 8, being realized by the thickness of the cardboard layer, does not allow or reduce the risk the foot to bent when subject to strong side stresses, and therefore avoids its unsticking.

Moreover, the second cardboard layer 6 will substantially reduce to nil a possible tearing of the paper sheet forming the first cardboard layer 5, whereon the foot 7 is glued, since said paper sheet is locked by the second cardboard layer 6 glued to the first cardboard layer 5.

To balance the papers forming the cardboard layers and maintain a flat loading plane, the mutual gluing of cardboard layers 5 and 6, generally each consisting of a high and a low waving or corrugation, is done by bonding to each other the two surfaces of the cardboard layers having the low corrugation wave.

Gluing of spacing feet 7 to the cardboard layer 5 is made with hot-melt glue.

Cardboard pallets are generally handled by mechanical means, such as fork trucks, but in some cases they may be moved from the pallet loading station to the shipping station by conveying them on rollers, i.e. the so-called roller bands, before using mechanical means fitted with forks.

Moreover, said roller planes usually comprise platforms fitted with balls to transfer the loads to other roller bands departing from the first one, or simply to roll the load onto the roller band.

In these instances, the cardboard pallets are equipped with cardboard members connecting the spacing feet to each other in the sliding direction of the pallet on the roller band, as shown in the Figs. 4 and 5 and as described in the following, to avoid the risk of the feet driving into the rollers or balls with consequent distortions and/or stopping the pallet motion.

Fig. 4 shows a perspective view of an embodiment of a corrugated board pallet according to the object of the present invention, turned upside down for convenience's sake.

Number 4 indicates the pallet as described above.

Number 9 indicates some cardboard members whose length is equal to a dimension of the pallet 4.

Said members consist of two corrugated board layers glued to each other as for the resting plane of the pallet 4, not necessarily with the sense of the corrugation waves being perpendicular to each other, indicated with numbers 10 and 11, respectively.

The cardboard layer 10 has some throughholes 12, whose diameter is equal and/or slightly larger than the diameter of feet 7.

Said punched holes 12 are arranged in the same number and in line with feet 7 glued to the loading plane of the pallet 4, on the side of the pallet which slide over the roller band.

Members prepared as above are mounted on feet 7 of the pallet 4 by inserting the feet 7 in the throughholes 12 and gluing the feet to the cardboard layer 10 of the members 9.

Members 9 are glued to the feet 7 using vinyl adhesives distributed over the round section of the foot to be bonded with the member.

Also in this instance, the edge of holes 12, i.e. realized by the thickness of the cardboard layer 10, will hinder or strongly reduce a possible bending of the foot, should the latter be subject to strong side stresses, so that it will not come off.

Moreover, the second cardboard layer 10 will substantially nullify a possible tearing of the paper sheet forming the first cardboard layer 11, whereon the foot 7 is glued, since said paper sheet is locked by the second cardboard layer 10 glued to the first cardboard layer 11 forming the member 9.

Thus, the pallet can slide over the roller band or platform with balls without any danger for the spacing feet, since the cardboard members form a plane that can freely slide either on rollers or balls.

Moreover, using two cardboard members instead of a lower plane similar to the top loading plan not only will help to save material, but also allow the use of manual fork trucks, fitted with wheels for their operation. Said wheels would then interfere with a complete lower plane. which would hinder both a truck displacement and the pallet lilting from the floor.

The characteristics of the pallet system consisting

of several corrugated board layers and the relevant method to obtain them are clear from the above description and annexed drawings.

From the above description also the advantages resulting from a pallet system consisting of corrugated board layers and a relevant method to obtain them according to the present invention are clear.

Specifically, they consist in:

- an improved resistance of the spacing feet to side stresses, since they are held firmly not only by the glue, but also by the edge of the foot throughhole being glued and by the second cardboard layer which hinders the paper sheet forming the first cardboard layer whereon the foot is glued to tear off
- an improved sturdiness of the pallet loading plane, through two cardboard layers glued to each other with the direction of the corrugations or waving being perpendicular to each other;
- a simple addition of two cardboard connecting members for easy sliding of the pallet over a roller band or on a platform with balls, thus further improving the pallet sturdiness and the spacing feet resistance to side stresses;
- the addition of connecting members to allow sliding over roller bands or platforms with balls without jeopardizing the use of manual mechanical means fitted with forks for pallet handling.

It is obvious that many changes and applications can be easily made and applied by the man skilled in the art to the pallet system consisting of corrugated board layer and to the relevant manufacturing method described by way of example, without departing from the principles of novelty related to the innovative solution.

For instance, to further increase sturdiness of the loading plane several cardboard layers may be used, which are glued to each other always in the sense of the corrugations being perpendicular to each other.

As regards for instance the spacers, they may be made in the form of a parallelepiped instead of starting from a cardboard tube, being realized through gluing and/or pressing several cardboard layers, so as to obtain a full element, which working inbond could be capable of supporting considerable weights.

Claims

1. Pallet system consisting of corrugated board layers, said pallet comprising a first cardboard layer (5) forming the pallet loading plane, a second cardboard layer (6) glued to said first cardboard layer (5) and at least three feet (7) which keep the pallet loading plane apart from the floor, so as to provide a throughway to mechanical means for the lifting and handling of said pallet, characterized in that said spacing feet (7) are glued to said first cardboard layer (5) and that said second cardboard layer (6) has throughholes (8) for the passage of said feet (7).

2. System according to Claim 1, characterized in that said first (5) and second (6) cardboard layer are glued to each other with their corrugation sense being perpendicular to each other.

3. System according to Claim 1, characterized in that said spacing feet (7) have a tubular shape.

4. System according to Claim 1, characterized in that the thickness of the edge of said throughholes for the spacing feet (7) aids the spacing feet (7) to withstand likely side stresses.

5. System according to Claim 1, characterized in that said second cardboard layer (6) is glued to said first cardboard layer (5) with the purpose of exerting forces that hinder a tearing of the paper sheet forming the first cardboard layer (5) whereon the spacing foot is glued (7), due to likely side stresses on the spacing foot (7).

6. System according to Claim 1, characterized in that said throughholes (8) for the passage of the spacing feet (7) have an equal and/or slightly larger diameter than the spacing feet (7).

7. System according to Claim 1, characterized in that two cardboard members (9) are provided in the pallet lower section (1) for its sliding over roller planes.

8. System according to Claim 1, characterized in that two cardboard I-beams (9) are provided in the pallet lower section (1) for its sliding over platforms fitted with balls.

9. System according to Claim 7, characterized in that said cardboard members (9) join together the spacing feet (7) being positioned according to the sliding direction of the pallet (1) over the roller plane.

10. System according to Claim 7, characterized in that said cardboard members (9) consist of two cardboard layers (10,11) glued to each other.

11. System according to Claim 10, characterized in that one of the two cardboard layers (10) forming the cardboard members (9) has holes (12).

12. System according to Claim 11, characterized in that said holes (12) are provided for the passage of the spacing feet (7) and their gluing to the second cardboard layer of the cardboard member (11).

13. System according to claim 7, characterized in that

said cardboard members (9) allow the use of manual mechanical fork means for the handling and lifting of the pallet (4).

14. System according to Claim 1, characterized in that said spacing feet (7) are glued to said first cardboard layer (5) using hot-melt glues.

15. System according to Claim 7, characterized in that said cardboard members (9) are glued to the spacing feet (7) through vinyl glues.

16. System according to Claim 1, characterized in that said spacing feet (7) have a parallelepiped form, obtained by joining and pressing several cardboard layers together.

17. Method for realizing at least a resting plane consisting of at least two corrugated cardboard layers and at least three spacers (7) between the resting plane and the floor or another underlying plane, comprising a first cardboard layer (5) forming the resting plane and a second cardboard layer (6) glued to said first cardboard layer (5), characterized in that said spacers (7) are glued to said first cardboard layer (5) and said second cardboard layer (6) has throughholes (8) for the passage of the spacers (7).

18. Method for realizing at least a resting plane according to Claim 17, characterized in that the free end of said spacers (7), by passing through holes (12) being present on a first cardboard layer (10), can be glued to a second cardboard layer (11) being glued to said first cardboard layer (10), so defining a usable space between the lower section of the resting plane and the first lower cardboard layer (10).

19. Method according to Claims 17 and 18, characterized by the following steps:

- punching the second cardboard layer (6) for obtaining the holes (8) for the passage of the spacing feet (7);
- gluing of the first cardboard layer (5) to the second cardboard layer (6) having the punched holes (8), crossing the corrugation sense of the cardboard layers;
- gluing the spacing feet (7) to the first cardboard layer (5), by passing through the punched holes (8) of the second cardboard layer (6);
- punching of a cardboard layer (10) forming the members (9) for obtaining the holes for the passage of the spacing feet (7);
- mutual gluing of the cardboard layers (10,11) forming the members (9);
- gluing the members (9) to the spacing feet (7), by inserting the feet in the holes (12) obtained on a cardboard layer (10) of the member.

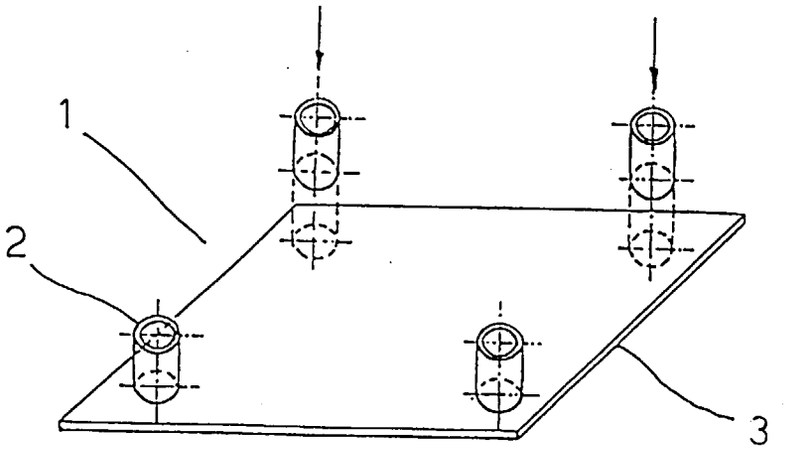


FIG. 1

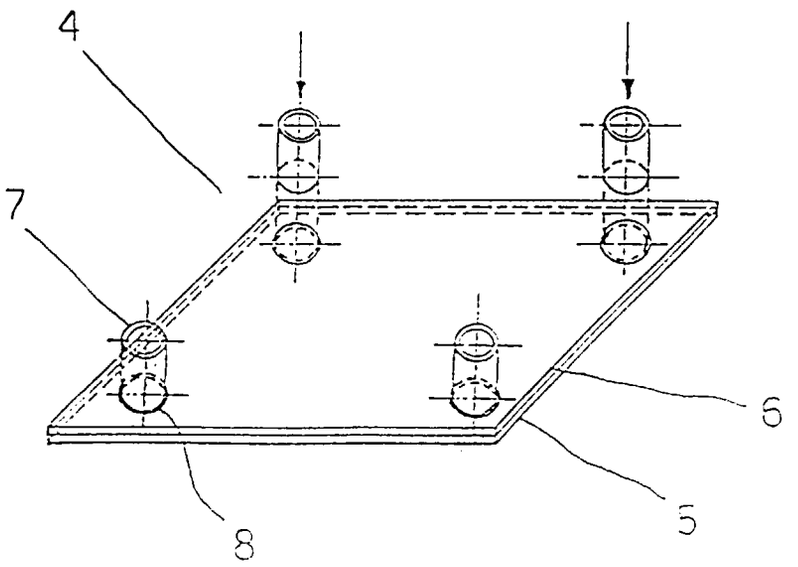


FIG. 2

FIG. 4

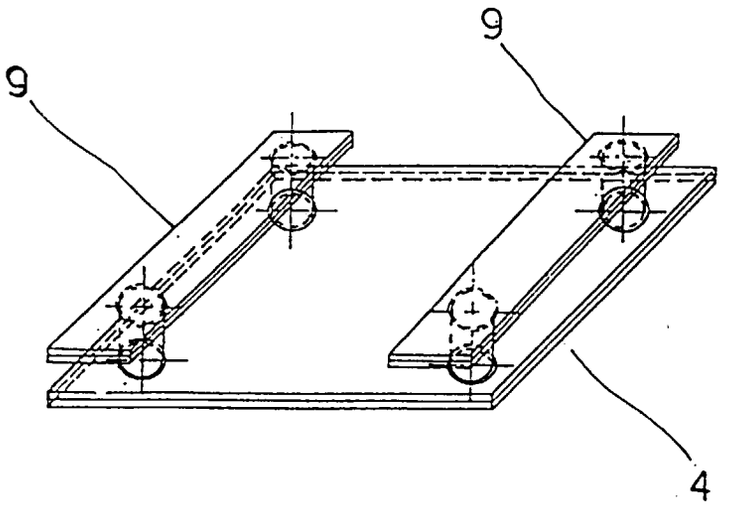


FIG. 3

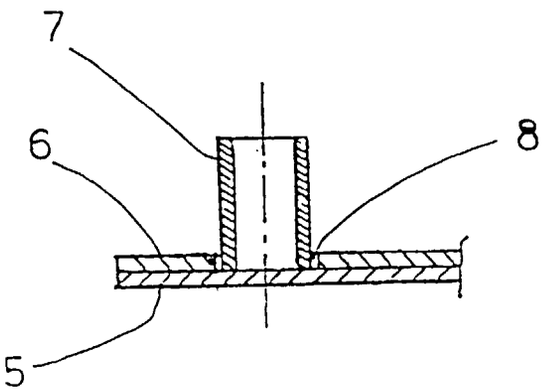
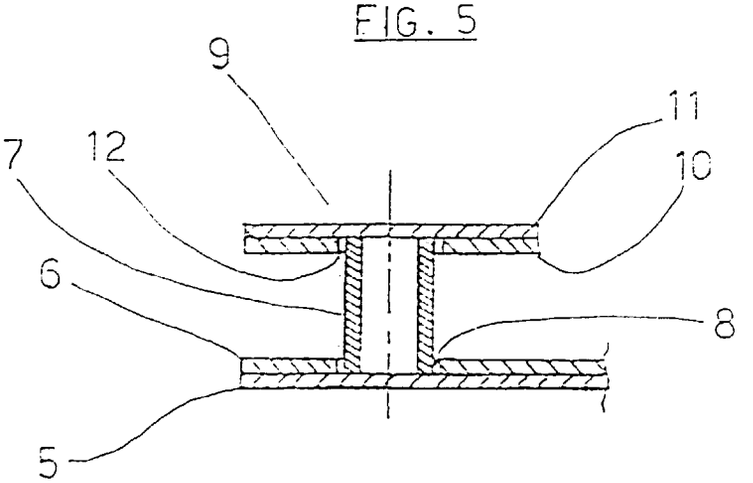


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 98 10 0392

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 Y	US 5 567 263 A (GIASI) * the whole document *	1,3-6, 17,18 2,14,16, 19	B65D19/34
X A	DE 90 06 016 U (SCHRÖTER & BAKE) * page 6, paragraph 6 - page 7, paragraph 2 *	1,3-6, 17,18 14,18	
Y	GB 2 127 773 A (REDDITCH PACKAGING) * page 3, line 17 - line 27; figure 2 *	2,19	
Y	US 4 244 766 A (YELLEN) * abstract *	14	
Y	EP 0 283 799 A (INTER-IKEA) * abstract; figure 2 *	16	
A	FR 2 342 905 A (JOHNSSON) * page 4, line 28 - line 31; figures 1,2 *	7-9,19	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 April 1998	Leong, C

CATEGORY OF CITED DOCUMENTS

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