# (12) UK Patent Application (19) GB (11) 2 103 573

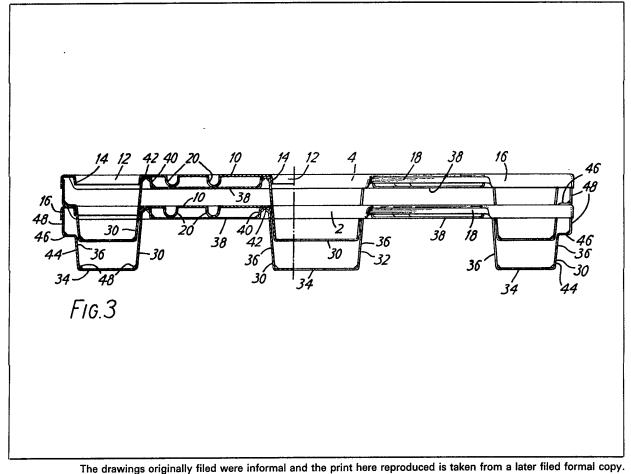
- (21) Application No 8216507
- (22) Date of filing 7 Jun 1982
- (30) Priority data
- (31) 8117419
- (32) 8 Jun 1981
- (33) United Kingdom (GB)
- (43) Application published 23 Feb 1983
- (51) INT CL3 B65D 19/40
- (52) Domestic classification **B8H LC**
- (56) Documents cited
  - GB A 2076359
  - GB 1487533
  - GB 1403592
  - GB 1330180
  - GB 1294822
  - **GB 1052348**
  - GB 1008928
  - **GB 1024008**
  - GB 0696214
- (58) Field of search **B8H**
- (71) Applicant
  - Kerrin Maurice Lyons

- 50 Thorne Road South Lambeth London SW8 2BY
- (72) Inventors Kerrin Maurice Lyons **Neal Bernard Carter**
- (74) Agents Mathys and Squire 10 Fleet Street London EC4Y 1AY

## (54) Pallet

(57) A pallet comprises a deck 10 supported on hollow legs 30 and having apertures 12 positioned over the hollow legs so that one pallet 4 can be stacked on top of another pallet 2 with the legs of the upper pallet projecting partway into the legs of the lower pallet. The legs 30 are arranged in rows, and the outer leg of each row is shaped to provide an abutment 46 which, when

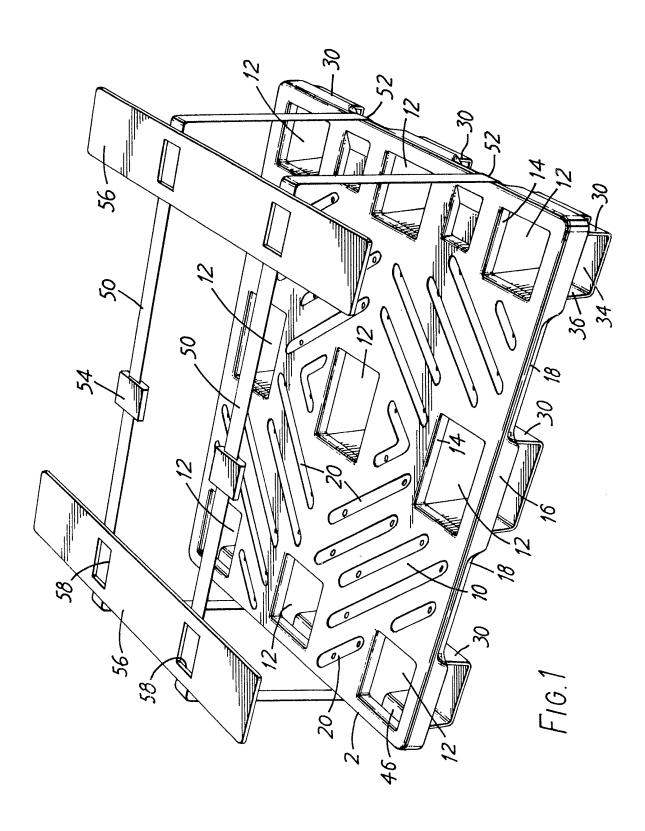
the pallet is stacked on top of another pallet, engage the deck 10 of the lower pallet 2 to support the upper pallet 4 with the deck of the lower pallet 2 spaced from the deck of the upper pallet 4 to allow the forks of a lift truck to be inserted beneath the deck of the upper pallet 4 to lift it from the stack. Each row of legs 30 may be formed from a single strip of steel sheet spotwelded to the deck 10, which may also be of steel sheet formed with channels 20 and flanges 14 and 16 to increase its rigidity.

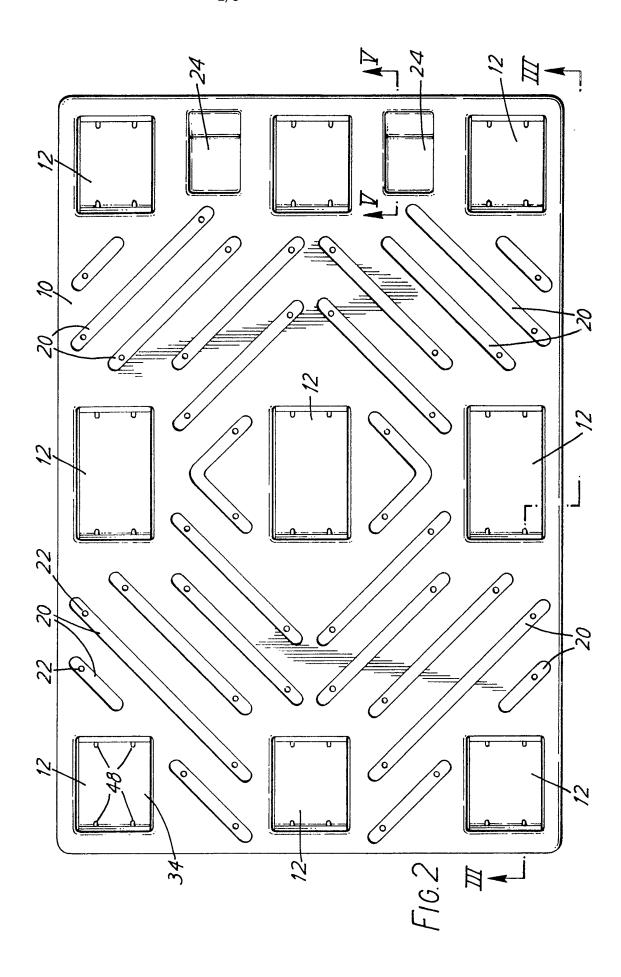


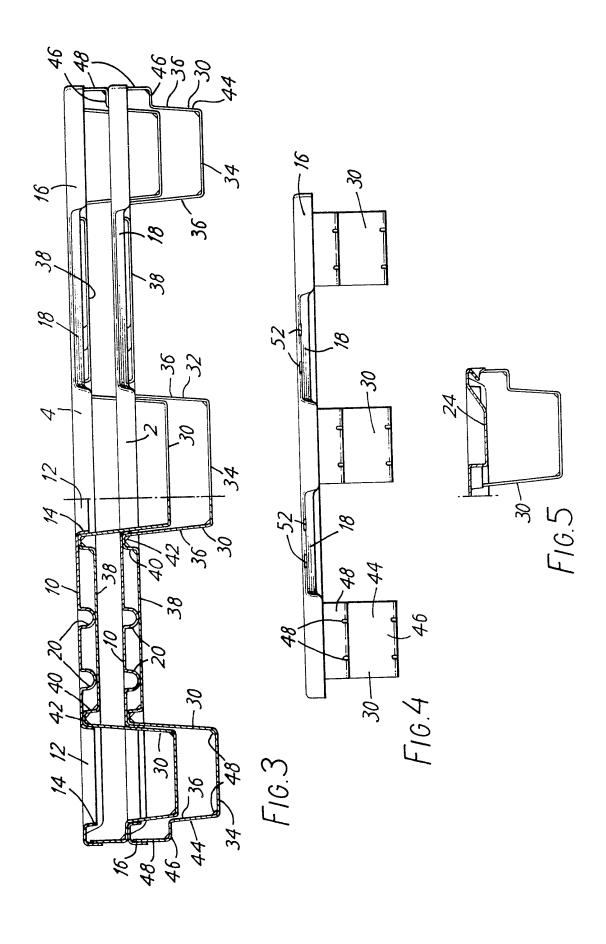
10357

W

2







#### **SPECIFICATION**

#### **Pallet**

5 This invention relates to pallets.

Conventional pallets have the disadvantage that a stack of empty pallets cannot easily be moved safely, for example on the forks of a fork lift truck, without the danger of the stack 10 toppling or of pallets sliding from the stack. To overcome this problem, stackable pallets have been proposed, in which the pallets are shaped so that the empty pallets can be nested one within the other. However, with 15 known stackable pallets, a further problem arises in that it is difficult to remove empty pallets from a stack.

It is an object of this invention to provide a pallet which enables empty pallets to be read-20 ily stacked and destacked.

This invention consists in a pallet comprising a deck supported on hollow legs fixed to the deck, in which the deck has apertures positioned over the hollow legs so that one 25 pallet can be stacked on top of another with the legs of the upper pallet projecting partway into the legs of the lower pallet, and in which the pallet is provided with abutments which, when the pallet is stacked on top of another 30 pallet, engage co-operating surfaces on the lower pallet to support the upper pallet with the deck of the lower pallet spaced from the deck of the upper pallet to allow the forks of a lift truck to be inserted beneath the deck of 35 the upper pallet to lift the upper pallet from the stack.

Preferably, each of the legs comprises a strip of sheet material bent to form a horizontal base and two side walls extending upwards 40 and outwards from the base and joined to the deck at their upper ends, at least some of the side walls being formed to provide a horizontal portion extending outwards from a lower portion of the side wall and forming one of 45 the said abutments, the horizontal portion being arranged to rest on the deck of a lower pallet in the region adjacent the aperture through which the leg projects.

The legs may be arranged in rows, each row of legs being formed from a single continuous strip of sheet material, the length of strip extending between each pair of legs including at least a portion spaced from the deck, to increase the rigidity of the deck.

5 Preferably, the legs are positioned so that the lifting forks of a lift truck or the like can be inserted beneath the deck from any of the four sides of the pallet.

The invention will now be described, by 60 way of example, with reference to the accompanying drawings, in which:

65

Figure 1 is a perspective view of a pallet in accordance with the invention,

Figure 2 is a plan view of the pallet, Figure 3 is a side elevation, partly in section

on line III-III of Fig. 2, showing two pallets stacked together,

Figure 4 is an end elevation of the pallet, and

70 Figure 5 is a fragmentary section on line V–V of Fig. 2.

Referring to the drawings, a pallet 2 comprises a rectangular deck 10 supported on nine hollow legs 30. The deck 10, which is

75 press-formed from steel sheet, has nine rectangular holes 12, each positioned above one of the legs 30 as described below. Each hole 12 is bounded by a downwardly extending peripheral flange 14, which joins the adjacent

80 area of the deck through a smooth radius, to assist in guiding the leg of another pallet into the hole, when empty pallets are stacked together as described below. A depending flange 16 also extends around the entire

85 periphery of the deck 10. A number of channels 20 are formed in the deck 10, the channels extending at 45° to the edges of the deck and being arranged in four groups with channels in two of the groups at 90° to those

90 of the other two groups. The channels 20 increase the rigidity of the deck 10. To ensure that rainwater drains from the deck, each channel has a drainage hole 22. The deck 10 is also formed with two recesses 24, adjacent

95 on edge of the deck, to accommodate the buckles of straps for securing loads to the pallet, as described below.

The legs 30 are arranged in three rows of three. The three legs in each row are formed 100 from a single strip 32 of sheet steel. As shown in Fig. 3, each leg 30 has a flat base 34 and two side walls 36 which extend upwards and outwards from the base, at an angle typically of 5° to the vertical, so that the

105 leg 30 can receive the leg of a second pallet 4 stacked on top of the pallet 2. The legs in each row are joined together by two portions 38 of the strip 32, each portion 38 lying parallel to the deck 10 and engaging the

110 bottoms of the channels 20. Each portion 38 is joined to the side wall 36 of each adjacent leg 30 through an upwardly extending portion 40 and a horizontal portion 42 which lies flat against the lower face of the deck 10 adjacent

115 the hole 12. The adjacent part of the flange 14 surrounding the hole lies against the side wall 36. The deck 10 is spot-welded to each strip 32 at points on the horizontal portions 42 and on the lines of contact between the

120 channels 20 and the portions 38 of the strip.

The outermost side walls 36 of the two legs 30 at the ends of each row each comprise a lower, inclined portion 44 and an upper vertical portion 48 joined by a horizontal middle

125 portion 46. The upper portion 48 engages, near its upper edge, the inner face of the flange 16 of the deck 10, to which it is spot welded. The horizontal portion 46 of the side wall forms a step which, when the pallet is
130 stacked on top of another pallet, rests on the

deck 10 of the lower pallet. The arrangement is such that, when two pallets are stacked as shown in Fig. 3, the spacing between the deck 10 of the lower pallet and the portions 38 of the strip 32 extending between the legs of the upper pallet is sufficient to allow the forks of a lift truck to be inserted between the two pallets, to enable the upper pallet to be lifted from the lower pallet.

10 The legs 30 are positioned so that the forks of a lift truck can be inserted from any of the four sides of the pallet. The flange 16 on the deck 10 has portions 18 pressed in the regions of the fork entry points, forming in-15 wardly inclined faces providing a lead-in for each fork, to facilitate the entry of the forks, particularly between two stacked pallets. When the forks are inserted they engage the underside of the strip portions 38 and/or the 20 undersides of the channels 20. The portions 38 and the bottoms of the channels lie in the same plane, and present in effect a smooth surface to the forks as they are inserted beneath the deck.

At each of the junctions between the base 34 and side walls 36 of each leg 30, and between each horizontal portion 42 and the adjacent wall 36 and vertical portion 40, the material of the strip 32 is pressed in at spaced 30 points 48, to increase the rigidity of the structure.

As shown in Fig. 1, the pallet may be provided with pairs of load-securing straps 50. Each strap is fixed at one end to an 35 anchorage 52 on the pallet, and is joined to the other strap of the pair by means of a buckle 54.

The straps are used to clamp loads to the pallet. When the straps are not in use, the 40 position of each buckle 54 on its strap is such that it can rest in one of the recesses 24 in the deck 10, with the straps 50 lying flat against the deck, so that the straps and buckles do not interfere with stacking of the 45 pallets when empty, or with loading of the pallet when the straps are not needed to secure the load.

When two or more loaded pallets are to be stacked one on top of another, flat plates 56 50 may be postioned on top of the loads or the lower pallet or pallets, to support the legs of the pallet above and so distribute the weight on the loads on the lower pallet. As shown in Fig. 1, each plate 56 is of a width and length 55 to support one row of legs 30. Each plate is formed with slots 58 through which the straps 50 are threaded, so that the plate can slide along the straps, enabling it to be moved to the correct position on top of the loads.

60 When the empty pallets are stacked together as described above, the stack of pallets can be moved without the risk of pallets sliding from the stack. The nesting of the legs of the pallets reduces the height of the stack,

65 typically by 50%, so enabling more pallets to

be carried safely in a single stack and reducing the space required for storage of empty pallets. The design of the pallet enables one or more pallets to be easily removed from a 70 stack of empty pallets by a fork lift truck or

the like. The construction of the described pallet gives considerable strength, of compression, tension and torsion, to the pallet, and enables relatively thin sheet steel to be used,

75 thus reducing the weight and cost of the pallet. The deck 10 can in particular be made of thin sheet, owing to the rigidity of the box construction provided by the channels 20 and the strip portions 38. The design of the hol-

80 low legs, open on two sides, ensures that water will drain from the legs, and simplifies the manufacture of the legs.

The steel sheet may be given a hot galvanised finish to increase the useful life of the 85 pallet. The use of steel, or other suitable material, enables the pallet to be easily cleaned, and allows it to be sterilised, for example if it is to be used in the handling of food. The deck may be provided with a non-90 slip surface, for example by the addition of rubber pips, self-adhesive pads, rubberised paint or by using "textured finish" steel

One advantageous way of providing a non-95 slip surface is to use a number of short lengths (e.g. 100 mm) of foam-filled rubber tubing of diameter somewhat greater than the width of the channels 20. Each length of tubing is compressed and glued into position 100 in one of the channels, with the axis of the tubing aligned with that of the channel, so

sheeting for the deck.

that the tubing projects a little way above the surface of the deck 10. Lengths of tubing are thus positioned at suitably distributed posi-105 tions on the pallet. The tubing is compressed under the weight of loads on the pallet, the

rubber thus providing a grip on the loads. The described embodiment may be modified to provide a crate pallet to hold loose 110 goods, by adding four vertical side walls. Two opposite side walls can be made strong enough to support the weight of other loaded pallets stacked on top, with the abutments 46 of an upper pallet resting on the top of the

115 side walls of the lower pallet, to leave space for the entry of lifting forks beneath the upper pallet. The supporting side walls could for example be formed from pressed steel sheet with ribs to provide strength. The other two

120 side walls may be less strong, and can be formed for example from steel rod, resistance welded together. These side walls hold the supporting side walls in their upright position. and at least one of them may be removable,

125 or hinged to one supporting side wall so as to swing outwards, to facilitate loading and unloading. The side walls are mounted on the pallet by suitable means, for example by vertical rods at the corners engaging in holes in

130 the deck 10, with rubber pads on top of the

deck around the rods to prevent scratching of the surface of the deck. The four side walls are removable, so that they can be folded flat for storage or transport of empty pallets. The side walls could be arranged to fold flat on to the deck, so that another empty pallet could be stacked on top, with the legs of the upper pallet resting on the folded side walls.

It will be appreciated that other modifica10 tions may be made in the described embodiment. For example, the dimensions of the
pallet could be modified to suit any required
standard. The number and arrangement of the
legs could be altered, for example to provide
15 four legs along two sides of the pallet, provided that the legs are positioned to allow
lifting forks to be inserted between them.
Rubber pads could be fixed to the abutment
faces 46, to prevent scratching of the deck of

20 the pallet below when empty pallets are stacked. The pallet could be constructed of other suitable material, instead of steel sheet.

### **CLAIMS**

- 25
  1. A pallet comprising a deck supported on hollow legs fixed to the deck, in which the deck has apertures positioned over the hollow leg so that one pallet can be stacked on top of another with the legs of the upper pallet
- 30 projecting partway into the legs of the lower pallet, and in which the pallet is provided with abutments which, when the pallet is stacked on top of another pallet, engage co-operating surfaces on the lower pallet to support the
- 35 upper pallet with the deck of the lower pallet spaced from the deck of the upper pallet to allow the forks of a lift truck to be inserted beneath the deck of the upper pallet to lift the upper pallet from the stack.
- 40 2. A pallet as claimed in claim 1, in which each of the legs comprises a strip of sheet material bent to form a horizontal base and two side walls extending upwards and outwards from the base and joined to the deck at 45 their upper ends.
- A pallet as claimed in claim 2, in which at least some of the legs have at least one side wall formed to provide a horizontal portion extending outwards from a lower portion of the side wall and forming one of the said abutments, the horizontal portion being arranged to rest on the deck of a lower pallet in
  - abutments, the horizontal portion being arranged to rest on the deck of a lower pallet in the region adjacent the aperture through which the leg projects.

    4. A pallet as claimed in claim 2 or claim
- 3, in which the legs are arranged in rows, each row of legs being formed from a single continuous strip of sheet material, the length of strip extending between each pair of legs including at least a portion spaced from the deck.
- A pallet as claimed in claim 4, in which the deck is of sheet material formed with channels, and the said portions of strip spaced
   from the deck engage and are fixed to the

bottoms of the channels.

- 6. A pallet as claimed in any preceding claim, in which the deck is of sheet material and has a downwardly extending peripheral
- 70 flange, and in which the flange is shaped to form a downwardly and inwardly inclined face in the region of each point of entry for a lifting fork, to guide the forks into position beneath the deck.
- 75 7. A pallet as claimed in any preceding claim, in which the legs are positioned so that the lifting forks of a lift truck or the like can be inserted beneath the deck from any of the four sides of the pallet.
- 80 8. A pallet as claimed in any preceding claim, in which there is provided at least one pair of load-securing straps, each strap extending between an anchorage on the pallet and attachment means releasably joining it to 85 the other strap of the pair.
- 9. A pallet as claimed in claim 8, in which there are provided a number of plates attached to the straps so that they can be positioned on top of a load on the pallet so as 90 to be engaged by, and spread the force ex-

erted by, the legs of another pallet stacked on top of the load.

 A pallet as claimed in any preceding claim, in which the deck and legs are made
 from metal sheet.

## CLAIMS (10 Sep 1982)

- 11. A pallet as claimed in any preceding claim, in which there are provided four side100 walls which can take up positions extending vertically from the deck, to form a crate pallet.
- 12. A pallet as claimed in claim 11, in which at least two of the side walls are adapted in their vertical position to support a 105 second pallet stacked on top of the first pallet.
- 105 second pallet stacked on top of the first pallet, the abutments of the second pallet resting on the upper edges of the side walls with the deck of the second pallet spaced from the upper edges of the side walls so that the forks
- 110 of a lift truck can be inserted beneath the deck of the second pallet.
- 13. A pallet as claimed in claim 11 or claim 12 in which the side walls are adapted to be removed from the pallet and folded flat 115 for transport or storage.
  - 14. A pallet as claimed in any preceding claim, in which the deck is formed with channels, and there are fixed in at least some of the channels lengths of foam-filled rubber
- 120 tubing, each length of tubing having its axis aligned with that of the channel and being of a diameter such that the tubing projects above the surface of the deck, the lengths of tubing providing a non-slip surface for the deck.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon) Ltd.—1983. Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.