Sept. 20, 1971 C. T. STEWART 3,605,651

PALLET OF LOW-COST DIPOSABLE TYPE

Filed May 28, 1969 2 Sheets-Sheet 1

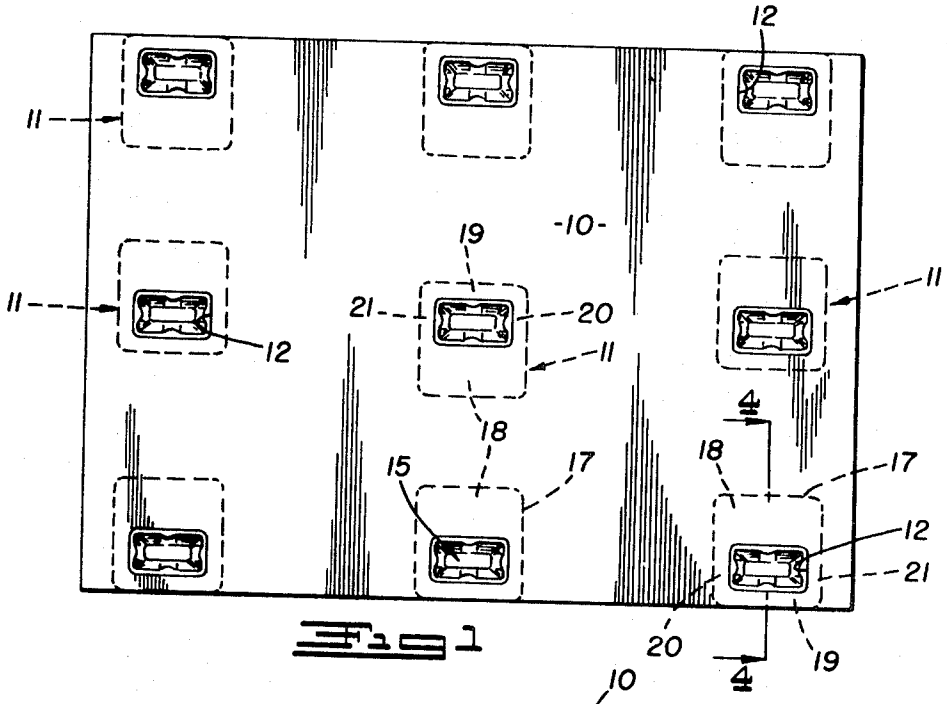


Fig 1

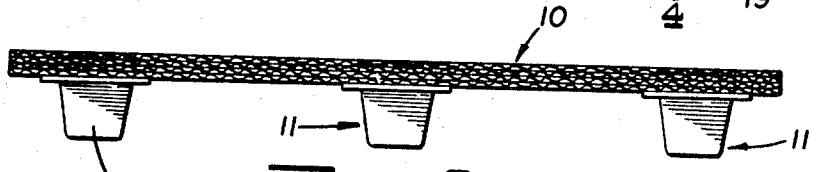


Fig 2

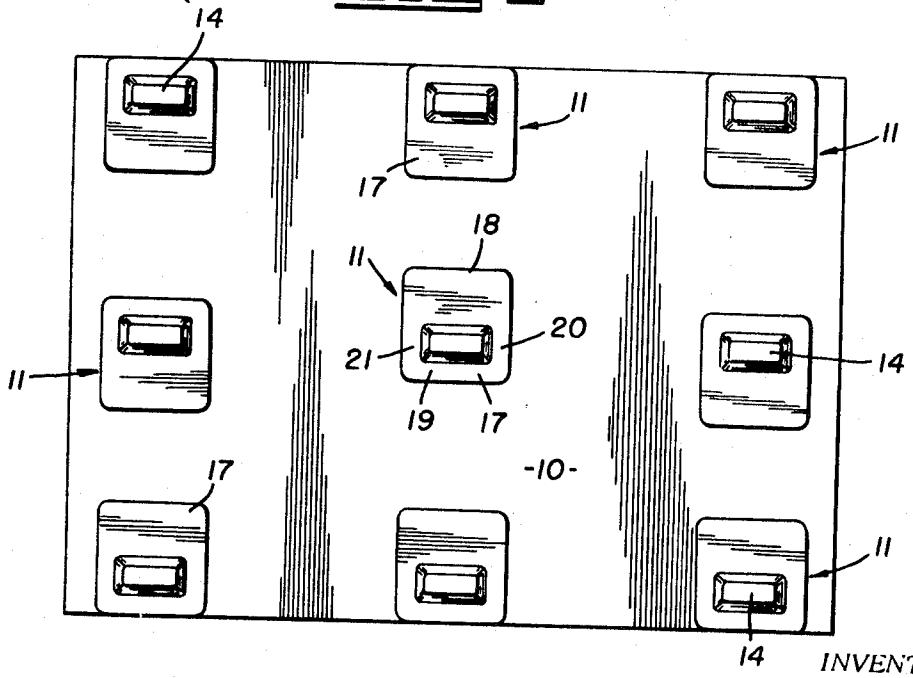


Fig 3

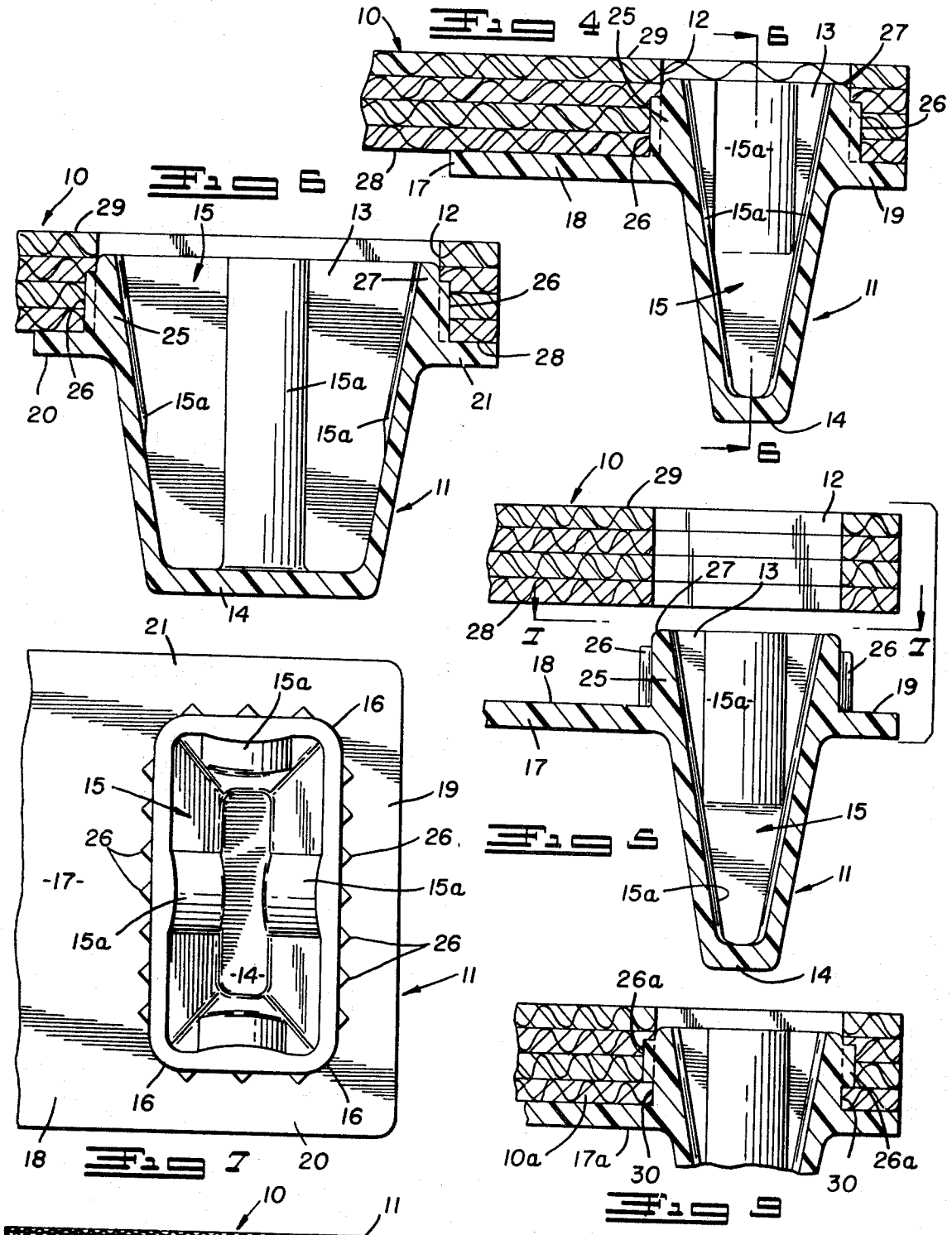
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PALLET OF LOW-COST DIPOSABLE TYPE

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PALLET OF LOW-COST DISPOSABLE TYPE

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U.S. Cl. 108—51 8 Claims

ABSTRACT OF THE DISCLOSURE

A low-cost disposable type pallet including a load-supporting deck panel of inexpensive material having a plurality of sockets in which are locked separately-produced, inexpensive, hollow, molded legs which project below the panel and support it and which are properly distributed throughout its area to provide spaces for receiving the tines of a fork-lift truck.

BACKGROUND OF THE INVENTION

The purpose of this invention is to produce a pallet which can be used for module packaging of materials. The pallet is lightweight, is a one-trip throw-away unit, and is strong enough to carry relatively heavy loads. Further, the pallet is of a design that will lend itself to complete automation in its fabrication in order to reduce costs. Prior art pallets of the kind commonly in use today are often made of wood requiring some hand operation in their production, are heavy in weight, are bulky, and will not nest properly for shipment. Prior art metal pallets, wire pallets, and pallets of similar types are all high priced and much too expensive to be used as throw-away types.

This invention contemplates the use in the pallet of molded hollow legs, spaced according to the load pattern, upon a deck panel that is made of inexpensive material such as a multiple-wall corrugated board or other low-cost board of either plastic, wood fiber, or paper. The legs are preferably molded from any one of a number of plastics, but could be die-cast from metal or made out of other materials, such as pressed fiber material, according to conventional processes. The deck panel is provided with sockets or cavities for receiving the upper ends of the legs which are fitted tightly therein and are suitably locked in position. Due to the inexpensive materials used in the molding of the legs and the producing of the deck-board or panel of the pallet the pallet unit costs but a few cents and can be discarded after a single trip, thus eliminating returns, repairs and reuse.

In the accompanying drawings, there is illustrated a preferred embodiment of this invention and in these drawings:

FIG. 1 is a top plan view of the pallet.

FIG. 2 is an edge elevational view of the pallet.

FIG. 3 is a bottom plan view of the pallet.

FIG. 4 is an enlarged fragmentary vertical sectional view taken along line 4—4 of FIG. 1.

FIG. 5 is a view similar to FIG. 4, but showing the separate leg before it is positioned in the socket of the deck panel.

FIG. 6 is a vertical sectional view taken on line 6—6 of FIG. 4.

FIG. 7 is a horizontal sectional view taken on line 7—7 of FIG. 5.

FIG. 8 is an edge elevational view showing two of the panels superimposed with their hollow legs nested.

FIG. 9 is an enlarged fragmentary vertical sectional view showing a modification in the means for locking the upper end of the leg in the socket of the deck panel.

With reference to the drawings, there is illustrated in FIGS. 1 to 3, a pallet embodying the features of this invention. The pallet is shown as consisting generally of a load-carrier deck panel or board **10** and a plurality of legs **11** which are distributed at predetermined positions, throughout the board.

The board **10** may be of various suitable, inexpensive materials, but is illustrated as being of corrugated board. Other boards made of low-cost material such as plastics, wood fiber or paper may be used. However, as will later appear, it is important that this material be yieldable or compressible so that the legs can be tightly fitted and locked in sockets or cavities **12** formed at selected positions therein and extending completely vertically therethrough. Also, the board must have sufficient structural strength to support the load which it is designed to carry. The legs **11** are separately produced and are preferably molded from any one of a number of plastics such as polyethylene, polystyrene, etc. However, they could be die-cast from metal or pressed from fibrous material or made by usual methods from other inexpensive materials.

Each leg, as indicated in FIGS. 4 to 7, is of hollow form and is shown as being of rectangular, horizontal cross-section, but as later indicated, it could be of other cross-sections. The leg is provided with an inner upwardly opening cavity **15** which tapers from an enlarged open upper end **13** to a closed lower-end or foot **14** which may be provided with a drain opening (not shown). It will be apparent from FIG. 7 that the corners **16** of the hollow legs are provided with a radius inside and outside. At a level towards the upper end of the leg, but a substantial distance below the upper extremity thereof, the leg is provided with an integral outwardly projecting horizontal peripheral flange which in effect provides a square pad **17** surrounding the leg. It will be noted from FIGS. 1 and 3 that this pad **17** is offset to one side providing a wider supporting shelf **18** at that side and a narrower shelf **19** at the opposite side and on the remaining sides, shelf portions **20** and **21** of equal width are provided. Since the pad **17** is located below the upper end of the leg, an upstanding socket-engaging flange portion **25** is provided above it which is vertically disposed and has the upright ribs or splines **26** formed thereon at spaced positions around its periphery. These splines extend from the pad **17** upwardly but terminate a short distance below the upper edge of the leg so that there is provided an exposed upwardly projecting lip **27** at the upper extremity of the leg. It will be noted that the ribs **26** are of triangular horizontal cross-section with a sharp edge outermost. Thus, the ribs **26** provide an upstanding serrated surface which is adapted to be positioned in a cooperating socket **12** of the board **10**.

The sockets **12** may be formed in any suitable manner in the board **10**, such as by die-cutting, and are made of such a size and shape that the flange portion **25** will fit therein and the ribs **26** will press into the sides of the socket. As previously indicated, the board **10** is of such material that the walls of the socket will yield inwardly to receive the ribs or splines **26** which will serve to lock the legs therein. In the example shown, the deck board **10** is made of a plurality of laminations of corrugated board adhesively secured together.

In FIG. 5, a leg **11** is indicated before its upper end if forced upwardly into the socket **12** of the board **10**. The socket **12** will be of a size and shape to complementally receive the upstanding lip **27** which is rounded so as to aid in guiding the upper end of the leg into the socket. The end will be moved upwardly into the socket until the pad **17** engages the lower surface **28** of the board **10** and will be in flat contact therewith. At this time, the upper extremity of the lip **27** on the leg **11** will be spaced below the upper surface **29** of the board, as is indicated in FIGS. 4 and 6. Also, as indicated in FIGS. 4, 6, and 7, the splines or ribs **26** are embedded in the resiliently com-

pressible material of the board **10** forming the walls of the socket **12**.

As indicated in FIG. 9, the ribs or splines around the leg, indicated at *26a*, may terminate short of the upper surface of the pad **17***a* to provide a locking space **30** between the lower ends of the ribs and the upper surface of the pads **17***a*. With this arrangement, the lowermost corrugated board lamination or face board **10***a* of the deck panel will snap into the spaces **30** and more securely lock the leg in position.

It will be apparent from FIG. 8 that due to the fact that the legs **11** are hollow and have upwardly opening tapered cavities **15**, the legs of one pallet may extend down into the cavities of the legs of the next lower pallet and nest therein. This is very desirable for storage and shipping as the pallets will consequently occupy a minimum of space. Nesting is facilitated by all surfaces being tapered and all corners being radiused. To provide an air space between nesting legs, so as to prevent condensation or sticking, all the walls of the cavities **15** may be provided with inwardly protruding convex surfaces or ridges **15***a*, as shown in FIGS. 5 to 7.

The pallet of this invention is of lightweight inexpensive construction and can be a one-trip throw-away unit. However, in use, such as in the module packaging of materials, the pallet will be a very strong unit carrying the necessary load. It will be noted from FIG. 1 that the legs of the pallet will be so arranged that the tines of a fork-lift truck can be inserted therebetween from any direction. However, with the arrangement of FIG. 1, it is preferred that the tines be inserted from one or the other narrower ends and that the tines extend longitudinally. This will make more effective use of the load-supporting pads since the wider areas **18** thereof will extend over the tines to obtain a more equal distribution of the load on the tines. The center leg **11** is reversed relative to the others in that longitudinal row so that the one tine will have four pad areas **18** thereabove and the other will have five. Also, the hollow cross-section of each of the legs **11** is rectangular and extends in the same direction as the rectangular deck panel **10** to obtain better distribution of the load. Furthermore, the substantially closed lower end of each of the legs is relatively blunt to provide better support. Also, due to the fact that the lip **27** is recessed below the upper surface of the board, a cushioning effect between the load and the upper end of the leg is provided.

The pallet is of such a nature that it will lend itself to complete automation in its fabrication. This invention provides a means of making a low-cost pallet by providing an inexpensive deck board of a readily available commercial material, such as corrugated board. Also, the hollow leg can be readily made of various inexpensive materials by high production low-cost methods. The board can be readily provided with the leg-receiving sockets by economical methods and the legs can be forced into said sockets, and due to the serrations thereon, will be automatically locked in the sockets. Thus, it will be possible to eliminate all handwork commonly associated in the production of pallets and provide a low-cost pallet with economic justification for throw-away.

While the leg is shown to be rectangular in cross-section, which is preferred, it would be round, hexagonal, or any geometric shape, depending upon the configuration of the pallet, the size of the pallet and spaces between legs required for insertion of tines of a lifting machine. Also, the number of legs used can vary according to the size of the pallet and the load to be carried by the pallet. The type and strength of material used in the legs and the deck would be determined by the type of loading required to be carried by the pallet and leg assembly. By varying the types of material used both on the deck and the leg, almost any arrangement of strengths can be obtained, which strengths are adjusted to the type of the load to be carried by the pallet, therefore permitting use of readily available material in a selection that will produce the best pallet at the least cost for the work to be accomplished.

Since the legs permit nesting of the pallets, a plurality of pallets will occupy a minimum of space facilitating storage and shipping. The design of the leg, being tapered for nesting and also with radiused corners is such that it permits easy insertion of the tines of the lifting mechanism in the receiving spaces between the legs, the tapered and rounded corner leg acting as an effective guide for centering the tines, versus the rectangular square block leg of the conventional pallet, which tends to stop the tine unless the tine is adequately centered. This permits faster movement of the tines into the spaces in that the operator of the lifting vehicle does not have to take the care to center his vehicle as carefully as he would with conventional pallets, thus adding materially to the speed at which the pallets can be used in a distribution system. In summary, features of the invention are:

(1) Low cost of material used.
(2) The wide base pad of each leg to distribute loading over the deck onto the leg.
(3) The hollow self stacking leg.
(4) The locking splines on the uppermost part of the leg which is inserted into a mating hole in the deck.
(5) The curved inner surface of the cavity of each leg to prevent sticking of the adjacent surfaces of nesting legs.
(6) Low cost of the completely assembled pallet.
(7) Structure permitting complete automation of the manufacturing process of the components and assembly thereof.
(8) Components of such a nature that they can be produced commercially in large volumes at low unit cost.
(9) Tapered and radiused legs for permitting rapid entrance of tines of a lifting vehicle in reducing cost of movement of pallet.

Having thus described this invention, what is claimed is:

1. A pallet comprising a deck panel and a plurality of supporting legs depending therefrom at selected locations throughout the area of the panel;

said panel being formed of resiliently compressible material and having sockets formed therein at selected locations throughout the area thereof and opening downwardly at the lower side of the panel;

said legs having upper ends which project into and are retained in the sockets by vertical ribs located at intervals spaced therearound which project outwardly therefrom sufficiently that when forced into said sockets they become embedded in the resiliently compressible material forming the walls of said sockets;

said legs having outwardly projecting bearing flanges adjacent to but below said ribs thereof and engaging the lower face of said panel so that the panel is supported by said bearing flanges.

2. A pallet according to claim **1** in which the deck panel is made of corrugated board having corrugated laminations including upper and lower face boards.

3. A pallet according to claim **2** in which the ribs terminate above said flanges to provide locking spaces in which said lower face board is expanded.

4. A pallet according to claim **3** in which the ribs of each leg terminate slightly below the upper end of the leg to provide an upper lip, said lip being rounded to facilitate entrance into the respective socket of the panel.

5. A pallet according to claim **1** in which the legs are hollow and open upwardly to provide cavities which open upwardly through said panel, the walls of said cavities flaring outwardly and upwardly to facilitate stacking of the pallets with the legs of an upper pallet extending downwardly into and nesting in the upwardly opening cavities of the legs of the next lower pallet.

6. A pallet according to claim **5** in which the flanges of respective legs extend completely therearound in surrounding relationship thereto, to form a load-supporting

pad, each leg being of hollow angular horizontal cross-section and being eccentrically disposed in said pad.

7. A pallet according to claim 5 in which the deck panel is of rectangular form and the leg pads are of substantially square form, the said cross-section of each leg being rectangular having its longer dimension extending in the same direction as the longer dimension of the deck panel.

8. A pallet comprising a deck panel and a plurality of supporting legs depending therefrom at selected locations throughout the panel;

said panel having sockets formed therein at the selected locations,

said legs having upper ends which project into and are retained in said sockets,

said legs having outwardly projecting flanges adjacent to but spaced below their upper ends and engaging the lower face of said panel,

said legs being hollow and opening upwardly to provide cavities which open upwardly through said panel, the walls of said cavities flaring outwardly and upwardly to facilitate stacking of the pallets with the legs of an upper pallet extending downwardly into and nesting in the upwardly opening cavities of the legs of the next lower pallet,

the deck panel being of rectangular form and the leg pads being of substantially square form, the said cross-section of each leg being rectangular and having its longer dimension extending in the same direction as the longer dimension of the deck panel,

each of the legs including a pair of bearing areas on the opposite elongated sides of the hollow leg with one of the areas being greater than the other, said legs being disposed in the respective sockets in the panel so that the greater areas of respective pads are reversed relatively.

References Cited

UNITED STATES PATENTS

2,573,304	10/1951	Bronstein	108—54
2,706,099	4/1955	Whalley	108—53
2,930,560	3/1960	Carnwath et al.	108—56
3,393,647	7/1968	Howell	108—52
3,407,758	10/1968	Simkins	108—57
3,470,832	10/1968	Hefferman	108—53
3,199,469	8/1965	Sullivan	108—53
3,247,810	4/1966	Sepe et al.	108—53
3,428,003	2/1969	Hefferman	108—53
2,826,470	3/1958	Denton	248—188.8
2,842,417	7/1958	Scanlon	248—188.8
3,052,058	9/1962	Wash et al.	248—188.8

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