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(54) Pallets.

(57) A pallet is disclosed which comprises upper and lower stackable components. Each component (10) comprises a deck and connectors (20) which stand proud of the deck. The connectors of the upper deck protrude downwardly and the connectors of the lower deck protrude upwardly. The two sets of connectors co-operate with one another to form columns which space the decks vertically from one another. The connectors include interlocking formations (22, 24) which mesh and prevent the components moving relatively to one another in the horizontal direction. The meshing formations can be spigots and sockets. Alternatively, each formation can be a pair of wedges which are diametrically opposed to one another and on the exposed face of its connector. The raised wedges are arranged with their apices directed towards one another and each has a radially outer face which is 90° degrees in extent. When the pallet components are presented to one another with one of them inverted, the sockets receive the spigots (in the first constructional form) and the wedges mesh (in the second constructional form).

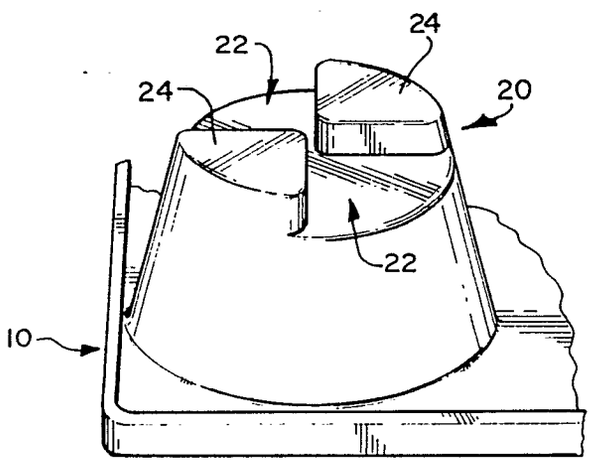

FIG 3

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BACKGROUND TO THE INVENTION

With the advent of containerization, the use of shipping pallets has become a necessity insofar as the shipping of most commodities is concerned, and vast numbers of pallets are in use.

The simplest form of pallet comprises upper and lower decks fabricated using wooden planks, there being wooden blocks between the upper and lower decks. The blocks not only connect the decks but also hold them apart so that the tines of forklift trucks can be inserted between them.

Wooden pallets are normally constructed near where they are to be loaded with goods and make a one-way journey. This is because it is, generally speaking, not economical to return empty pallets to their source. Furthermore, mechanical handling of the pallets often results in them being damaged so that they are not fit for re-use.

Applicant is aware of a pallet which comprises two components which are identical to one another and which are fabricated using wood waste in chip and/or shaving and/or sawdust form which is mixed with a binder. The resultant material is then pressed to the desired shape. Because composite wood of this nature is weak, such pallet components have to be of considerable thickness. The pallet components are for shipping purposes placed in a stack and nest with one another so that they occupy minimum space. When a pallet is to be erected, one of the components is inverted and fastening elements such as nails or screws are driven through to secure the components together. Each component has a generally planar deck and has a plurality of raised areas. When said one pallet component is inverted its raised areas become depressed areas and engage with the top surfaces of the raised areas of the uninverted pallet component. Thus, a plurality of columns are formed which space the decks of the components apart.

Experience with pallets of this form has shown that because of the thickness of material which must be used, the components do not nest very satisfactorily and the space which is saved by nesting the components is not as substantial as users would like. Furthermore, it is difficult to secure the components to one another sufficiently strongly to resist damage should one pallet component be urged laterally with respect to the other. The screws, nails, or other fastening devices which are inserted simply tend to rip out.

OBJECTS OF THE PRESENT INVENTION

The main object of the present invention is to provide a pallet constructed of components which, when all the same way up, can be nested and two of which, when one is inverted, interlock to provide a pallet which is sufficiently strong to resist forces imposed thereon during mechanical handling thereof.

A further object of the present invention is to provide a pallet comprising two components which are of synthetic plastics material.

BRIEF DESCRIPTION OF THE INVENTION

According to the present invention there is provided a pallet comprising first and second components moulded in synthetic plastics material, each component comprising a horizontally extending deck and connectors standing proud of the deck, the connectors of the upper deck protruding downwardly and abutting the connectors of the lower component which protrude upwardly, thereby to form columns which space the decks apart vertically, the connectors having formations which mesh with one another and resist any forces tending to move the pallet components relatively to one another in the horizontal plane.

In one constructional form said formations comprise spigots and sockets. In this constructional form each of said connectors of one of said pallet components comprises a frusto-conical wall, the larger diameter end of which merges with said deck and the smaller diameter end of which is closed by a horizongal end wall, said sockets being in the outer faces of said end walls, and each of the connectors of the other pallet component comprises a frusto-conical wall, the larger diameter end of which merges with the deck and the smaller diameter end of which is closed by a transverse end wall, each spigot being part of one of said end walls.

In another constructional form said connectors of one pallet each comprise a frusto-conical wall, the larger diameter end of which merges with said deck and the smaller diameter end of which is closed by a horizontal end wall, said formations being on the outer faces of said end walls. In this constructional form each formation comprises two raised wedges which are at diametrically opposed positions on said outer face and the apices of which point towards one another.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which

FIGURE 1 is a top plan view of a pallet component moulded in synthetic plastics material;

FIGURE 2 is an elevation showing two components of the form illustrated in Figure 1, stacked with the top component inverted;

FIGURE 3 is a pictorial view of a connector;

FIGURE 4 is an elevation illustrating two nested connectors;

FIGURE 5 is a pictorial view of a pallet with box retaining edge pieces;

FIGURE 6 is an 'exploded' pictorial view of a further form of pallet;

FIGURE 7 shows how an insert is connected to the pallet deck;

FIGURE 8 and 9 show high friction inserts;

FIGURE 10 is a pictorial view of a further connector;

FIGURE 11 is a top plan view of the connectcr of Figure 10;

FIGURE 12 is a section on the line XII-XII of Figure 11;

FIGURE 13 to 15 are a pictorial view, a top plan view and a section on line XV-XV of Figure 14, and show a connector which is compatible with the connector of Figures 10 to 12;

FIGURE 16 is a section showing the connectors of Figures 10 to 12 and 13 to 15 meshed;

FIGURE 17 shows connectors of the form illustrated in Figures 10 to 12 stacked; and

FIGURE 18 shows connectors of the form illustrated in Figures 13 to 15 stacked.

The pallet component 10 shown in Figure 1 is moulded in synthetic plastics material. It comprises a peripheral frame 12, two intersecting cross ribs 14 and 16, and four areas 18 which are thinner than the frame 12 and ribs 14 and 16. The frame, ribs and areas form a deck. On one face of the deck are nine connectors 20.

Each connector 20 is hollow (see particularly Figure 4) and is of generally frusto-conical form. Its top surface, as viewed in Figure 3, comprises two diametrically opposed depressed areas 22 of wedge shape and two diametrically opposed raised areas 24 also of wedge shape.

The component 10 can be used as a stillage for unitized loads. Its primary function, however, is as part of a pallet (see Figure 2) in which event two of the pallet components 10, the upper one inverted, are employed. The configuration of connectors 20 is such that as the upper pallet component 10 is placed on the lower pallet component 10, the raised areas 24 enter the depressed areas 22. Engagement between the depressed and raised areas 22, 24 prevents sideways movements of the pallet components 10 with respect to one another. As will be explained in more detail hereinafter, fastening elements can be driven through the components 10 to secure them together.

For shipping purposes, pallet components 10 can be stacked on one another, the pallet components all being the same way up as shown in Figure 4. Thus, each connector 20 of a lower pallet component 10 enters a connector 20 of the superposed pallet component 10.

If desired, each pallet component can have recesses 26 (see Figures 5 and 6) in the edges of the face thereof opposed to the connectors 20. The recesses 26 are generally rectangular in form and receive edge pieces 28. Each edge piece 28 includes two downwardly protruding pins 30 which are inserted into holes 32 of the pallet component 10.

Each edge piece is of right-angled configuration when viewed in section. The horizontals of the edge pieces 28 are received in the recesses 26, the top surfaces of the horizontals being flush with the top surface of the pallet component. Similarly, the outer face of ther vertical part of each edge piece 28 is flush with the edge of the pallet component 10. The edge pieces inhibit sideways movement of boxes on the pallet top decks.

In a modified constructional form the areas 19 are omitted so that the pallet component has holes in it. Each of these holes can, if desired, be closed off by a removable insert which has a pattern of ventilation holes in it. A pallet of this form is illustrated in Figures 6 and 7 where an insert is shown at 34 and its ventilation holes at 36. The edges of the deck which surround the holes in the pallet component can be configured as shown in figure 7, so that the inserts 'snap' into the deck with the ribs 38 of the insert in grooves 40 of the deck.

It will be understood that the tines of a forklift truck are inserted between the pallet components 10 when it is desired to move the pallet. To prevent the pallet slipping off the tines, an additive can be introduced into the plastics material from which the pallet is manufactured to cause its surface coefficient of friction to increase. Alternatively, the surface of each pallet component can be moulded with roughened surfaces or can have a pattern of ridges and valleys or other protrusions. In other forms, the pallet component is moulded with sockets for receiving components having a high coefficient of friction. For example, sockets 42 (Figure 8) which are slightly more than semi-cylindrical in extent can be provided for receiving tubular friction elements 44. In the form of Figure 9, the friction elements are shown at 46 and 'snap' into sockets 48 provided therefor.

Turning now to Figures 10, 11 and 12, these Figures show a connector 50 which forms part of a pallet component designated 52. The pallet component 52 can have nine connectors 50 arranged in the same way that the connectors 20 are arranged in Figure 1.

Each connector 50 has an upwardly tapering frusto-conical wall designated 54 and a generally cylindrical portion 56 which is closed by a circular top wall 58. The portion 56 has a smaller diameter than the smaller diameter end of the wall 54, and an annular surface 60 encircles the portion 56.

In Figures 13 to 15 there is illustrated a connector 62 which forms part of a pallet component 64. The connector 62 includes a frusto-conical wall 66, the smaller diameter end of which is closed by a circular end wall 68. In the top surface of the end wall 68 there is a circular recess 70. An annular surface 72 encircles the recess 70.

When a pallet component 52 and a pallet component 64 are brought into co-operating relationship with one of the components inverted (as shown in Figure 16), the portion 56 enters the recess 70 and the surfaces 60 and 72 engage with one another. A screw 74 is shown passing through both pallet components, thereby to secure them to one another.

It will be understood that when the pallet is loaded, the component 52 bears down on the component 64. Should any force be exerted which tends to shift the components 52, 64 literally with respect to one another, movement is prevented as the peripheral walls of the portion 56 and the recess 70 are in engagement with one another.

The components 64 does not have to be attached in a very secure manner to the underside of the component 52. The only time that the component 64 can drop away from the component 52 is when the tines of a forklift truck are inserted between the pallet components (into the space designated S) and the pallet lifted. The screws 74 must be sufficient to prevent the pallet component 64 dropping away from the component 52.

The components 52 stack (as shown in Figure 17) with the lower faces of the portions 56 engaging the peripheries of the top walls 58. The components 64 stack (as shown in Figure 18) with the surfaces 72 in engagement with the underfaces of the end walls 68.

It will be understood that a pallet of the form shown in Figure 16 requires two different types of pallet component and hence two different moulds. A pallet of the form shown in Figure 2 can be constructed from two identical pallet components. If the pallet component 10 is fabricated with the areas 18 omitted, and inserts such as are shown in Figure 6 inserted into the generally rectangular openings provided, then only a single pallet mould is needed together with a smaller mould or moulds for the inserts. The inserts can have ventilation holes 36 in them or they can be unapertured.

The screws 74 can be replaced by other mechanical fastening elements or by adhesive, or mechanical fastening elements can be supplemented by adhesive. For example, a hole can be drilled in one pallet component and hot melt adhesive injected into the gap between the components.

Two pallet components, as shown in Figure 1, can be secured together using any of the methods described.

Claims

1. A pallet comprising first and second components (10), each of which comprises a horizontally extending deck and connectors (20, 50, 62) standing proud of the deck, the connectors of the upper deck protruding downwardly and abutting the connectors of the lower component which protrude upwardly thereby to form columns which space the decks apart vertically, characterized in that the connectors (20) have formations (22, 24 : 56, 70) which mesh with one another and resist any forces tending to move the pallet components (10) relatively to one another in the horizontal plane.

2. A pallet according to Claim 2, characterized in that said formations comprise spigots (56) and sockets (70).

3. A pallet according to Claim 2, characterized in that each of said connectors (62) of one of said pallet components comprises a frusto-conical wall (66), the larger diameter end of which merges with said deck and the smaller diameter end of which is closed by a horizontal end wall (68), said sockets (70) being in the outer faces of said end walls, and each of the connectors (50) of the other pallet component comprises a frusto-conical wall (54), the larger diameter end of which merges with the deck and the smaller diameter end of which is closed by a transverse end wall (58), each spigot (56) being part of one of said end walls.

4. A pallet according to Claim 1, characterized in that said connectors (20) of one pallet each comprise a frusto-conical wall, the larger diameter end of which merges with said deck and the smaller diameter end of which is closed by a horizontal end wall, said formations (24) being on the outer faces of said end walls.

5. A pallet according to Claim 4, characterized in that each formation comprises two raised wedges (24) which are in diametrically opposed positions on said outer face and the apices of which point towards one another.

6. A pallet according to Claims 1 to 5, and including elements (28) mounted along the edges of the upper component and standing proud of the upper deck to inhibit lateral movement of goods placed on the pallet.

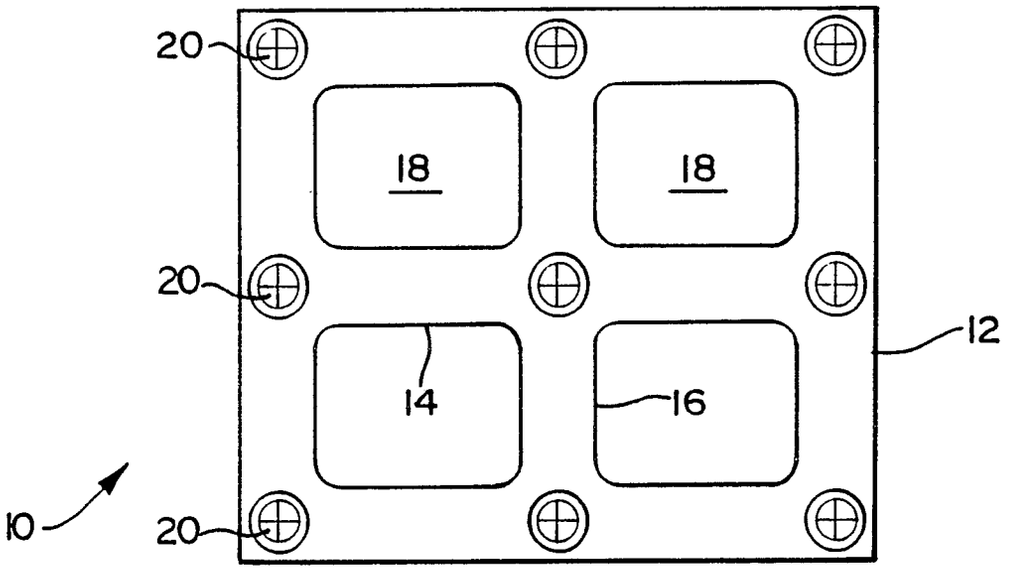

FIG 1

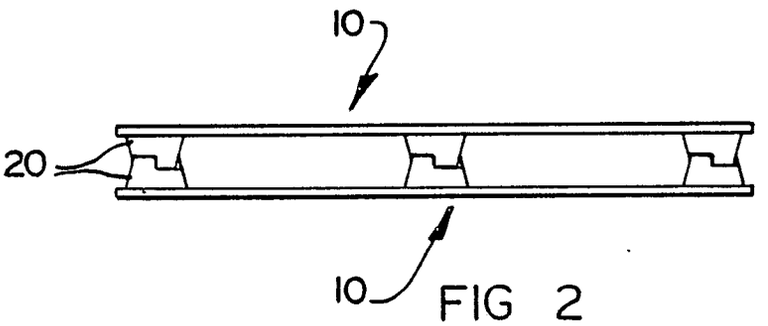

FIG 2

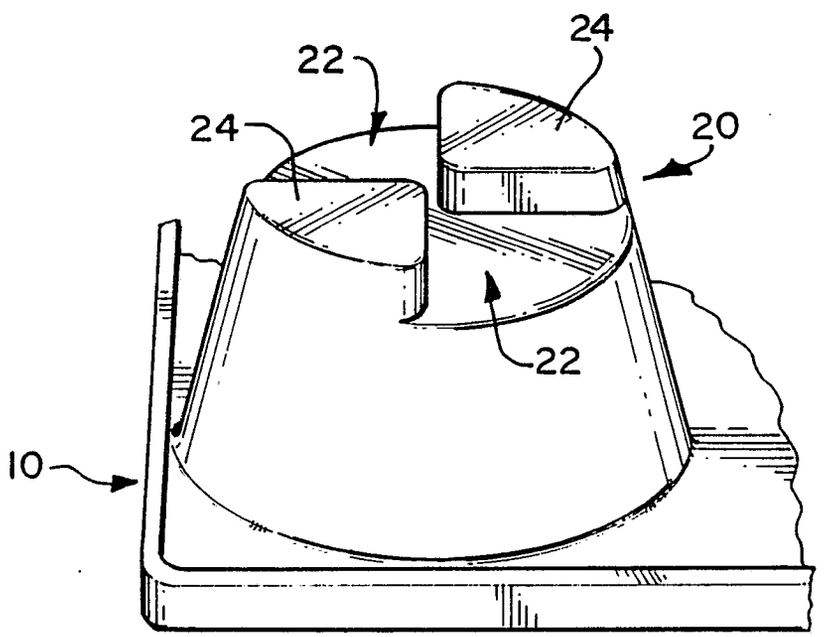

FIG 3

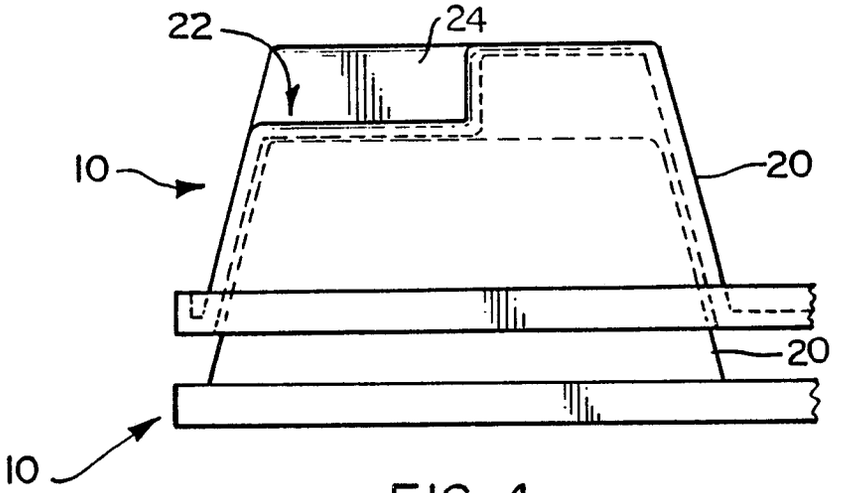

FIG 4

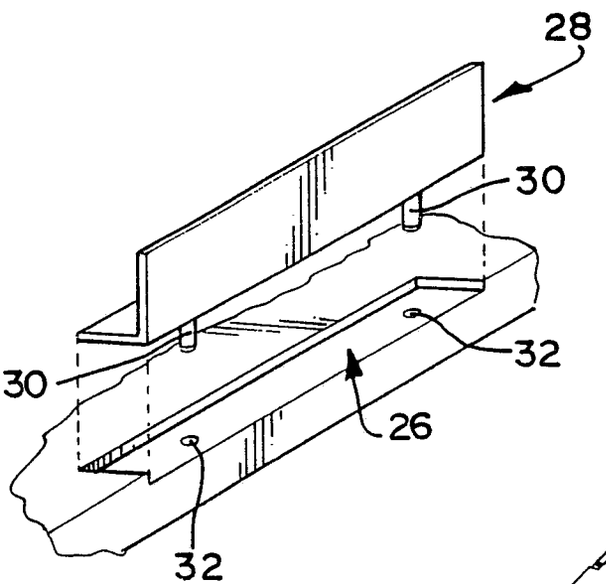

FIG 5

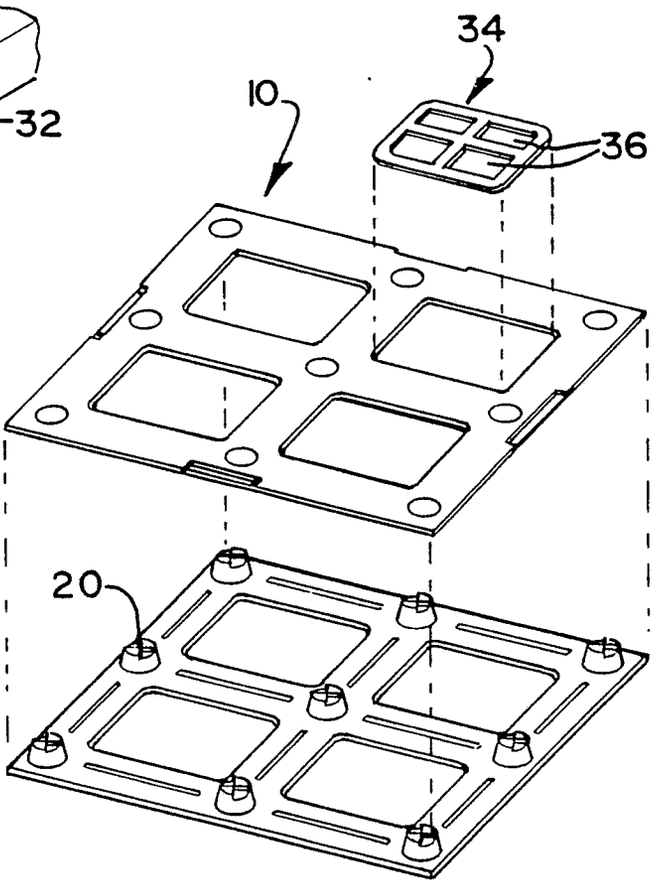

FIG 6

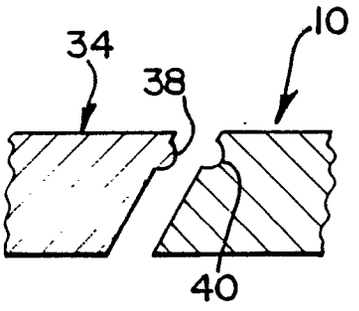

FIG 7

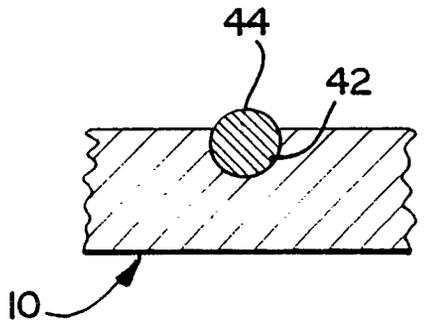

FIG 8

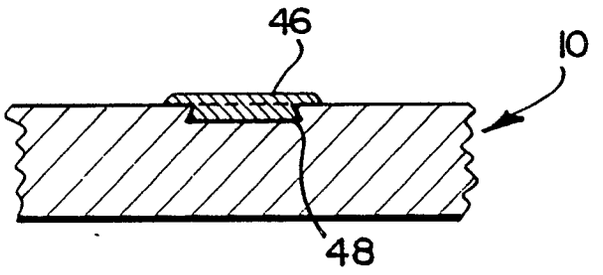

FIG 9

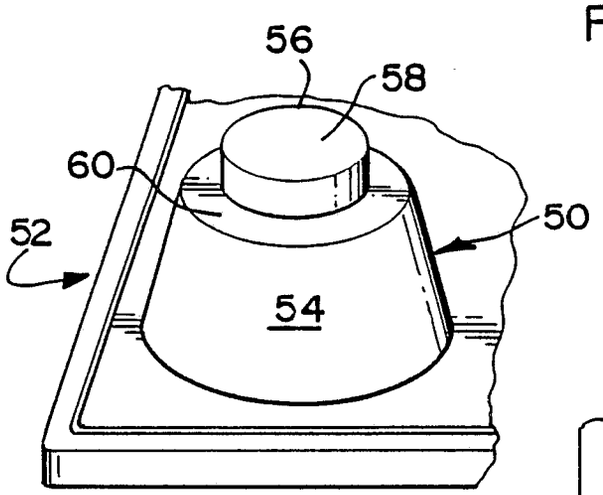

FIG 10

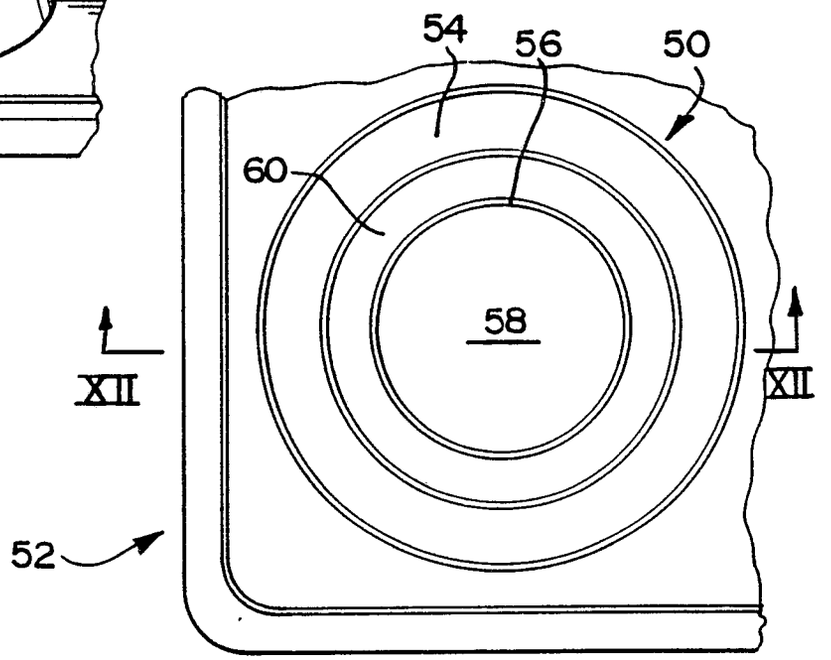

FIG 11

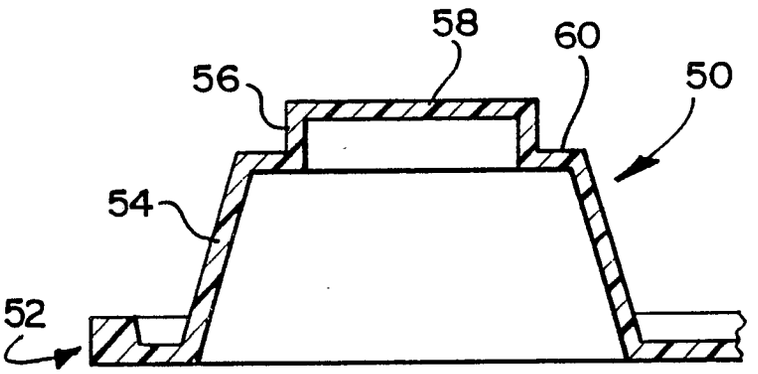

FIG 12

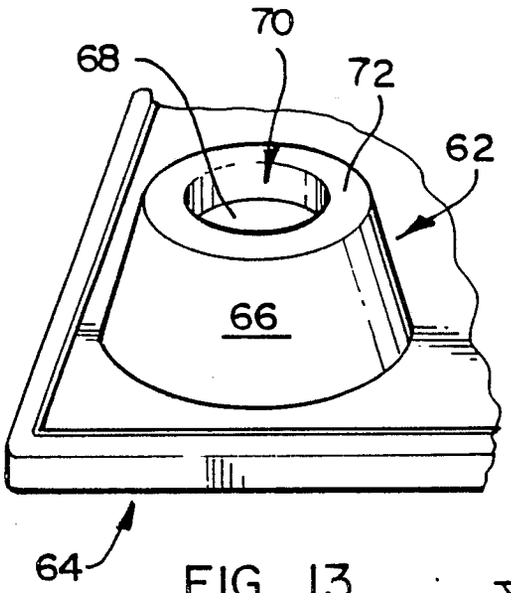

FIG 13

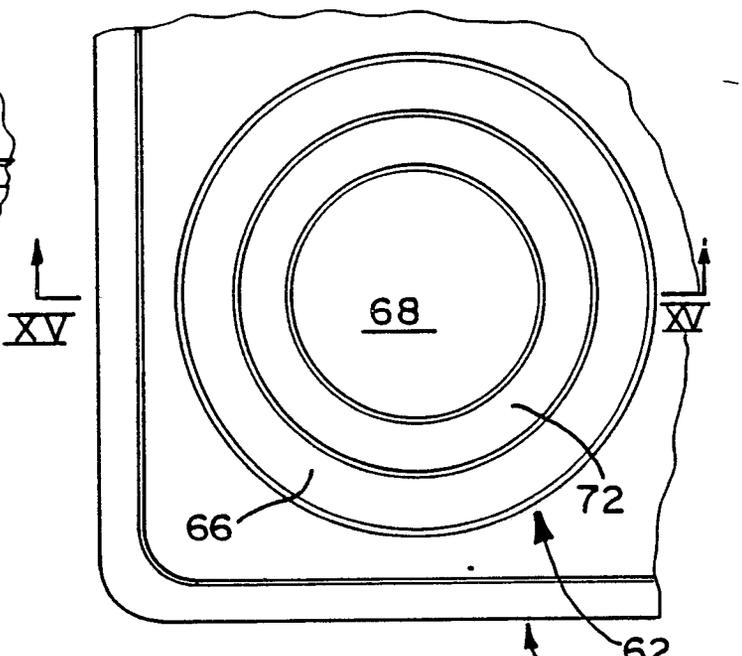

FIG 14

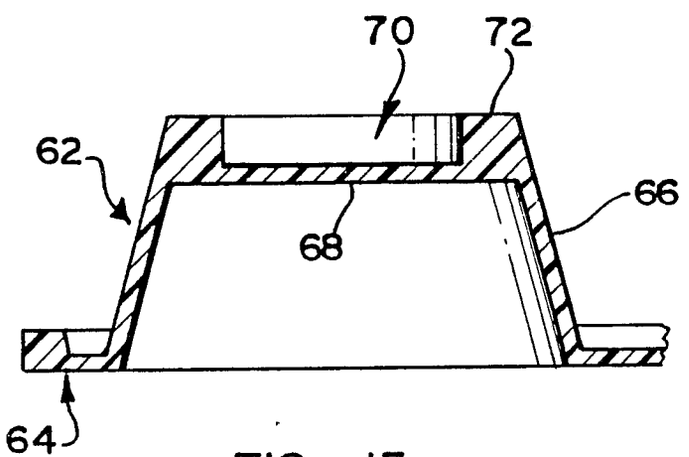

FIG 15

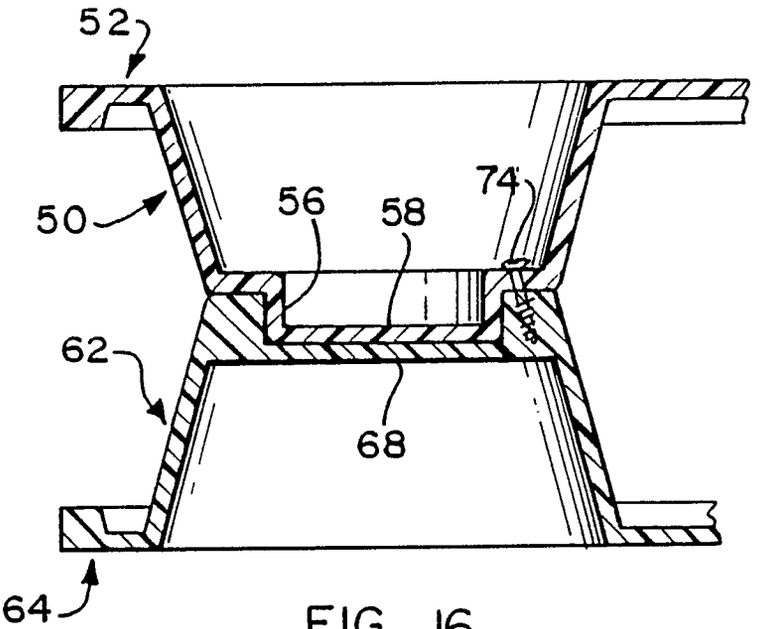

FIG 16

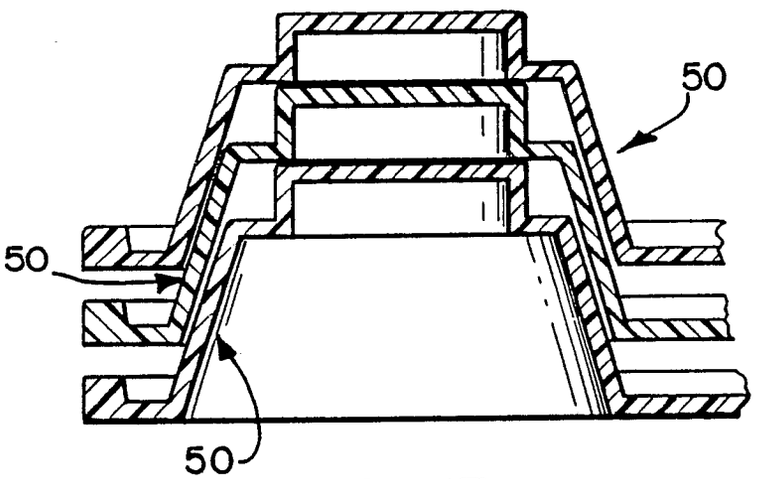

FIG 17

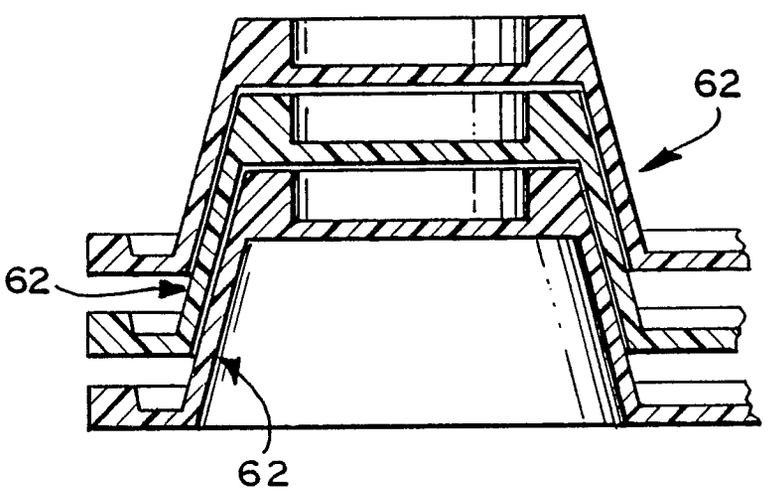

FIG 18

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 30 7403

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-3 680 496 (WESTLAKE) * Claim 1; column 3, lines 24-33; figures 2-4 *	1-4	B 65 D 19/32
Y		5	
Y	US-A-4 604 014 (FRANO) * Column 1, lines 28-37; figures 1-6 *	5	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 65 D
F 16 D
F 16 B
A 63 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18-11-1988	LEONG C.Y.

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
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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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