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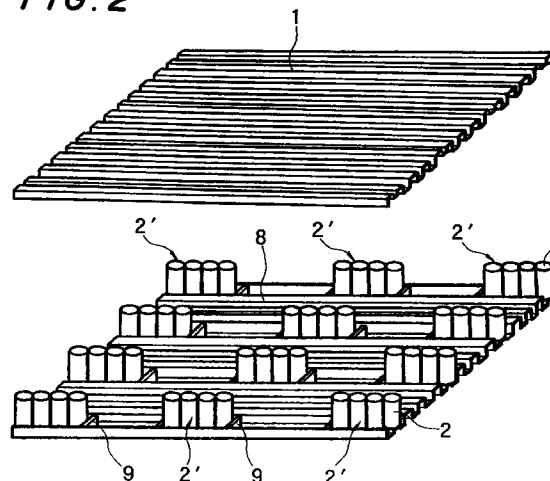
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(54) **Pallet incorporating empty cans.**

(57) A pallet for a forklift has a plurality of empty cans such as juice-contained cans (2,2'), which are used as a pallet structure, a group of the empty cans being arranged in their upright attitudes so that a metal top plate (1) serving as a load bearing plate is supported by upper end faces of the empty cans.

**FIG. 2**



## BACKGROUND OF THE INVENTION

### 1. Field of the invention

This invention relates to a pallet for a forklift in which empty cans, which would otherwise be treated as wastes, are used as a load resisting structure of a pallet.

### 2. Brief Description of the Prior Art

There is known a conventional pallet for a forklift which includes a plurality of square columns, etc. each having a large sectional area and served as ribs of load-resisting structure, and a load bearing plate (top plate) formed of a plurality of plate materials each having a comparatively heavy thickness, the square columns and the load bearing plate being rigidly formed. Therefore, the conventional pallet for a forklift is not only heavy but also expensive.

With respect to a wooden pallet which is most widely used at present, since a large number of wooden plates forming the top plate and a plurality of wooden columns serving as ribs in the load resisting structure are consumed, a provision of a substitute which is light in weight and inexpensive is demanded in view of saving of the natural resources and protection of the nature.

The present invention has been accomplished in view of the above situation.

## SUMMARY OF THE INVENTION

It is, therefore, a general object of the present invention to provide a pallet for a forklift which is capable of fulfilling the above-mentioned demand.

A specific object of the present invention is to provide a pallet for a forklift, in which empty cans of juice-contained cans, coffee-contained cans or the like, which would otherwise be treated as wastes, are used as a load resisting structure of a pallet.

To achieve the above objects, there is essentially provided a pallet for a forklift characterized in that a plurality of empty cans such as juice-contained cans are used as a pallet structure, a group of the empty cans being arranged in their upright attitudes so that a metal top plate serving as a load bearing plate is supported by upper end faces of the empty cans.

From another aspect of the invention, there is also provided a pallet for a forklift characterized in that a plurality of box-like frames are spacedly arranged, side-by-side, on and along a lower surface of a metal top plate serving as a load bearing plate, a plurality of empty cans being arranged in their upright attitudes in each frame so that the top plate is supported by upper end faces of the empty cans.

As described above, heretofore, a large quantity of empty cans of used juice-contained cans, coffee-

contained cans, etc., are discharged and a huge amount of money is spent for recovering the same.

The present invention is intended to reuse such empty cans, which would otherwise be treated as wastes as a load resisting structure of a pallet for a forklift.

As shown in Fig. 8, an empty can has such a characteristic that it is not strong against a sideward load w2 but it is comparatively strong against a normal load w1 and very light in weight.

According to the present invention, a large number of such empty cans are arranged in their upright attitudes and the top plate serving as a load bearing plate is supported by upper end faces of a group of such empty cans, thereby enabling to form a pallet which is very large in strength against a superimposed load and light in weight.

In other words, according to the present invention, there can be provided a pallet utilizing such characteristics of empty cans as light in weight and large in strength against a normal load.

Further, since empty cans are available at a very low cost, the pallet price can be extensively reduced. In addition, since much time and labor required for recovering such empty cans for disposal can be totally eliminated or reduced, the present invention is also effective as a counter-measure of saving the natural resources.

## BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 is a perspective view of a pallet for a forklift according to one embodiment of the present invention;

Fig. 2 is an exploded perspective view of the pallet of Fig. 1;

Fig. 3 is a sectional view taken on line III-III of Fig. 1;

Fig. 4 is a sectional view taken on line IV-IV of Fig. 1;

Fig. 5 is a perspective view, partly cut-away, of a pallet for a forklift according to another embodiment of the present invention;

Fig. 6 is a sectional view taken on line VI-VI of Fig. 5;

Fig. 7 is a sectional view taken on line VII-VII of Fig. 5; and

Fig. 8 is a sectional view of an empty can.

## DETAILED DESCRIPTION OF THE EMBODIMENT

In Figs. 1 to 4 inclusive, reference numeral 1 denotes a top plate forming a load superimposing plate (load bearing plate). This top plate 1 is formed of a metal plate which is bent into pulse waveforms.

There is a provision of a pallet structure resisting a normal load (superimposed load) applied to the top plate 1. This pallet structure includes a large number

of empty cans 2 supporting a lower surface of the top plate 1.

As shown in Figs. 1 and 3, as well as elsewhere, the group of empty cans 2 are arranged in their upright attitudes with the axis of each can 2 perpendicular to the top plate 1, so that upper end faces of the group of empty cans 2 are in abutment with the lower surface of the top plate 1 in order to uniformly support the top plate 1.

Also, the group of large number of empty cans 2 are divided into a plurality of unit groups of unit empty cans 2' arranged in such a manner as to support important positions of the top plate 1 as shown in Fig. 1. The group of empty cans 2 are spacedly arranged in a width direction of and between the top plate 1 and a bottom plate 8, so that fork insertion spaces 16 for a forklift may be formed between the top plate 1 and the bottom plate 8, as shown in Fig. 3.

As shown in Fig. 8, an empty can of a juice-containing can or the like is large in strength against a normal load  $w_1$  in a direction of the axis of the can. An overall superimposed load applied to the top plate 1 is dispersed to individual empty cans 2. Accordingly, a very strong load resisting structure can be formed by an aggregate of the empty cans 2.

The top plate 1 is formed of a metal plate bent in rectangular waveforms. By using this metal plate bent in rectangular waveforms, convexly curved portions and concavely curved grooves 3, 4, 5 and 6 are alternately formed in side-by-side relation in an upper and a lower surface of the top plate 1.

The convexly curved portions and concavely curved grooves 3, 4, 5 and 6 are functioned as a resisting member for resisting slippage of a load superimposed on the top plate 1 and also served as to increase the strength of the pallet against the superimposed load.

As shown in Fig. 3, upper ends of the group of empty cans 2 are fitted in the concavely curved grooves 6 formed in the lower surface of top plate 1, so that the rightward and leftward movement of the group of empty cans 2 is restricted by inner side surfaces of the concavely curved grooves 6 and bottom surfaces of the concavely curved grooves 6 are supported by the upper end faces of the group of empty cans 2.

The bottom plate 8 is laid in parallel relation with the top plate 1. This bottom plate 8 supports lower end faces of the group of empty cans 2. The bottom plate 8, together with the lower end faces of the empty cans 2, constitutes a grounding plate.

Partition elements 9 for restricting side surfaces of the empty cans 2 project from the upper surface of the bottom plate 8 constituting the grounding plate and also from the lower surface of the top plate 1, so that forward and backward movement of the unit group of empty cans 2' is restricted.

The group of the empty cans 2 are restricted their

leftward and rightward movement by inner surfaces of the convexly curved grooves 6 formed in the top plate 1 and also restricted their forward and backward (extending direction of the concavely curved grooves 6) movement by the partition elements 9 of the top plate 1 and bottom plate 8, thereby maintaining a supporting position of the top plate 1. The bottom plate 8, like the top plate 1, is formed of a metal plate which is formed in pulse waveforms.

By using this metal plate bent in pulse waveforms, convexly curved portions and concavely curved portions 11, 12, 13 and 14 are alternately formed in side-by-side relation in an upper and a lower surface of the bottom plate 8. The convexly curved portions and concavely curved portions 11, 12, 13 and 14 are functioned as a resisting member for resisting slippage at the time of grounding and also served to increase the strength of the pallet against the superimposed load.

As shown in Fig. 3, the convexly curved portions and concavely curved portions of the top plate 1 and bottom plate 8 are arranged in opposing relation to each other, and the lower ends of the group of empty cans 2 are fitted into the concavely curved grooves 12 formed in the inner surface of the bottom plate 8, so that the rightward and leftward movement of the group of empty cans 2 is restricted by the inner side surfaces of the grooves 12 and the lower end faces of the group of empty cans 2 are supported by the bottom surfaces of the grooves 12.

The grooves 12 are each provided at the bottom surface with the above-mentioned partition element 9 so that forward and backward (extending direction of the grooves 6 and 12) movement of the unit groups of empty cans 2' can be restricted.

In the above-mentioned embodiment, the empty cans 2 are interposed between the top plate 1 serving as a load bearing plate and the bottom plate 8 serving as a grounding plate such that the axis of each can 2 is perpendicular to the top plate 1 and the bottom plate 8, thereby forming an upright pallet.

As means for making the individual group of empty cans 2 integral with the top plate 1 and bottom plate 8, blind rivets 10, for example, may be used as shown in Figs. 1 and 3.

Fig. 5 show another embodiment of the present invention, Fig. 6 is a vertical sectional view thereof, and Fig. 7 is a lateral sectional view thereof.

In this embodiment, the top plate 1 formed of a metal plate serving as a load bearing plate is provided with box-like metal frames 7, as illustrated, arranged on the lower surface of the top plate 1 with a space in the width direction of the top plate 1, and a fork insertion space 16 for a forklift is formed between adjacent frames 7.

In Figs. 5 and 7, the frames 7 are arranged, side-by-side, on opposite sides and a central portion of the lower surface of the top plate 1, and a fork insertion

space 16 for a forklift is formed between adjacent frames 7.

A large number of empty cans 2 are received in each frame 7, the group of empty cans 2 are arranged in their upright attitudes on the bottom plate of the frame 7, and the top plate 1 is supported by the upper end faces of the empty cans 2. A plurality of recesses 15 may be formed, side-by-side, in the top plate 1.

As shown in Fig. 5, a plurality of rows of the group of empty cans 2 are received and arranged in the frames 7, and the top plate 1 is supported by the plurality of rows of the group of empty cans 2 per each frame 7.

As shown in Fig. 5, the group of empty cans 2 are retained in high density in each frame 7 and divided per each frame 7 so that the top plate 1 supported by the divided group of empty cans 2. Therefore, the group of empty cans 2 can stably support the top plate 1 without a need of fixture of the empty cans 2 to the top plate 1 by blind rivets 10 or the like.

The empty cans are very light in weight and large in strength against a normal load.

The present invention is capable of providing a pallet for a forklift which is light in weight and very large in strength against a superimposed load, by utilizing the above-mentioned characteristic of empty cans.

Although the present invention has been described in its preferred form with a certain degree of particularity, it should be understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes and modifications in the details of construction and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

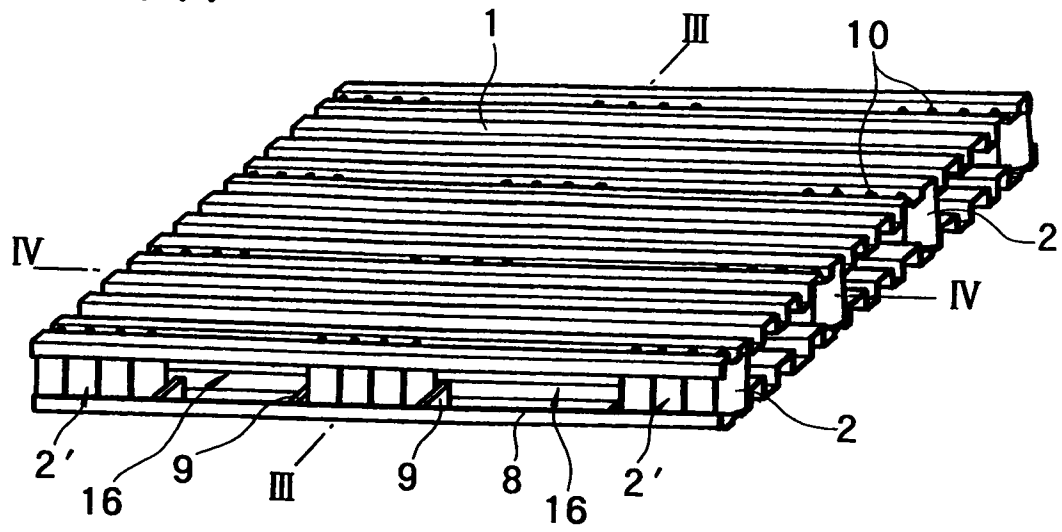
## Claims

1. A pallet for a forklift characterized in that a plurality of empty cans such as juice-contained cans are used as a pallet structure, a group of said empty cans being arranged in their upright attitudes so that a metal top plate serving as a load bearing plate is supported by upper end faces of said empty cans.
2. A pallet for a forklift characterized in that a plurality of box-like frames are spacedly arranged, side-by-side, on and along a lower surface of a metal top plate serving as a load bearing plate, a plurality of empty cans being arranged in their upright attitudes in each frame so that said top plate is supported by upper end faces of said empty cans.
3. A pallet for a forklift according to claim 1 or 2,

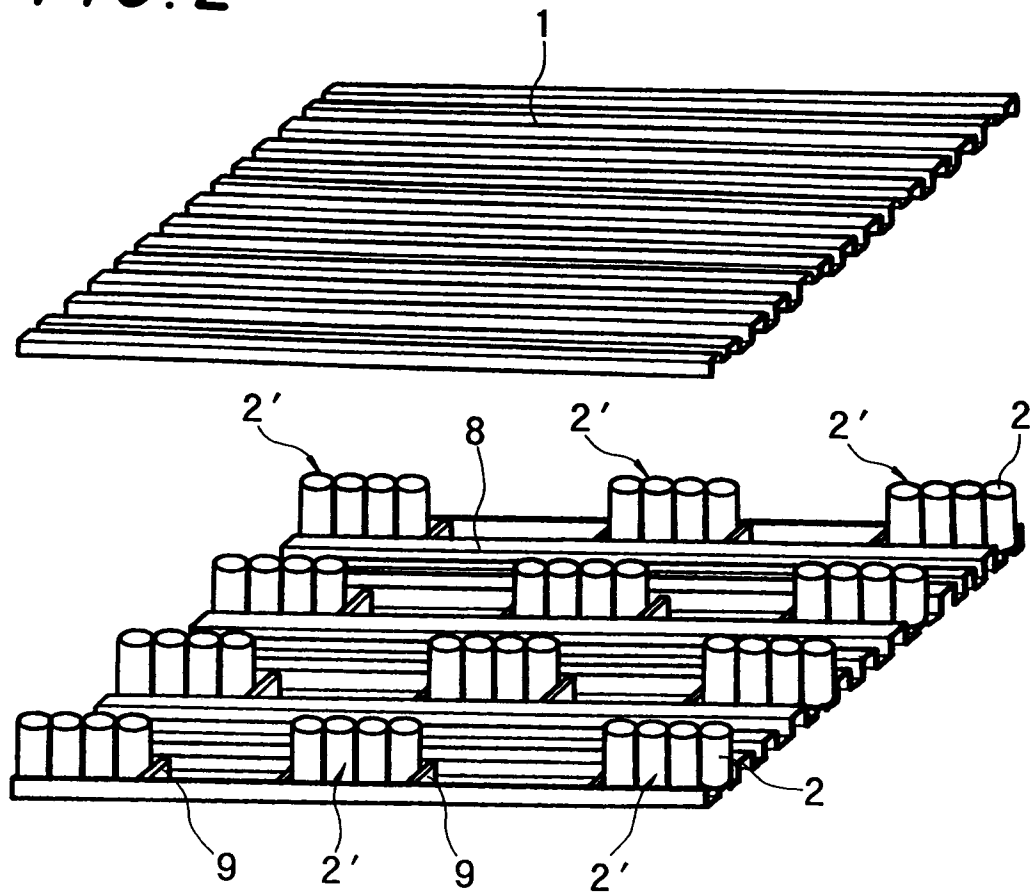
characterized in that said top plate is formed of a metal plate bent into waveforms, upper ends of said group of empty cans being fitted in a concavely curved groove formed in said metal plate.

4. A forklift according to claim 1 or 2, characterized in that said group of empty cans form unit groups each consisting of plurality of empty cans.
5. A pallet for a forklift according to claim 2, characterized in that said box-like frames are formed on and along opposite sides and a central portion of the lower surface of said top plate.

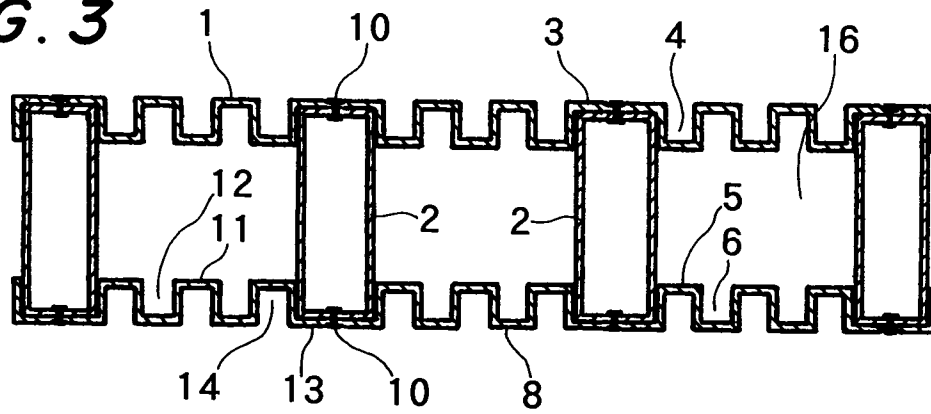
**FIG. 1**



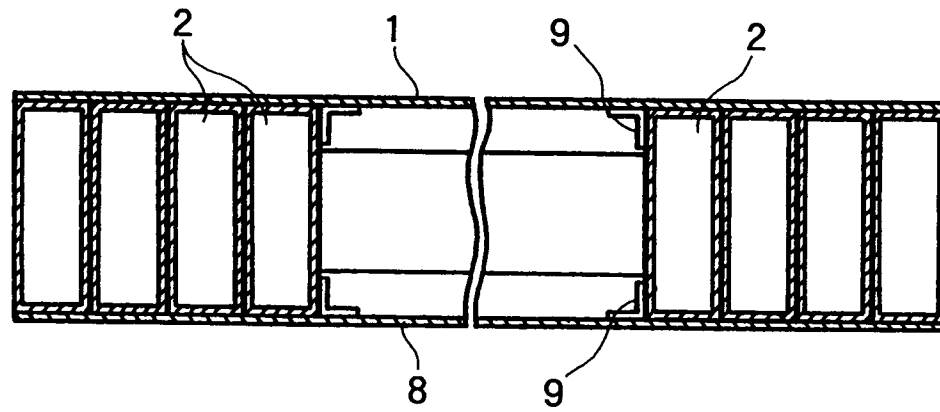
**FIG. 2**



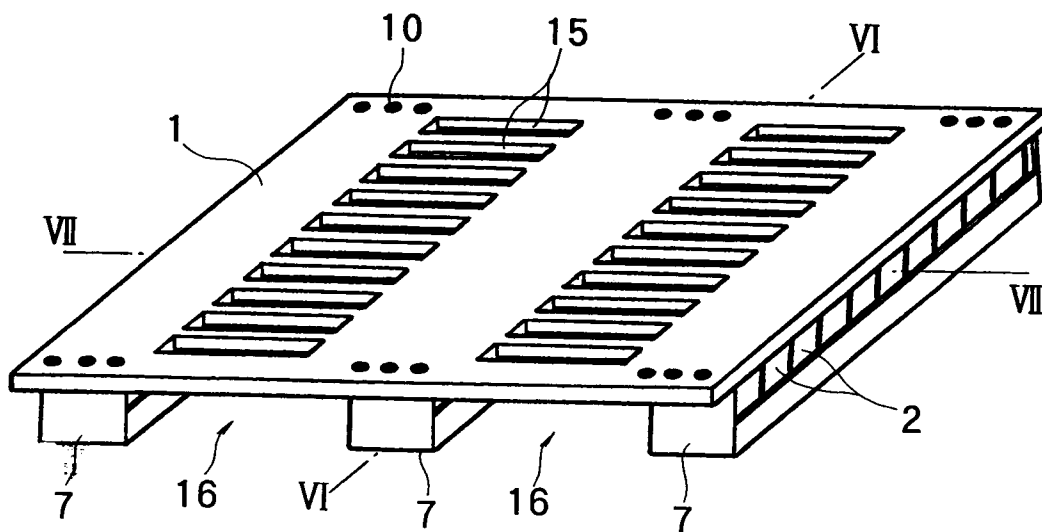
**FIG. 3**



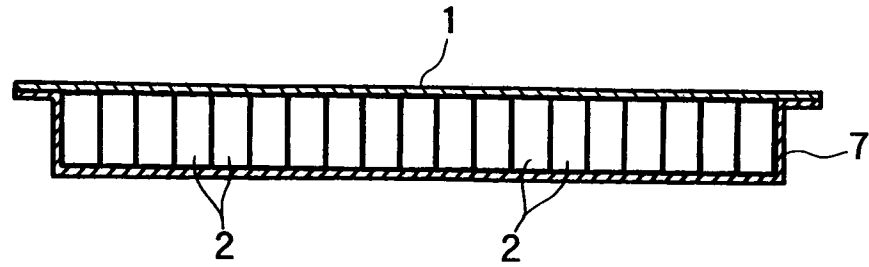
**FIG. 4**



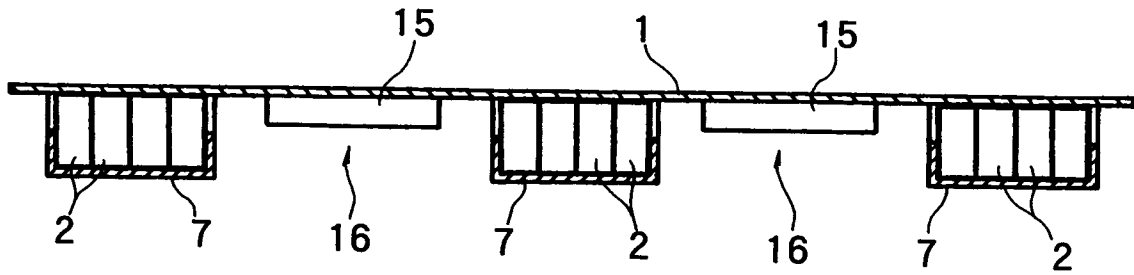
**FIG. 5**



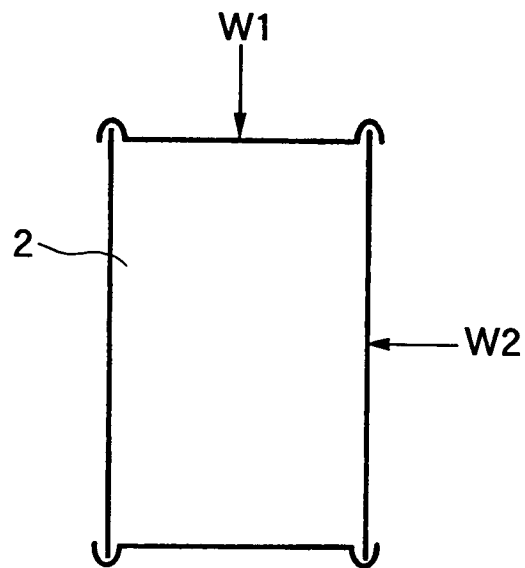
**FIG. 6**



**FIG. 7**



**FIG. 8**





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# EUROPEAN SEARCH REPORT

Application Number  
EP 95 30 1915

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB-A-656 082 (TATE & LYLE) * the whole document * ---	1	B65D19/28 B65D19/40
A	PATENT ABSTRACTS OF JAPAN vol. 014 no. 006 (M-916) ,9 January 1989 & JP-A-01 254548 (TORU NAKAJIMA) 11 October 1989, * abstract * ---	1	
A	US-A-3 277 847 (JENSEN) * column 3, line 38 - line 61; figure 2 * ---	1	
A	FR-A-2 229 622 (SOCIETE D'APPLICATIONS THERMIQUES) * page 3, line 23 - page 4, line 6 * ---	1	
A	FR-A-2 139 742 (LANTZ) * page 5, line 28 - page 6, line 34; figure 10 * ---	2,5	
A	WO-A-90 03922 (CHINCHILLA GONZALEZ) -----		TECHNICAL FIELDS SEARCHED (Int.Cl.6)  B65D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 July 1995	Examiner Leong, C
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons ----- &amp; : member of the same patent family, corresponding document</p>			

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