

TITLE: ONE-WAY LIGHTWEIGHT PALLETField of the Invention

This invention relates to improvements in pallets.

Background of the Invention

Pallets are widely used in the transportation and storage of goods and are most commonly manufactured from wooden slats secured to the opposite sides of wooden spacers to create fork lift access openings. Wooden pallets are often hired by the user, but because of their capital cost, they should be returned for reuse. This additional transportation cost serves to exacerbate the hiring or capital cost of the pallets. Although one-way wooden pallets of low quality material are available, their cost is still relatively prohibitive and the environmental consequences of such use of wood is becoming increasingly unpopular.

In the past, many attempts have been made to create a one-way pallet of material other than wood, and while the capital cost is reduced by fabricating a pallet from folded corrugated board blanks or from moulded waste paper pulp, such pallets have not thus far been able to carry an adequate load or are not sufficiently less expensive than one-way wooden pallets.

A typical example of a pallet proposed to be manufactured from corrugated paperboard is found in United States Patent 2,432,295 Donahue, which described a pallet made from corrugated board comprising spaced base and platform members each formed from sheets of board between which elements of adhesively bonded corrugated board are sandwiched with the corrugations on edge. The base and platform members are held in spaced relation by spacer blocks which may be formed from tightly wound corrugated board members on edge. The main shortcoming of this proposal is that the formation of the base and platform members is labour intensive and therefore expensive, and unless the corrugated board elements are carefully assembled and maintained on edge, the reinforcing effectiveness of the corrugated board elements may be seriously compromised.

In our Australian Patent Application No. AU-A 11162/92 we described a pallet formed from a multiplicity of interconnected shaped elements formed from tightly wound corrugated board, each element having a central shaped opening and having portions defining load-bearing beam members intersecting desired regions of support of the pallet

while this pallet functioned adequately in its load bearing performance, its construction from separate shaped elements was found to be too labour intensive and therefore not cost effective.

Summary of Invention and Object

It is an object of the present invention to provide a one-way lightweight pallet which is able to support adequate loads and which can be manufactured in a less labour intensive manner than the prior art pallets.

The invention therefore provides a pallet comprising a pallet body having an upper load supporting face and a lower face, said pallet body being formed from corrugated paperboard tightly wound in multiple thicknesses which are in intimate contact with each other with the corrugations of the multiple thicknesses extending substantially perpendicularly between said upper and lower faces, said tightly wound multiple thicknesses of corrugated paperboard defining a multiplicity of load bearing beam members and adjacent shaped openings in the pallet body, said beam members being positioned to intersect those regions of the pallet body which in use are engaged by the forks of a fork lifting device during elevation of the pallet, said body being formed from at least one length of single-face corrugated board substantially continuously wound to define said multiplicity of load bearing beam members and adjacent shaped openings.

Preferably, said shaped openings are of limited transverse dimensions so as to provide an upper load supporting face, said limited dimensions being such as to enable a person taking care to stand on the upper load supporting face of the pallet.

By making the pallet from a single element of corrugated board, or a limited number of elongate connected elements, the labour content involved in manufacturing the pallet is significantly reduced since the only significant labour involved is in the positioning of formers for defining the shaped openings as the corrugated board is wound to define the pallet. This enables the resultant pallet to carry a load, and to be stood upon, without the need for a covering cap or flat top member, as is required in the case of the prior art pallet of AU-A-11162/92.

The element(s) of corrugated board defining the pallet are tightly wound to define the load bearing beams and the adjacent shaped openings with the adjacent elements of corrugated board adhesively secured to each other to maintain the desired pallet

configuration.

In a particularly preferred form of the invention, the openings comprise a central circular or square opening, a pair of opposed generally triangular openings, a pair of truncated triangular openings positioned at 90° to the triangular openings, a further pair of truncated triangular openings at about 45° to the preceding pair, a still further pair of truncated triangular openings at about 90° to the preceding pair, two pairs of truncated triangular openings at 45° to each opening of the preceding pair, and a peripheral element of multiple layers of corrugated board defining a generally square periphery of the pallet and having generally triangular openings at each corner.

Although it is possible to form fork access openings in the corrugated board elements, it is preferred to provide access openings by separately formed feet which are preferably made of wound corrugated board adhesively secured to the base of the pallet. If desired, the feet may be waxed at the edges which contact the floor or otherwise protected against moisture damage.

In another aspect, the invention provides a method of forming a pallet comprising winding multiple layers of a narrow strip of single-face corrugated board around formers defining openings of limited transverse dimensions positioned so as to define a pallet having an upper surface which is capable of supporting a load and on which a person is able to stand.

Brief Description of the Drawings

In order that the invention may be more readily understood, preferred embodiments will now be described with reference to the accompanying drawings in which:

Figure 1 is a plan view of a pallet embodying the invention;

Figure 2 is a side elevation of the pallet showing the positioning of the support feet of the pallet, and

Figure 3 is an enlarged fragmentary plan view showing the manner in which the corrugated board is wound to define the pallet configuration shown in Figure 1.

Description of Preferred Embodiment

Referring to Figures 1 to 3 of the drawings, the pallet is formed from a continuous length of single-face corrugated board wound in multiple layers to define a continuous supporting element 51 defining a central square opening 52, which may alternatively be

round, a pair of opposed generally triangular openings 53, 54, a pair of opposed truncated triangular openings 55, 56 at 90° to the triangular openings 53, 54, a further pair of larger truncated triangular openings 57, 58, located at 45° to the preceding pair, a further pair of slightly larger truncated triangular openings 59, 60 at 90° to the preceding pair, two further opposed pairs of larger truncated triangular openings 61, 62, 63, 64 at 45° to each of the preceding openings 59, 60, and triangular openings 65, 66, 67 and 68 at the corners of the pallet defined by the square peripheral element 51 of wound single-face corrugated board.

Although the above configuration is presently preferred, it will be appreciated that other configurations may be adopted to achieve a similar result, providing a supporting pallet which is able to be stood upon and which will support the required loads without the need for an enclosing cap, as is provided in the prior art pallet described in AU-A-11162/92.

Formation of triangular and truncated triangular openings in the pallet is for the purpose of generating a final pallet shape which is substantially square, and for providing cross beam members which are at an angle, in the present formation, preferably 45° , to the principal direction of support by the lifting forks between the feet described below. These beam members provide the resistance to bending of the pallet when the pallet is lifted by forks carrying a load. The arrangement of openings reduces the amount of corrugated board used to form the pallet while ensuring that the resistance to bending of the pallet will be satisfactorily met by the beam members.

Different beam/opening configurations can be used to produce pallets of sufficient strength. For example, the corrugated board strip may be wound to produce parallel beam members separated by narrow rectangular openings, extending transversely to the direction of fork support.

The pallet is provided with three elongate generally rectangular feet 69, 70 and 71, which preferably comprise wound single-face corrugated board defining an open rectangular loop of the configuration shown in Figures 1 and 3. If desired, the edges of the feet which are to contact a support surface may be treated to prevent damage by moisture. For example, the edges may be dipped in water-proofing wax or may have thin particle board laminated to their lowermost faces. The provision of separate feet which

are adhesively secured to the lower face of the pallet is a preferred method of providing fork access for the pallet since the provision of slots in the edges of the corrugated board elements has the disadvantage of weakening the structural integrity of the pallet.

The described arrangement of openings in the pallet means that each beam has about eight layers of board so that a load of the order of 1 tonne may be supported by the pallet, even with as much as 20 to 25% of the pallet unsupported by the lifting forks, without significant flexing of the pallet. In this regard, the positioning of the feet as shown in Figure 2 of the drawings maximizes the strength of the pallet and reduces flexing during lifting by a fork lift. If desired, a cap similar to that shown in AU-A-11162/92 may be used for cosmetic purposes, although the use of such a cap would increase the production cost of the pallet.

The pallet according to this embodiment of the invention has a generally square outer periphery defined by multiple layers of single-face corrugated board tightly wound from a central starting position around a number of formers of different shapes to define the openings visible in Figures 1 and 2. The continuous multi-layered element which defines the openings also defines load carrying elements which radiate in a generally spiral manner from the central opening to the periphery referred to above.

The use of a single length of corrugated board wound into the configuration described above not only reduces the labour content of the product but also increases its structural integrity. It will be appreciated that while it is preferred to use a single length of board, similar results can be obtained by using limited numbers of relatively long strips of board secured together or overlapped with each other.

Since the pallet described above are made entirely from corrugated board, it is lightweight in construction (4 to 5 kg compared with 40 to 50 kg for wood), significantly less expensive than one-way wooden pallets, and can be disposed of for recycling after it has been used. The pallet has high compressive strength and is able to withstand loads of the order of 1 to 6 tonnes in the configuration shown. The pallet flexes only minimally when lifted or when it is supported on an irregular surface and does not present any nails or splinters to the user or to the goods supported thereon. Furthermore, since it is light in weight, it significantly reduces the risk of injury during handling.

The cost of each pallet is significantly less than the cost of a wooden pallet so that

it may be more readily disposed of after each use. The pallet may be made from recycled paper and further savings are possible by making the base elements from off-cut paper or corrugated board. The pallet is able to be recycled after use to significantly reduce environmental impacts.



CLAIMS

1. A pallet comprising a pallet body having an upper load supporting face and a lower face, said pallet body being formed from corrugated paperboard tightly wound in multiple thicknesses which are in intimate contact with each other with the corrugations of the multiple thicknesses extending substantially perpendicularly between said upper and lower faces, said tightly wound multiple thicknesses of corrugated paperboard defining a multiplicity of load bearing beam members and adjacent shaped openings in the pallet body, said beam members being positioned to intersect those regions of the pallet body which in use are engaged by the forks of a fork lifting device during elevation of the pallet, said body being formed from at least one length of corrugated board substantially continuously wound to define said multiplicity of load bearing beam members and adjacent shaped openings.
2. The pallet of claim 1, wherein said shaped openings are of limited transverse dimensions so as to provide said upper load supporting face on which a person taking care can stand.
3. The pallet of claims 1 or 2, wherein said body is formed from one or more lengths of single-face corrugated paper board tightly wound with adjacent elements of the winding adhesively secured to each other.
4. The pallet of claim 3, wherein said shaped openings comprise a central circular or square opening, a pair of opposed generally triangular openings, a pair of truncated triangular openings positioned at about 90° to the triangular openings, a further pair of truncated triangular openings at about 45° to the preceding pair, a still further pair of truncated triangular openings at about 90° to the preceding pair, two pairs of truncated triangular openings at about 45° to each opening of the preceding pair, and a peripheral element of multiple layers of corrugated board defining a generally square periphery of the pallet and having generally triangular openings at each corner.
5. The pallet of claim 1 or 4 further comprising feet members secured to the lower face of the pallet body to define the regions of support of the pallet accessible to the forks of a fork lift device.
6. The pallet of claim 5, wherein said feet comprise elongate generally rectangular elements formed from tightly wound lengths of corrugated board adhesively secured to



the lower face of the pallet body.

7. A method of forming a pallet comprising winding multiple layers of a narrow strip of single-face corrugated board around formers defining shaped openings of limited transverse dimensions positioned so as to define a pallet body having a multiplicity of load bearing beam members positioned to intersect regions of support of the pallet body by the forks of a fork lift device during lifting of the pallet, said shaped openings being such that the pallet body has an upper load supporting face on which a person is able with care to stand.