



(11) **EP 1 419 973 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
03.06.2009 Bulletin 2009/23

(51) Int Cl.:
B65D 19/06 (2006.01)

(21) Application number: **03380263.8**

(22) Date of filing: **13.11.2003**

(54) **Collapsible pallet box**

Zusammenklappbarer Palettenbehälter

Caisse-palette pliable

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

(30) Priority: **15.11.2002 ES 200202628**

(43) Date of publication of application:
19.05.2004 Bulletin 2004/21

(73) Proprietor: **Tarpack S.L.**
50004 Zaragoza (ES)

(72) Inventor: **Rivera Ballarin, Carlos**
50004 Zaragoza (ES)

(74) Representative: **Carpintero Lopez, Francisco et al**
Herrero & Asociados, S.L.
Alcalá 35
28014 Madrid (ES)

(56) References cited:
EP-A- 1 041 008 **WO-A-02/074642**
US-A- 4 580 680 **US-A- 4 856 657**
US-A- 5 133 460

EP 1 419 973 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to a palletised box according to the preamble of claim 1.

[0002] Palletised boxes of the prior art are described in the following patents: EP 1041008, US 5133460 and US 4856657. In particular, EP 1041008 discloses a palletised box corresponding to the features of the preamble of claim 1.

[0003] The palletised box forming the subject of the present invention is intended to contain various articles with a base platform and an upper closing lid which are preferably connected by an intermediate folding laminar element, or a carton which is commonly known by the English name of "box" and is widely used for the transport of all types of parts and articles in various industries, for example the automotive industry, etc.

[0004] The palletised box forming the subject of the present invention is specifically designed to have its platform and lid produced by injection moulding and to be able to assume a very compact folded structure in that the platform receives the intermediate laminar element or carton of folded shape, the lid being situated thereon and being retained against the platform by a plurality of tongues which have an anti-withdrawal retaining profile and are inserted in apertures of the platform, making the assembly very compact and stable for the storage and transport thereof.

[0005] Furthermore, the palletised box forming the subject of the present invention has means to allow the displacement thereof on roller tracks which assume the form of detachable sliders coupled to the protuberances projecting from the lower part of the platform in such a way that the palletised box can adopt a shape suitable for the translation thereof on roller tracks as it has the aforementioned detachable sliders. Alternatively, the box may be arranged for the positioning thereof in a stack on other platforms when the detachable sliders have been separated from the platform. Similarly, the palletised box forming the subject of the present invention has devices for locking the folding laminar part or carton which are easier to use and prevent the loss of the component parts of the elements making up the closure means.

[0006] Optionally, the palletised box forming the subject of the present invention comprises apertures which are conveniently disposed in both the platform and the lid to allow said elements to be joined together by a strap which is especially useful when the palletised box is to be used without an intermediate laminar closure element between the platform and the box, for example for the palletised transport of a plurality of small-sized boxes which, after being stacked on the platform, make up a parallelepiped structure of which the base coincides with the rectangular shape of box and lid.

[0007] To assist understanding and as a non-limiting example, a preferred embodiment of the present invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a side view of the components of the palletised box in the folded position.

Fig. 2 is a perspective view of the palletised box in the folded position.

Figs. 3 and 4 correspond respectively to a plan view from above of the lid of the palletised box and a lateral elevation thereof from one of its larger sides.

Figs. 5 and 6 are a view from the lower face of the lid of the palletised box forming the subject of the present invention and a lateral elevation from one of the smaller sides respectively.

Figs. 7 and 8 are a plan view and an elevation respectively in the position of inversion of the platform of the box.

Figs. 9 and 10 are respective views from below and in a lateral elevation through one of the smaller sides of the platform of the box.

Figs. 11 and 12 are respective elevations from one end and in a plan view of the assembly of sliders incorporated in the box forming the subject of the present invention.

Fig. 13 is a perspective view of said assembly of sliders.

Fig. 14 is a section through the parts making up a retaining closure for the lateral laminar element of the palletised box of the present invention.

Figs. 15 and 16 are respective sections of the closure shown in Fig. 14 in the respective inactive and active or locking positions of said closure.

Fig. 17 is a perspective view, with the elements disassembled and partially in section, of the closure shown in Figs. 14 to 16.

Figs. 18 and 19 are respective views showing two palletised boxes according to the present invention in the stacked position.

[0008] As shown in the figures, the palletised box of the present invention is substantially composed of a lower platform or base part 1, an upper lid 2 and a foldable laminar part or carton 3 of which the position, when assembled, is shown in Figs. 18 and 19 which illustrate two stacked boxes designated by reference numerals 4 and 5 and having the base or platform 4' and the lid 4" as well as the intermediate laminar part 4''' and, with respect to the box 5, the base 5' with its lid 5" and the lateral laminar part 5''' respectively.

[0009] The constitution of the palletised box forming the subject of the present invention is suitable for production of the platform 1 and lid 2 by injection moulding of thermoplastic material, since the existing sections and reinforcements of various zones which will be evaluated hereinafter are intended to impart high rigidity and mechanical strength to the parts making up the box, as well as a light weight thereto.

[0010] In its upper face, the lid 2 of the palletised box (Fig. 2) comprises the recesses 6, 7, 8 and 9 in which are disposed the seats for the closures for connecting the laminar element, as will be described in detail here-

inafter. Similarly in said upper face, the lid comprises three rows of locating lugs adjacent to the large sides of the lid and which are indicated by the reference numerals 10, 10', 10" and 11, 11', 11" respectively, assuming the form substantially of a truncated pyramid with rounded edges and comprising a third central row of locating lugs which are indicated by the reference numerals 12, 13 and 14, the two end lugs, in other words those indicated by reference numerals 12 and 14 being substantially in the form of a truncated cone of which the base is a segment of a circle, as shown in Fig. 5, while the locating means 13 of the central portion assumes the form of a circular truncated cone. Said locating means coincide in size and position with those of the platform 1 shown in Figs. 7 and 9 which illustrate the seats of mating shape of the lateral rows 15, 15' and 15" on one of the sides and 16, 16' and 16" on the other side, the corresponding central seats indicated by reference numerals 17 and 18 being for the end seats and 19 for the central seat. This allows rapid centring and retention of the box and lid for the stacking thereof.

[0011] To allow the coupling and retention thereof in the folded position, as shown in Fig. 2, said platform and lid having engagable structures for the folding thereof, and the lid 2 also has a plurality of peripheral flanges which project through its lower face, as shown in the figures illustrating two of them for each of the large sides, those on the corresponding side shown in Fig. 4 being indicated by reference numerals 20 and 21. Identical flanges are arranged in an identical arrangement on the opposite side, as shown in Fig. 6 which also shows one of the flanges 22 of the opposing side. Said flanges have the form of an anti-withdrawal retention means or hook at their ends, as shown by reference numerals 23 and 24 in Fig. 6, so that, after being introduced into the corresponding apertures in the platform, shown in Figs. 7 and 9 by reference numerals 25 and 25' on one of the large sides and 26 and 26' on the opposing side, the lid is retained on the platform, assuming a compact and rigid structure as shown in Fig. 2 in which the palletised box is completely folded assuming very compact dimensions which allow easy storage and transport thereof.

[0012] A further characteristic of the palletised box forming the subject of the present invention relates to the production of assemblies of detachable sliders which are illustrated in Figs. 11 to 13, each assembly being made up of three elements corresponding to the sides and the centre of the box respectively and being designated in said figures by reference numerals 27, 28 and 29. Said sliders are elongate parts with a plane lower face, as shown in Fig. 11, to allow the easy displacement thereof on roller tracks or other surfaces and comprising, on the opposing face, in other words on the upper face, groups of locating means having a form similar to those of the box and lid and which have been described hereinbefore, which have been indicated by their truncated pyramid shape designated by the reference numerals 30, 30' and 30" for the slider 27 and 31, 31' and 31" for the slider 29.

The slider element 28 has terminal locating means 32 and 32' in the form of a truncated cone with the base in the form of a segment of a circle and a central projection or protuberance 32" in the form of a circular truncated cone. Said sliders are complemented by further groups of protuberances, sometimes of a male and female type arranged in pairs adjacent to each of the aforementioned locating means, the pair of respective male and female locating means 33 and 33' being shown, for example, which correspond to the protuberance 30 and are combined with seats of mating shape of the lower protuberances on the platform, in a corresponding number, those corresponding to a row of one of the larger sides being designated by reference numerals 34, 35 and 36 in Figs. 8 and 10 and by 37 and 38 which complement the row of the smaller side shown by reference numerals 36 to coincide with the corresponding row of the large side. Owing to this arrangement of male and female locating means and projections of the sliders and of the protuberances of the platform, it is possible to couple each of the sliders 27, 28 and 29 in the corresponding row of protuberances of the platform in a simple and rigid manner, as can be seen in particular in Figs. 1, 2, 18 and 19.

[0013] The lid and platform of the palletised box have means for joining the two elements together by strapping which, as indicated, is especially suitable when the platform and the lid of the box are used to contain other smaller boxes which, when assembled, make up a parallelepiped form similar to that shown in Figs. 18 and 19 which corresponds to the use of a laminar element for lateral closure or a carton.

[0014] To allow the above-mentioned strapping, suitable apertures are arranged in the sides of the box 2, indicated in Fig. 1 by reference numerals 39 and 40 which correspond to similarly arranged apertures in the platform to allow strapping.

[0015] As mentioned, when the palletised box utilises the laminar element for lateral closure of the carton, locking elements will be arranged on the lid and the platform to retain said laminar element. Said closures comprise transversely displaceable tongues which are introduced into apertures of said laminar element or carton. The precise constitution is shown in Figs. 14 to 17. Said figures show one of the closures made up of an upper part 41 and a further, lower part in the form of a catch 42 which receives the upper part 41 in its central hollow 43 and a guide 44 in which the lateral flanges 45 of the lower part 42 meet. The two parts 41 and 42 are arranged on the respective upper and lower part of one of the multiple seats 46 arranged in the bottom of the corresponding cavities of the platform and the lid, as shown by reference numerals 6 to 9 in Fig. 2. The seat 46 has a form resembling a figure-of-eight in a plan view (Fig. 17), so the projecting portion in the form of a smooth truncated cone 47 of the lower part 42 can slide through the interior of said seat having retention positions in the relatively enlarged end portions of the seat 46 in which the entry of the protuberance 47 after passing through the narrower inter-

mediate zone 48 will provide a clear sensation of retention and will indicate acoustically to the user that the fastener has been displaced to one or other side, in other words is in the closure position or is open.

[0016] The injection-moulded formation of the lid and the platform of the palletised box forming the subject of the present invention allows the production of reinforced zones of complex shapes in both the lid and the platform, Fig. 5, for example, showing multiple ribs 49 and 50 on the lid 2, which are substantially arranged in a mutually perpendicular disposition parallel to the large sides of the lid, Fig. 9 showing the platform 1 equipped with multiple ribbing such as 50 and 51 which are mutually perpendicular and parallel to the sides of the platform complemented in certain zones, in a modular form, by further ribs arranged diagonally, in other words obliquely to the ribbing 50 and 51 and with points of intersection both in the centre of each of the zones and at the vertices thereof.

[0017] By way of example, two of said reinforcing ribs have been designated by reference numerals 52 and 53. However, it will be appreciated that the modular arrangement of assemblies of mutually perpendicular ribs mating with further, diagonally arranged ribs, extends over the majority of the internal face of the platform, as shown in Fig. 9, without merely covering the plane zones such as those indicated by reference numerals 54, 55 and 56 in which the stacking locating means are arranged.

[0018] A further characteristic of the palletised box forming the subject of the present invention resides in the special arrangement for stacking in which, after the partial engagement of the stacked parts, there are provided free zones with free steps for the manual holding thereof.

Claims

1. Palletised box comprising an assembly formed by a lower platform (1) and an upper lid (2), both produced by injection moulding of thermoplastic material, and an intermediate element (3) of the folded laminar type, the upper face of the lid part comprising rows of locating means (10, 11) which are parallel to the large sides and disposed along a central zone, wherein the lid comprises a plurality of aligned cavities (6, 7, 8, 9) in the vicinity of the large sides and containing, in their interior, retaining catches (42) for the laminar element (3) for lateral closure of the box the internal space between platform and lid being sufficient to receive the laminar element (3) for lateral closure of the box in the folded position, **characterised in that** the lateral edges of the lid have lower projecting flanges (21, 22) with retaining profiles and capable of engaging in opposing apertures (25, 26) of the platform while being retained by said retaining profiles, said platform and lid comprising respective engaging structures for forming a folded assembly in which the aforementioned flanges (21, 22) of the lid are introduced in corresponding apertures (25, 26) of the platform.
2. Palletised box according to claim 1, **characterised in that** the lower protuberances (34, 35, 36, 37, 38) of the platform, disposed in the form of rows parallel to the large sides, comprise, in their lower base, seats (15, 16, 17, 18, 19) which are shaped so as to mate with projections (30,31,32) of respective detachable profiles which constitute sliders (27, 28, 29) capable of being retained with a press fit in said seats and comprising a plane lower face to allow displacement of the palletised box on roller tracks and the like.
3. Palletised box according to claim 2, **characterised in that** the sliders (27, 28, 29) which may be coupled in the lower faces of the lower protuberances of the platform comprise, in conformity with said protuberances, respective pairs of projections (33, 33') optionally with a male and female structure having a form which mates with those of the projecting protuberances of the platform to produce the rigid but detachable coupling of the sliders (27, 28, 29) offering their smooth lower faces to allow displacement of the box thereon.
4. Palletised box according to claim 1, **characterised in that** the interior of each of the cavities (6, 7, 8, 9) for receiving the retaining catches (42) for the laminar element (3) are formed by substantially figure-of-eight-shaped seats (46) in which the cylindrical rod (47) of the catch (42) travels, to determine the respective locking and unlocking positions of the catch (42) in the enlarged zones.
5. Palletised box according to claims 1 and 4, **characterised in that** the locking catches comprise a lower part (42) of laminar shape which travels on the inside of a plane guide and an upper part (41) capable of engaging in the central orifice (43) of said lower part (42), the two parts being located respectively on either side of the seat in the lid and platform to allow the common displacement thereof in a captive manner.
6. Palletised box according to claim 1, **characterised in that** the lateral faces of the lid (2) have apertures (39, 40) which are congruent with apertures in the platform (1) to allow the arrangement of strap elements to enable the lid (2) to be rigidly connected to the platform (1), trapping the load between the two elements.
7. Palletised box according to claim 1, **characterised in that** the locating means (10, 10', 10", 11, 11', 11") adjacent to the large sides in the upper face of the lid assume a substantially truncated pyramid-shaped structure with rounded edges, and the pro-

jections (12, 13, 14) of the central row assume a truncated cone shape corresponding to segments of a circle at the ends and of circular shape in the central portion.

Patentansprüche

1. Palettenbox, umfassend eine aus einer unteren Plattform (1) und einem oberen Deckel (2), die beide durch Spritzguss aus thermoplastischem Material hergestellt sind, und einem Zwischenelement (3) des klappbaren Plattentyps gebildete Anordnung, wobei die obere Fläche des Deckelteils zwei Reihen von Positioniereinrichtungen (10, 11) aufweist, die parallel zu den längeren Seiten entlang einer mittleren Zone angeordnet sind, wobei der Deckel eine Vielzahl von fluchtenden Hohlräumen (6, 7, 8, 9) in der Nähe der längeren Seiten aufweist, die in ihrem Inneren Halteschieber (42) für das Plattenelement (3) zum seitlichen Verschließen der Box enthalten, wobei der Innenraum zwischen der Plattform und dem Deckel zur Aufnahme des Plattenelements (3) zum seitlichen Verschließen der Box in der eingeklappten Position ausreicht, **dadurch gekennzeichnet, dass** die seitlichen Ränder des Deckels untere vorspringende Flansche (21, 22) mit Halteprofilen haben, die in der Lage sind, in gegenüberliegende Öffnungen (25, 26) der Plattform einzugreifen, während er von den Halteprofilen gehalten wird, wobei die Plattform und der Deckel jeweilige Eingriffsstrukturen zur Bildung einer zusammengeklappten Anordnung haben, bei welcher die vorstehend genannten Flansche (21, 22) des Deckels in entsprechende Öffnungen (25, 26) der Plattform eingeführt werden.
2. Palettenbox nach Anspruch 1, **dadurch gekennzeichnet, dass** die unteren Ansätze (34, 35, 36, 37, 38) der Plattform, die in Form von zu den längeren Seiten parallelen Reihen angeordnet sind, in ihrem Unterboden Sitze (15, 16, 17, 18, 19) enthalten, die so geformt sind, dass sie mit Vorsprüngen (30, 31, 33) von jeweiligen abnehmbaren Profilen zusammenpassen, welche Gleitstücke (27, 28, 29) bilden, die mit einer Presspassung in den Sitzen gehalten werden können und eine flache Unterseite enthalten, um die Verschiebung der Palettenbox auf Rollenbahnen und dergleichen zu ermöglichen.
3. Palettenbox nach Anspruch 2, **dadurch gekennzeichnet, dass** die Gleitstücke (27, 28, 29), die in die unteren Flächen der unteren Ansätze der Plattform gekoppelt werden können, in Übereinstimmung mit den Ansätzen jeweilige Paare von Vorsprüngen (33, 33'), optional mit einer vorragenden und einer vertieften Struktur, enthalten, die eine Form aufweisen, die mit derjenigen der vorspringenden Ansätze

der Plattform zusammenpasst, um die starre, aber lösbare Koppelung der Gleitstücke (27, 28, 29) herzustellen, so dass ihre glatten unteren Flächen frei liegen, um eine Verschiebung der Box darauf zu ermöglichen.

5

4. Palettenbox nach Anspruch 1, **dadurch gekennzeichnet, dass** das Innere jedes der Hohlräume (6, 7, 8, 9) zur Aufnahme der Halteschieber (42) für das Plattenelement (3) durch Sitze (46) gebildet ist, die im wesentlichen in Form der Ziffer 8 gebildet sind, in welchen der zylindrische Stab (47) des Schiebers (42) läuft, um die jeweilige verriegelte und entriegelte Position des Schiebers (42) in den erweiterten Zonen zu bestimmen.
5. Palettenbox nach den Ansprüchen 1 und 4, **dadurch gekennzeichnet, dass** die Sperrschieber einen unteren plattenförmigen Teil (42) aufweisen, der innerhalb einer flachen Führung läuft, und einen oberen Teil (41), der in der Lage ist, mit der zentralen Öffnung (43) des unteren Teils (42) in Eingriff zu kommen, wobei die beiden Teile jeweils auf einer Seite des Sitzes in dem Deckel und der Plattform angeordnet sind, um ihre gemeinsame Verschiebung in untrennbarer Weise zu ermöglichen.
6. Palettenbox nach Anspruch 1, **dadurch gekennzeichnet, dass** die Seitenflächen des Deckels (2) Öffnungen (39, 40) haben, die mit Öffnungen in der Plattform (1) kongruent sind, um die Anordnung von Befestigungselementen zu erlauben, um es zu ermöglichen, dass der Deckel (2) mit der Plattform (1) starr verbunden wird, wobei die Ladung zwischen den beiden Elementen eingeschlossen ist.
7. Palettenbox nach Anspruch 1, **dadurch gekennzeichnet, dass** die den längeren Seiten in der Oberfläche des Deckels benachbarten Positioniereinrichtungen (10, 10', 10", 11, 11', 11") eine im wesentlichen gestutzte pyramidenförmige Struktur mit abgerundeten Kanten annehmen und die Vorsprünge (12, 13, 14) der mittleren Reihe eine Kegelstumpfform annehmen, die an den Enden Kreissegmenten entspricht und in dem Mittelteil kreisförmig ist.

10

15

20

25

30

35

40

45

50

55

Revendications

1. Caisse-palette composée d'un ensemble formé d'une plate-forme inférieure (1) et d'un couvercle supérieur (2), ces deux éléments étant fabriqués par moulage par injection de matière thermoplastique ainsi qu'un élément intermédiaire (3) de type lamellaire plié, la face supérieure du couvercle ayant des rangées de moyens de positionnement (10, 11) parallèles aux grands côtés et disposés suivant une zone centrale,

le couvercle comporte un ensemble de cavités (6, 7, 8, 8, 9) alignées au voisinage des grands côtés avec intérieurement des prises de retenue (42) pour l'élément laminaire (3) de fermeture latérale de la boîte,

l'espace interne entre la plate-forme et le couvercle est suffisant pour recevoir l'élément laminaire (3) de fermeture latérale de la boîte, en position repliée,

caractérisée en ce que

les bords latéraux du couvercle ont des brides (21, 22) venant en saillie vers le bas avec des profils de retenue qui peuvent être engagés dans des orifices opposés (25, 26) de la plate-forme tout en étant retenus par les profils de retenue,

la plate-forme et le couvercle ont des structures de coopération respective pour former un ensemble plié dans lequel les brides (21, 22) du couvercle sont introduites dans des ouvertures correspondantes (25, 26) de la plate-forme.

2. Caisse-palette selon la revendication 1,

caractérisée en ce que

les parties inférieures en saillie (34, 35, 36, 37, 38) de la plate-forme sont disposées suivant une forme de rangées parallèles aux grands côtés et comportent dans leur base inférieure, des sièges (15, 16, 17, 18, 19) formés de façon à recevoir des projections (30, 31, 32) des profils détachables, respectifs, constituant des coulisseaux (27, 28, 29) susceptibles d'être retenus par un ajustage pressé dans les sièges et ayant une face inférieure plane permettant un déplacement de la caisse-palette sur un chemin à billes ou un moyen analogue.

3. Caisse-palette selon la revendication 2,

caractérisée en ce que

les coulisseaux (27, 28, 29) qui peuvent être couplés aux faces inférieures des saillies inférieures de la plate-forme comportent, en concordance avec les protubérances, les paires respectives de parties en saillie (33, 33') ayant en option une structure mâle et une structure femelle, avec une forme adaptée à celle des protubérances en saillie de la plate-forme pour constituer un couplage rigide mais détachable des coulisseaux (27, 28, 29) offrant leur face inférieure lisse qui permet de déplacer la caisse.

4. Caisse-palette selon la revendication 1,

caractérisée en ce que

l'intérieur de chacune des cavités (6, 7, 8, 9), qui reçoivent les prises de retenue (42) de l'élément laminaire (3), est formé par des sièges (46) pratiquement en forme de 8, dans lesquels circule la tige cylindrique (47) de la prise (42) pour déterminer les positions de verrouillage et de déverrouillage respectives de la prise (42) dans les zones agrandies.

5. Caisse-palette selon les revendications 1 et 4,

caractérisée en ce que

les prises de verrouillage ont une partie inférieure (42) de forme lamellaire qui chemine à l'intérieur d'un guide plan et une partie supérieure (41) susceptible d'être engagée dans l'orifice central (43) de la partie inférieure (42), les deux parties étant situées respectivement de chaque côté du siège du couvercle et de la plate-forme pour permettre leur déplacement en commun de manière captive.

6. Caisse-palette selon la revendication 1,

caractérisée en ce que

les faces latérales du couvercle (2) ont des ouvertures (39, 40) qui correspondent aux ouvertures de la plate-forme (1) pour permettre le montage d'éléments en forme de membre permettant de relier rigidement le couvercle (2) à la plate-forme (1) en prenant la charge entre les deux éléments.

7. Caisse-palette selon la revendication 1,

caractérisée en ce que

le moyen de localisation (10, 10', 10" ; 11, 11', 11") adjacent au grand côté dans la face supérieure du couvercle a une structure pratiquement en forme de pyramide tronquée avec des bords arrondis et les parties en saillie (12, 13, 14) de la rangée centrale ont une forme tronconique correspondant aux segments d'un cercle passant par les extrémités et d'une forme circulaire dans la portion centrale.

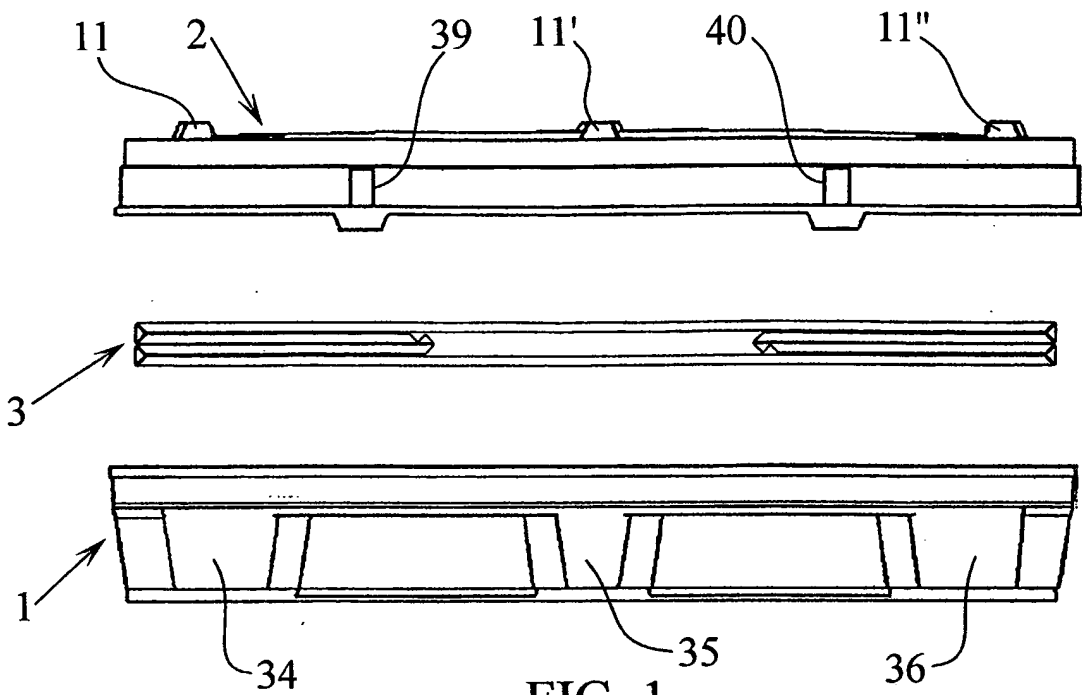


FIG. 1

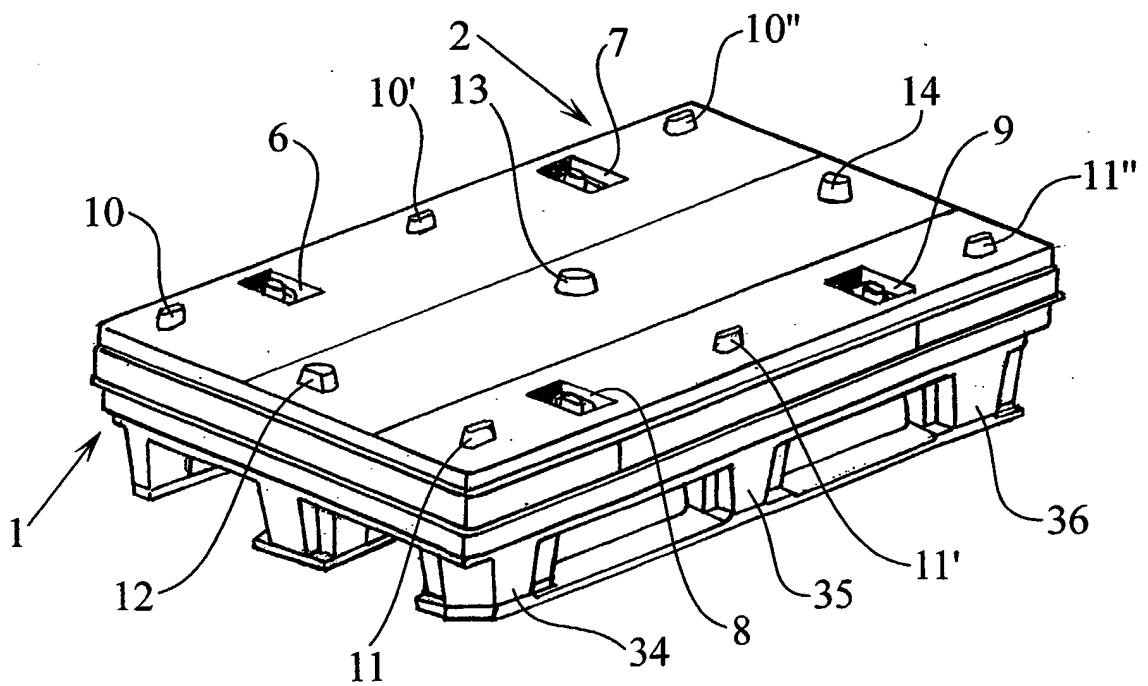
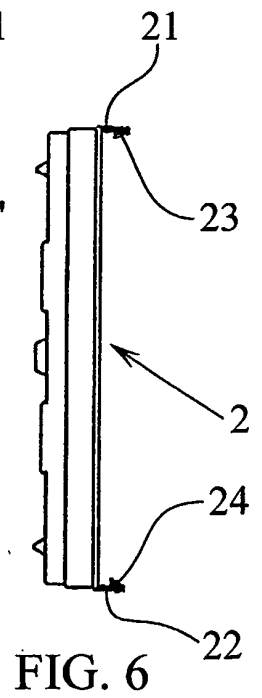
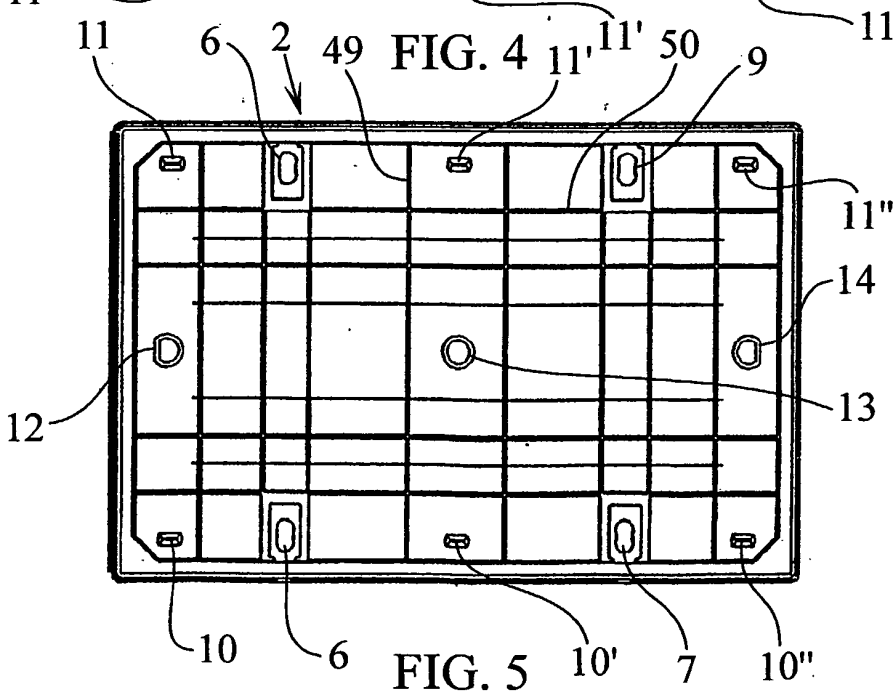
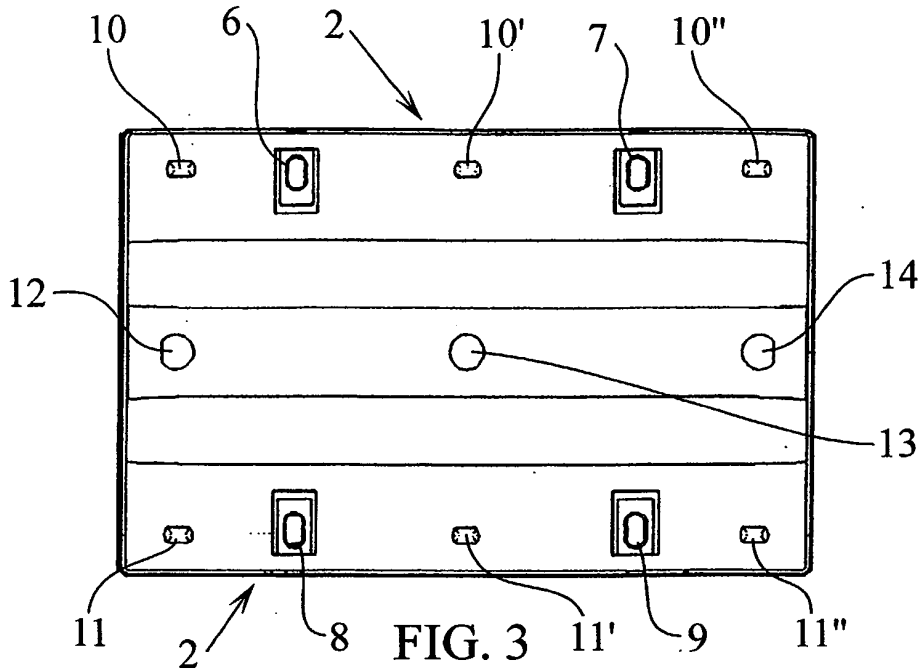
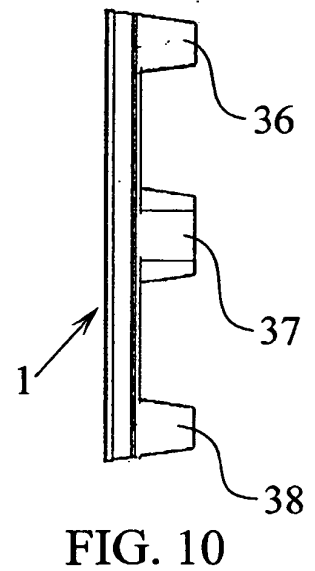
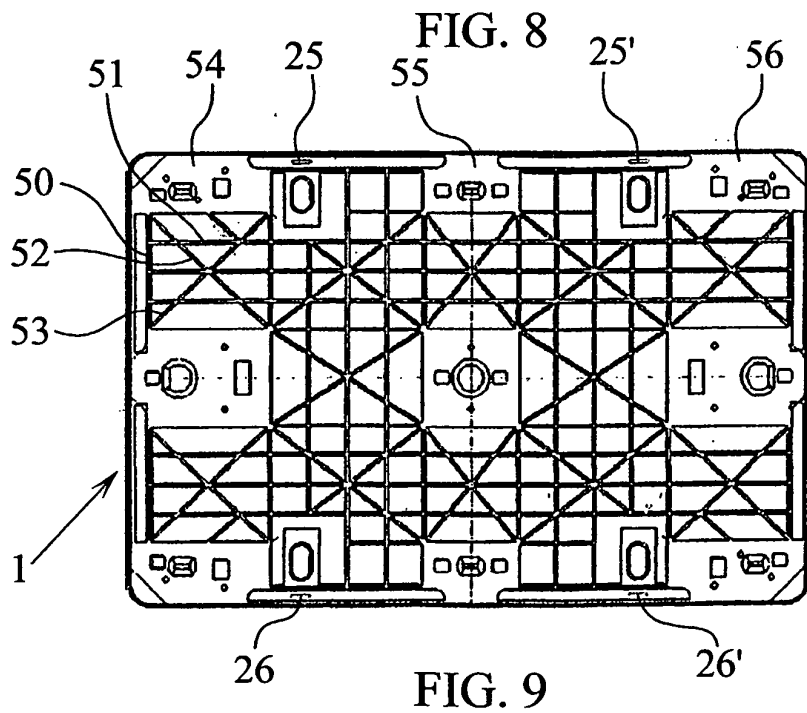
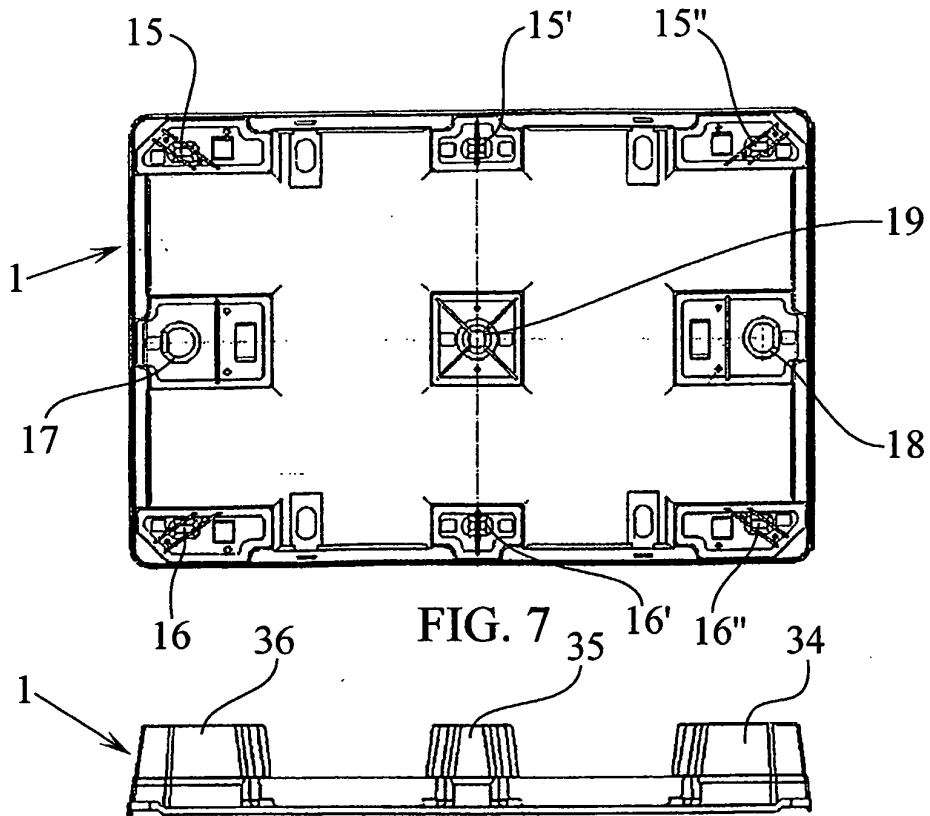


FIG. 2





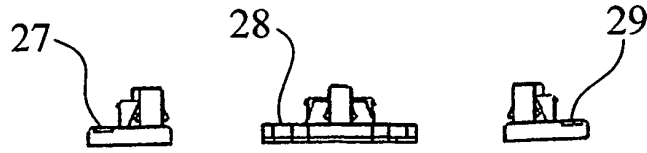


FIG. 11

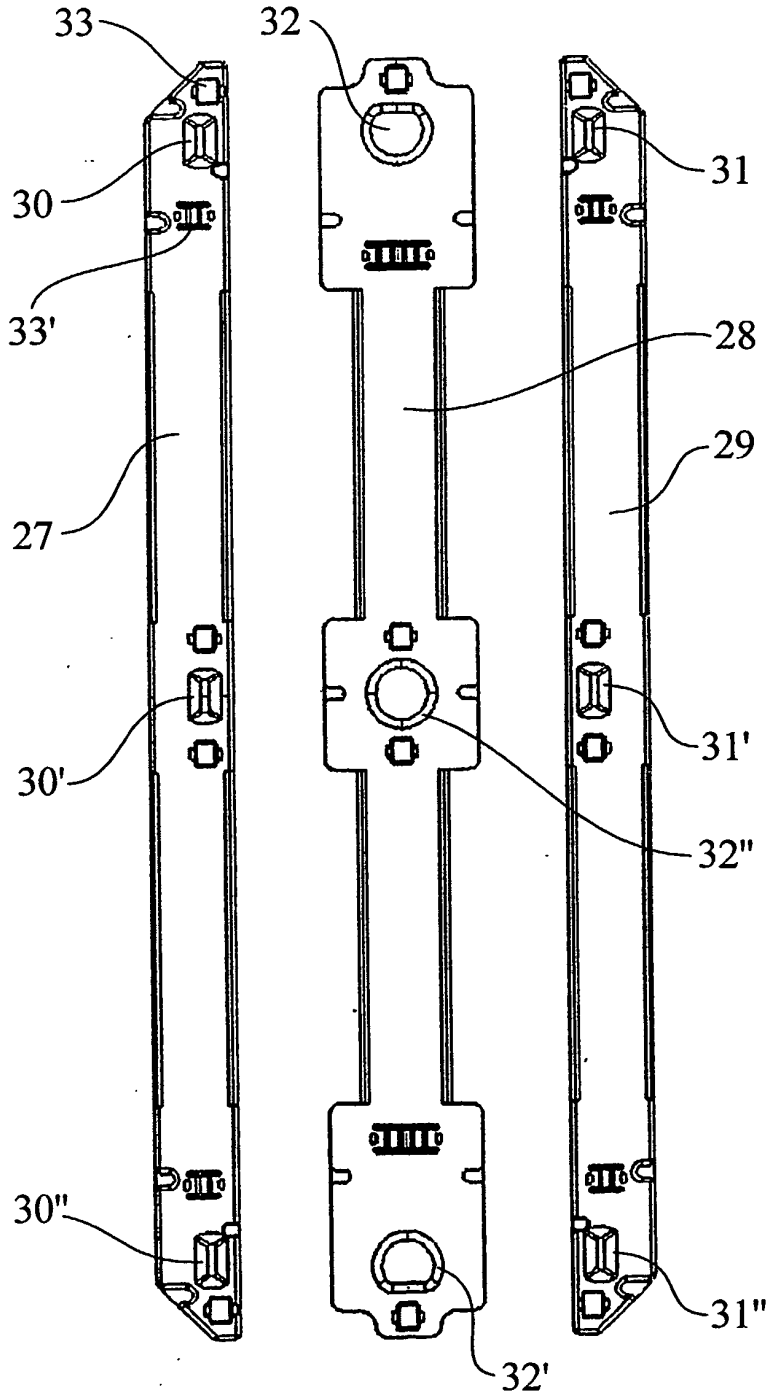


FIG. 12

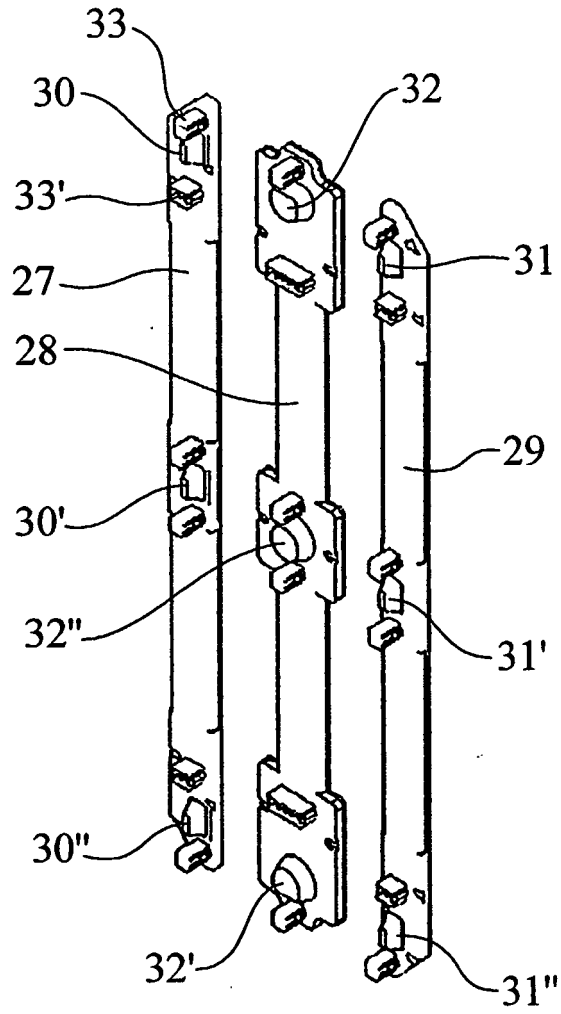
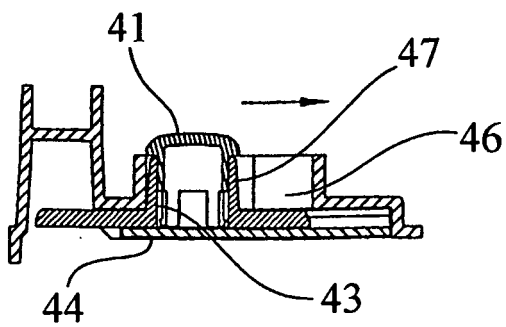
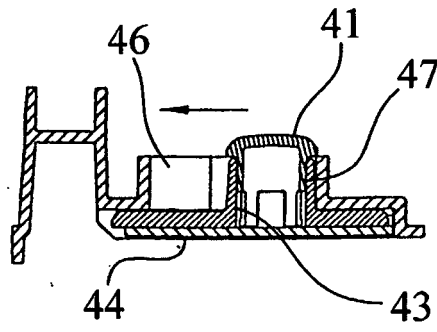
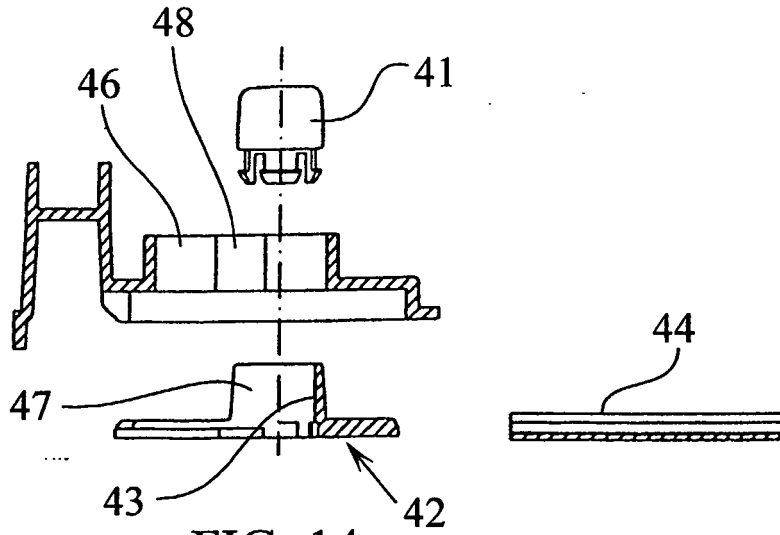
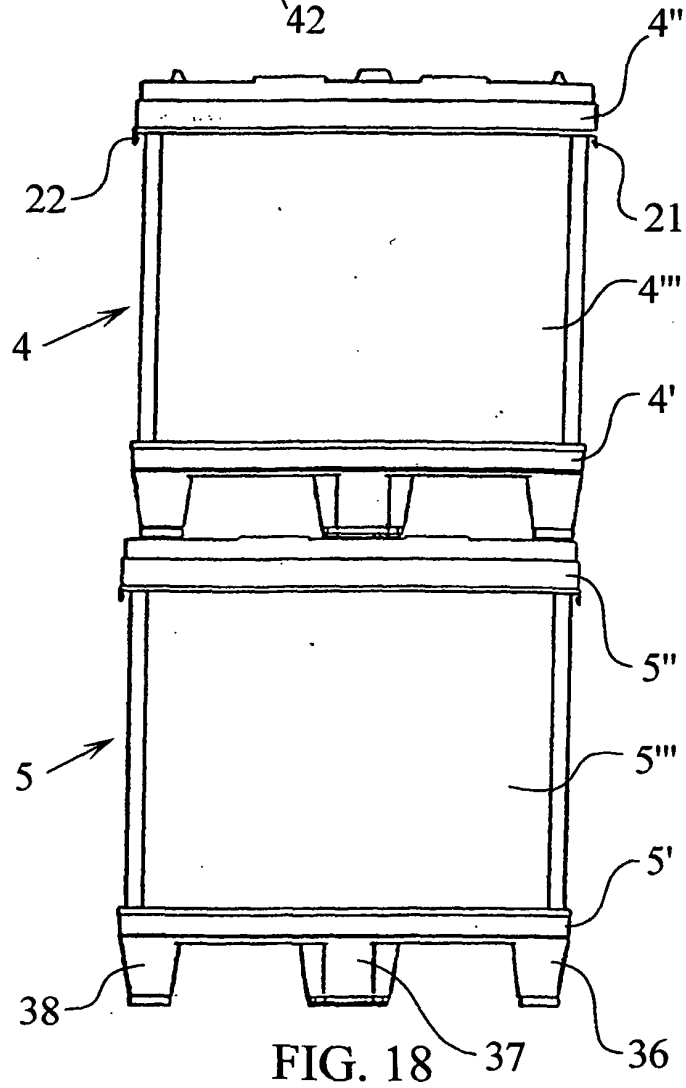
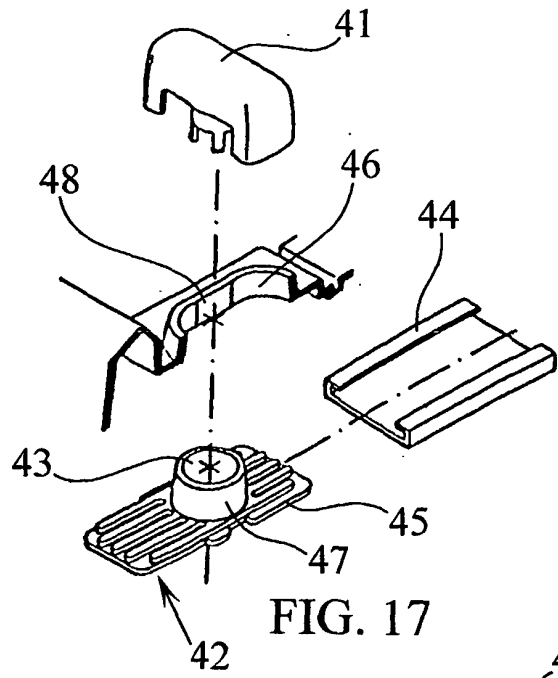


FIG. 13





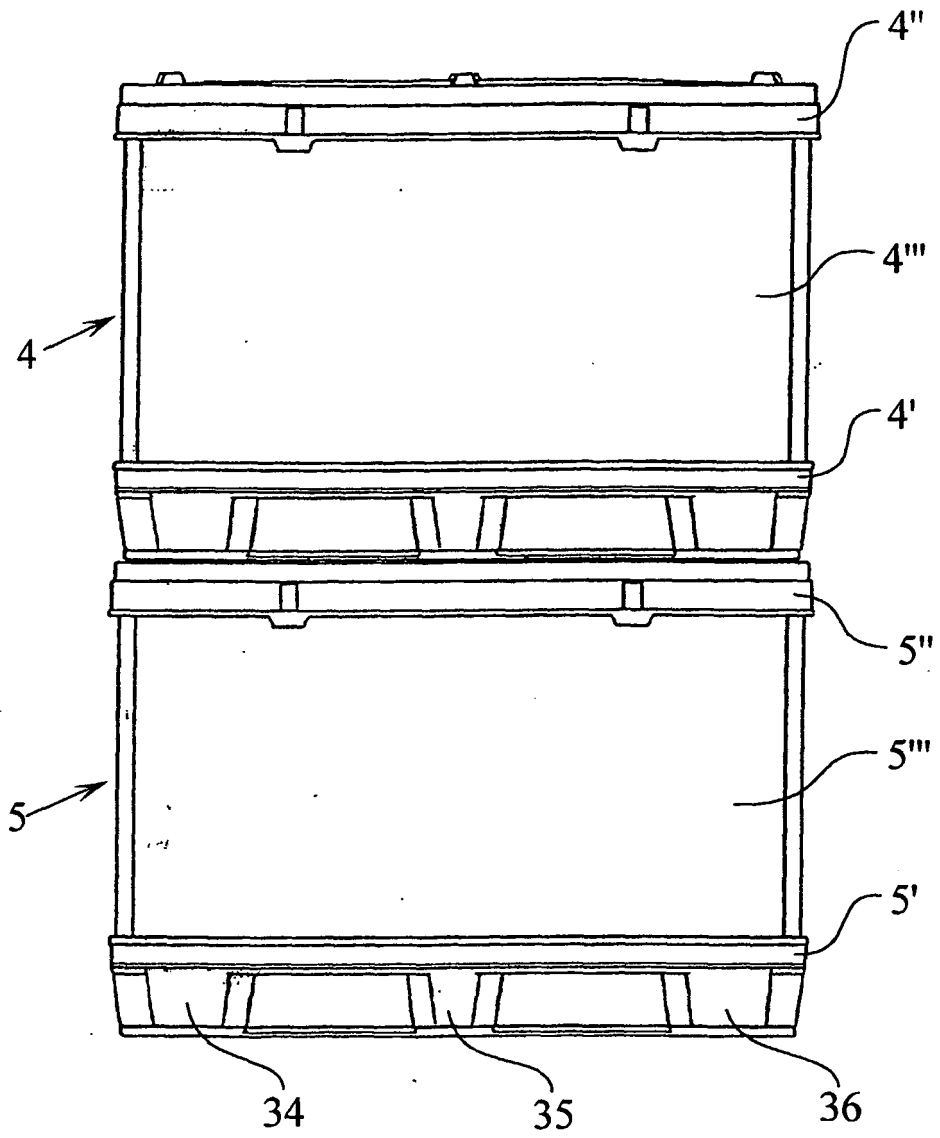


FIG. 19

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1041008 A [0002] [0002]
- US 5133460 A [0002]
- US 4856657 A [0002]