United States Patent

Palfey

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[54] GOODS SUPPORTING PALLET

[72] Inventor: **Albert J. Palfey**, Midland, Mich.

[73] Assignee: **The Dow Chemical Company**, Midland, Mich.

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[52] **U.S. Cl.** **108/53**, 108/58

[51] **Int. Cl.** **B65d 19/38**

[58] **Field of Search** 108/51–58

[56] **References Cited**

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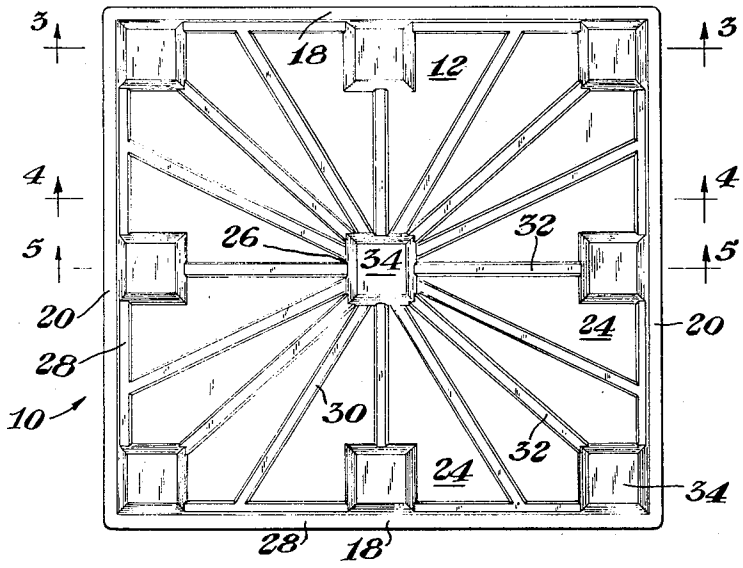
Primary Examiner—Bobby R. Gay
Assistant Examiner—Glenn O. Finch
Attorney—Griswold & Burdick, William R. Norris and Lloyd S. Jowanovitz

[57] **ABSTRACT**

The present invention concerns novel goods-supporting pallets which possess good mechanical strength and can be easily transported. The pallets are also readily accessible on all sides to the tines of lifting devices. Additionally, the pallets nest easily into one another thereby saving storage space.

1 Claim, 5 Drawing Figures



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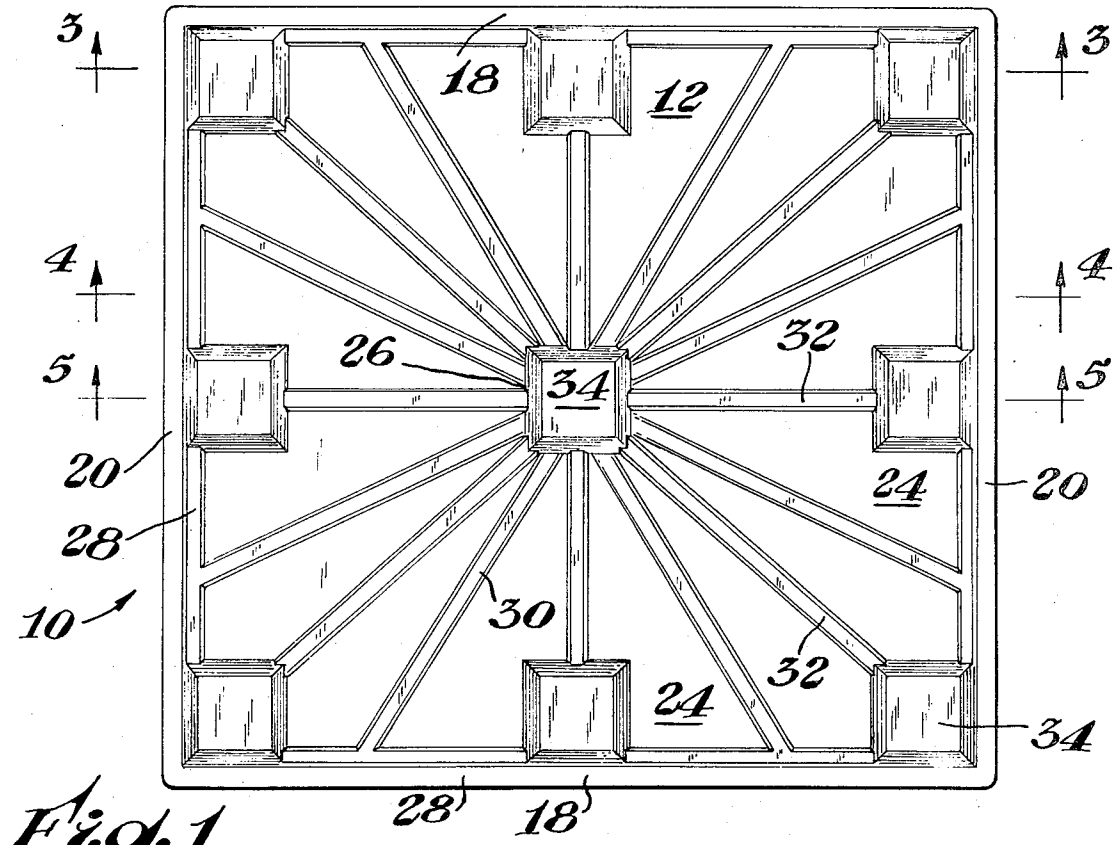

Fig. 1

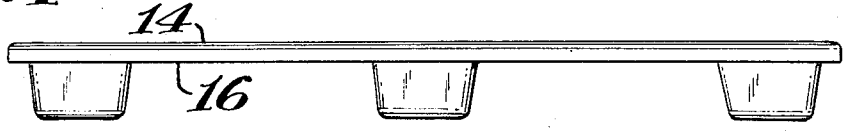

Fig. 2

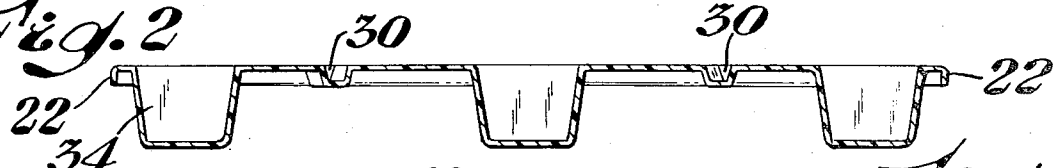

Fig. 3

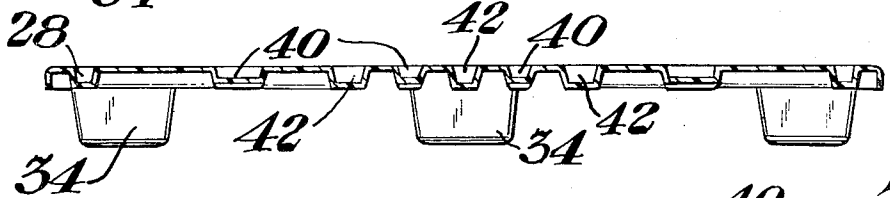

Fig. 4

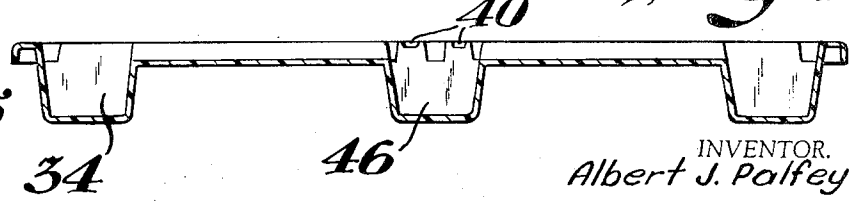

Fig. 5

INVENTOR.
Albert J. Palfey

BY

Griswold & Burdick
ATTORNEYS

GOODS SUPPORTING PALLET

BACKGROUND OF THE INVENTION

The commonly-employed wooden shipping pallet possesses a number of disadvantages. Normally, being constructed of wood, it is mechanically strong, but relatively heavy. The typical construction of such pallets utilizes a floor of boards supported and elevated above the surrounding surface by three or more stout wooden support members running perpendicular to the boards supported. This structure permits the tines of commonly employed lifting devices to enter under and lift the pallet only from two directions. The lifting is essentially analogous to lifting an "*m*" shaped object by inserting tines under the arches of the "*m*", i.e., the lifting cannot be accomplished from the directions closed by the sides of the "*m*". Therefore, the pallets must be carefully positioned so that at least one of the two open sides can be reached by the tines of the lifting device.

Wooden pallets are also disadvantageous in that they are manufactured by fastening boards together with nails. This process is relatively time-consuming, and the strength of the pallet is impaired if "fasteners" give way. Additionally, cargo is sometimes damaged by the nails or other fasteners.

A principal object of the invention is to provide easily accessible, relatively strong unibodied pallets which are easily manufactured.

FIG. 1 of the drawing is a top view of a referred embodiment of the invention.

FIG. 2 is a side view of the pallet of FIG. 1.

FIGS. 3, 4, and 5 are cross-sectional views of the pallet taken respectively along lines 3, 4, and 5.

DESCRIPTION OF THE INVENTION

Pallets of the invention comprise a sheet of a generally rigid formable material such as metals or plastics. The sheet defines a goods-supporting surface and a lift-engaging surface. The lift-engaging surface is positioned opposite and substantially parallel to the goods-supporting surface, i.e., the lift-engaging surface is the reverse side of the sheet defining the goods-supporting surface. All configurations present in one side of the sheet will have corresponding configurations present in the reverse side of the sheet. The sheet can have opposed sides and edges such as, for example, where the sheet is square or is rectangular in shape. However, the sheet can also be circular, ellipsoidal, or irregular in shape.

The pallet is generally surrounded by a peripheral flange extending generally normally to the plane of the sheet and in a direction away from the goods-supporting surface. A primary function of the flange is to strengthen the sheet and retard folding or "buckling" of the pallet. Pallets can be constructed without the peripheral flange where relatively light loads are anticipated.

In the lift-engaging surface of the sheet is disposed a peripherally extending rib. The rib is situated proximately to the peripheral flange. Generally, the peripherally extending rib runs parallelly to the flange. The rib may extend continuously around the periphery of the pallet, or it may be discontinuous. If discontinuous, it is preferred that the rib portions be (1) generally uniformly dispersed around the periphery of the sheet, and (2) communicate with the supporting legs to be described below.

In the goods-supporting surface, the sheet defines a multiplicity of rib members in the lift-engaging surface. The ribs originate in the central portion of the sheet and extend radially therefrom toward the periphery. As a primary purpose of the ribs is to provide added strength to the pallet, it is preferred that the radially extending ribs be relatively uniformly spaced apart thereby providing uniform strengthening action to the sheet.

The sheet also defines a plurality of legs in the lift-engaging surface(with corresponding depressions being defined in the goods-supporting surface). The legs project substantially farther from the lift-engaging surface than do the ribs., i.e., the height of the legs exceeds the height of the ribs. This is necessary so that the tines of a lifting device can be inserted between the ribs and the surface upon which the pallet is resting. The legs are generally positioned in rows with one leg in the central portion of the sheet with the remaining legs being disposed approximately uniformly about the periphery of the sheet.

In the pallet, if desired, the ribs may communicate with the legs defined by the sheet. For example, the centrally disposed leg may communicate with all of the radially extending ribs and the ribs may communicate with the peripherally disposed legs and peripheral rib. In a particularly useful embodiment of the invention, every other radially extending rib communicates with the centrally disposed leg and with a peripherally disposed leg. The remaining ribs communicate with a peripheral rib and with the centrally disposed leg. If desired, any of the ribs can be tapered so that their depth gradually decreases. The tapering may be so abrupt that the radial ribs fail to communicate with the legs or peripheral rib. To facilitate drainage of moisture accumulated during use or storage, the pallets can be fitted with ports through which moisture can drain out of the pallet.

To better understand the invention, a preferred embodiment thereof will now be described in relation to the Figures. Referring to FIGS. 1 through 3, the pallet **10** comprises a planar sheet **12** of rigid material having a goods supporting surface **14** and a lift-engaging surface **16**. The lift-engaging surface **16** is positioned opposite and substantially parallel to the goods-supporting surface **14**. The pallet also has opposed parallel sides **18** and edges **20**. The sheet is either square or rectangular in shape.

The pallet has a peripheral flange **22** (see FIG. 3) which extends normally to the plane of the sheet. The flange extends away from the goods-supporting surface **14** of the sheet. The sheet also has a peripheral flange region **24** disposed adjacently to the flange **22**. The peripheral flange region **24** surrounds a centrally disposed portion of the sheet **26**. The peripheral flange region **24** defines a peripherally extending rib **28** (also see **28** in FIG. 4) situated in the lift-engaging surface **14**. The sheet also defines a corresponding peripheral depression (also numbered **28**) in the goods-supporting surface of the sheet.

The sheet defines a plurality of legs **34** in the lift-engaging surface. Corresponding depressions (also numbered **34**) are defined in the goods-supporting surface. The legs **34** project to at least twice the height of the ribs **32**. One of the legs **34** is positioned in the centrally disposed portion of the sheet **26**. The remaining legs **34**

are positioned approximately uniformly along the peripheral flange region **24** of the sheet.

The sheet also defines a plurality of radially extending channels **30** in the goods-supporting surface. The sheet defines corresponding ribs (also numbered **30**) in the lift-engaging surface. The ribs and channels **30** originate in the central portion **26** of the sheet and extend radially outward. From FIG. **1**, it can be seen that the ribs **32** communicate with the centrally disposed legs **34**. Every other rib **32** communicates with a peripherally disposed leg **34**. The intervening ribs communicate with the peripherally disposed rib **28**.

With reference to FIGS. **4** and **5**, it can be seen that the ribs **32** communicating with the peripherally extending rib gradually decrease in depth as they approach the centrally disposed leg., i.e., these ribs are tapered so that in the cross-section of the pallet shown in FIG. **4**, the tapered ribs **40** clearly are decreased in depth in comparison with the ribs **42** which communicate with the peripherally-disposed legs **34**. From FIG. **5**, it can be seen that the tapered ribs communicate only slightly with the centrally disposed leg **46**. The peripherally-disposed channel **28** (and corresponding rib) is of substantially constant depth.

The number of radially extending ribs can vary greatly. For example, enough ribs can be present so that the goods-supporting surface appears to be substantially corregated. If desired, only a few ribs need be present as, for example, where the pallet is "square-shaped", four quadrately positioned ribs could be employed. Regardless of the number of ribs present, the structural strength of the pallet is increased if the ribs are positioned substantially symmetrically in relation to the central region **26** of the pallet. The ribs can be any desired cross-sectional shape, e.g., "U-shaped" or "V-shaped".

To insure proper goods support by the loaded pallet, it is desirable that the legs be of substantially the same height so that all the legs will simultaneously participate in supporting a loaded pallet. The legs can be of any convenient height so long as enough clearance is provided between the ribs and the surface upon which the pallet resides. The clearance enables the tines of a lifting device to be inserted under the pallet to raise or move it.

The legs can be of any desired shape such as cubical or cylindrical. Preferably, the legs will be tapered to facilitate nesting of the pallets. Tapering as used in relation to the legs of the pallet means that the legs decrease in cross-sectional area as the distance from the lift-engaging surface of the pallet increases. In the preferred embodiment described above in relation to FIGS. **1–5**, the tapered legs are shaped like truncated four-sided pyramids, with the smaller or truncated portion of the pyramid being adapted to communicate with the surface on which the pallet resides.

The pallets of the invention possess many advantages over conventional wooden pallets. For example, the pallets are composed of a single structural member rather than a series of parts held together with nails. Such unibodied construction imparts good structural strength to the pallet. The unibodied pallet can also be lifted from any side as all sides are "open" to the tines of lifting devices. The pallets also nest easily when not in use, thereby reducing storage space, e.g., nested pallets of the invention fabricated from plastic sheet one-eighth inch thick occupy about one-eighth of the space necessary for storing conventional wood pallets. The unibodied nature of the pallet permits fabrication by relatively fast and simple processes such as stamping or molding. Proper choice of structural material gives the unibodied pallet superior mechanical strength in relation to the weight of the pallet, especially in comparison to conventional wooden pallets. Additionally, the use of plastics or metals in the pallets greatly alleviates the warping and decay sometimes encountered in wooden pallets.

Materials from which the pallet is constructed can be any rigid material possessing sufficient mechanical strength to support the intended load. Conveniently, materials will be selected so that fabrication can proceed by stamping in a press, or by molding. Examples of suitable materials are steel, plastics and various alloys of magnesium with aluminum.

Preferably, the pallet is made from flat plastic sheet such as acrylonitrite-butadiene-styrene copolymer, high or low density polyethylene, polypropylene, high impact polystyrene or the like. Commercial thermo forming equipment may be used to form the sheet by heating and pressure or vacuum drawing over a mold conforming to the desired pallet shape.

What is claimed is:

1. A pallet for supporting goods, said pallet comprising a sheet of generally rigid material having a top surface for supporting goods and a bottom surface serving as a lift-engaging surface, said bottom surface having (1) a peripherally extending rib, (2) a multiplicity of only radially extending ribs communicating with a centrally disposed leg, with every other rib also communicating with a peripherally disposed leg and with the remaining radial ribs communicating with the peripherally disposed rib and (3) a plurality of legs positioned centrally and uniformly around the periphery of the bottom surface, said legs extending to a height above the height of the ribs.

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