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(54) **Process for manufacturing a modular pallet and the modular pallet made therewith**

(57) Process for manufacturing a modular pallet, of the type stamped in corrugated cardboard, comprising the steps of: (a) stamping of the corrugated cardboard sheet templates with their waves located perpendicular or parallel to the folding lines, wherein the templates correspond to long and short studs forming the supporting frame of the base cover; (b) folding the template 90° along the double lines of minor strength -6-; (c) folding 180° towards inside both ends of the template along the minor strength lines -5-; (d) folding along the remaining double line -6- of minor strength; (e) folding back the already folded regions over the remaining central plane; (f) completing the definite folding along the central minor strength double line -7- to finish the long stud, wherein all folds are being bound by an adhesive, preferably selected between hot melt adhesive or vinyl adhesive; (g) embedding and binding both short and long studs in the amount required for forming the base frame; and (h) adhering the base cover. The invention also relates to the modular pallet made with the process.

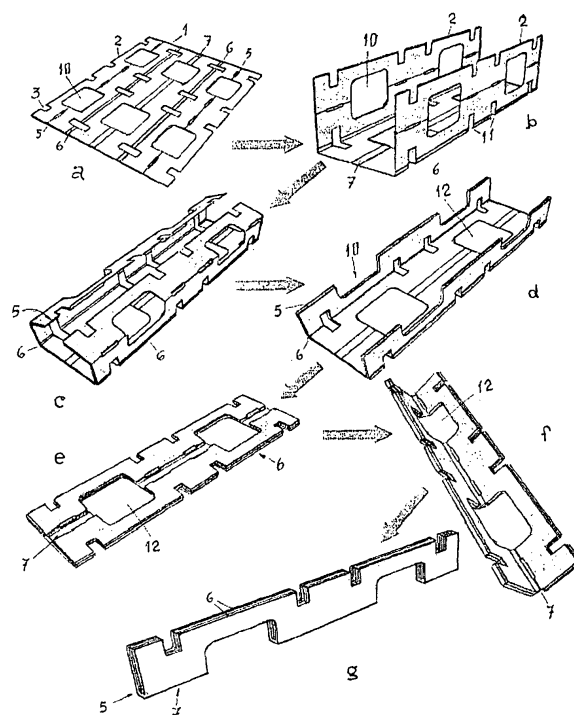


FIG.5

Description

Field of the Invention

[0001] The instant invention relates to transport devices in general and, particularly, it relates to a process for manufacturing a modular pallet, to obtain the required component parts and to develop the system for assembling a pallet.

Prior Art

[0002] No loading devices or pallets as simple as that of the instant invention are known in the art.

[0003] Argentine Patent No. 225,922 relates to a foldable container capable of being piled up. Hinge means at the side panels allow folding of the panel over themselves such that the ends engaged to the base and cover get close until they contact each other.

[0004] Argentine Patent No. 249,677 relates to improvements in a portable assembly of modular tight containers, which may be vertically fitted and capable of containing food products.

[0005] None of the above patents constitute opposable antecedents for the instant invention.

[0006] Argentine Patent No. 250,012 relates to an improved corrugated cardboard container, No. 250,078 describing a closure device for boxes or containers, and No. 250,384 disclosing a returnable container. These patents do not constitute any relevant antecedent.

Summary of the Invention

[0007] The main object of the invention is a simple and economic modular arrangement for longitudinal beams and crosspieces constituting the pallet base, optimizing their storage and delivery. This is attained by a special stamping method affording substantial improvements to the process for mounting the component parts for their further assembly. This particular structure allows a better result and life of longitudinal beams and crosspieces obtained.

[0008] Therefore, the particular structure of each of the longitudinal beams and crosspieces allows their manufacture from an economic and light material, corrugated cardboard, thus obtaining important advantages in conveying, stamping and assembling in large scale production machines, further affording a much reduced cost per unit. The light weight involved makes this pallet suitable for air freight. In this respect, we note that wooden pallets weight about 30 kg, while those made of cardboard of similar strength weight about 7 kg.

[0009] Another advantage is the fact that, in particular markets, disposal materials should pay a compensation fee due to their further handling as remainders, which in case of cardboard, being recyclable, does not exist.

[0010] The design of the parts comprising the modular pallet allows their automatic folding, according to a simple

sequence of successive steps, in a very economical way.

[0011] Eventual changes in the shape and size of the pallet may be effected in a few minutes by means of simple adjustments, while in other embodiments, long periods of time and labor costs are involved.

[0012] Due to the light weight of the forming elements and due to the fact that they may be piled up into packages being easily handled, the pallets may be delivered to the usage sites and assembled at the working place. Merely as an operative reference, 400 assembled pallets may be carried in a conventional semi trailer. 2400 pallets of the invention may be contained into the same vehicle for then being assembled at the site of use.

[0013] Therefore, the main object of the invention is a novel and economic way for stamping corrugated cardboard templates required for obtaining pallet skids, using an efficient assembling process which does not expose the waves involved in the formation of cardboard sheets.

[0014] Further, the assembly process may be made automatically, folding of the stamped parts being carried out by vertical discharge. In the first place skids are stamped, and then assembled by vertical folding. At this time each template is folded and adhered over itself to form each skid. Then, complementary skids are embedded to form the framed or reticular base, ending with the folding of the base cover.

[0015] The modular pallet of the invention replaces those made of wood and fulfills all the requirements complying with phytosanitary regulations for international freight, as well as hygienic regulations.

[0016] The invention is comprised by a modular member formed by modules which may be embedded to adapt themselves to several sizes, being the most common from 400 mm to 1340 mm.

[0017] Due to design features, this pallet may convey loads higher than 1 ton and support a static weight of about 4 tons. Due to the structural rigidity it may be conveyed by most of transporting systems.

[0018] The pallet of the invention is formed by several studs placed such that the mentioned strength is attained. The standard model is comprised by four short studs, of about 1000 mm long and three long studs of about 120 mm, covered by an upper sheet of the same size.

[0019] On the other hand, amount and shape of the studs will depend on the specific application.

[0020] The process of the invention includes the following steps: (a) stamping the corrugated cardboard sheet templates with their waves located perpendicular or parallel to the folding lines, wherein the templates correspond to long and short studs forming the supporting frame of the base cover; (b) folding the template 90° along the double lines of minor strength -6-; (c) following the folding 180° towards inside both ends of the template along the minor strength lines -5-; (d) folding along the remaining double line -6- of minor strength; (e) folding back of the already folded regions over the remaining central plane; (f) completing the definite folding along the

central minor strength double line -7- to finish the long stud, wherein all folds are being bound by an adhesive, preferably selected between hot melt adhesive or vinyl adhesive; g) embedding and binding both short and long studs in the amount required for forming the base frame; and (h) adhering the base cover.

[0021] The modular pallet is comprised by two parts which are a short stud and a long stud obtained from corresponding templates assembled in the required amount, which mate with a base sheet; wherein the long module template has two straight opposite edges, while the remaining longer edges have at least four notches located along each edge; said template has a variety of cuttings and lines of minor strength defining a succession of different width symmetrical strips. Said cuttings are aligned symmetrically in corresponding axes, such that, at the pair of end strips separated by a minor strength line, a pair of rectangular openings are formed, having rounded corners separated at the center by a pair of narrow cuts and by a cut of edges opposite to the template; minor strength lines separate them from the two central strips; following the same axes mating stampings corresponding to folds determined by the double minor strength symmetrical lines, there are cuttings being relatively narrow and slightly widened coinciding with the minor strength double lines; the mentioned cut portions are completed with other larger portions defining corresponding rectangular windows in templates, having rounded corners and being aligned as per corresponding axes, located on the minor strength double lines parallel to the central lines, the central lines being higher than the other lines.

Brief Description of the Drawings

[0022]

Figure 1 is a plan view of the stamped template required for assembling the long stud employed in the present invention.

Figure 2 is a plan view of the short stud for the pallet of the invention.

Figure 3 is a perspective exploded view of the already mounted studs and of the upper sheet, required for constructing a pallet.

Figure 4 is a perspective view of the already mounted pallet.

Figure 5 shows the sequence of steps of the process for mounting one of the studs forming the pallet.

[0023] In the above mentioned figures, the same reference symbols designate the same or equivalent parts.

Detailed Description of the Invention

[0024] In the first place, templates are stamped, directing the corrugated cardboard sheets such that their waves remain perpendicular to the minor strength lines

which are marked on each of them.

[0025] Considering figure 1, the long stud is formed from a stamped corrugated cardboard sheet having a substantially rectangular shape, in which two of the opposite edges -1- are straight while the longer edges -2- have at least four portions cut, which are fairly narrow having rounded outer corners, forming end notches -3- near both ends and central notches -4-.

[0026] Thickness of the notches will depend on the width of the already folded and assembled stud.

[0027] There are various cuts and minor strength lines on the sheet, defining a succession of symmetrical strips which in this exemplary embodiment are six. Strips have different width according to the corrugated cardboard thickness so that once same is folded and bound, each fold absorbs the material thickness and forms a uniform block until the modular stud is finished.

[0028] Minor strength lines facilitating each folding are designated -5-, those near the edges -2-, from the double lines, those narrower designated -6- are symmetrical with respect to the central line, which is wider and designated -7-.

[0029] In lines -5- narrow cuts -8- are formed, which are coaxial to cuts -3- but of a larger width, being the central lines -9- coaxial to cuts -4-. Between center lines -9- and end lines -8- there are a pair of windows formed by rectangular spaces -10- with rounded corners.

[0030] The folding minor strength double lines -6- are subjected to a number of cuts -11- which is equal to the number of notches -3- and -4-, the cuts having the same width as that of the notches, but having a length of twice the depth of the notches. Cuts -11- are slightly broadened to match the minor strength lines -6-. Another pair of rectangular openings -12- with rounded edges aligned and slightly higher than openings -10-, is stamped at the two central strips separated by the minor strength double line -7-.

[0031] As shown in figure 2, the same kind of cuts as those designated -10-, -11- and 12 in figure 1, are made in the template used for obtaining short studs, several of which will be placed as cross members, intercalating narrower cuts -13- similar to those designated -8-. Further, double minor strength lines -14- and simple lines -15 are symmetrically located.

[0032] Figure 3 shows the upper sheet -16-, the already mounted shorter studs -17- and long studs -18- ready for embedding, as shown in figure 4.

OPERATION

[0033] Upon establishing the essential components of the invention, a functional and operative relationship of the forming parts and of the result obtained are described below.

[0034] Figure 5 shows the assembly steps of one of the studs.

[0035] The process begins at the upper left corner following the arrows. This scheme corresponds to the

stamped template for the long stud, designated -a- in Figure 1, corresponding to the first step of the process.

[0036] In step -b- the template is folded 90° along one of the minor strength double lines -6-; in step -c- both ends of the template are folded 180° inwardly as per the minor strength lines -5-; in step -d- folding along the remaining minor strength double line -6- is carried out; in step -e- both already folded portions are folded back over the plane; the definite folding being effected along the minor strength central double line -7-, thus obtaining the finished long stud. The folded portions are bound by means of an adhesive preferably selected between hot melt and vinyl adhesives.

[0037] Folding of the short studs is carried out with the same process. Once the required amount of studs is obtained, they are embedded by means of the notches defined by cuttings -3- and -4- of the long stud and notches -10- of the short stud, as shown in figures 3 and 4.

[0038] Having described a preferred embodiment of the invention as well as operation thereof, the invention is intended to cover all alternatives, as contained within the scope of the appended claims.

Claims

1. Process for the manufacture of a modular pallet, of the type stamped in corrugated cardboard, **characterized by** comprising the steps of:

- (a) stamping the corrugated cardboard sheet templates with their waves located perpendicular or parallel to the folding lines, wherein the templates correspond to long and short studs forming the supporting frame of the base cover;
- (b) folding templates 90° along the double lines of minor strength -6-;
- (c) folding 180° towards inside both ends of the template along the minor strength lines -5-;
- (d) folding along the remaining double line -6- of minor strength;
- (e) folding back the already folded regions over the remaining central plane;
- (f) completing the definite folding along the central minor strength double line -7- to finish the long stud, wherein all folds are being bound by an adhesive, preferably selected between hot melt adhesive or vinyl adhesive;
- (g) embedding and binding both short and long studs in the amount required for forming the base frame; and
- (h) adhering the base cover.

2. Modular pallet manufactured according to the process claimed in claim 1, **characterized in that** the modular pallet is comprised by two parts which are a short stud and a long stud obtained from corresponding templates assembled in the required

amount, which mate with a base sheet; wherein the long module template has two straight opposite edges, while the remaining longer edges have at least four notches located along each edge; said template having a variety of cuttings and lines of minor strength defining a succession of different width symmetrical strips, said cuttings being aligned symmetrically in corresponding axes, such that, at the pair of end strips separated by a minor strength line, a pair of rectangular openings are formed, having rounded corners separated at the center by a pair of narrow cuts and by a cut of edges opposite to the template; minor strength lines separate them from the two central strips; following the same axes mating stampings corresponding to folds determined by the double minor strength symmetrical lines, cuttings being relatively narrow and slightly widened coinciding with the minor strength double lines; the mentioned cut portions being completed with other larger portions defining corresponding rectangular windows in templates, having rounded corners and being aligned as per corresponding axes, located on the minor strength double lines parallel to the central lines, the central lines being higher than the other lines.

3. Modular pallet, as claimed in claim 2, **characterized in that** said rectangular cuts, having the same width and being coaxially arranged with said notches made at the upper edge of the template, are distributed in the same amount as that of said notches.
4. Modular pallet, as claimed in claims 2 and 3, **characterized in that** said cuts having the same width as that of said notches have their width according to the thickness of the corrugated cardboard upon the later is being folded and bound such that each stud obtained forms a uniform block.
5. Modular pallet, as claimed in claims 2-4, **characterized in that** the templates are symmetrically distributed forming six strips.
6. Modular pallet, as claimed in claims 2-5, **characterized in that** the template corresponding to short studs has the same type of cuts that the template forming long studs, excepting for the edges which are continuous and for two minor strength double lines symmetrical to the central line which have no cuts.
7. Modular pallet as claimed in claims 2-6, **characterized in that** said rectangular cuts have a height which is twice the height of said notches.
8. Modular pallet as claimed in claims 2-7, **characterized in that** said variety of minor strength lines defining a succession of six strips symmetrically ar-

ranged at the sides of the two central lines, have different widths, decreasing from the central lines, wherein the differences among widths is a function of the thickness of the corrugated cardboard employed.

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9. Process according to claim 1, **characterized in that** in the first stamping step of the corrugated cardboard sheet templates, the cardboard is arranged with its waves parallel to the folding line.

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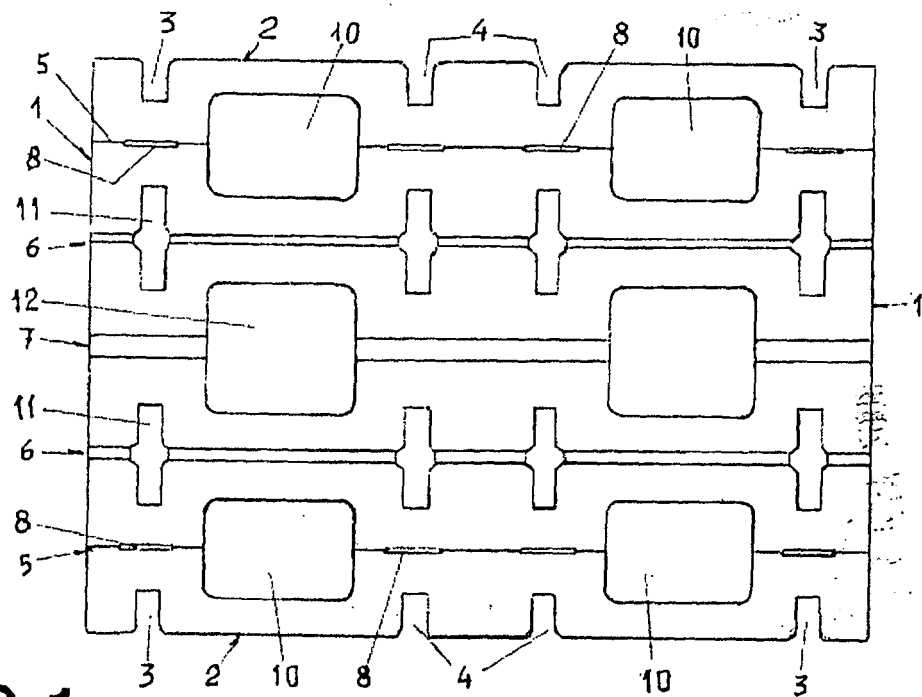


FIG. 1

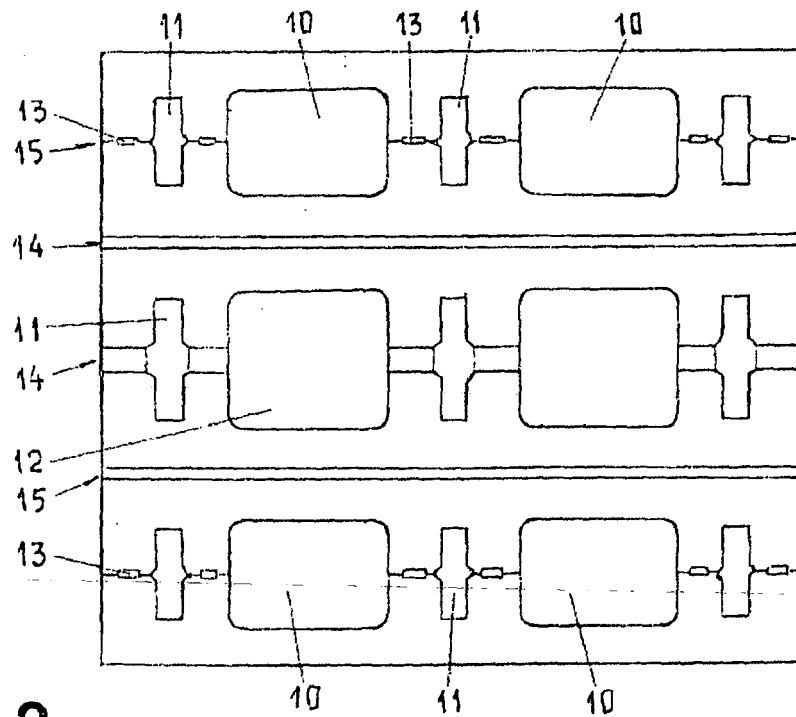


FIG. 2

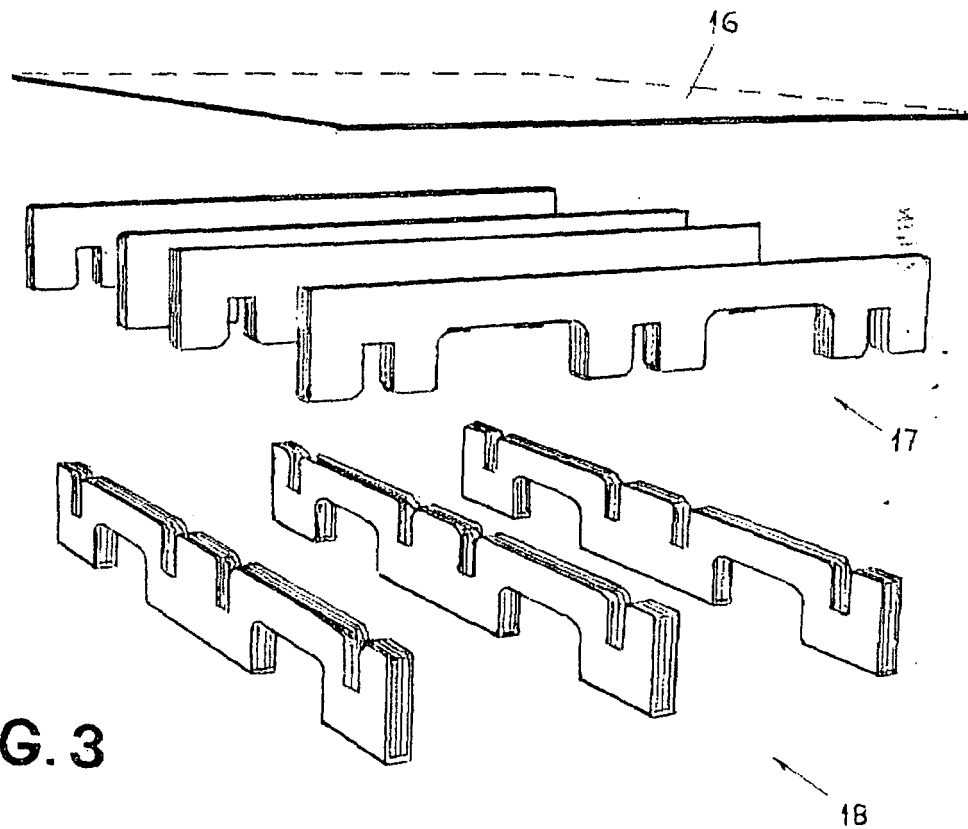


FIG. 3

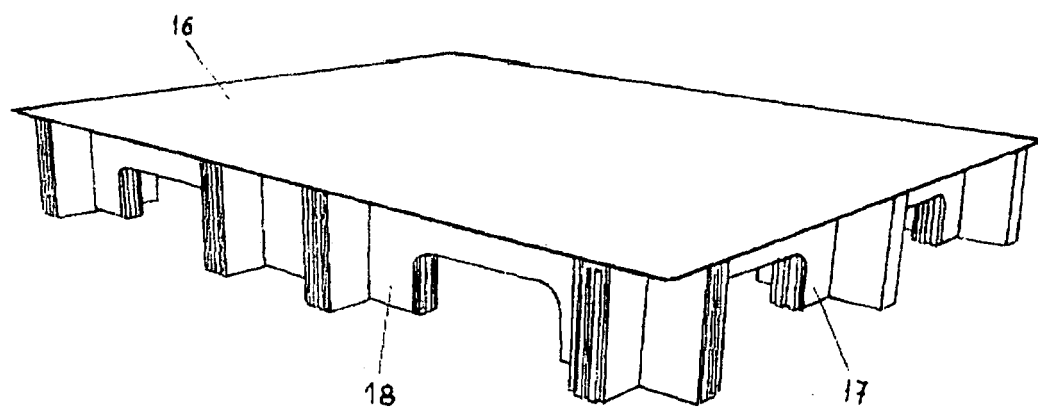


FIG. 4

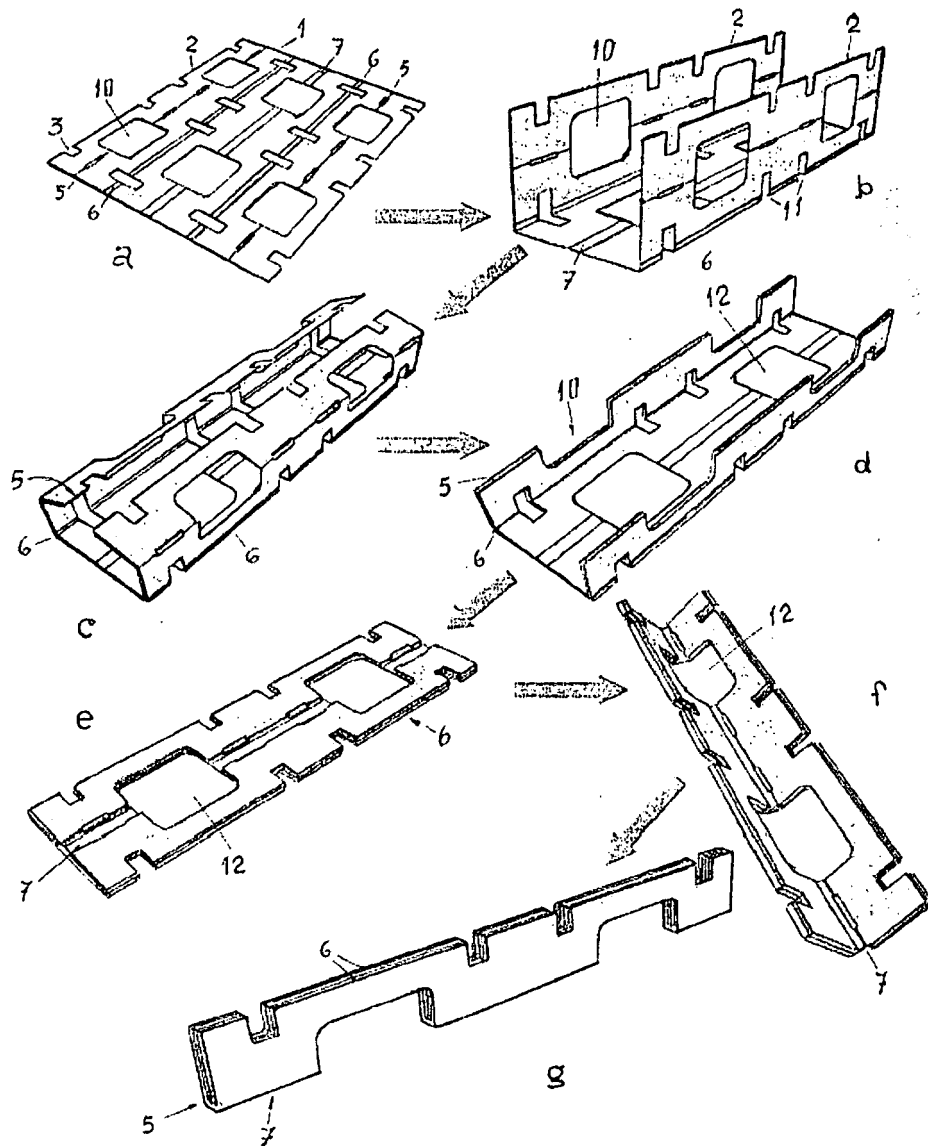


FIG.5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 38 0153

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 September 2008	Examiner Fitterer, Johann
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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EP 08 38 0153

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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