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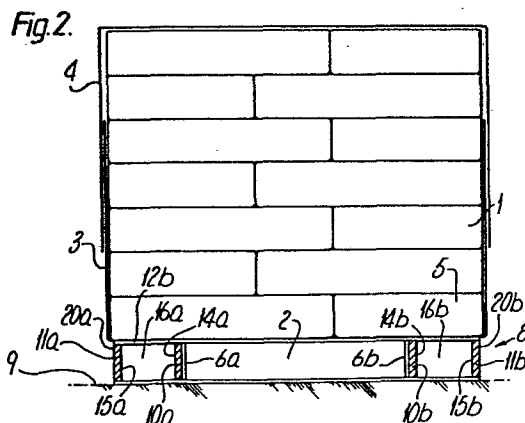
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54 **Packaging.**

57 A stack of articles (1), e.g. sacks, is wrapped in a plastics film shroud (3, 4) with a small enough base layer (2) to permit the insertion of the tines (17) of a fork-lift truck on either side of the base layer (2). To stabilise the package, a cradle (8) of height equal to the height of the base layer (2), is provided into which the wrapped stack sits.



Packaging

This invention relates to packaging. For certain types of articles, such as sacks, boxes, and drums, it is convenient to store and transport the articles as a stack of the articles on a
5 pallet. The pallet provides a load-bearing surface held in spaced relationship from the support, e.g. the ground, on which the pallet rests. This provides access for the tines of a fork-lift truck under the load-bearing surface of the pallet so that the latter, with the stack of articles thereon, can be lifted and moved by the
10 fork-lift truck. In some cases, to provide protection to the stack of articles and to maintain stability of the palletized stack, the latter has been wrapped in a plastic film, for example by shrink or stretch wrapping.

Pallets have generally been constructed from materials
15 such as timber although it has been proposed to make pallets from plastics materials. Because of the costs of such materials, it is normally intended that the pallets should be returnable. However many pallets are not returned, or are returned broken and unfit for re-use. This pallet wastage, together with the cost of collecting and transporting those pallets that are returned, often adds
20 a significant cost to the consignment of articles. With increasing raw material, labour and transportation costs, it is desirable to provide an economic packaging method that does not employ a returnable pallet.

25 To this end a recent development for example as described in United Kingdom Patent Specifications 1412175, 1423264, and 1534246,

has been the so-called "palletless" package in which a stack of articles, without a pallet, is wrapped e.g. by shrink wrapping, in a plastic film shroud. Generally at least the base and sides of the stack, and often also the top, are enclosed in the shroud.

5 To enable the package to be lifted and transported, the base layer of the stack is of smaller dimensions than subsequent layers so that the second layer overhangs at least one pair of opposite sides of the base layer. The package may be lifted by placing a lifting device under the overhanging second layer.

10 For example, if a normal layer consists of five sacks; two laid end-to-end and three laid side-by-side, i.e. two headers and three stretchers, the base layer may consist of four sacks laid in a square pin-wheel arrangement viz with one end of each sack abutting a side of an adjacent sack leaving a square hole in the
15 centre. In this system the amount of overhang at each side of the package is about half the difference between the length and the width of a sack. A similar overhang is obtained with another common sack pattern, viz four sacks laid in square pin-wheel array with the base layer being of three sacks, one sack being laid across
20 the end of two sacks laid side-by-side, i.e. one header and two stretchers.

The commonly available fork-lift trucks developed for general purpose industrial use for loads up to 2 to $2\frac{1}{2}$ tonne have a distance between the outer sides of the tines of about 100 cm
25 while the distance between the inner sides of the tines is about 75 cm. It is not possible to lift such the "palletless" packages with these general purpose fork-lift trucks but instead a fork-lift truck having widely spaced tines is required. Thus to lift a stack of sacks of approximate size 66 x 44 cm having a four
30 sack pin-wheel base layer arrangement, a tine spacing of at least about 112 cm is required while a three sack (header plus two stretcher) base layer arrangement requires a tine spacing of at least about 90 cm.

While fork-lift trucks having wide tine spacings are
35 available and could be used at the package loading site, often the

package recipient will not have such a fork-lift truck with widely spaced tines and so cannot transport the delivered package except by having the package deposited on a suitable support, e.g. a normal pallet, so that the tines of the usual general purpose fork-lift truck can be inserted beneath the package.

If the size of the base layer is further reduced, e.g. to two or three stretchers with no header, the package can be lifted by the general purpose fork-lift trucks, provided of course that the size of the articles, e.g. sacks, is such that this small base layer can be accommodated between the fork-lift truck tines. However the use of such small base layers may render the package unstable and liable to topple over, particularly where the packages are stacked one on top of another as is customary at least in warehouses.

In the present invention, this instability is overcome by providing a cradle into which the package fits so that the cradle provides support for the overhanging portions of the second layer, and hence any tendency for the package to tip over is eliminated.

Accordingly we provide in combination (i) a package comprising an assembly of a plurality of layers of articles in which the base layer is smaller than the second layer so that the latter overhangs the base layer on at least one pair of opposed sides of the base layer, at least the sides and base, and preferably also the top, of said assembly being shrink-wrapped in a film shroud of plastics material so that the package can be lifted and transported by fork-lift truck tines positioned on either side of the base layer and beneath said overhanging second layer, and, disposed under the overhanging portions of said second layer, (ii) a stabilising cradle, of height substantially equal to the height of the base layer, providing a support between a surface on which said base layer is resting and those portions of said second layer overhanging at least one pair of opposed sides of the base layer, said cradle having openings to permit the insertion of the tines of a fork-lift truck on either side of the base layer, and under

said overhanging portions of said second layer.

When resting on a suitable supporting surface, e.g. the ground or another package, a substantial proportion of the weight of the package (and of any packages stacked on top thereof) is transmitted to said surface through the base layer and the cradle only has to withstand the compressive forces applied from the overhanging portions of the second layer. On lifting the package and cradle, the flexural and tensile loads are borne by the shroud and the cradle may be largely unstressed.

Because of these reduced stresses applied to the cradle compared to those that would be encountered if a conventional pallet had been employed, the cradle can be of light and hence inexpensive construction, thus avoiding the need to make it returnable. For example, the cradle may be made of timber with longitudinal battens disposed below a pair of opposed overhanging portions of the second layer to provide the desired support, with light cross battens holding the longitudinal members in the desired spaced relationship.

The cradle preferably has a length and breadth substantially the same as those of the second layer. To this end the base layer is preferably such that the second layer overhangs the base layer on both pairs of opposite sides of the base layer: in this case there is no need for the cradle to extend outwardly of the second layer. (When the second layer overhangs the base layer on only one pair of opposed sides of the base layer either the cradle has to be made in two unconnected pieces or members connecting the cradle pieces have to be positioned outside those sides of the base layer that are not overhung by the second layer, and so the cradle necessarily has at least one dimension greater than that of the second layer).

When using conventional sacks of aspect ratio, i.e. the ratio of the sack length to width, of about 1.5, a five sack (2 headers and 3 stretchers), or a four sack pin-wheel, second layer arrangement with a base layer of two stretcher sacks, i.e. side-by-side, results in such an overhang on all sides of the base layer.

The cradle is provided with openings to permit the insertion of the tines of a fork-lift truck on either side of the base layer. Preferably parts, e.g. cross members, of the cradle extend across the top of the tine openings so that the cradle is
5 lifted together with the package by the tines of the fork-lift truck.

As indicated above, a suitable construction of the cradle is longitudinal battens underneath one pair of opposed overhanging portions of the second layer connected by cross battens.
10 Preferably a pair of longitudinal battens are disposed so that they will support one pair of opposed overhanging portions of the second layer near to the extremities of said overhanging portions. Preferably a second pair of longitudinal battens are provided in-board of said first pair and are disposed on either side of the space
15 in the cradle for receiving the base layer. In this way the base layer may be protected from puncturing or other damage by misaligned insertion of the fork-lift truck tines.

The shrink wrapped package may be made by the techniques known in the art, for example as described in aforementioned
20 United Kingdom patent specifications 1412175, 1423264 and 1534246.

One embodiment of the invention is illustrated by reference to the accompanying drawings wherein

Figure 1 is a side elevation of a package located on
on a cradle in accordance with the invention,
25 Figure 2 is an end elevation of the combination shown in Figure 1, and
Figure 3 is a plan of the cradle used in the combination of Figures 1 and 2.

Seven layers each composed of four sacks 1 arranged in
30 pin-wheel fashion are stacked upon a base layer 2 composed of two sacks laid side-by-side. Each sack has approximate dimensions 66 x 44 x 13 cm and contains 50 kg of the packaged material. The assembly thus consists of thirty sacks giving a total net weight of 1.5 te. The stack is shrink wrapped in a pair of hoods 3, 4
35 (the top and sides of which are shown spaced apart from the sacks

in Figures 1 and 2 for clarity) of heat shrinkable plastics film by the procedure described in United Kingdom Patent Specification 1534246.

The second layer 5 (and subsequent layers) overlap the base layer 2 by about 22 cm on one pair 6a, 6b of opposed sides of the base layer 2 and by about 11 cm on the other pair 7a, 7b of sides of the base layer 2.

The package sits in a cradle 8 of height 13 cm so that the bottom of the package, i.e. the shrunk film hood under the base layer 2, contacts the surface 9 on which the assembly is resting.

The cradle comprises two pairs, 10a, 10b and 11a, 11b, of longitudinal wooden battens, each of section about 11 cm x 2 cm fastened together by cross battens 12, 13 each of section 6 cm x 1 cm. Battens 12, are provided both above and below the longitudinal battens, while the intermediate cross battens 13 are provided only above the longitudinal battens.

Batten 10a, 10b are spaced about 68 cm apart so as to have a space therebetween large enough to receive the base layer 2. (In Figure 3 the positions of the base layer 2 and the second layer 5 are indicated by broken lines). The distance between the outer edges 14a, 14b of battens 10a, 10b is about 72 cm.

Battens 11a, 11b are spaced apart with about 104 cm between their inside edges 15a, 15b so that openings 16a, 16b are provided large enough, and so spaced, to be able to receive the tines 17a, 17b of a general purpose fork-lift truck having a distance of about 75 cm between the inside faces 18a, 18b of the tines and a distance of about 100 cm between the outside faces 19a, 19b of the tines. The tines are shown by the dot-and-dash lines in Figure 3.

The distance between the outer edges 20a, 20b of battens 11a, 11b is about 108 cm, i.e. slightly less than the overall width of the package: hence the portions of the second layer 5 overhanging sides 6a, 6b of the base layer 2 are thus supported by battens 11a, 11b.

The connecting cross battens 12a, 12b, are spaced apart with about 108 cm between their outer edges 21a, 21b so that they sit beneath the portions of the second layer overhanging sides 7a, 7b of base layer 2.

- 5 The additional, short, cross battens 13 are provided to hold the battens 10 and 11 in position relative to one another intermediate the ends. Further cross battens may be provided if desired.

1. A combination of:

(i) a package comprising an assembly of a plurality of layers of articles (1) in which the base layer (2) is smaller than the second layer (5) so that the latter overhangs the base layer (2) on at least one pair (6) of opposed sides of the base layer (2), at least the sides and base of said assembly being shrink-wrapped in a film shroud (3, 4) of plastics material so that the package can be lifted and transported by fork-lift truck tines (17) positioned on either side of the base layer (2) and beneath said overhanging second layer (5), and, disposed under the overhanging portion of said second layer (5)

(ii) a stabilising cradle (8), of height substantially equal to the height of the base layer (2), providing a support between a surface (9) on which said base layer (2) is resting and those portions of said second layer (5) overhanging at least one pair (6) of opposed sides of the base layer, said cradle (8) having openings (16) to permit the insertion of the tines (17) of a fork-lift truck on either side of the base layer (2), and under said overhanging portions of said second layer (5).

2. A combination as claimed in claim 1 wherein the cradle (8) has longitudinal battens (10, 11) disposed below the portions of the second layer (5) overhanging the opposed sides of the base layer (2), and cross battens (12, 13) holding said longitudinal battens (10, 11) in the desired spaced relationship.

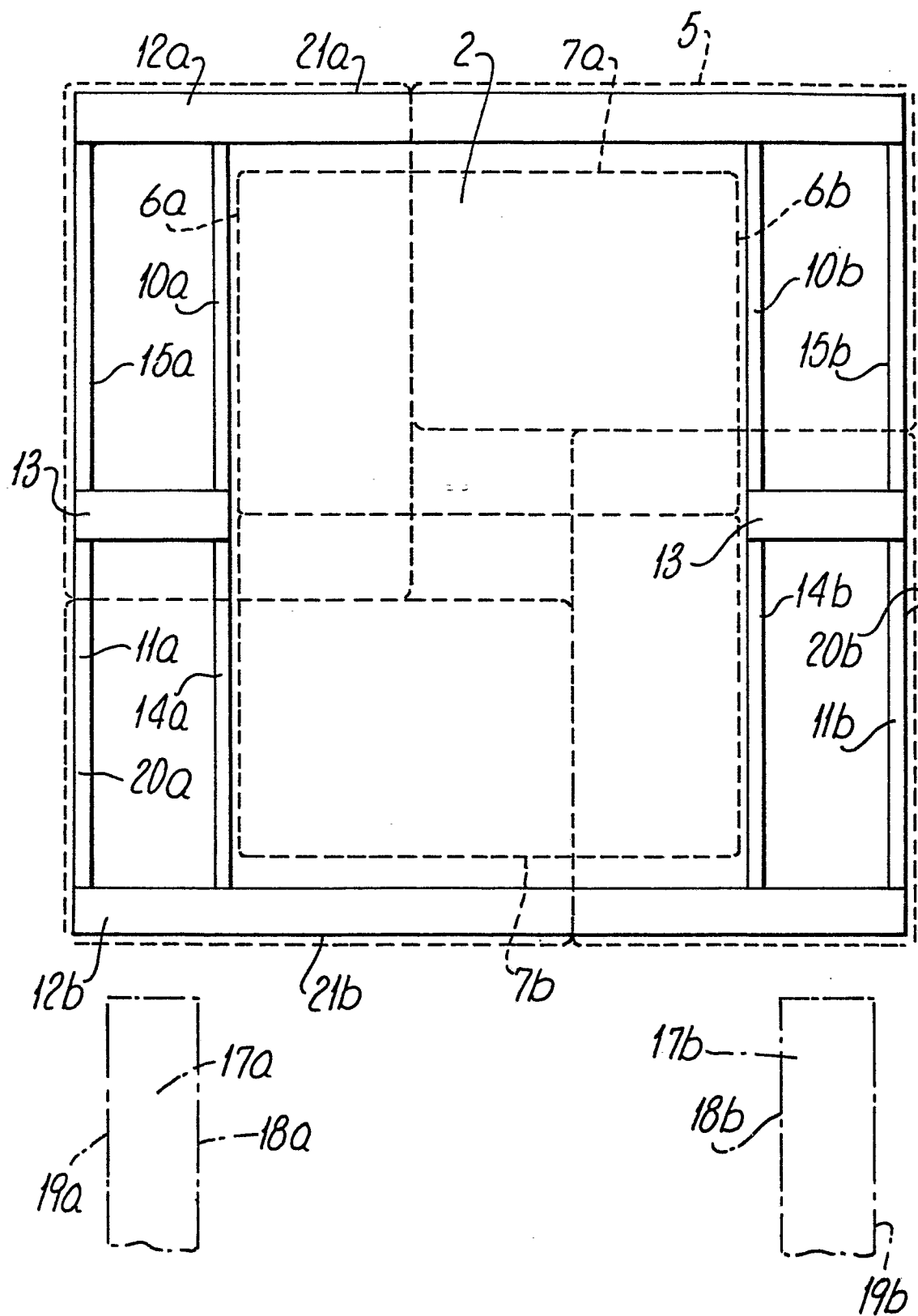
3. A combination as claimed in claim 2 wherein the cradle (8) has a first pair (11) of longitudinal battens disposed to support one pair of opposed overhanging portions of the second layer (5) near to the extremities thereof and a second pair (10) of longitudinal battens inboard of said first pair (11) and disposed on either side of the base layer (2).

4. A combination as claimed in any one of claims 1 to 3 wherein the second layer (5) overhangs the base layer (2) on both pairs (6,7) of opposed sides of the base layer (2).

5. A combination as claimed in any one of claims 1 to 4 wherein parts (12, 13) of the cradle (8) extend across the top of the openings (16).

6. A combination as claimed in any one of claims 1 to 5 wherein the top of the assembly, together with the sides and base, is shrink wrapped in a film shroud (3,4).

Fig. 3.





European Patent
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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
D, A	<u>GB - A - 1 412 175</u> (AB PLÅT-MANUFAKTUR) --	1, 4	B 65 D 19/26 B 65 B 53/02
D, A	<u>GB - A - 1 534 246</u> (FA. E. MOELLERS) --	1, 6	
A	<u>DE - A - 1 924 659</u> (A. BERENTELG & CO.) --		
D, A	<u>DE - A - 2 307 106</u> (MAGNUSSON) & GB-A-1 423 264 --	1, 4	TECHNICAL FIELDS SEARCHED (Int. Cl.)
A	<u>DE - A - 2 448 720</u> (AB PLÅT-MANUFAKTUR) ----	1	B 65 B 11/00 B 65 B 27/00 B 65 B 53/00 B 65 D 19/00 B 65 D 71/00 B 65 D 85/00
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
X	The present search report has been drawn up for all claims		
Place of search VIENNA		Date of completion of the search 23-12-1981	Examiner MELZER