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(54) Pallets provided with a transponder

(57) A pallet (1) for carrying articles, such as boxes and/or bottles, is provided with a chamber (5) for accommodating a transponder (20). The chamber (5), which is preferably centrally located in the top deck (2) of the pallet, is constituted by a through hole closed off by a cover (6) or a transponder holder (7). Thus the transponder (20) is easily and inexpensively fitted in the pallet (1) while being mechanically protected.

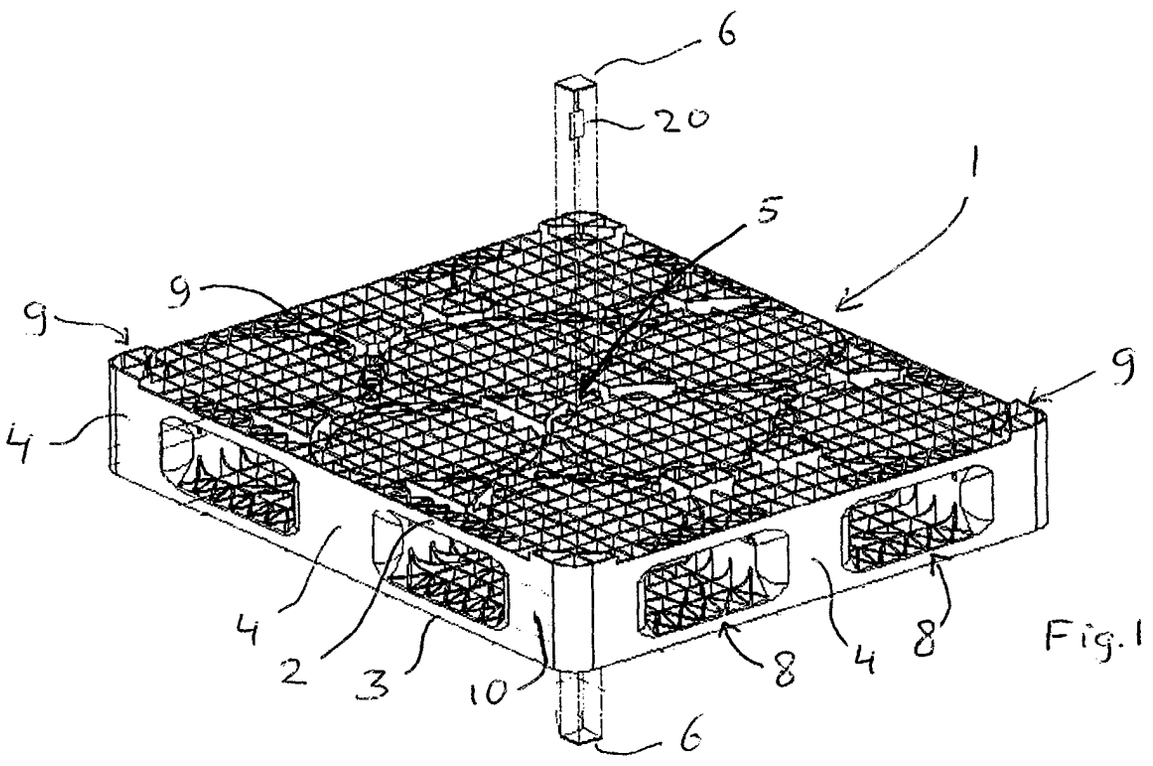

Fig. 1

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Description

[0001] The present invention relates to pallets or like platforms, with or without side walls, for supporting loads to be lifted or lowered. More in particular, the present invention relates to a pallet formed of a plastics material and provided with a transponder. Such a transponder, an electronic unit which may emit an identification signal when it receives a query signal, can be used to quickly and conveniently identify the particular pallet, its owner and/or its load.

[0002] It is known to use transponders in pallets. A wooden pallet provided with a transponder is disclosed in French Patent Application FR 2 706 422. The transponder is accommodated in a box which replaces one of the supports of the top deck.

[0003] Wooden pallets, however, have the disadvantages of easily being damaged and, more importantly, of being capable of absorbing liquids, such as water. For many applications a high standard of hygiene is required and this is often not possible with wooden pallets.

[0004] It is further known to make pallets out of plastics materials, such as polymeric materials. United States Patent US 6 289 823, for example, discloses a nestable pallet having a top deck and foot portions supporting the top deck. This known pallet is made of a thermoplastic or polymeric material. Such materials do not absorb liquids, can normally be easily cleaned and can therefore provide a high level of hygiene. The pallet of said US Patent is, however, not provided with a transponder.

[0005] An example of a transponder in a plastics pallet is disclosed in French Patent Application FR 2 697 801. A cavity is provided in one of the support elements of the pallet, the cavity being open to the bottom side of the pallet only. A stop is provided to close off the cavity. Even if this known pallet is not equipped with a transponder, the stop should be in place as otherwise dirt would accumulate in the cavity.

[0006] Accommodating a transponder in a pallet should be simple and economical, that is, it should influence the cost price of the pallet to the smallest extent possible. Fitting the transponder should be simple while the basic production process of the pallet (for example injection moulding) should not be made more complicated. Also, the presence of the transponder should not diminish the pallet's capability of being thoroughly cleansed. On the other hand, the transponder should be mechanically protected as a transponder typically is a small, fragile part.

[0007] It is an object of the present invention to provide a pallet formed of a plastics material which is provided with a transponder.

[0008] It is another object of the present invention to provide a pallet in which the transponder is mechanically protected.

[0009] It is a further object of the present invention to provide a pallet in which a transponder can be easily and economically fitted.

[0010] It is a still further object of the present invention to provide a pallet suitable for receiving a transponder, which pallet is hygienic and can be thoroughly cleansed, even if no transponder is fitted.

[0011] Accordingly, the present invention provides a pallet formed of a plastics material, the pallet comprising a substantially planar top deck for carrying articles, support elements for supporting the top deck, a chamber for accommodating a transponder unit, and a transponder unit accommodated in said chamber, characterised in that the chamber is constituted by a through hole closed off by at least one cover element.

[0012] By providing a chamber inside the pallet, the transponder can be securely accommodated within the pallet, protected against any mechanical damage. In addition, various advantageous embodiments become possible.

[0013] The chamber is constituted by a through hole closed off by at least one cover element. That is, the chamber is defined by the walls of a through hole extending through the pallet, the through hole being open to two sides, preferably the top and the bottom of the pallet. Such a through hole has the advantage that when no transponder is fitted, the hole can be easily flushed and thus cleansed. Also, a through hole is relatively simple and therefore economical to produce. The chamber thus formed can be closed off by at least one, but preferably two cover elements so as to prevent the ingress of any dirt. It can also be envisaged that the cover element is constituted by an element which fills the entire chamber and thus closes off the through hole at both ends.

[0014] Advantageously, the chamber may extend through the top deck and a support element. By having a chamber which extends into a support element, a larger chamber is made possible, the dimensions of the chamber not being limited by the thickness of the top deck.

[0015] Preferably, the chamber contains a holding element for holding the transponder unit. Such a holding element provides two advantages: it can be shaped to hold and protect the transponder unit, and it makes it possible to first fit the transponder unit in the holding element, and then insert the holding element in the pallet, thus facilitating the production process of the pallet.

[0016] Advantageously, at least one cover element may be integral with the holding element. That is, the holding element both holds the transponder unit and closes off the chamber, preferably on both sides.

[0017] In a particularly advantageous embodiment, the holding element consists of two locking parts. Such a holding element may for example consist of two halves which are inserted into the chamber from opposite directions and lock or interlock there. Suitable locking and/or interlocking means, such as means providing a snap-fit, may be present.

[0018] Advantageously, the holding element may

contain a foam material. Such a material is very well suited for damping any shock, thus providing further mechanical protection. In addition, it is relatively easy to carve out from such a material a suitable slot or other aperture for accommodating the transponder unit.

[0019] Preferably, the chamber is substantially centrally located in the pallet. This ensures that the transponder is located approximately at the same distance from all sides of the pallet, thus making any signal strength independent from the orientation of the pallet in the horizontal plane.

[0020] Although a pallet according to the present invention may have only a single, top deck, in preferred embodiments the pallet further comprises a bottom deck. A bottom deck provides additional support and structural integrity.

[0021] In a preferred embodiment, the bottom deck is integral with the support elements and the top deck. That is, the entire pallet is a single, integrated structure. It is, however, also possible for the pallet to consist of a top part comprising the top deck and a bottom part comprising the bottom deck, which top and bottom parts are mutually connected, and wherein the chamber is located between the top part and the bottom part. In such an embodiment the top and bottom parts could be produced separately and then be connected by welding, gluing, interlocking or other suitable techniques. As the chamber is not defined by a through hole in this embodiment but is closed off by the deck parts, cover elements can be omitted.

[0022] Most pallets have a substantially flush top deck, without any protrusions, so as to allow virtually any arrangement of articles thereon. For some applications, however, it may be advantageous to provide means for holding the articles carried on the pallet in place. Accordingly, in an embodiment of the present invention the top deck is provided with protrusions for positioning articles, such as kegs. The protrusions may project from the surface of the top deck and may be integral with the top deck or may have been mounted on the top deck, for example by inserting the ends of the protrusions into suitable holes in the top deck. The protrusions may be arranged in suitable patterns to hold certain articles, such as kegs or boxes.

[0023] Although the top deck may have a relatively smooth, "closed" surface, in a particularly advantageous embodiment the top deck is constituted by a plurality of interconnected ribs. That is, the top deck is "open" which makes it much easier to cleanse the part of the pallet underneath the top deck. Also, having an "open" top deck saves both weight and material without influencing the strength of the pallet to any significant extent. Thus a relatively light yet strong pallet is achieved.

[0024] The present invention further provides a kit-of-parts for forming a pallet as defined above, and a holding element for use in a pallet as defined above.

[0025] The present invention will now further be explained below with reference to exemplary embodiments illustrated in the accompanying drawings, in which:

Fig. 1 schematically shows, in perspective, a pallet according to a first embodiment of the present invention.

Fig. 2 schematically shows, in perspective, a pallet according to a second embodiment of the present invention.

Fig. 3 schematically shows, in perspective, a transponder holding element according to the present invention.

Fig. 4 schematically shows, in side view, a mechanism for locking the parts of a transponder holding element according to the present invention.

[0026] The pallet 1 shown merely by way of non-limiting example in Fig. 1 (as well as subsequent embodiments according to the present invention) is preferably formed of a thermoplastic or other polymeric material and is preferably, but not necessarily, formed by an injection moulding process. Engineered materials may be used, as well as a synthetic resin such as polyethylene or polypropylene with a filler added to stiffen the resin. It is contemplated that the pallet disclosed herein may be manufactured by various other moulding techniques and manufacturing processes applicable to the design and material selected, including but not limited to blow moulding, thermoforming, vacuum moulding, etc. It is further contemplated that the material from which the pallet according to the present invention is formed may include materials other than plastics and polymer blends, and may include metallic materials, such as aluminium or tin.

[0027] As illustrated in Fig. 1, pallet 1 includes a pallet body having a top deck 2 and a bottom deck 3 which both have an upper surface and a lower surface. The deck 2 and 3 preferably have a rectangular shape with rounded corners, but may also take other shapes, including but not limited to a square, circular, triangular or other shapes as desired or required by the use and application. Pallet 1 is preferably and generally symmetrical about a centreline. The upper surface of top deck 2 is preferably a substantially planar surface on which articles (not shown) can be carried. However, at the corners the top deck 2 preferable has raised areas which may assist in positioning the articles. In addition, other areas of the upper surface are slightly raised to provide additional protrusions or positioning elements 9. In the example shown, these positioning elements 9 are arranged for positioning kegs, e.g. beer kegs, but it will be understood that other arrangements can be made to position other articles.

[0028] Top deck 2 and bottom deck 3 are connected by support elements 4, which preferably are integral with both decks. Between the support elements 4 apertures 8 are capable of accepting the prongs of a fork lift or

similar device.

[0029] In accordance with the present invention, a chamber 5 is provided in the pallet 1. In the embodiment shown in Fig. 1, the chamber 5 is constituted by a through hole which passes through the top deck 2, a central support element 4 (not shown in Fig. 1) and the bottom deck 3. A transponder unit 20 may be accommodated in the chamber 5 by inserting it from either side of the pallet. The chamber 5 is then closed off by cover elements 6 which are preferably welded to the pallet, but which may also be mounted using other techniques, for example gluing or snap-fitting.

[0030] As can be seen, the upper surface of top deck 2 is constituted by a structure of interconnected ribs. This open structure is very strong yet light. The open character allows the pallet 1 to be thoroughly cleansed. The pallet 1 may further be provided with a label 10.

[0031] In the embodiment of Fig. 2, a holding element 7 is provided. The holding element shown consists of two parts 7a, 7b which together can enclose the transponder unit 20. The holding element parts shown have integral cover elements, thus providing a holding element without increasing the number of parts. The holding element 7, which is shown in more detail in Fig. 3, may contain a piece of foam material (not shown) for containing the transponder unit 20.

[0032] The holding element parts 7a, 7b shown in Figs. 2 and 3 are inserted into the chamber 5 from opposite sides of the pallet, the transponder being accommodated in one of the parts 7a, 7b. The integral cover elements 6 may then be welded or glued to the top deck and bottom deck respectively. Preferably, however, a mechanism is provided which allows the inserted parts 7a, 7b lock in the chamber 5 when fully inserted. Alternatively, the inserted parts 7a, 7b can be made to interlock when fully inserted into the chamber 5. An example of such a mechanism is shown in Fig. 4.

[0033] The mechanism of Fig. 4 has lips 11 which lock in recesses 12. In the embodiment shown, each holding element part 7a, 7b is provided with one lip 11, although two or more lips 11 could also be provided. The chamber 5 has recesses 12 for receiving the lips 11 of the inserted parts 7a, 7b. This mechanism locks the holding element 7 in place and makes the pallet "tamper-proof': an attempt to remove or replace the transponder unit would damage the holding element and the pallet. Alternatively, the holding element could be designed such that it could be opened using a special key.

[0034] The transponder unit 20 shown in the drawings consists of a transponder and a substrate. In the examples shown, the substrate on which the transponder proper is mounted is a card made from, for example, carton or plastic. It will be understood that the actual shape of the substrate, and the exact nature of the transponder, are not essential to the present invention.

[0035] It will therefore be understood by those skilled in the art that the present invention is not limited to the embodiments illustrated above and that many modifications and additions may be made without departing from the scope of the invention as defined in the appending claims.

Claims

1. A pallet (1) formed of a plastics material, the pallet comprising a substantially planar top deck (2) for carrying articles, support elements (4) for supporting the top deck, a chamber (5) for accommodating a transponder unit, and a transponder unit (20) accommodated in said chamber, **characterised in that** the chamber (5) is constituted by a through hole closed off by at least one cover element (6).

2. The pallet according to claim 1, wherein the chamber (5) extends through the top deck (2) and a support element (4).

3. The pallet according to claim 1 or 2, wherein the chamber (5) contains a holding element (7) for holding the transponder unit (20).

4. The pallet according to claims 3, wherein at least one cover element (6) is integral with the holding element (7).

5. The pallet according to claim 3 or 4, wherein the holding element (7) consists of two locking parts.

6. The pallet according to claims 3, 4 or 5, wherein the holding element (7) contains a foam material.

7. The pallet according to any of the preceding claims, wherein the chamber (5) is substantially centrally located in the pallet.

8. The pallet according to any of the preceding claims, further comprising a bottom deck (3), the bottom deck preferably being integral with the support elements (4) and the top deck (2).

9. The pallet according to any of the preceding claims, wherein the top deck (2) is provided with protrusions (9) for positioning articles, such as kegs.

10. The pallet according to any of the preceding claims, wherein the top deck (2) is constituted by a plurality of interconnected ribs.

11. The pallet according to any of the preceding claims, made of polyethylene, preferably high density polyethylene.

12. The pallet according to any of the preceding claims, made by injection moulding, preferably high pressure injection moulding.

13. The pallet according to any of the preceding claims, wherein the transponder unit (20) comprises a transponder mounted on a substrate, preferably a card-like substrate.

14. A kit-of-parts for forming a pallet according to any of the preceding claims, the kit comprising a pallet body (1) and a transponder unit (20), the pallet body (1) being formed of a plastics material and comprising a substantially planar top deck (2) for carrying articles, support elements (4) for supporting the top deck, and a chamber (5) for accommodating the transponder unit, **characterised in that** the chamber (5) is constituted by a through hole closed off by at least one cover element (6).

15. The kit-of-parts according to claim 14, the kit further comprising a holding element (7) for holding the transponder unit (20).

16. A holding element (7) for use in a pallet or kit-of-parts according to any of the preceding claims, the holding element (7) consisting of two locking parts and preferably containing a foam material.

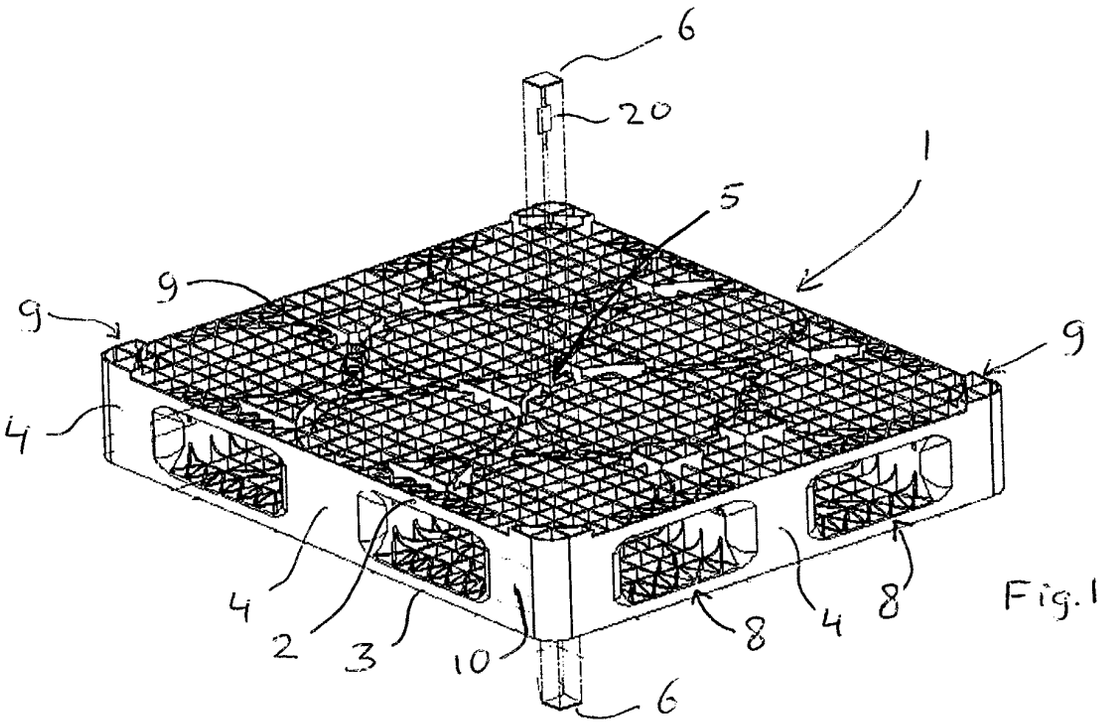

Fig.1

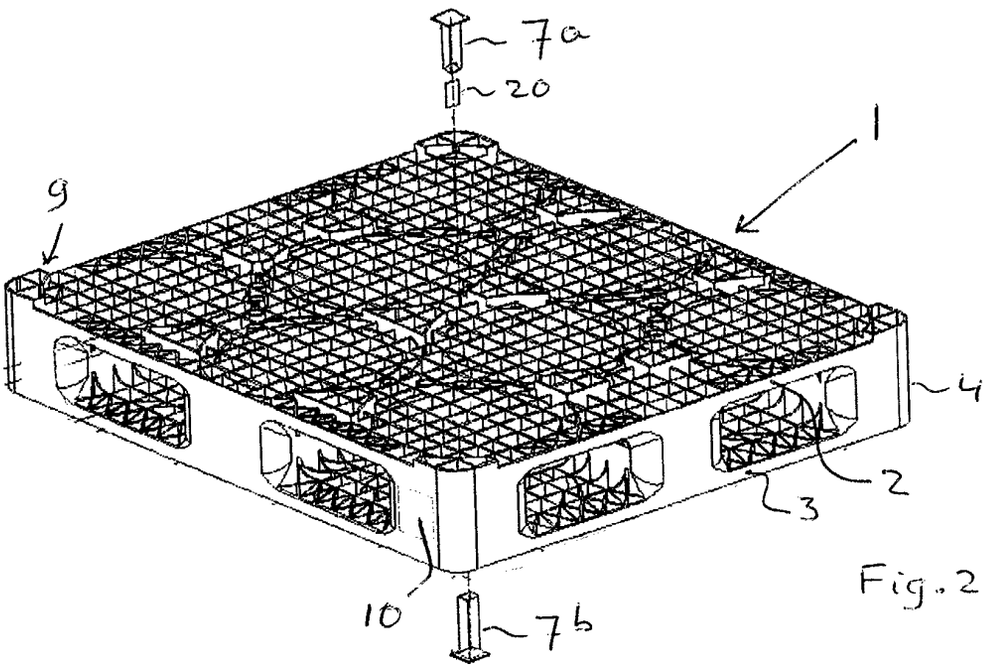

Fig.2

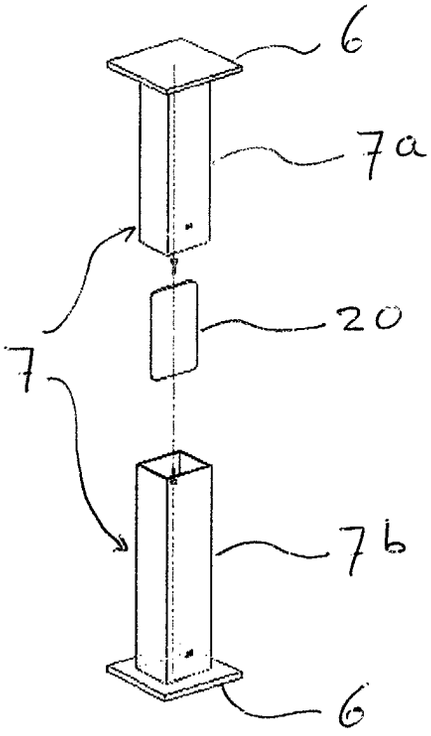

Fig.3

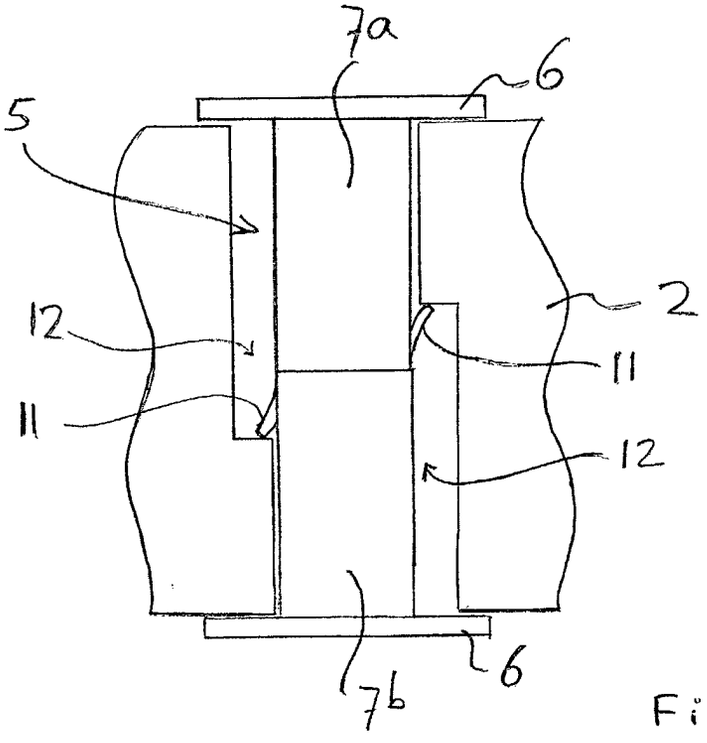

Fig.4