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(54) **BLANK, METHOD AND APPARATUS FOR MAKING A PALLET**

ZUSCHNITT, VERFAHREN UND VORRICHTUNG ZUR HERSTELLUNG EINER PALETTE
FLAN, PROCEDE ET MACHINE POUR FABRIQUER UNE PALETTE

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Description

[0001] The invention relates to load handling apparatus, particularly a blank for forming a pallet.

[0002] Pallets are used in grocery and retail distribution and in industry for handling loads. The pallets are often loaded with a load which can be transported round say a factory or warehouse site on fork-lift trucks or the like. Also, the pallets can be loaded onto a lorry or truck for transporting a load over distance. Such pallets must be strong enough to perform their function. Traditionally such pallets have been made of wood. Whilst being able to support a load, such pallets are heavy, bulky and are liable to break or splinter, which is a health or injury hazard for operatives. Such pallets too are often "recycled" in the sense of being returned after use to an authorised depot, but such systems consume substantial space for storage of pallets prior to return, and require numerous lorry journeys to effect that return. There is also a risk that pallets will be lost or damaged.

[0003] As an alternative to wood, lighter pallets made from foldable and creasable materials such as corrugated cardboard have been produced. However prior non-wooden pallets of this kind have proved difficult to manufacture cost effectively, requiring as they do several parts which need to be assembled. In this regard US 4 864 940 discloses a blank for forming a pallet formed from two pallet sections which are attached together to provide the pallet, in accordance with the preamble of appended claim 1. .

[0004] It is accordingly an object of the invention to seek to mitigate these disadvantages.

[0005] According to the invention there is provided a single blank of material, comprising a creasable material which is foldable about crease means formed therein, whereby to form a sleeve by securing areas of the blank together, the sleeve having major surfaces superposed and with one surface displaced with respect to the other, the sleeve comprising an upper in use surface for receiving a load, a lower in use surface substantially parallel to the upper surface and spaced therefrom in an erected condition by walls defined by hinge lines which space the two surfaces apart, characterized by the blank comprising a plurality of integral in use spaced support devices, each formed by cutting and creasing the blank and which have substantially the same height as the walls and are adapted to extend between the upper and lower surfaces of the sleeve in use, whereby to rigidify the sleeve, the arrangement being such that the sleeve can be acted upon to shift the sleeve bodily whereby to form a pallet.

[0006] The pallet may be erected ready for use from a flat form into its final form, in an erecting apparatus, particularly when the blank is made of creasable material which may be foldable about crease means formed therein.

[0007] The single blank of material may thus comprise a fluted blank of planar material, for example corrugated material such as cardboard.

[0008] Some at least of the areas which may be secured together by adhesive may comprise a member formed by cutting and creasing and extending internally of the erected pallet to form an internal supporting wall for supporting the upper and lower surfaces in the erected, spaced apart condition.

[0009] The members may be in the lower in use surface and providing therein in the erected pallet, apertures for receiving the wheels of a pallet truck.

[0010] Each member may be attached to the in use lower surface by crease means about which it is hingable to extend to the inner surface of the upper in use surface and having a flap formed by a hinge line by which flap the member is secured to the upper (in use) surface.

[0011] The member may have a pair of further hinge lines extending substantially at right angles to the crease lines and additional flaps extending in planes substantially at right angles to the first flap and formed by cuts substantially at right angles to the hinge lines, whereby the additional flaps can be hinged to provide additional support members between the hinge line and first flap and extending between the upper and lower surfaces of the pallet.

[0012] The additional flaps may have a projection and the lower surface through slots for receiving an associated respective projection for interlocking the additional flaps and lower surface. This provides for a positive forming of the pallet from the blank.

[0013] There may be a plurality of spaced rows of members as considered transversely of the pallet.

[0014] The additional flaps of each member may be directed towards one another.

[0015] The rows of members may be positioned intermediate the length of the pallet. This provides for a neat construction, and appearance.

[0016] There may be a support member adjacent each end of the pallet, formed by parts of the lower surface hinged thereto and separated therefrom by cuts, and the respective support members may define receptors for a respective fork of spaced forks of a fork lift or similar lifting apparatus.

[0017] The blank may have two pairs of major crease means comprising crease lines formed at each end of the blank, each pair being spaced by a distance equivalent to the height of the formed pallet, whereby when the pallet is formed by folding about the major crease lines, free ends overlap and are secured together to form the pallet.

[0018] The part of the blank between each pair of major crease lines may form an end wall of the pallet, and preferably each end wall may have inwardly foldable end support members which together form an entry for a fork lift element.

[0019] The respective crease lines may extend transversely to flutes of the blank.

[0020] The pallet may have walls on all four sides.

[0021] According to a second aspect of the invention there is provided a method for forming a pallet from a

single blank as hereinbefore define, according to appended claim 20.

[0022] The method may comprise the step of shifting the overlapping surfaces bodily with respect to one another to form the pallet. This is a relatively simple forming step.

[0023] According to a third aspect of the invention there is provided apparatus for forming a sleeve from a single blank as hereinbefore defined, according to claim 22.

[0024] There may be two die cutters, one of which may be reversed with respect to the other and each being positioned together upstream of the folding section. This provides for forming a reverse crease.

[0025] The apparatus may be in combination with a device for forming a pallet received from the apparatus by moving overlapping surfaces thereof bodily with respect to one another to provide spaced apart surfaces and actuating integral support devices of the pallet to support the surfaces in said spaced apart relation.

[0026] A pallet embodying the invention is hereinafter described, by way of example, with reference to the accompanying drawings.

Fig. 1 is a plan view of a first embodiment of a single die cut blank of corrugated cardboard;

Fig. 2 is a plan view of a second embodiment of a single blank;

Fig. 3 is a plan view of a third embodiment of a single blank;

Fig. 4 is a plan view of a fourth embodiment of a single blank;

Fig. 5 is a plan view of a fifth embodiment of a single blank;

Fig. 6 is a plan view of a sixth embodiment of a single blank;

Figs. 7 to 10 are respective views of a pallet formed from a single blank, Figs. 7 and 8 being respective perspective and plan views of an upper (in use) surface of the pallet and

Figs. 9 and 10 are respective perspective and side elevational views of the lower (in use) surface of the pallet;

Fig. 11 is a schematic plan view of a single blank showing glueing regions;

Figs. 12 to 15 show schematic views of a blank for forming a further embodiment of pallet according to the invention, Fig. 12 showing a die cut blank prior to folding and with glueing areas indicated in shading, Fig. 13 showing a perspective view of a sleeve

formed by folding and glueing the blank of Fig. 12 Fig. 14 showing a perspective top view of the pallet erected from the sleeve of Fig. 13, and Fig. 15 showing a perspective bottom view of the pallet erected from the sleeve of Fig. 13;

Figs. 16 to 19 show schemate views of a blank for forming a further embodiment of pallet according to the invention, Fig. 16 showing a die cut blank prior to folding and with glueing areas indicated in shading, Fig. 17 showing a perspective view of a sleeve formed by folding and glueing the blank of Fig. 16, Fig. 18 showing a perspective top view of the pallet erected from the sleeve of Fig. 17, and Fig. 19 showing a perspective bottom view of the pallet erected from the sleeve of Fig. 17;

Figs. 20 to 22 show schematic view of a blank for forming a further embodiment of pallet according to the invention, Fig. 20 showing a die cut blank prior to folding and with glueing areas indicated in shading, Fig. 21 showing a perspective top view of the erected pallet, and Fig. 22 showing a perspective bottom view of the erected pallet;

Figs. 23 to 25 show schematic views of a blank for forming a further embodiment of pallet according to the invention, Fig. 23 showing a die cut blank prior to folding and with glueing areas indicated in shading, Fig. 24 showing a perspective top view of the erected pallet, and Fig. 25 showing a perspective bottom view of the erected pallet; and

Figs. 26 and 27 show schematically respective plan and side elevational views of apparatus for producing sleeves which are adapted for erection subsequently to form a pallet.

[0027] Referring to the drawings, all relate to a pallet which is erected from a sleeve which is made from a single blank 1 of material such as corrugated cardboard. Thus a corrugated sheet or blank is used.

[0028] Such a material is creasable, foldable and cuttable being foldable about crease (or hinge) means in the form of lines formed in a major surface thereof.

[0029] In all the figures showing blanks 1, cuts in the material of the single blank 1 are denoted by numeral 2, and crease or hinge lines by numeral 3. Like parts are generally indicated by like numerals throughout, for ease of reference.

[0030] Referring to Fig. 1, the single blank 1 shown has three pairs 4, 4' of parallel transverse crease or fold lines, one pair 4 being adjacent one end 5 of the blank 1 and the other two pairs 4' being intermediate the length of the blank 1. The pair 4 of fold lines has cuts 2 through the thickness of the blank 1 to form a support device 6 in the form of a flap which flap can hinge about a hinge or crease line 3' orthogonally arranged to the crease lines

and extending in the direction of the arrow 'F'. The flaps 6 formed between the other two pairs 4' of crease lines have projections 7 which are associated with slots 8 of rectangular configuration through the thickness of the blank. There are also four square holes 9 cut through the thickness of the blank to form apertures in the formed pallet for receiving in use a wheel positioned at the end of a fork of a pallet truck.

[0031] By application of securing means in the form usually of glue to a part or parts of the blank which overlap, in this case along an edge strip 10 and the opposite edge 11, when the blank 1 is folded upwardly out of the plane of the material so that the edge strip 10 contacts, and is secured to, the surface of the blank and the edge 11 is secured to the surface of the blank which is below the one viewed on Fig. 1, just beyond the line of the pair of hinge lines 4, a pallet 1 is formed with upper 12 and lower 13 surfaces in parallel and longitudinally displaced in the direction of the arrow F. Thus a sleeve is formed.

[0032] On pushing the formed sleeve from opposite sides, the surfaces 12, 13 of the sleeve are moved apart by the distance 'W' of the spacing between the pairs of hinge lines 4, 4' which form the walls of the pallet, and hence the height thereof, so that when the flaps 6 are pushed out of the plane of the walls, inwardly of the pallet 1, by hinging about the hinge lines 3' so that they are orthogonally positioned with respect to the walls 'W', the pallet 1 is erected to form a rigid, load bearing integral unit, from the single blank 1. Forks of a fork lift apparatus can then be inserted in fork-receiving apertures (see Fig. 10 for example) 14 between the respective walls and a central wall formed by the edge strip and blank material between the hinge lines 4,4'.

[0033] Referring now to Fig. 2, the single blank 1 shown has two spaced pairs 4' of transverse fold lines with flap or support members 6 formed as in Fig. 1. There are also through slots 8 as in the first embodiment. In addition, there are additional members 15 cut out of the blank and hingable with respect thereto by crease lines 15', the members each having a flap or tongue and further flaps or support members which are cut out except at the hinge line. The flaps 15 at the left hand end as viewed form a trapezoidal kind of aperture, the sides of which match or are complementary to broad notches 16 at one end 17 (the right hand end as viewed in Fig. 2) of the blank 1, the opposite end of which has support flaps 18 with a projection 19 and a hinged edge strip 20. Securing mean such as adhesive is applied along the edge 17 and edge strip 20 respectively, so that when the blank 1 is folded about the hinge lines 4', the spacing 'W' between which again determines the wall height, the edge 17 overlies the edge so that the angled cut outs 15 and notches 16 are vertically aligned and is secured thereto by the adhesive and the edge strip 20 is secured to the blank 1 to form two longitudinally offset surfaces in contact to form a sleeve, which when a force is applied raises the surfaces 12, 13 by the height of the wall 'W' such that when the flaps 6 are orthogonally pushed out of the plane of

their flap members, the pallet is formed in a rigid, erected manner for receiving a load, from the one blank. There are tongues 20' which are glued to the inside surfaces of the blank when it is folded to form the sleeve.

[0034] Fig. 3 shows a sleeve similar to Fig. 2, the main differences being that left hand flaps 6 of Fig. 2 are removed prior to folding to form the sleeve.

[0035] Referring to Fig. 4, the blank shown therein is similar to that of Fig. 2, except that in addition there are longitudinal edge members 21 which when a pallet is erected from the sleeve determine that the pallet is closed on all sides, and not just at the ends. Entries for forks of a fork lift apparatus are provided by flaps 21' which are folded out of the plane of the edge strips 21 inwardly of the pallet 1 to support the surfaces 12 and 13 in a rigid manner as before.

[0036] The single blank of Fig. 5 is similar to those described hereinbefore in that it is formed into a sleeve which is erected to form a pallet, there being in Fig. 5 no intermediate supporting wall, the rigidity of this formed pallet being provided by the flaps 6, tongues 20' of the flaps as in all the embodiments being secured as by glueing to a surface of the blank to which it comes into contact on folding about the pair of hinge lines 4, 4', the opposite edges of the blank overlapping and the overlapping parts being secured as by adhesive as before, the flaps or support devices 6 as before providing rigidity and stability of the erected pallet formed as an integral unit from the single blank.

[0037] This provides for a relatively smaller blank size than those required in Figs. 1 to 4.

[0038] The single blank of Fig. 6 is similar to that of Fig. 5 with the addition of opposite edge strips 21 to form a sleeve which is closed on all sides, except when the tongues 20' are pushed in, as described with reference to Fig. 5.

[0039] Figs. 7 to 10 show different views of a pallet 100 formed from a sleeve itself formed from a single blank 1, there being an upper surface 12, a lower surface 13 and walls 'W' defining the height of the pallet 100 formed by hinge or crease lines of the blank and support flaps turned out of the plane of the blank and secured as by adhesive to an opposite surface of the blank, the support flaps having support members which are folded out of the plane thereof as by being pushed out to extend orthogonally of the support flaps to form a rigid, erected pallet.

[0040] Fig. 11 shows schematically a blank similar to that of Fig. 2, and showing areas 22 to which adhesive is applied so that those parts become glued to parts of the surface of the blank which they contact on folding about the major hinge lines 4'. The flaps are of Z-shape in end elevation, in all embodiments, in the erected pallet 100.

[0041] Referring now to Figs. 12 to 15, the embodiment shown is formed from an initially flat corrugated sheet or blank of cardboard There is a panel which is a major upper surface 12 of the pallet, the major surface thus being a surface adapted for receiving and supporting a

load.

[0042] The blank 1 is generally oblong or rectangular in plan, and there are two end panels respectively one at either end of the panel forming the upper surface, the end panels in the erected pallet forming the lower surface 13 thereof.

[0043] There are various flaps formed in the blank, and areas to which an adhesive such as glue is applied are shown shaded and indicated by the letter 'G', the areas 'G' being on a surface of the blank which is an inner surface of a sleeve formed therefrom and from which a pallet is ultimately erected.

[0044] There are slots which can receive tabs of flaps during a forming operation.

[0045] In operation the blank is die-cut and glue is applied in the area 'G'. The die-cut blank is then folded so that the opposite end panels lie substantially parallel to and over the panel 12 about hinge lines. The glued areas contact opposite surfaces of the blank, and flaps which are joined to the blank by hinge lines at right angles to the direction 'F' of the corrugations or flutes form, in the erected pallet, substantially vertical supports or anti-crushing means when a load is applied to the surface of the pallet formed from the sleeve.

[0046] As can be seen from Fig. 15, the cut-outs or flaps are folded out of the plane of the blank and glued areas 'G' are secured to the underside of the panel 12 forming the upper surface of the formed pallet.

[0047] The embodiment of Figs. 16 to 19 is similar to that of the previous embodiment, the main difference being lateral flaps which in the erected pallet, are folded to 'wrap' the corners and walls adjacent entry ports for lines of a fork-lift truck to enhance the side wall strength of the erected pallet, as is shown in Figs. 18 and 19.

[0048] In the previous two embodiments intermediate support members or flaps provide a central rib along the length of the pallet.

[0049] The further embodiment shown in Figs. 20 to 22 is similar to those described previously, the larger flaps having a different configuration, and there being an additional row of flaps in the panel forming the upper surface. As there is no central rib, there is an extra row of flaps 2, and only one fold over to provide a glue point via the glued edge strip 10 which is glued to the outside 13.

[0050] A yet further embodiment is shown in Figs. 23 to 25, the difference from the immediately preceding embodiment being the addition of lateral flaps, akin to those of the embodiment of Figs. 16 to 19, so they will not be described again.

[0051] Turning now to Figs. 26 and 27, these show apparatus 200 forming a sleeve of all embodiments.

[0052] The apparatus 200 shown is one for continuous production of sleeves, comprises a station 201 for receiving raw material, i.e. corrugated sheet or blanks previously formed on a corrugator. The sheets or blanks are then fed sequentially from the station 202, whence they pass to a feeder 203 and print unit 204. After this, they pass downstream to a first, or bottom, die cutter 205,

thence to an upper, or top, die cutter 206. The die-cut blanks, which now have the requisite flaps and fold lines imparted to them at the die cutters 205, 206 are then passed to and through a glueing and folding station 207 at which the glue areas 'G' are first laid down prior to folding so the necessary glue contact is made to form a folded, glued, sleeve, which is not erected. It is essentially flat, with the major surfaces overlying one another, and longitudinally offset. The formed sleeve is then passed through a compressing and drying station 208 to ensure curing or setting of the glue, the formed sleeves being then received on a stacker 209, or down stacker, before being assembled at a discharge station 210 for subsequent despatch.

[0053] Although an "in-line" apparatus 200 has been described, it will be understood that the sequence of operations described may be carried out separately. In this latter case, a stack of die cut blanks will be removed from the die cutter and fed into a separate folding and glueing machine via a stack of die cut blanks placed in a separate feeding magazine for the folding and glueing machine. Glue is applied to the die cut blank as necessary to form a folded, glued sleeve. The production of sleeves in separate units may be advantageous for lower volume production of such sleeves.

[0054] In all the embodiments, the product formed from the die cut blank is a folded glued, sleeve, adapted for erection to provide a pallet from a unitary or single blank.

[0055] These sleeves are erected as required to form a usable pallet. An operation to erect the pallet from the sleeve can be carried out where desired, which may be at the premises of an end user, or at a location such as a factory where the sleeves are made. As described hereinbefore, in some embodiments, reinforcing or strengthening flaps are glued together at two ends of the pallet during the erection process.

[0056] It will be understood that in essence the invention relates to production of a one-piece sleeve which is erectable to form a pallet, the sleeve being formed from a single blank of material, suitably formed with appropriate panels and flaps, the arrangement of which in the blank being such that a surface to form a load bearing surface and a surface forming a base are overlying, and relatively slightly displaced longitudinally in the unerected condition of the sleeve, the respective surfaces being connected by parts or intermediate members of the blank which lie at an angle between and secured to the major surfaces and which when the sleeve is shifted bodily, are erected to erect the pallet, those parts or intermediate members providing strength against crushing when a load is applied to the load bearing surface. The respective surfaces may suitably be overlying and may be substantially in contact.

[0057] Stated in another way in all embodiments the single blank is folded to have its major surfaces lying one over the other, closely adjacent and longitudinally offset to form a sleeve which is erectable to form a pallet by "pushing" the sleeve so that the major surfaces are ver-

tically, in use, over one another. Side flaps 6 are pushed in from opposite sides by suitable pusher means such as a ram and engage in slots 8 when present to provide for additional vertical support of the load-bearing surface 12.

[0058] It will be understood that the pallets 100 described herein are light, rigid, strong, relatively inexpensive as they are formed from a sleeve formed from a single blank 1 which can be formed directly by folding and glueing. Moreover, as the pallets are made of corrugated cardboard, or the like, they can be recycled after use through established recycling channels and the like. Also, the danger of injury when using the pallets instead of wooden pallets is much reduced as the pallets do not splinter and are much lighter.

Claims

1. A single blank of material (1), comprising a creasable material which is foldable about crease means formed therein, whereby to form a sleeve by securing areas of the blank (10, 11, 20, 20', 22) together, the sleeve having major surfaces superposed and with one surface displaced with respect to the other, the sleeve comprising an upper in use surface (12) for receiving a load, a lower (13) in use surface substantially parallel to the upper surface and spaced therefrom in an erected condition by walls defined by hinge lines (4, 4') which space the two surfaces (12,13) apart, **characterized by** the blank comprising a plurality of integral in use spaced support devices (6), each formed by cutting and creasing the blank (1) and which have substantially the same height as the walls and are adapted to extend between the upper (12) and lower (13) surfaces of the sleeve in use, whereby to rigidify the sleeve, the arrangement being such that the sleeve can be acted upon to shift the sleeve bodily whereby to form a pallet.
2. A blank according to Claim 1, the said areas being secured together by adhesive.
3. A blank according to Claim 2, erected into the sleeve in an erecting apparatus.
4. A blank according to any preceding claim, the single blank of material comprising a fluted blank of planar material.
5. A blank according to Claim 4, the blank comprising a corrugated cardboard blank.
6. A blank according to any preceding claim, some at least of the areas comprising a member formed by cutting and creasing and extending internally of the erected device to form an internal supporting wall for supporting the upper and lower surfaces in the erected, spaced apart condition.
7. A blank according to Claim 6, the members being in the lower (13) in use surface and providing therein in the erected sleeve, apertures (6) for receiving a wheel of a pallet truck.
8. A blank according to Claim 7, each member being configured for being attached to the in use lower surface of the sleeve by having crease means about which it is hingeable to extend to the inner surface of the upper in use surface of the sleeve and by having a flap (20) formed by a hinge line by which flap the member is configured for being secured to the upper in use surface.
9. A blank according to Claim 8, the member having a pair of further hinge lines extending substantially at right angles to the crease means and additional flaps extending in planes substantially at right angles to the first flap and formed by cuts substantially at right angles to the hinge lines whereby the additional flaps can be hinged to provide additional support members between the hinge line and first flap and extending between the upper and lower surfaces of the pallet.
10. A blank according to Claim 9, the additional flaps having a projection and the lower surface through slots for receiving an associated respective projection for interlocking the additional flaps and lower surface.
11. A blank according to any of Claims 6 to 10, there being two spaced rows of members, one row comprising one member and the other row two members as considered transversely of the pallet.
12. A blank according to Claim 11, the additional flaps of each member being directed towards one another.
13. A blank according to Claim 12, **characterised by** the rows of members being positioned intermediate the length of the pallet.
14. A blank according to any of Claims 9 to 13, there being a support member adjacent each end of the sleeve, formed by parts of the lower surface hinged thereto and separated therefrom by cuts, the respective support members defining receptors for a respective fork of spaced forks of a fork lift apparatus.
15. A blank according to any one of Claims 7 to 14, the blank having two pairs of major crease means comprising crease lines formed at each or adjacent ends of the blank, each pair being spaced by a distance equivalent to the height of a formed pallet, whereby when a pallet is formed by folding about the major

crease lines, free ends overlap and are secured together to form the pallet.

16. A blank according to Claim 15, the part of the blank between each pair of major crease lines forming an end wall of the pallet, when erected.
17. A blank according to Claim 16, each end wall having inwardly foldable end support members which together form an entry for a fork lift element.
18. A blank according to Claim 17, the end support members having projections for engaging in associated cut outs in the or each support surface.
19. A pallet whenever formed from a blank according to any preceding claim, the pallet having walls on all four sides.
20. A method for forming a pallet from a single blank according to any of Claims 1 to 19, comprising the steps of providing a blank of creasable and severable material, forming crease means and cuts therein to provide members foldable out of the plane of the blank, providing means to secure contacting parts of the blank when folded together, folding the blank about the crease means, and securing overlapped parts of the blank together to form a sleeve with two overlapping surfaces lying over one another and substantially in parallel prior to subsequent erection to form a pallet.
21. A method according to Claim 20, comprising the step of shifting the overlapping surfaces bodily with respect to one another to erect the pallet.
22. Apparatus for forming a sleeve from a single blank for providing a pallet according to Claims 1 to 19, comprising sequentially a feeder for a single blank, at least one die cutter for cutting and creasing to form support members of the sleeve, a station for providing securing together of overlapping and contacting parts of the blank when folded, a folding unit for folding the blank, and a stacker for receiving a formed sleeve.
23. Apparatus according to Claim 22, there being two die cutters, one of which is inverted with respect to the other and each being positioned together upstream of the folding section.
24. Apparatus according to Claim 22 or Claim 23, in combination with a device for forming a pallet received from the apparatus by moving overlapping surfaces thereof bodily with respect to one another to provide spaced apart surfaces and actuating integral support devices of the pallet to support the surfaces in said spaced apart relation.

Patentansprüche

1. Einzelner Zuschnitt (1) aus Material, das ein faltbares Material aufweist, das um ein darin ausgebildetes Faltmittel faltbar ist, um eine Hülle durch Sichern von Flächen des Zuschnittes (10, 11, 20, 20', 22) miteinander zu bilden, wobei die Hülle Hauptflächen aufweist, die überlagert sind, und wobei ein Fläche mit Bezugnahme auf die andere verschoben wird, wobei die Hülle eine obere Gebrauchsfläche (12) für das Aufnehmen einer Last, eine untere Gebrauchsfläche (13) im Wesentlichen parallel zur oberen Fläche und beabstandet davon in einem aufgerichteten Zustand mittels der Wände aufweist, die durch Klappllinien (4, 4') definiert werden, die die zwei Flächen (12, 13) voneinander beabstanden, **dadurch gekennzeichnet, dass** der Zuschnitt eine Vielzahl von integrierten, bei Gebrauch beabstandeten Stützelementen (6) aufweist, wobei ein jedes durch Schneiden und Falten des Zuschnittes (1) geformt wird, und die im Wesentlichen die gleiche Höhe wie die Wände aufweisen und so ausgebildet sind, dass sie sich zwischen der oberen (12) und der unteren Fläche (13) der Hülle bei Gebrauch erstrecken, um die Hülle zu versteifen, wobei die Anordnung so ist, dass auf die Hülle eingewirkt werden kann, um die Hülle als Ganze zu verschieben, um **dadurch** eine Palette zu bilden.
2. Zuschnitt nach Anspruch 1, wobei die Flächen durch Klebstoff miteinander gesichert werden.
3. Zuschnitt nach Anspruch 2, der in die Hülle in einer Aufrichtevorrichtung aufgerichtet wird.
4. Zuschnitt nach einem der vorhergehenden Ansprüche, wobei der einzelne Materialzuschnitt einen gewellten Zuschnitt aus ebenem Material aufweist.
5. Zuschnitt nach Anspruch 4, wobei der Zuschnitt einen Wellpappenzuschnitt aufweist.
6. Zuschnitt nach einem der vorhergehenden Ansprüche, bei dem mindestens einige der Flächen ein Element aufweisen, das durch Schneiden und Falten gebildet wird und sich innerhalb des aufgerichteten Elementes erstreckt, um eine innere Stützwand für das Tragen der oberen und unteren Fläche im aufgerichteten beabstandeten Zustand zu bilden.
7. Zuschnitt nach Anspruch 6, bei dem die Elemente in der unteren Gebrauchsfläche (13) sind und darin in der aufgerichteten Hülle Öffnungen (6) für das Aufnehmen eines Rades eines Palettenwagens bereitstellen.
8. Zuschnitt nach Anspruch 7, bei dem ein jedes Element so ausgebildet ist, dass es an die untere Ge-

- brauchsfläche der Hülle angebracht werden kann, indem es Faltmittel aufweist, um die es klappbar ist, um sich zur inneren Fläche der oberen Gebrauchsfläche der Hülle zu erstrecken, und indem es eine Klappe (20) aufweist, die durch eine Klapplinie gebildet wird, wobei die Klappe ausgebildet ist, um das Element an der oberen Gebrauchsfläche zu sichern.
9. Zuschnitt nach Anspruch 8, bei dem das Element ein Paar weitere Klapplinien, die sich im Wesentlichen unter rechten Winkeln zum Faltmittel erstrecken, und weitere Klappen aufweist, die sich in Ebenen im Wesentlichen unter rechten Winkeln zur ersten Klappe erstrecken und durch Schnitte im Wesentlichen unter rechten Winkeln zu den Klapplinien gebildet werden, wodurch die weiteren Klappen geklappt werden können, um zusätzliche Stützelemente zwischen der Klapplinie und der ersten Klappe bereitzustellen, und die sich zwischen der oberen und unteren Fläche der Palette erstrecken.
10. Zuschnitt nach Anspruch 9, bei dem die weiteren Klappen einen Vorsprung und die untere Fläche Durchgangsschlitze für das Aufnehmen eines dazugehörigen jeweiligen Vorsprungs für das Verriegeln der weiteren Klappen und der unteren Fläche aufweisen.
11. Zuschnitt nach einem der Ansprüche 6 bis 10, bei dem zwei beabstandete Reihen von Elementen vorhanden sind, wobei eine Reihe ein Element und die andere Reihe zwei Elemente aufweisen, quer zur Palette betrachtet.
12. Zuschnitt nach Anspruch 11, bei dem die weiteren Klappen eines jeden Elementes in Richtung zueinander gerichtet sind.
13. Zuschnitt nach Anspruch 12, **dadurch gekennzeichnet, dass** die Reihen der Elemente zwischen der Länge der Palette positioniert sind.
14. Zuschnitt nach einem der Ansprüche 9 bis 13, wobei dort ein Stützelement benachbart einem jeden Ende der Hülle vorhanden ist, gebildet durch Teile der unteren Fläche, die daran klappbar ist, und die davon durch Schnitte getrennt werden, wobei die jeweiligen Stützelemente Aufnahmeeinrichtungen für die jeweilige Gabel der beabstandeten Gabeln einer Gabelstaplervorrichtung definieren.
15. Zuschnitt nach einem der Ansprüche 7 bis 14, wobei der Zuschnitt zwei Paar von Hauptfaltnitteln aufweist, die Faltnittlinien aufweisen, die an jedem oder den benachbarten Enden des Zuschnittes ausgebildet sind, wobei ein jedes Paar um einen Abstand beabstandet ist, der der Höhe einer gebildeten Palette äquivalent ist, wobei sich, wenn eine Palette durch Falten um die Hauptfaltnittlinien gebildet wird, die freien Enden überdecken und miteinander gesichert werden, um die Palette zu bilden.
- 5 16. Zuschnitt nach Anspruch 15, wobei der Teil des Zuschnittes zwischen einem jeden Paar der Hauptfaltnittlinien eine Endwand der Palette bildet, wenn sie aufgerichtet ist.
- 10 17. Zuschnitt nach Anspruch 16, bei der eine jede Endwand nach innen faltbare Endstützelemente aufweist, die zusammen einen Eintritt für ein Gabelstaplerelement bilden.
- 15 18. Zuschnitt nach Anspruch 17, bei der die Endstützelemente Vorsprünge für einen Eingriff in dazugehörige Aussparungen in der oder jeder Stützfläche aufweisen.
- 20 19. Palette, jedesmal wenn sie aus einem Zuschnitt nach einem der vorhergehenden Ansprüche gebildet wurde, wobei die Palette Wände an allen vier Seiten aufweist.
- 25 20. Verfahren zur Bildung einer Palette aus einem einzelnen Zuschnitt nach einem der Ansprüche 1 bis 19, das die folgenden Schritte aufweist: Bereitstellen eines Zuschnittes aus faltbarem und trennbarem Material; Bilden von Faltnitteln und Schnitten darin, um Elemente zu liefern, die aus der Ebene des Zuschnittes heraus gefaltet werden können; Bereitstellen eines Mittels zur Sicherung der sich berührenden Teile des Zuschnittes, wenn sie zusammengefaltet sind; Falten des Zuschnittes um das Faltmittel; und Sichern der sich überdeckenden Teile des Zuschnittes miteinander, um eine Hülle mit zwei sich überdeckenden Flächen zu bilden, die übereinander liegen, und die im Wesentlichen parallel sind, vor dem nachfolgenden Aufrichten, um eine Palette zu bilden.
- 30 21. Verfahren nach Anspruch 20, das den Schritt des Verschiebens der sich überdeckenden Flächen als Ganze mit Bezugnahme zueinander aufweist, um die Palette aufzurichten.
- 35 22. Vorrichtung zur Herstellung einer Hülle aus einem einzelnen Zuschnitt für das Bereitstellen einer Palette nach den Ansprüchen 1 bis 19, die sequentiell aufweist: eine Zuführvorrichtung für einen einzelnen Zuschnitt; mindestens eine Ausstanzvorrichtung für das Schneiden und Falten, um die Stützelemente der Hülle zu bilden; eine Station für das Bewirken des Sicherns der sich überdeckenden und berührenden Teile des Zuschnittes miteinander, wenn er gefaltet wird; eine Falteinheit für das Falten des Zuschnittes; und eine Stapleinrichtung für das Aufnehmen einer gebildeten Hülle.
- 40 45 50 55

23. Vorrichtung nach Anspruch 22, bei der zwei Ausstanzvorrichtungen vorhanden sind, von denen eine mit Bezugnahme auf die andere umgekehrt und jede zugleich oberhalb des Faltabschnittes positioniert ist.
24. Vorrichtung nach Anspruch 22 oder Anspruch 23 in Verbindung mit einem Element zur Bildung einer Palette, die von der Vorrichtung aufgenommen wird, indem die sich überdeckenden Flächen davon als Ganze mit Bezugnahme zueinander bewegt werden, um beabstandete Flächen bereitzustellen, und indem die integrierten Stützelemente der Palette betätigt werden, um die Flächen in der beabstandeten Beziehung zu stützen.

Revendications

1. Découpe unique de matériau (1), comprenant un matériau pliable, pouvant être replié autour d'un moyen de pliage qui y est formé, pour former ainsi un manchon en fixant des zones de la découpe (10, 11, 20, 20', 22) les unes aux autres, le manchon comportant des surfaces majeures superposées, une surface étant déplacée par rapport à l'autre, le manchon comprenant une surface supérieure en service (12) pour recevoir une charge, une surface inférieure en service (13), parallèle à la surface supérieure et espacée de celle-ci dans un état redressé par des parois définies par des lignes d'articulation (4, 4') espaçant les deux surfaces (12, 13), **caractérisée en ce que** la découpe comprend plusieurs dispositifs de support d'une seule pièce, séparés en service (6), chacun étant formé en découpant et en pliant la découpe (1), ayant pratiquement la même hauteur que les parois, et étant adapté pour s'étendre entre les surfaces supérieure (12) et inférieure (13) du manchon en service, pour accroître ainsi la rigidité du manchon, l'agencement étant tel que le manchon peut être entraîné à déplacer le manchon physiquement, pour former ainsi une palette.
2. Découpe selon la revendication 1, dans laquelle lesdites zones sont assemblées par un adhésif.
3. Découpe selon la revendication 2, redressée dans le manchon dans un dispositif de redressement.
4. Découpe selon l'une quelconque des revendications précédentes, l'unique découpe de matériau comprenant une découpe cannelée de matériau plan.
5. Découpe selon la revendication 4, la découpe comprenant une découpe de carton ondulé.
6. Découpe selon l'une quelconque des revendications précédentes, au moins certaines des zones comprenant un élément formé par découpage et pliage et s'étendant à l'intérieur du dispositif redressé, pour former une paroi de support interne, afin de supporter les surfaces supérieure et inférieure dans l'état redressé et espacé.
7. Découpe selon la revendication 6, les éléments étant agencés dans la surface inférieure en service (13) et formant dans le manchon redressé des ouvertures (6) pour recevoir une roue d'un transpalette.
8. Découpe selon la revendication 7, chaque élément étant configuré de sorte à être fixé sur la surface inférieure en service du manchon, et comportant un moyen de pliage autour duquel il peut être articulé afin de s'étendre vers la surface interne de la surface supérieure en service du manchon, et comportant un rabat (20) formé par une ligne d'articulation, ce rabat permettant la fixation de l'élément sur la surface supérieure en service.
9. Découpe selon la revendication 8, l'élément comportant une paire de lignes d'articulation additionnelles s'étendant pratiquement à angle droit par rapport au moyen de pliage, et des rabats additionnels s'étendant dans des plans situés pratiquement à angle droit par rapport au premier rabat, et formé par des découpes effectuées pratiquement à angle droit par rapport aux lignes d'articulation, les rabats additionnels pouvant ainsi être articulés pour fournir des éléments de support additionnels entre la ligne d'articulation et le premier rabat, et s'étendant entre les surfaces supérieure et inférieure de la palette.
10. Découpe selon la revendication 9, les rabats additionnels comportant une saillie et la surface inférieure des fentes de passage, pour recevoir une saillie respectivement associée, afin d'assurer le verrouillage des rabats additionnels et de la surface inférieure.
11. Découpe selon l'une quelconque des revendications 6 à 10, comportant deux rangées espacées d'éléments, une rangée comportant un élément et l'autre rangée deux éléments, vues transversalement par rapport à la palette.
12. Découpe selon la revendication 11, les rabats additionnels de chaque élément étant dirigés les uns vers les autres.
13. Découpe selon la revendication 12, **caractérisé en ce que** les rangées d'éléments sont positionnées entre la longueur de la palette.
14. Découpe selon l'une quelconque des revendications 9 à 13, comportant un élément de support près de chaque extrémité du manchon, formé par des parties de la surface inférieure qui y sont articulées, et sé-

- paré de celles-ci par des découpes, les éléments de support respectifs définissant des récepteurs pour une fourche respective de fourches espacées d'un élévateur à fourches.
- 15.** Découpe selon l'une quelconque des revendications 7 à 14, la découpe comportant deux paires de moyens de pliage majeurs, comprenant des lignes de pliage formées au niveau de chaque extrémité de la découpe ou des extrémités adjacentes de celle-ci, chaque paire étant espacée d'une distance égale à la hauteur d'une palette, de sorte que, lors de la formation d'une palette par repliement autour des lignes de pliage majeures, les extrémités libres se chevauchent et sont fixées l'une à l'autre pour former la palette. 5 10
- 16.** Découpe selon la revendication 15, la partie de la découpe située entre chaque paire de lignes de pliage majeures formant une paroi d'extrémité de la palette dans l'état redressé. 20
- 17.** Découpe selon la revendication 16, chaque paroi comportant des éléments de support d'extrémité pouvant être repliés vers l'intérieur, formant ensemble une entrée pour un élément d'élévateur à fourches. 25
- 18.** Découpe selon la revendication 17, les éléments de support d'extrémité comportant des saillies destinées à s'engager dans des entailles associées dans la ou chaque surface de support. 30
- 19.** Palette formée à partir d'une découpe selon l'une quelconque des revendications précédentes, la palette comportant des parois sur l'ensemble des quatre côtés. 35
- 20.** Procédé de formation d'une palette à partir d'une découpe unique selon l'une quelconque des revendications 1 à 19, comprenant les étapes de fourniture d'une découpe de matériau pliable et séparable, de formation de moyens de pliage et de découpes dans celle-ci afin de fournir des éléments pouvant être repliés hors du plan de la découpe, de fourniture d'un moyen pour fixer les parties en contact de la découpe dans l'état replié, de pliage de la découpe autour du moyen de pliage et d'assemblage des parties à chevauchement de la découpe pour former un manchon avec deux surfaces à chevauchement, agencées l'une au-dessus de l'autre, et étant pratiquement parallèles avant le redressement ultérieur pour former une palette. 40 45 50
- 21.** Procédé selon la revendication 20, comprenant l'étape de déplacement physique des surfaces à chevauchement afin de redresser la palette. 55
- 22.** Appareil de formation d'un manchon à partir d'une découpe unique pour fournir une palette selon les revendications 1 à 19, comprenant, de manière séquentielle, un moyen d'alimentation d'une découpe unique, au moins une matrice de coupe pour effectuer une coupe et un pliage, afin de former des éléments de support du manchon, une station pour assurer l'assemblage des parties à chevauchement et en contact de la découpe dans l'état replié, une unité de pliage pour plier la découpe et un empileur pour recevoir un manchon formé.
- 23.** Appareil selon la revendication 22, comportant deux matrices de coupe, l'une étant inversée par rapport à l'autre et chacune étant positionnée avec l'autre en amont de la section de pliage.
- 24.** Appareil selon les revendications 22 ou 23, en combinaison avec un dispositif pour former une palette reçue de l'appareil, par déplacement physique mutuel des surfaces à chevauchement, pour établir des surfaces espacées et actionner les dispositifs de support d'une seule pièce de la palette, afin de supporter les surfaces dans ladite relation espacée.

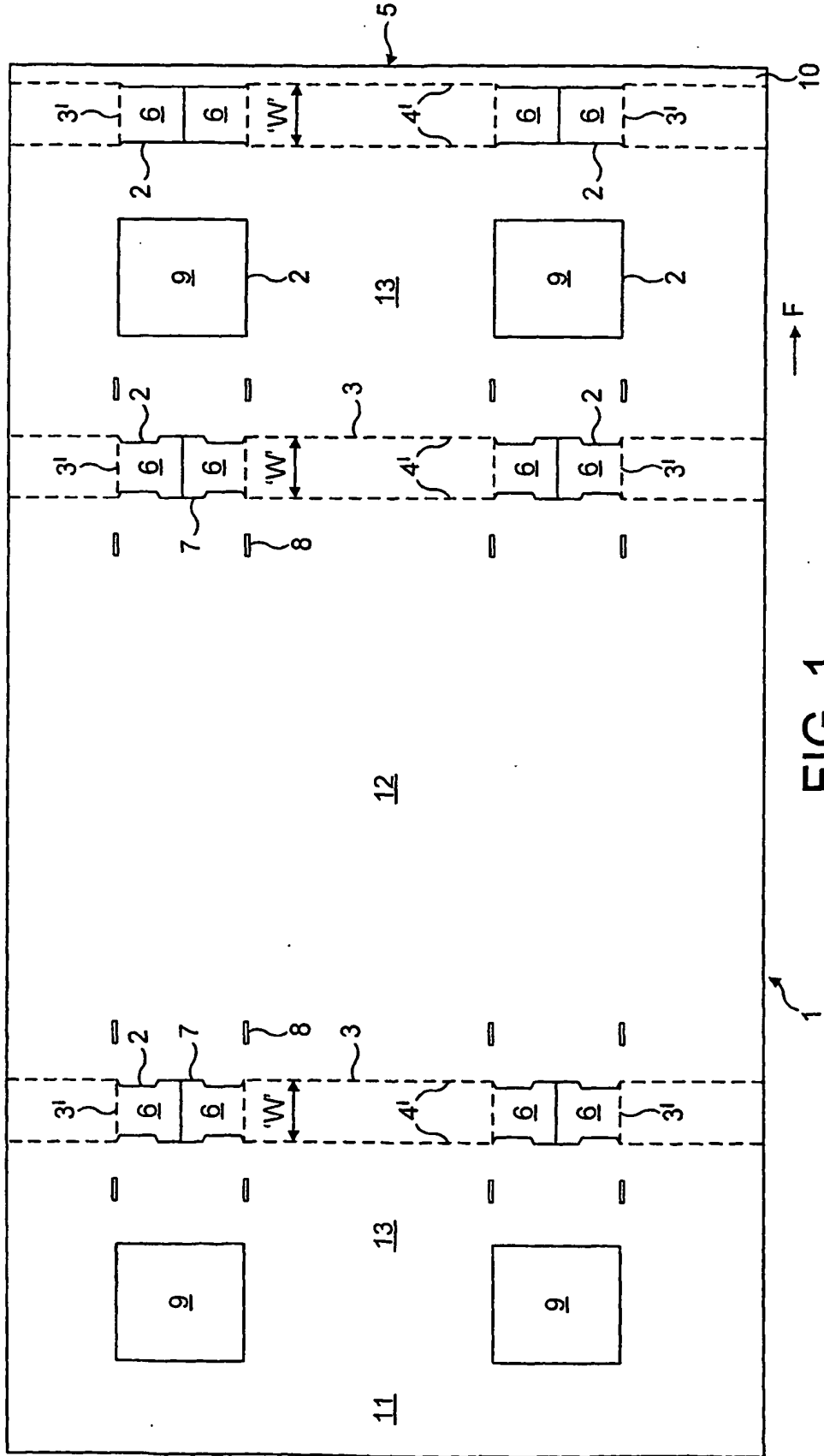


FIG. 1

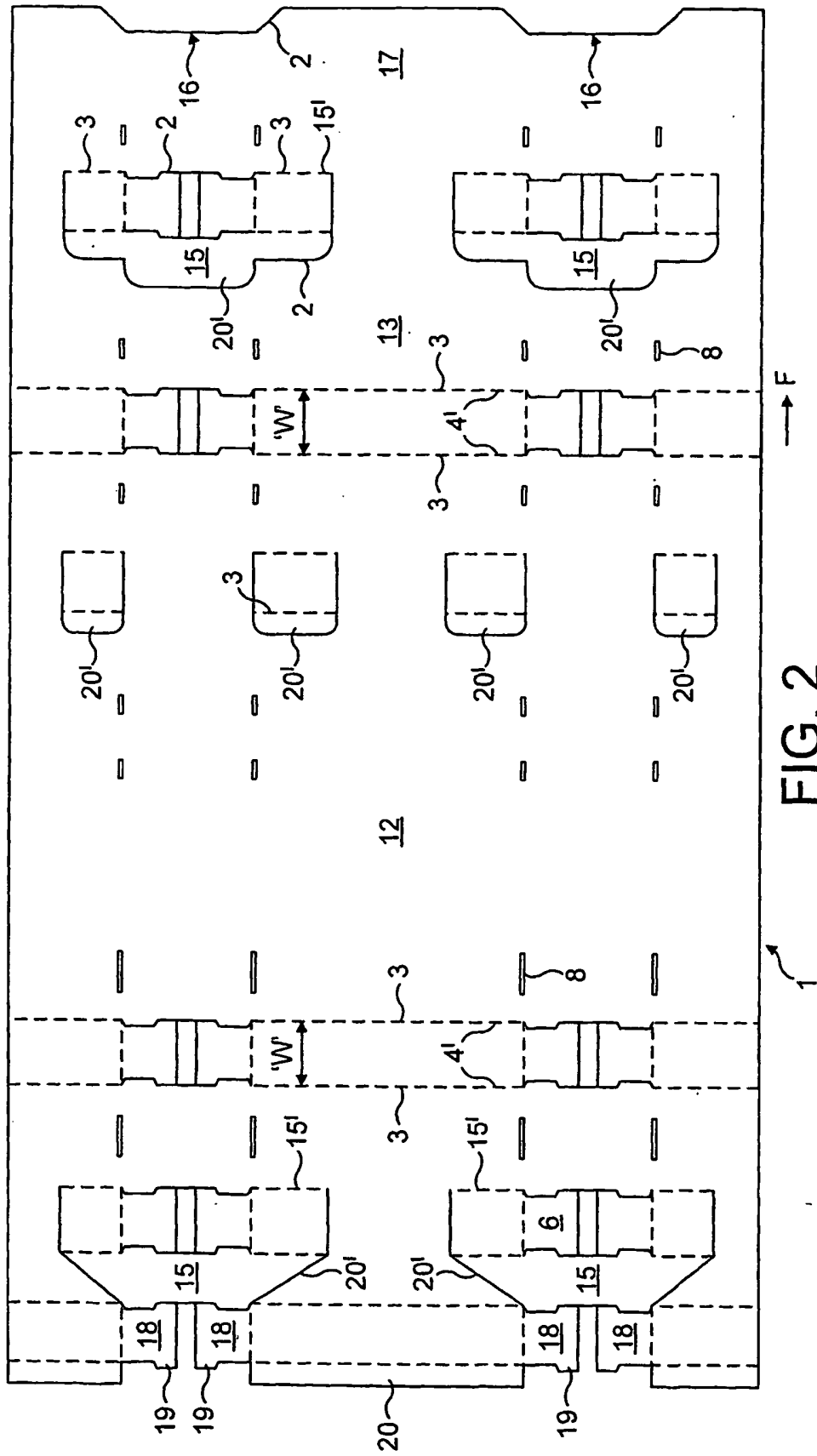


FIG. 2

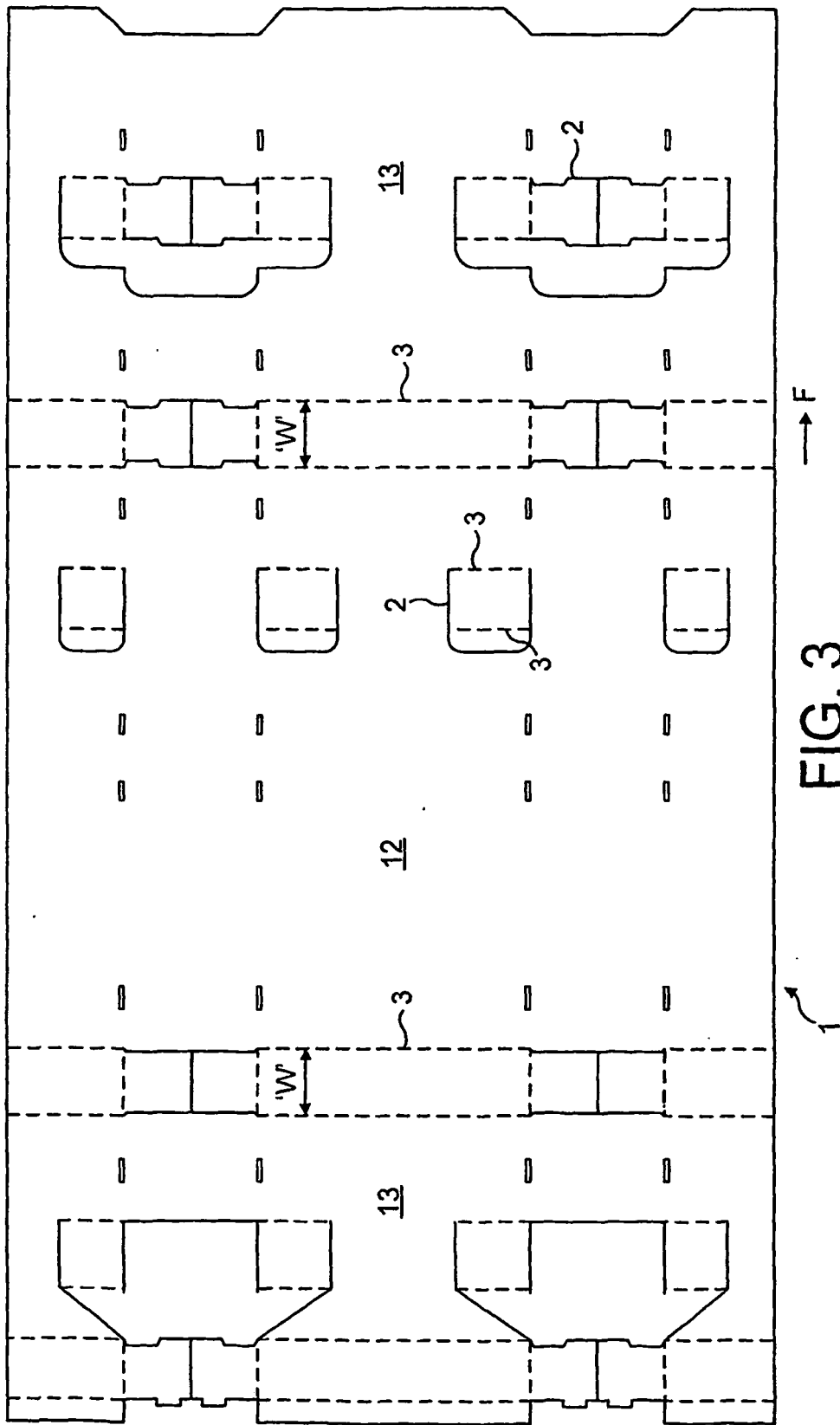


FIG. 3

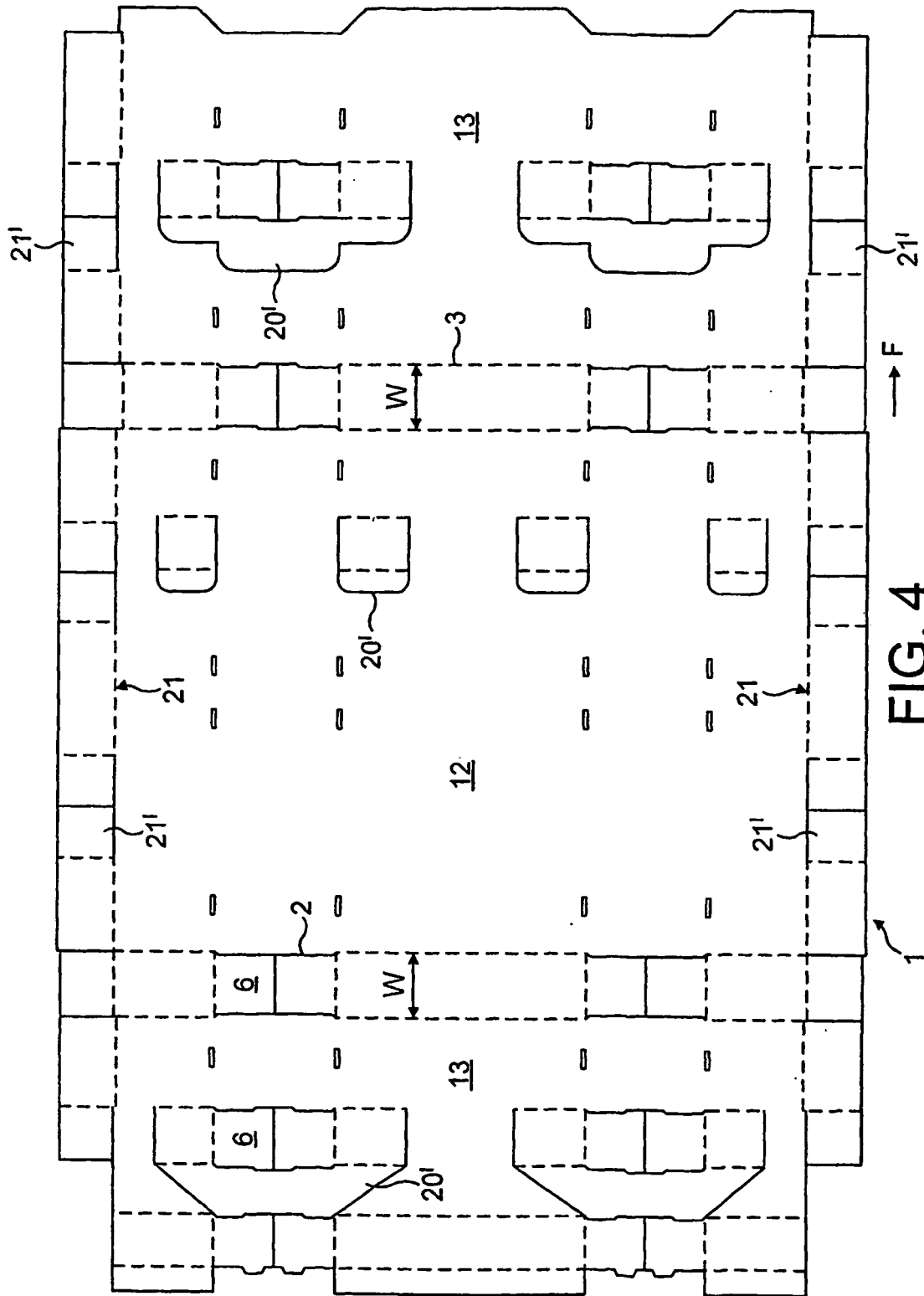


FIG. 4

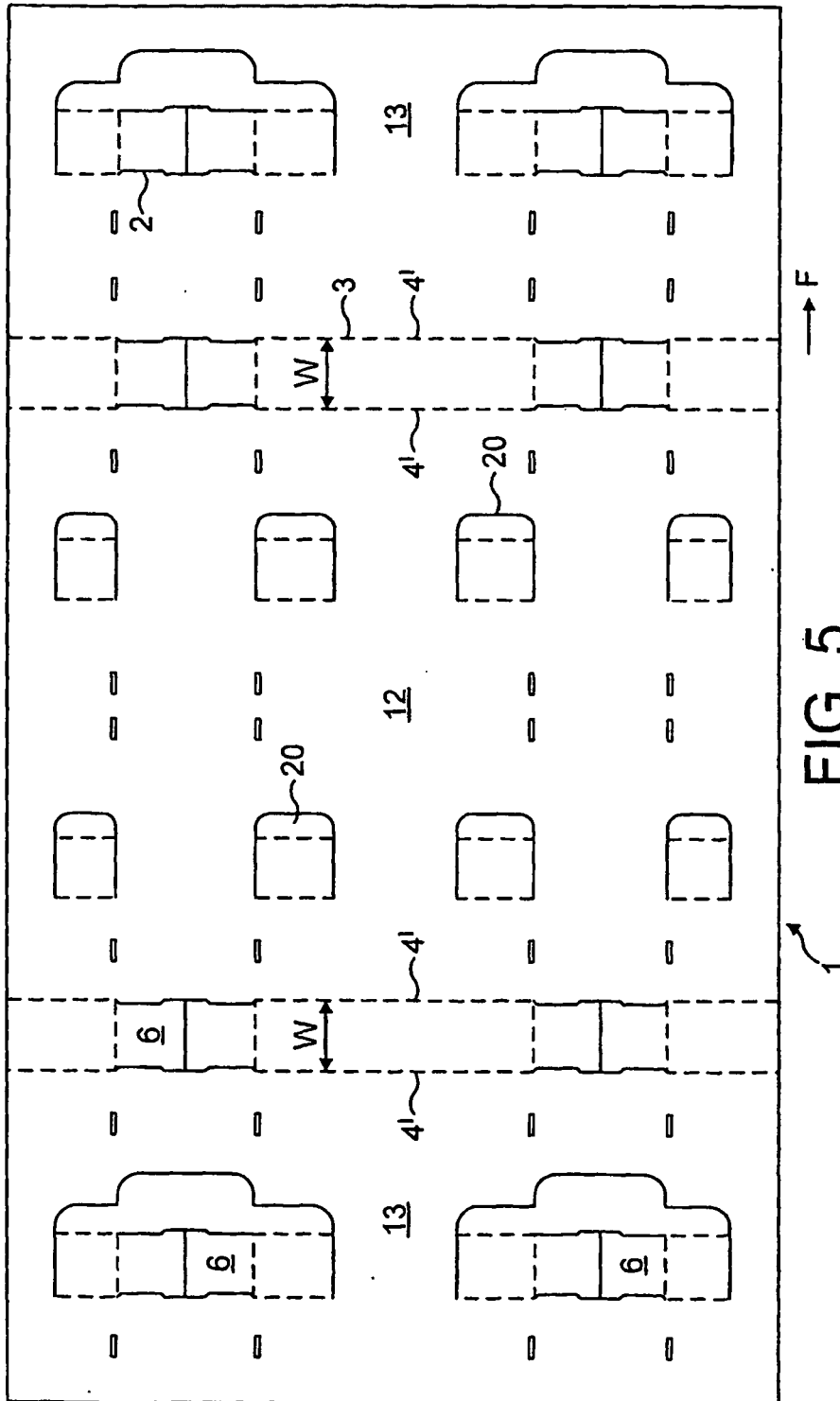


FIG. 5

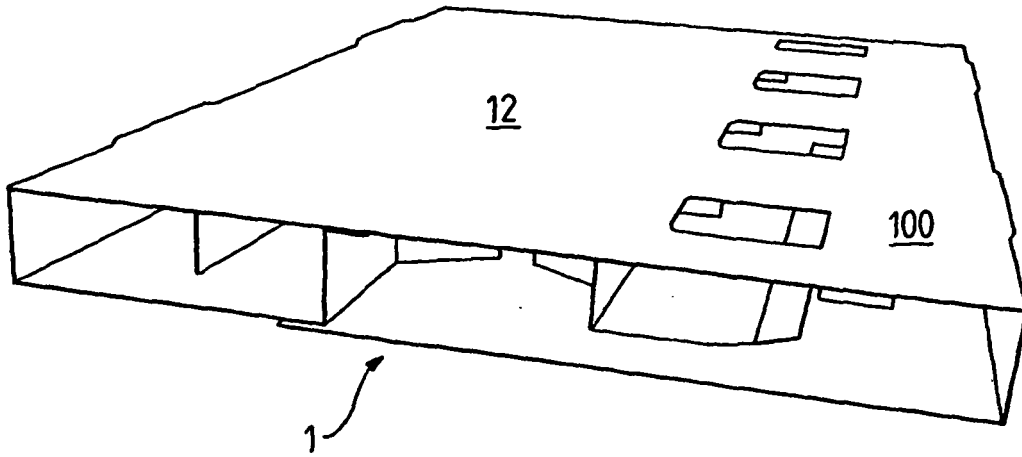


FIG. 7

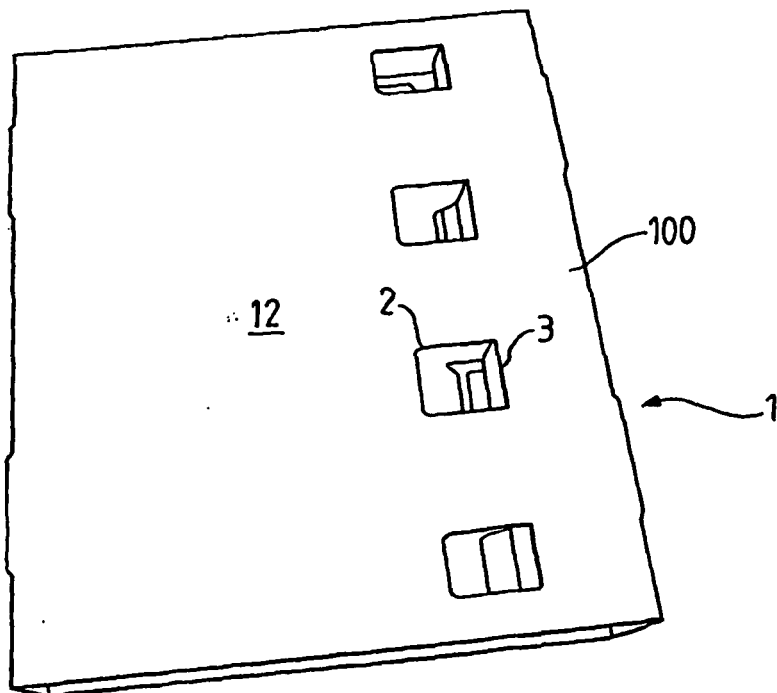
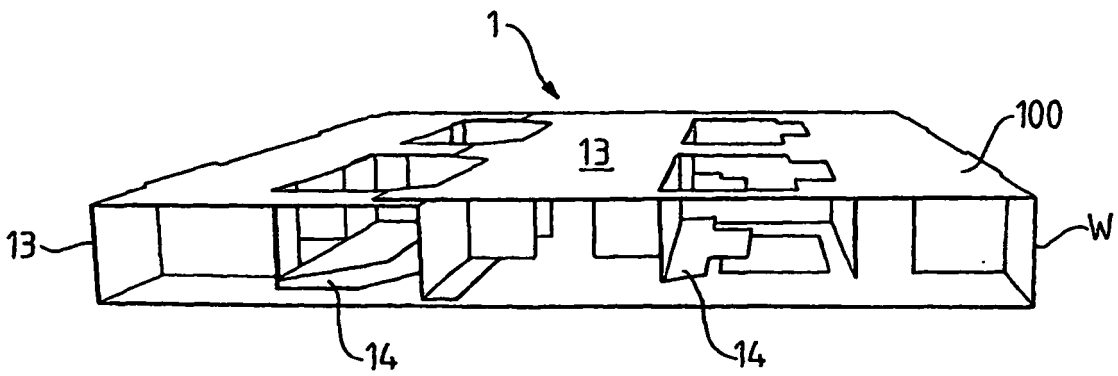
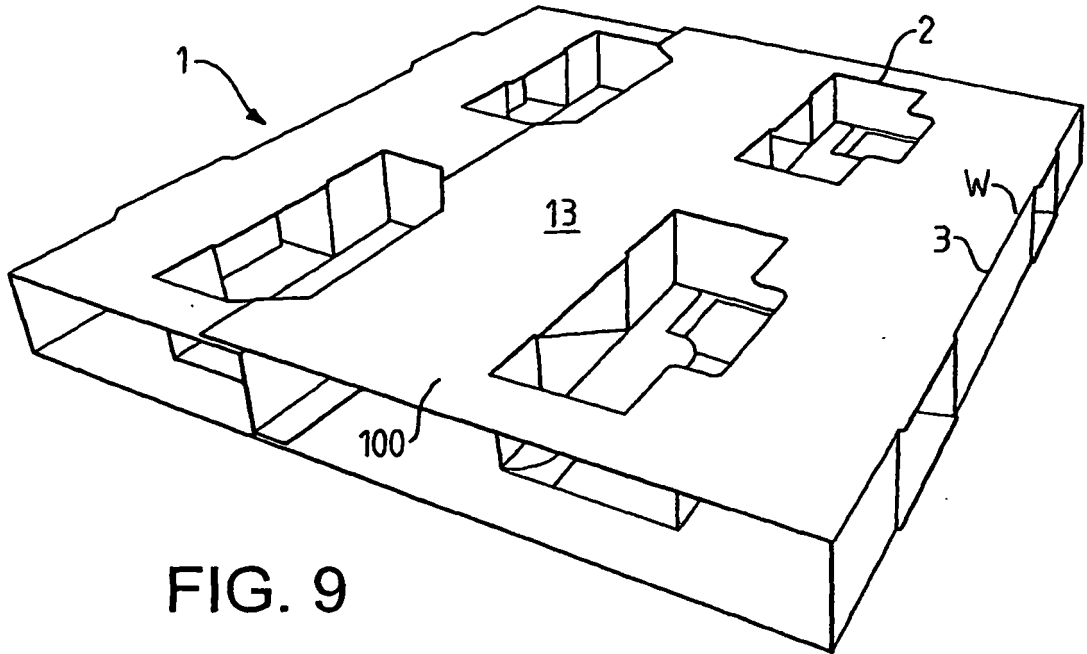


FIG. 8



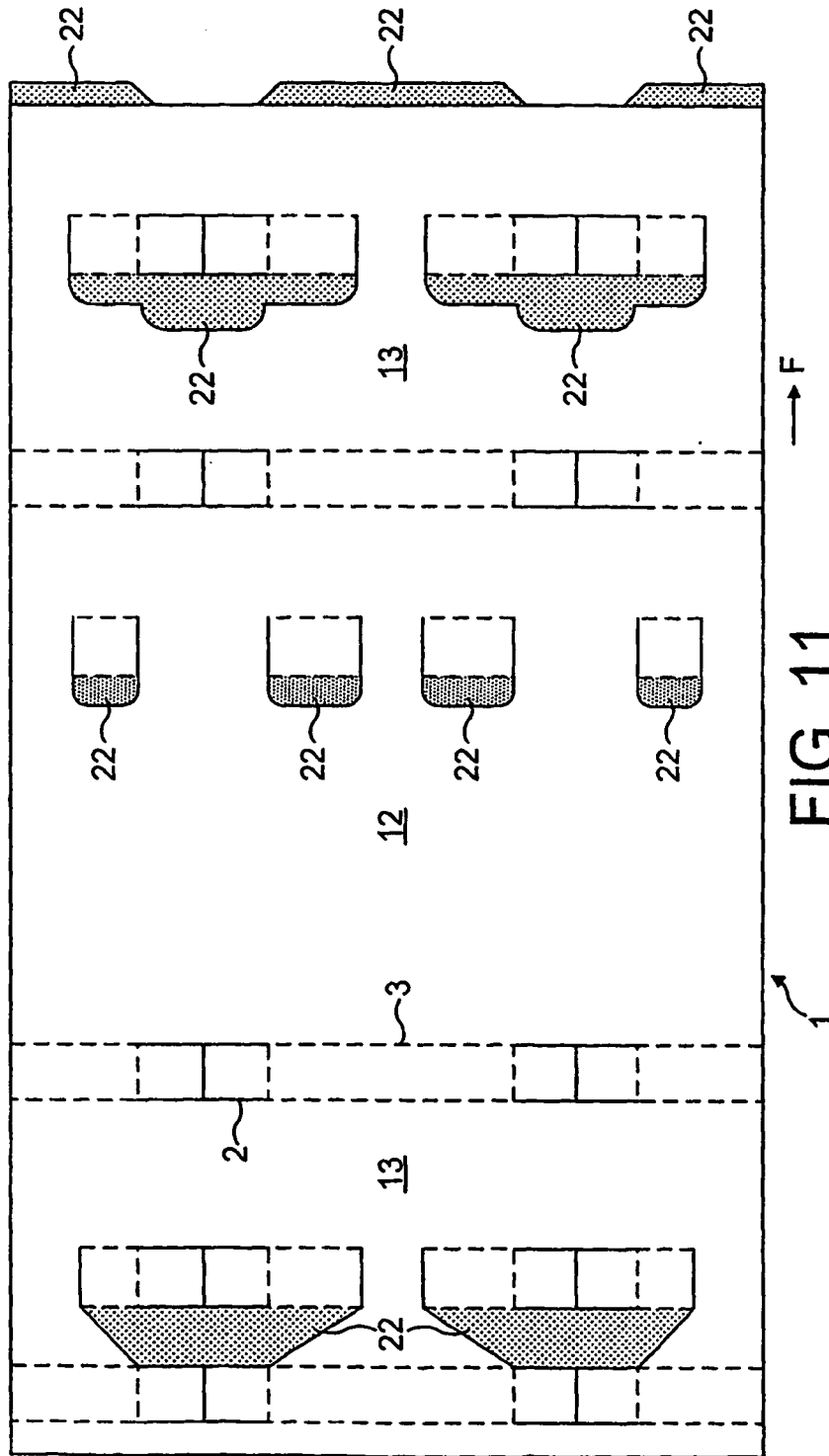
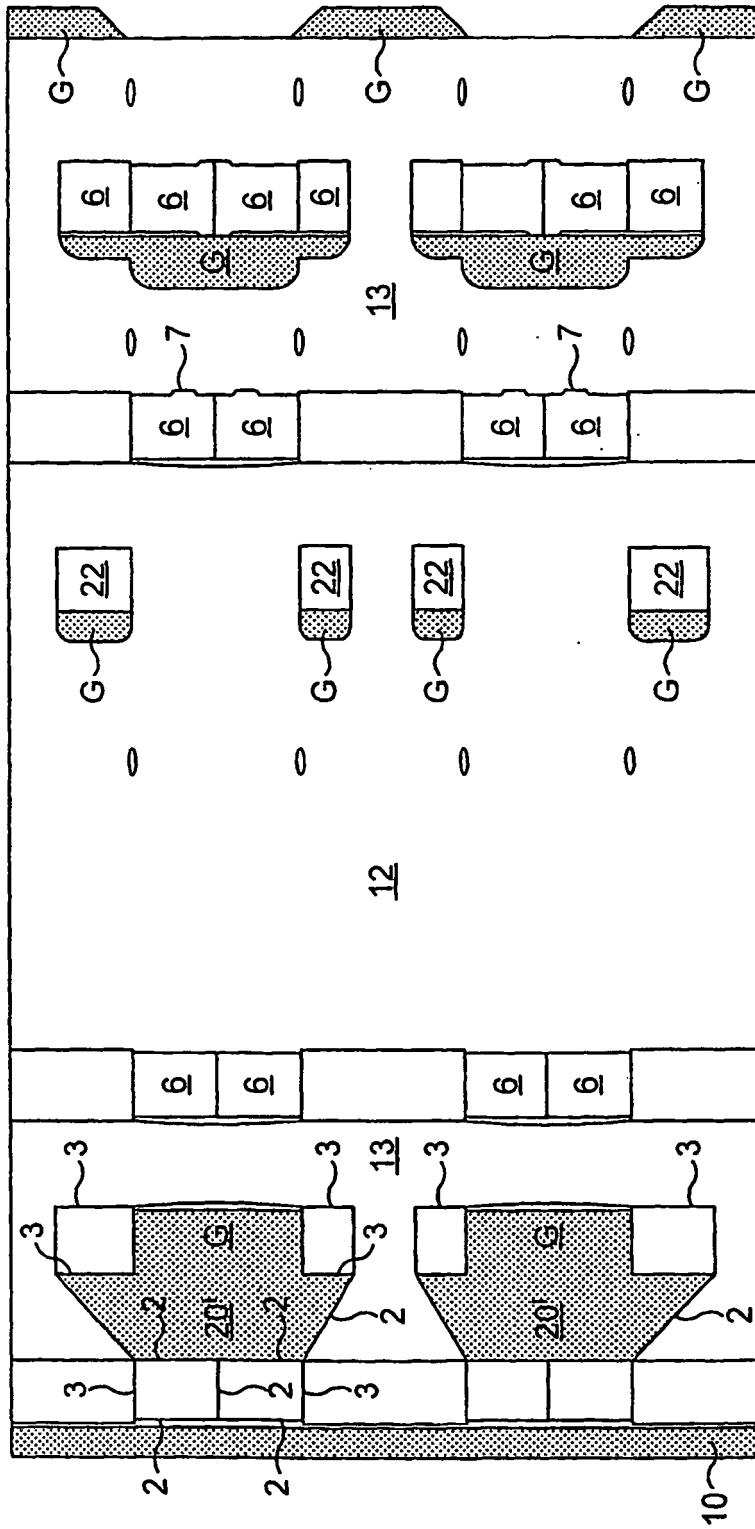


FIG. 11



→ F

FIG. 12

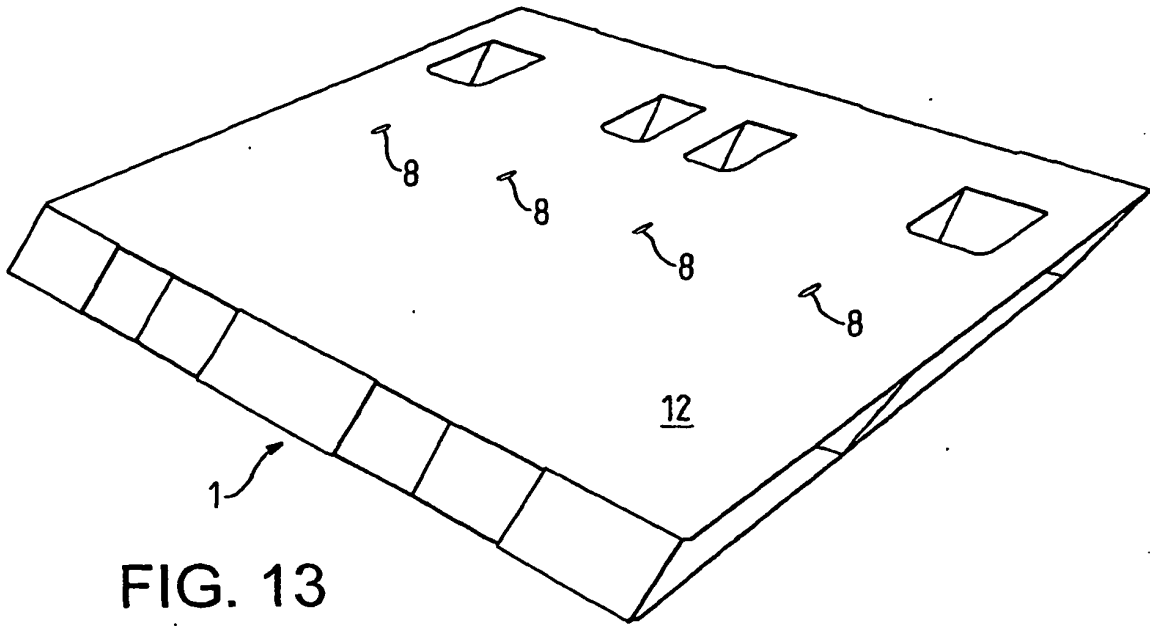


FIG. 13

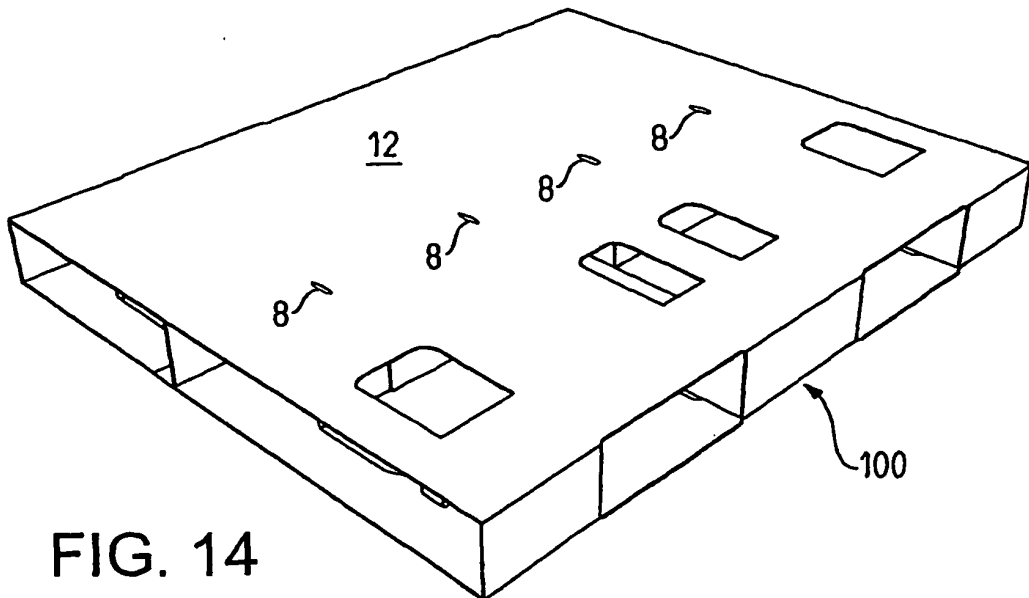


FIG. 14

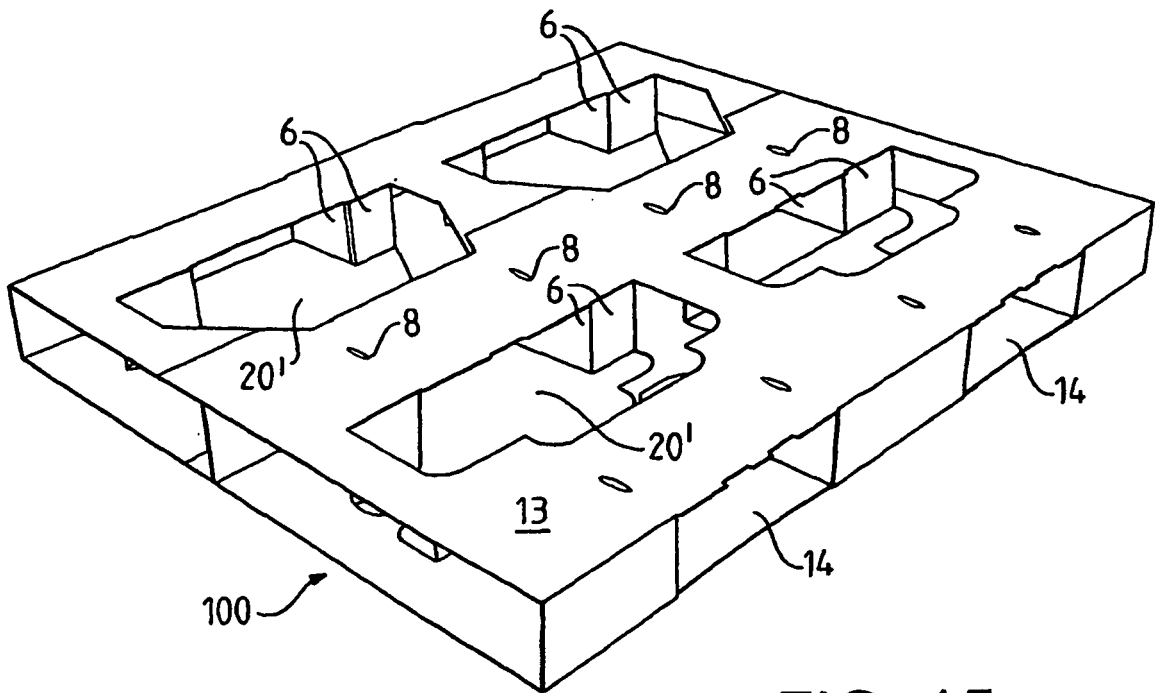


FIG. 15

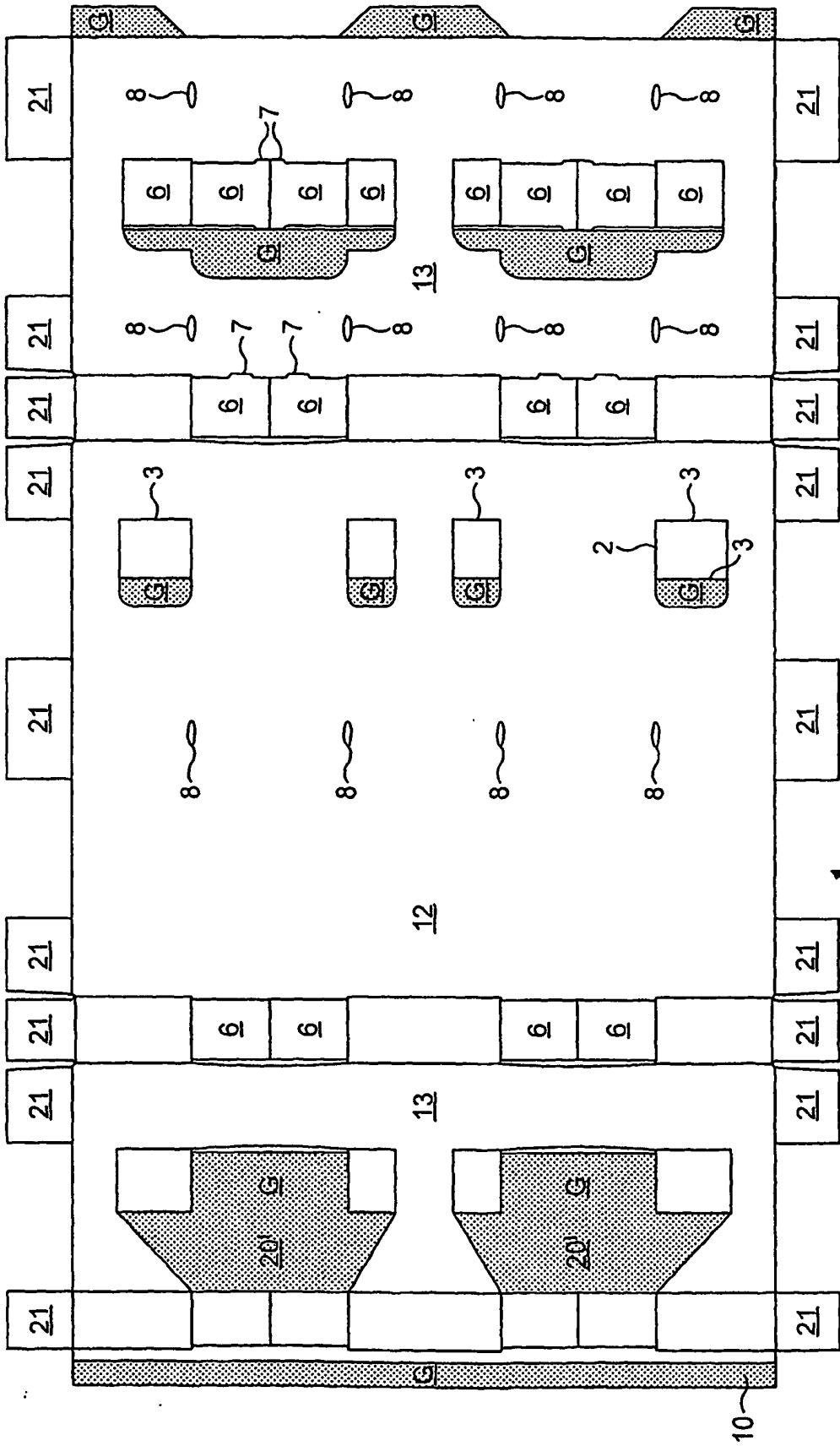


FIG. 16

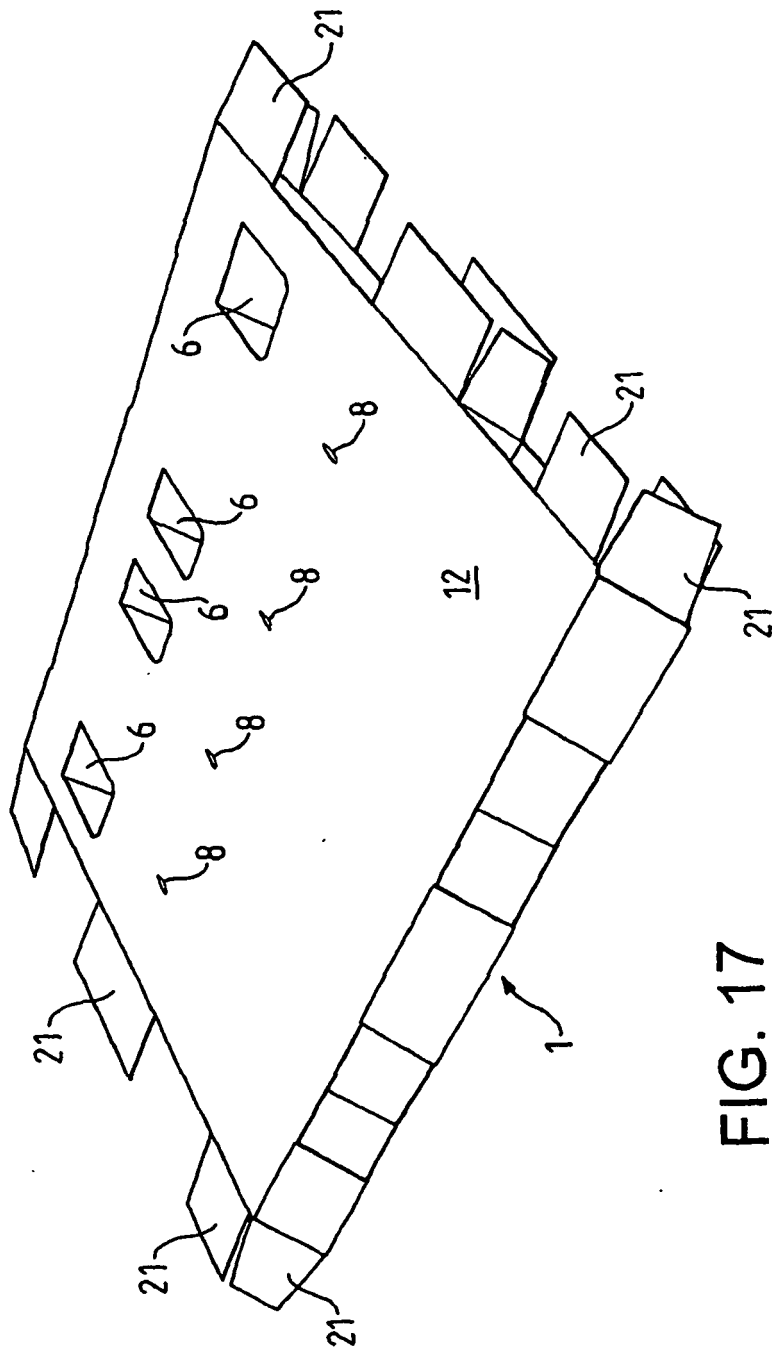


FIG. 17

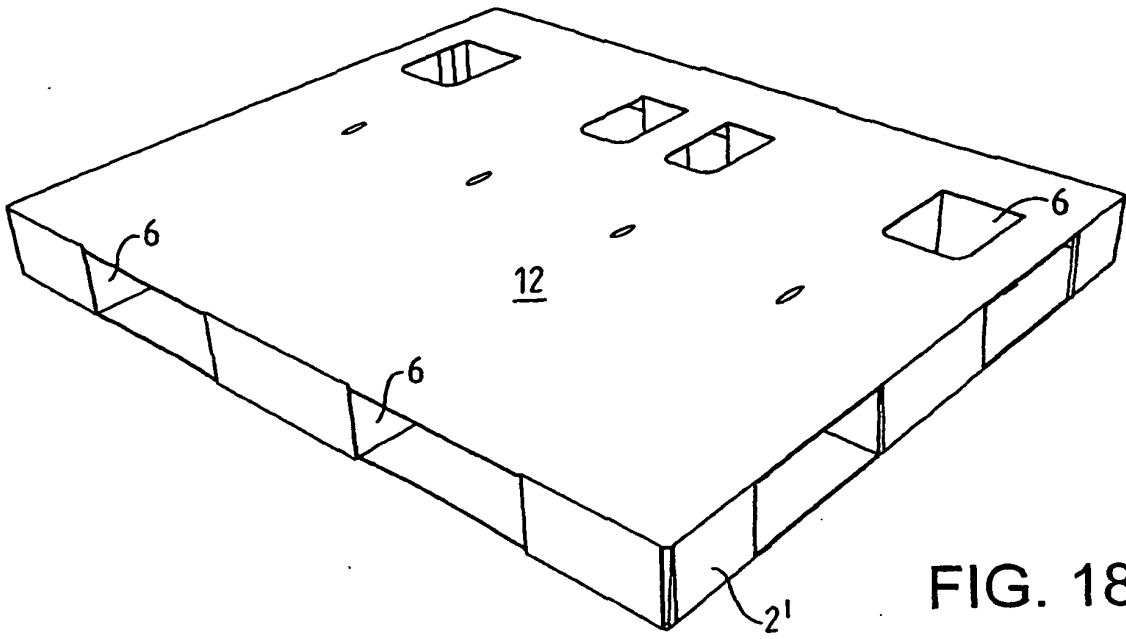


FIG. 18

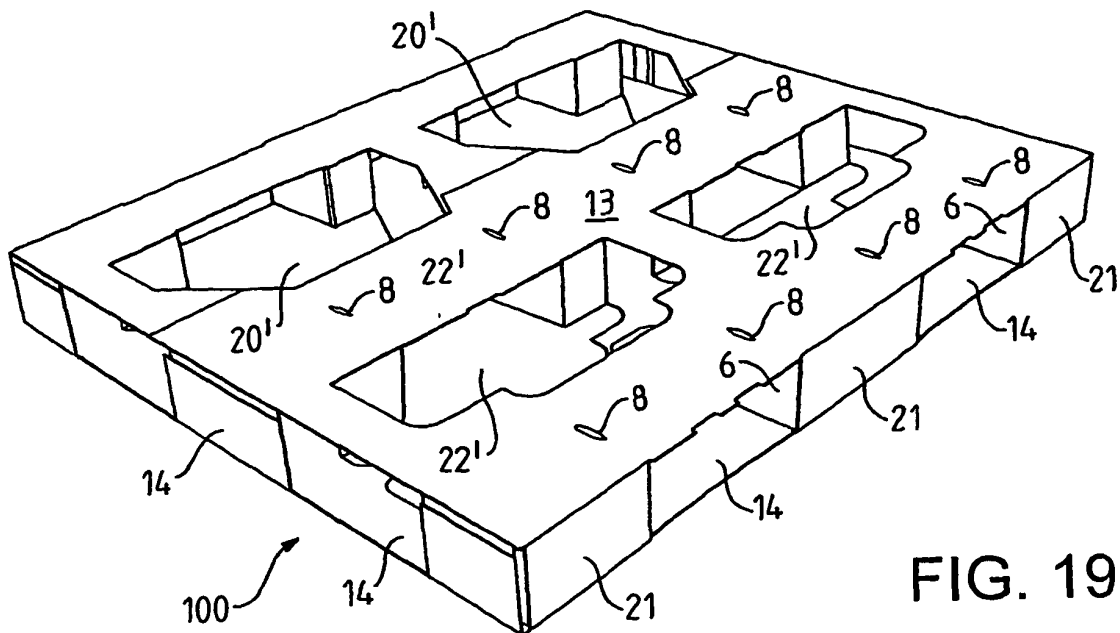
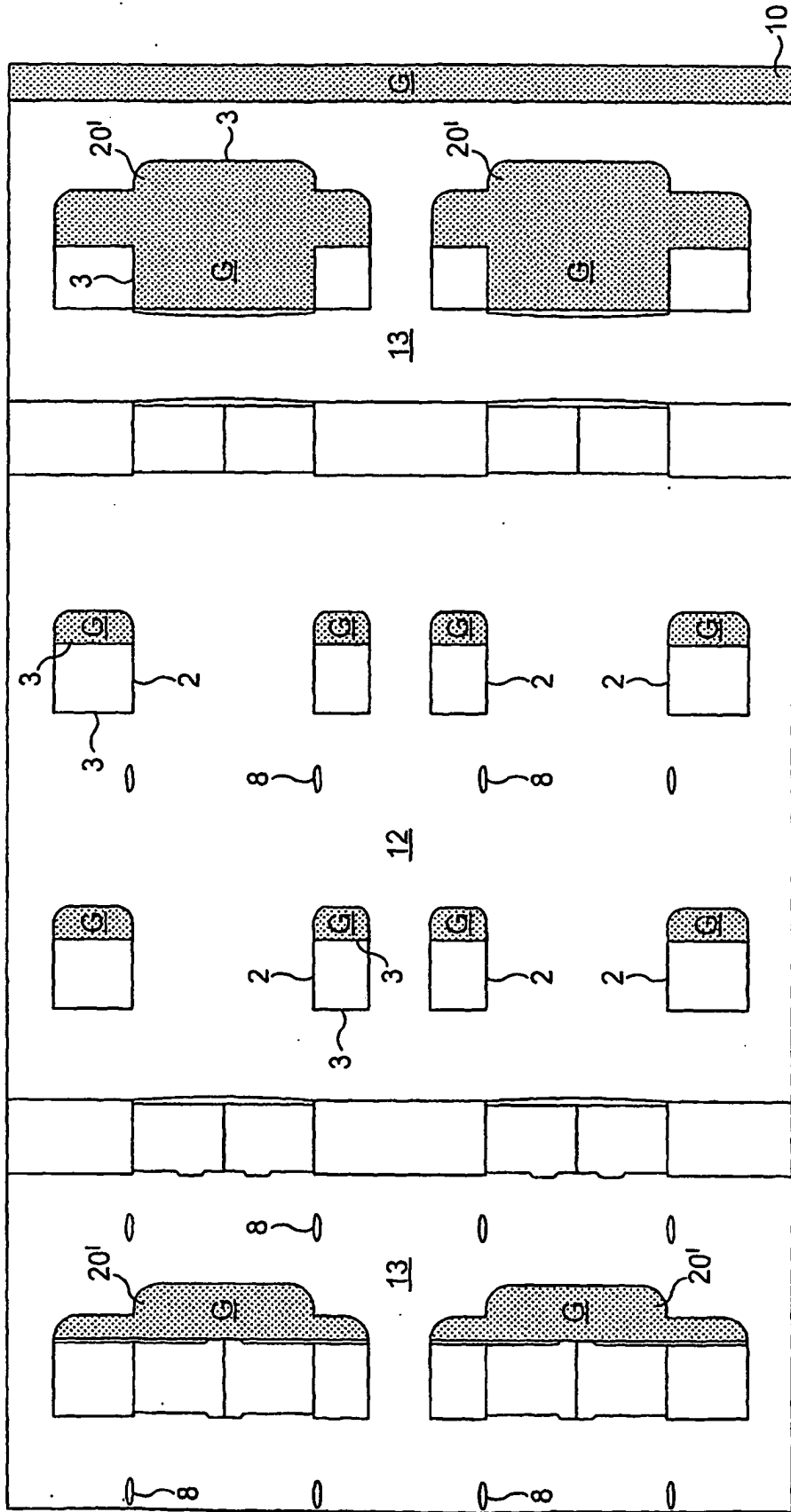


FIG. 19



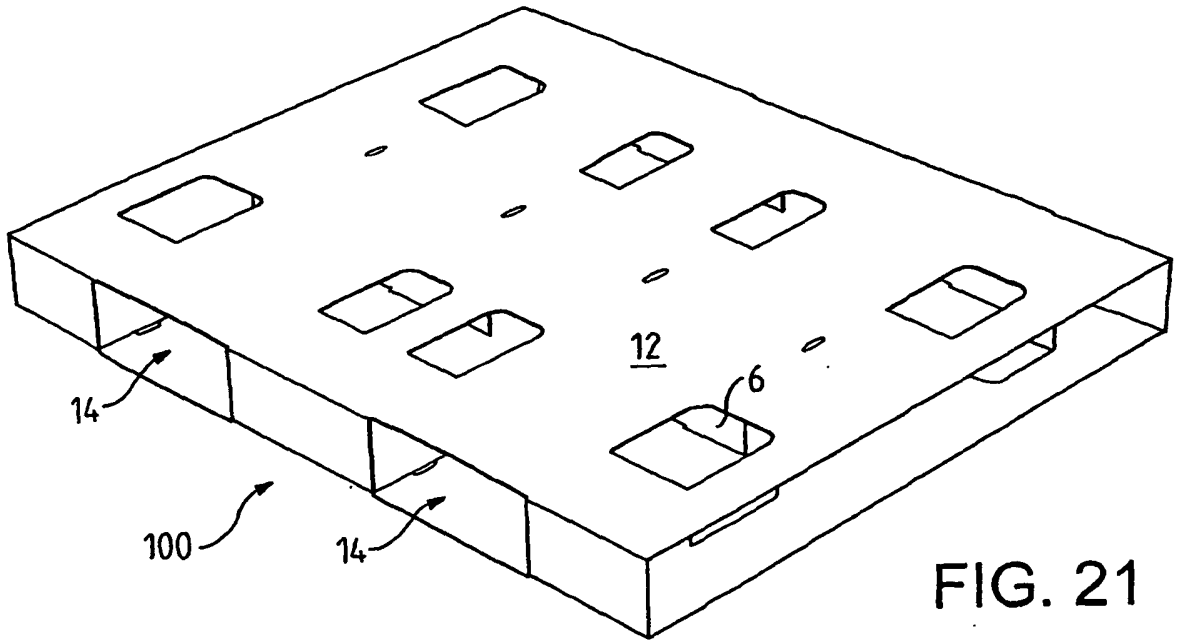


FIG. 21

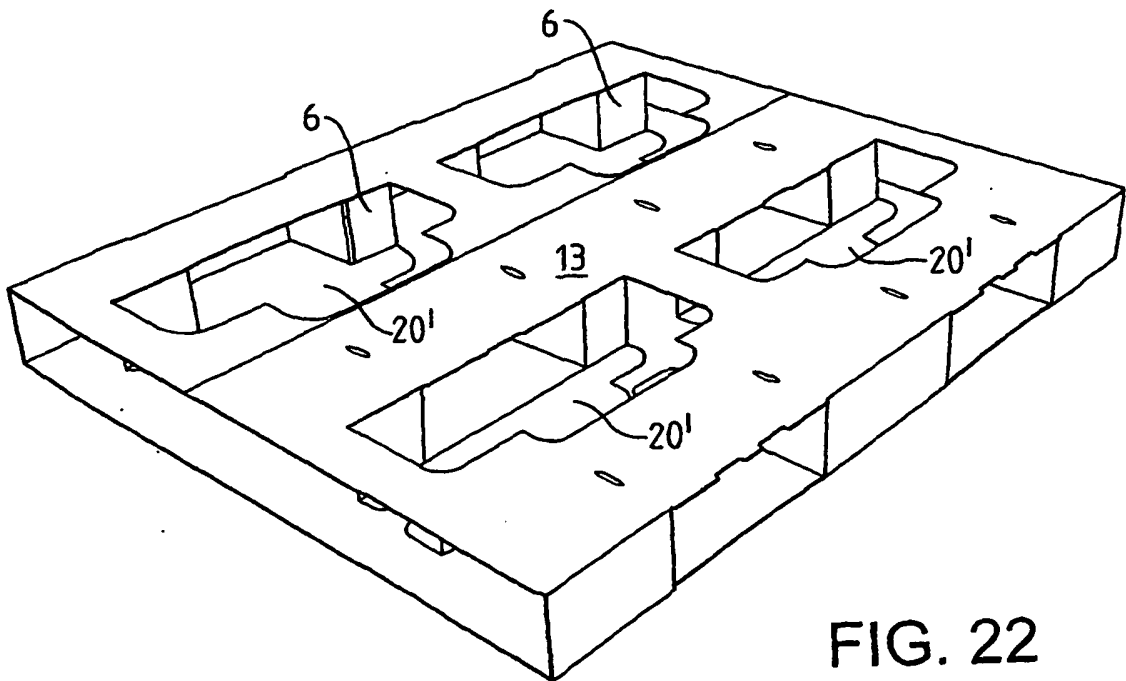


FIG. 22

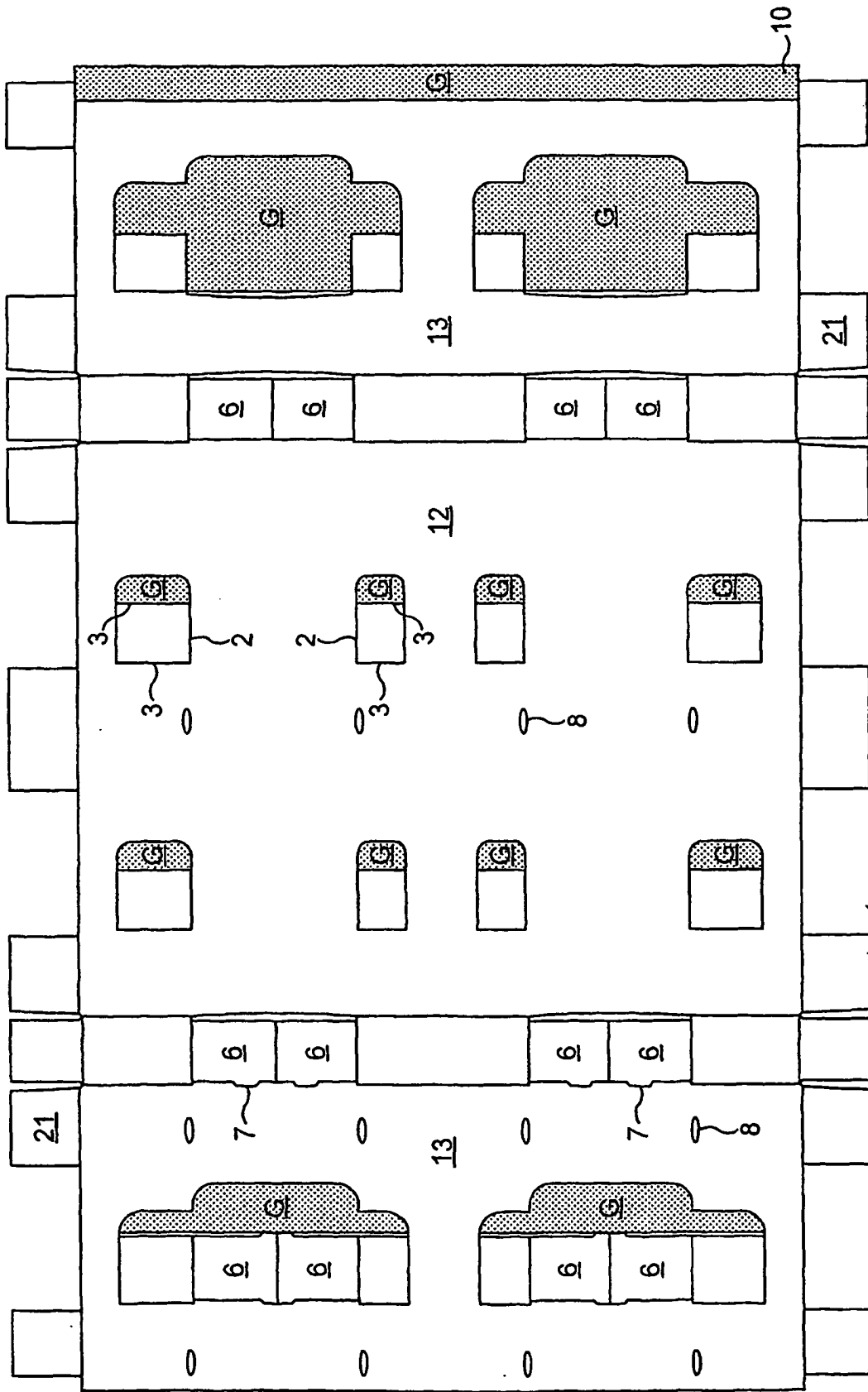


FIG. 23

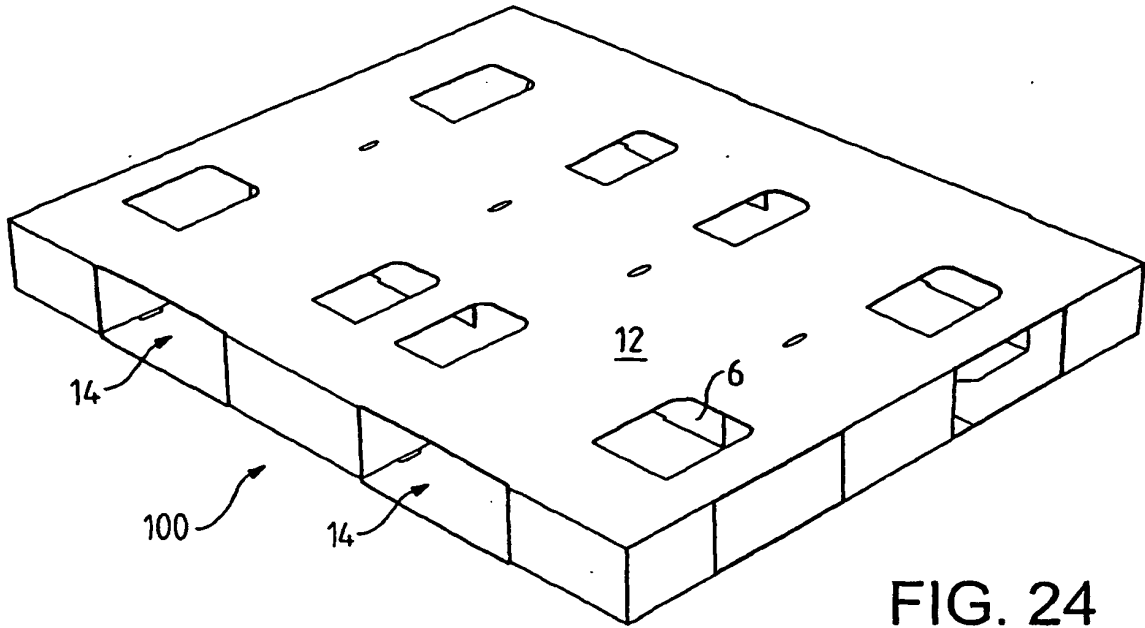


FIG. 24

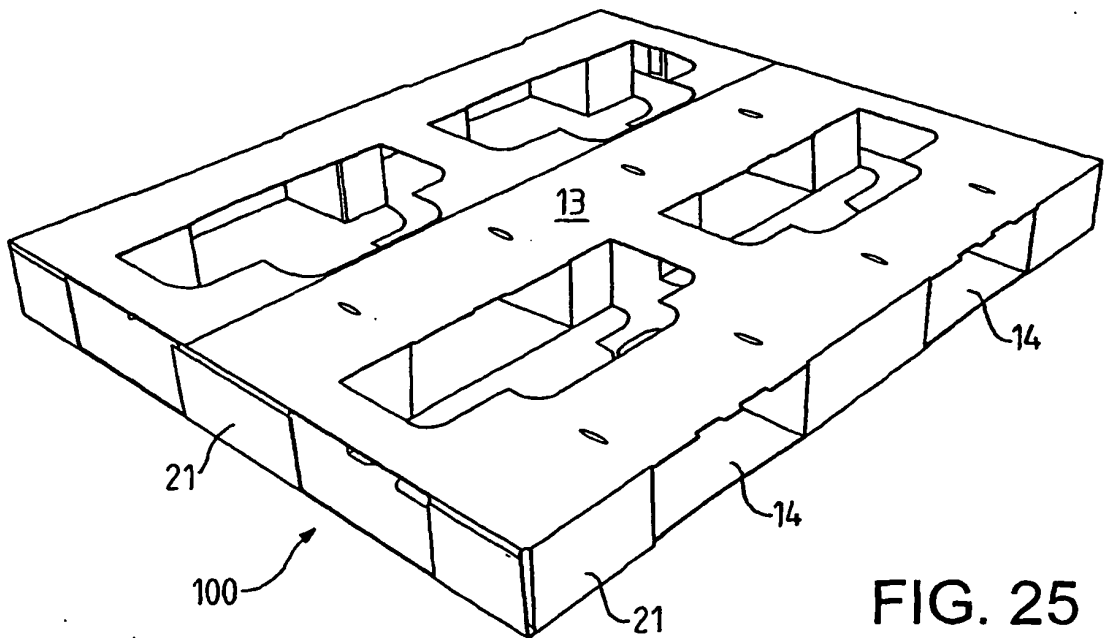
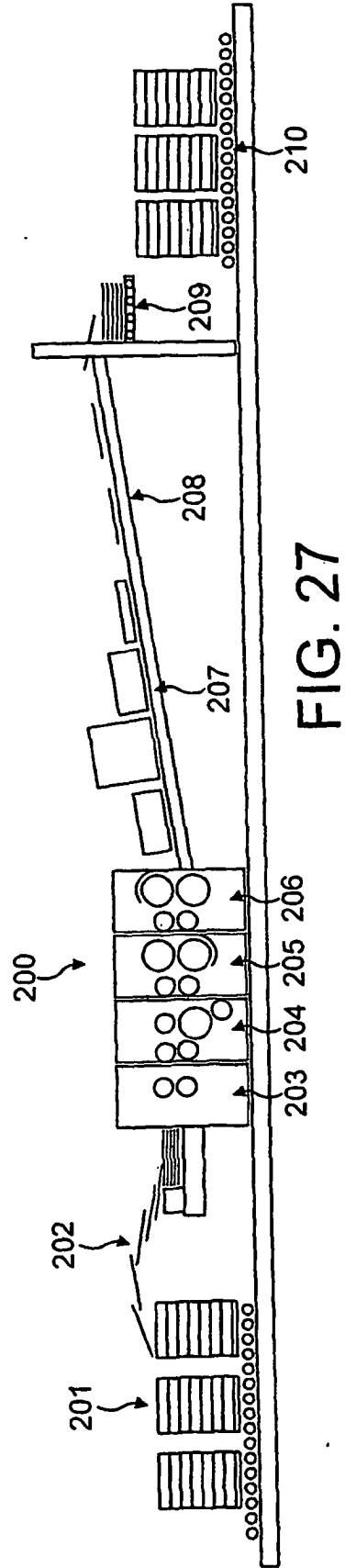
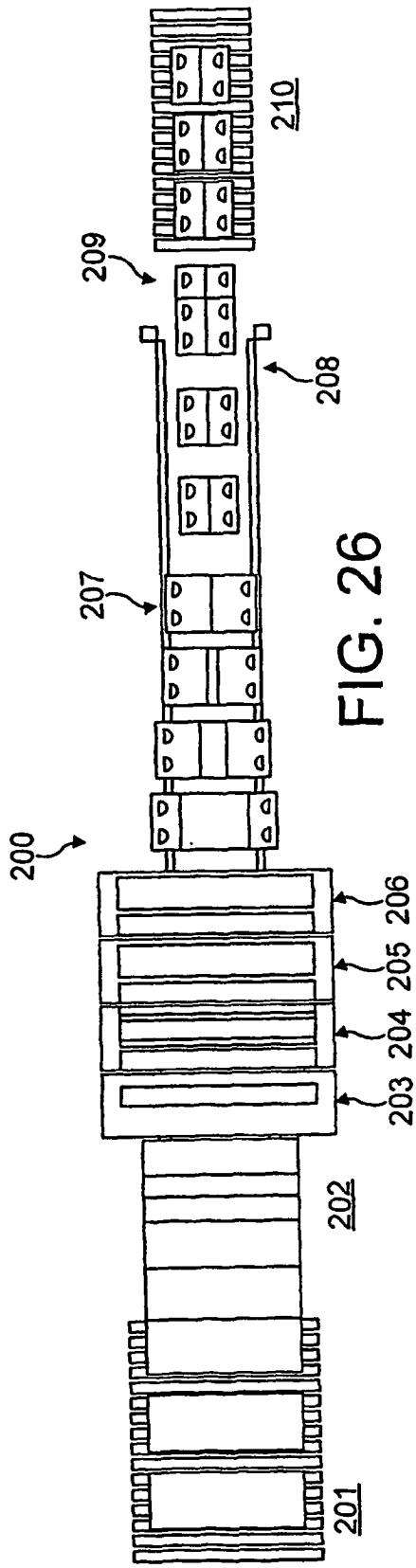


FIG. 25



REFERENCES CITED IN THE DESCRIPTION

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