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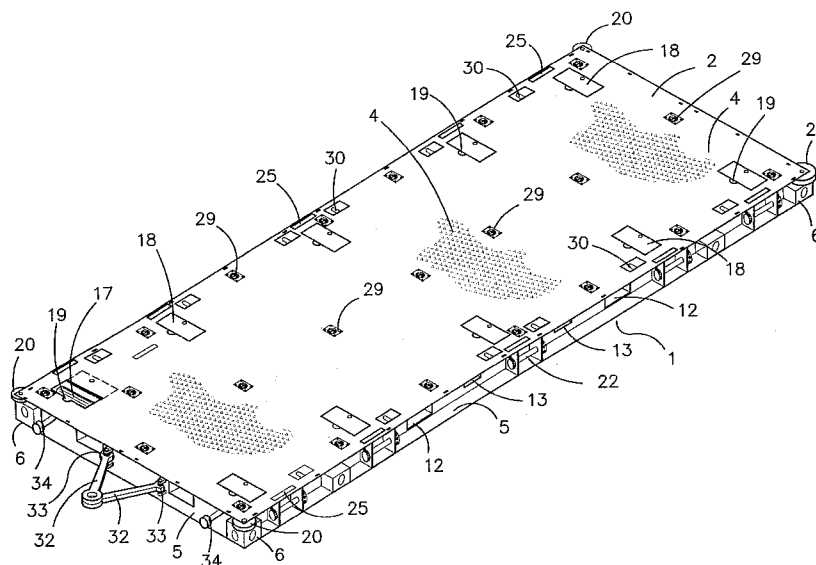
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(54) Title: A PALLET HAVING REINFORCING MEMBERS AND MOVABLE COVERS FOR ACCESS OPENINGS FOR ROLLERS



(57) Abstract: A pallet (1) comprising, a generally planar weight bearing floor (3) of generally square or rectangular plan, at least two reinforcing parallel members (9) extending transversely beneath the floor at locations on opposite sides of and generally parallel to a line bisecting the floor, the reinforcing parallel members providing a box section, an opening (12, 13) for two of the at least two reinforcing parallel members provided in the vicinity of an edge of the pallet to allow access of a tynes of a forklift into the box section, and locomotion means (17) beneath the floor extending to a level below the box section, the locomotion means being adapted to facilitate movement of the pallet over a surface.

WO 2007/041776 A1

## A PALLET HAVING REINFORCING MEMBERS AND MOVABLE COVERS FOR ACCESS OPENINGS FOR ROLLERS

### Field of the Invention

5

This invention relates to a pallet construction. In a particular non-limiting aspect it relates to a mobile pallet which is particularly suitable for the loading of shipping containers.

### 10 Background of the Invention

It has been known to use pallets for loading and unloading shipping containers as the pallets can be prestacked prior to loading into a container and can be unstacked after removal from the container. This is a far more efficient mode of operation than the  
15 alternative of loading goods directly into a sea freight container as the goods need to be stacked one by one through an access opening of the container, a time consuming and labour intensive operation. The inspection of containers loaded using pallets is for the same reason a far simpler job than the inspection of containers carrying individually packed goods.

20

Whilst pallets are an effective means of improving the efficiency of loading and unloading shipping containers, the current pallet designs still leave considerable room for improvement.

25 For example, it would be desirable to improve the mobility of pallets to assist with the loading and unloading operation.

Furthermore, when pallets are not in use, it would be desirable if they were to be constructed in such a fashion that they may be stacked on atop the other in a stable  
30 configuration.

Ideally, the pallets should be lightweight and should be constructed so as to fit snugly and readily into a shipping container.

Additionally, the pallets should be movable using conventional forklifts and should be constructed so as to allow them to be held securely within the shipping container.

- 5 It is an object of the invention to provide a pallet construction which addresses one or more of the aforesaid desirable requirements.

### **Disclosure of the Invention**

- 10 The invention provides in one aspect a pallet comprising,  
a generally planar weight bearing floor of generally square or rectangular plan having a length dimension and a breadth dimension,  
at least two reinforcing parallel members extending transversely beneath the floor at locations on opposite sides of and parallel to a line bisecting the floor, the  
15 reinforcing parallel members providing a box section,  
an opening for two of the at least two reinforcing parallel members provided in the vicinity of an edge of the pallet to allow access of a tyne of a forklift into the box section, and  
locomotion means beneath the floor extending to a level below the box  
20 section, the locomotion means being adapted to facilitate movement of the pallet over a surface.

- The weight bearing floor may comprise metal. It may comprise sheet steel. It may comprise aluminium. It may include antifriction means. The antifriction means may  
25 comprise profiling of the upper surface of the floor. It may comprise stippling.

- Suitably the pallet is of such dimensions that it can fit snugly within a standard shipping container. Thus in one configuration, it may have an overall length in the form in which it is being loaded of about 5,800mm to 5,900mm. Similarly, it may  
30 typically have an overall breadth of about 2,300mm to 2,400mm. More specifically, it may have a length between 5,810mm and 5,850mm and a breadth between 2,290mm and 2,320mm.

The at least two reinforcing parallel members may have a channel shape which when joined to the underneath of the floor forms the box section. Alternatively, the at least two reinforcing parallel members may of themselves comprise a box section.

- 5 Openings for the at least two parallel reinforcing members may be provided on both opposed edges of the pallet so as to allow access from both ends of the at least two parallel reinforcing members.

In addition to the at least two parallel reinforcing members, there may be provided  
10 one or more complementary reinforcing members extending generally at right angles to the parallel reinforcing members beneath the floor. In a particularly preferred form of the invention, there will be two such complementary reinforcing members. The complementary members may similarly be provided with an opening at each end to allow access of a tyne of a forklift. The complementary reinforcing members may  
15 similarly form a box section.

The locomotion means may comprise a plurality of rollers mounted beneath the floor. Suitably, the rollers extend below the level of the reinforcing members. Their axes of rotation may be generally parallel to the line bisecting the floor. There may be six or  
20 more rollers. In one embodiment there may be ten rollers.

The floor may be provided with access openings immediately above each of the rollers. Each of the access openings may be provided with a cover. The cover may be movable so as to allow it to be moved substantially clear of the access opening.  
25 By providing access openings for each of the rollers, it may be possible to stack a plurality of pallets according to the invention with rollers from an upper pallet registering with the access openings of a lower pallet to form a stable stack.

One or more perimeter reinforcing beams may be provided at the edge of the pallet.  
30 Suitably each of the four edges of the pallet is provided with a reinforcing perimeter beam. The perimeter beam may comprise a channel shaped metal member. Alternatively, it may comprise an L-shaped member. A portion of the perimeter beam may comprise a box section.

The pallet may be provided with additional access openings through the perimeter beams. The additional access openings may not necessarily be associated with the reinforcing members. The purpose of having additional access openings may be to  
5 allow access to tynes of a smaller forklift for moving the pallet when it is unloaded. Thus, the additional access openings may be located closer to each other than the access openings for the reinforcing members. This is because the access openings for the reinforcing members are provided for the tynes of a larger and more powerful forklift truck which may be used to lift the pallet when it is fully loaded.

10

One or more corners of the pallet may be provided with alignment wheels to facilitate movement of the pallet into a shipping container. Most suitably, each of the four corners is provided with an alignment wheel. Each of the alignment wheels may be rotatable about an axis generally perpendicular to the plane of the floor.

15

A pair of extendible draw bars may be provided at one end of the pallet to assist with towing. They may be mounted on a perimeter beam. They may be mounted via universal joints. The draw bars may be constructed so as to be foldable into registry with the perimeter beam.

20

The corners of the pallet may also comprise components which may be secured to the tray of a truck or other type of transporter as is known in the art.

Furthermore, one or more of the rollers may be fitted with brake mechanisms to  
25 prevent the pallets moving after they have been properly positioned. Alternatively or additionally, the rollers may be retractable so as to move them away from a weight bearing surface allowing the pallet perimeter beam and reinforcing members to sit directly on the ground.

30 The pallet may also incorporate positioning means to abut an end of the pallet against the wall of a shipping container.

The positioning means may be adjustable. The positioning means may comprise a screw threaded shaft co-operable with a screw threaded socket provided at the end of the pallet.

- 5 The pallet may include tie down means to assist with tying down goods loaded on the pallet. The tie down means may comprise any one or more of a rotatable drum and ratchet mechanism associated therewith, chain dogging bars, or tie rings.

10 One or more rotatable drum and ratchet mechanisms may be located on one or more of the perimeter beams. Each of the rotatable drums may be associated with a webbing slot provided in the floor. Suitably there are at least two rotatable drums and ratchet mechanisms provided on opposite longitudinal sides of the pallet.

15 Preferred aspects of the invention will be described with reference to the accompanying drawings.

### **Brief Description of the Drawings**

- 20 Figure 1 shows in isometric view of a pallet according to the invention;  
Figure 2 shows an enlarged fragmentary view of a forward corner of the pallet of Figure 1;  
Figure 3 shows an isometric underneath view of the pallet of Figure 1;  
Figure 4 shows an elevational view lengthwise along the pallet of Figure 1;  
Figure 5 shows an elevational view breadthwise of the pallet of Figure 1;  
25 Figure 6 shows a fragmentary view of a stack of four pallets; and  
Figure 7 shows an isometric view of a loaded pallet.

### **Detailed Description of the Preferred Embodiments**

- 30 The various elements identified by numerals in the drawings are listed in the following integer list.

**Integer List**

	1	Pallet
	3	Floor
5	4	Stippling
	5	Perimeter beam
	6	Corner casting
	7	Side casting
	9	Transverse beam
10	10	Longitudinal beam
	12	Tyne opening
	13	Tyne opening
	15	Tyne opening
	17	Roller
15	18	Cover
	19	Access opening
	20	Corner roller
	22	Rotatable drum
	23	Ratchet mechanism
20	24	Holes
	25	Webbing slot
	29	Tie ring
	30	Chain dogging bar
	32	Draw bar
25	33	Universal joint
	34	Adjustable positioners
	35	Slots
	38	Panel
	40	Web
30	42	Tie

Referring to Figures 1 to 5 of the drawings, there is shown a pallet generally designated 1 constructed in accordance with the invention.

The pallet includes a floor 3 of sheet material. Typically the floor may comprise a sheet of metal such as steel or aluminium. However, depending on the application other forms of flooring such as plastic or wood may be suitable.

5

The floor is provided with an antifriction surface in the form of stippling 4 comprising a number of raised features on the surface of the floor.

The floor is reinforced with perimeter beams 5 which are provided on the lengthwise and breadthwise sides of the pallet beneath the floor and aligned with the edges of the floor.

Typically, the perimeter beams may comprise a channel shaped or L-shaped metal member secured beneath the floor. Parts of the perimeter beams may have a front panel welded thereto to form a box section. Where the perimeter beams are L-shaped, the front panel may be joined along the edge of the floor to the perimeter beam to form the box section. This may be desirable when extra strength is required.

Corner castings 6 are provided at each corner of the rectangular pallet. These may be of a form known in the art in that they have an opening provided on their bottom surface to allow access for a locking member projecting upwardly from the tray of a truck or other vehicle to lock the pallet onto the vehicle.

A number of additional side castings 7 which perform a similar function are located attached to the perimeter beam in the manner illustrated.

As is shown more clearly in Figure 3, the underneath of the pallet is provided with two transverse beams 9 and two longitudinal beams 10 which intersect and provide additional reinforcement beneath the floor. Both the transverse and longitudinal beams are arranged so that they form a box section. In this respect, they may of themselves be in the form of metal box sections or, they may be channel shaped components which form a box section with the bottom of the floor when welded or secured in any other manner thereto.

Each of the box section beams extends to a respective perimeter beam on opposed sides of the pallet. The perimeter beams include tyne openings 12 for the tynes of a large scale forklift truck. The tyne openings 12 appear on the opposed ends of both the transverse and longitudinal beams. The tyne opening allow the tynes to penetrate into the box section beams. The beams provide the reinforcement required to enable the loaded pallet to be lifted by the tynes of a large size forklift truck. Tyne openings 13 are provided for access by the tynes of a smaller forklift when the pallet is unloaded.

10

It is to be noted that the tyne openings 13 and also the tyne openings 15 are located at equal distances of either side of an imaginary line bisecting the length or breadth of the pallet.

15 The tyne openings 13 are closer together than the openings 12 and there is no requirement for reinforcement by beams as these openings are only to be used when the pallet is to be lifted in the unloaded state.

The tyne openings 15 provided at opposed ends of the pallet communicate with the longitudinal beams 10 and provide reinforcement locations whereby the pallet may be lifted with a crane-like device incorporating tynes. These tyne openings 15 may also be used when the loaded pallet is pushed into a shipping container using the rollers 17 for mobility.

25 In the drawings, it can be seen that there are ten rollers 17 arranged so that they project beneath the level of the perimeter beam and the transverse and longitudinal beams.

Each of the rollers 17 lies beneath an opening in the floor 3 with a cover 18 closing off the opening.

30

As can be seen more clearly in Figure 1, the cover one on one of the rollers proximate a forward corner is movable to expose a roller 17 and the opening beneath which it

fits. The cover shown in dotted lines may be movable using means such as slide channels provided underneath the floor, hinges or any other suitable method of removing the cover.

5 When placed over the openings for the rollers 17, the covers 18 can act to prevent accidental injury which might otherwise be sustained by a workman stepping into one of the openings. It is a simple matter to use the access opening 19 to gain purchase on the cover 18 and to move it to a position away from the opening as is indicated by the dotted line so as to expose the opening above the roller. This provides a location  
10 for a corresponding roller from another pallet stacked on top of this pallet in the manner illustrated in Figure 6 ie. the rollers come in registry with the openings when the covers have been removed. This allows the pallets to sit flat one on top of the other with the rollers fitting into the openings and prevents relative movement between the pallets in the stack thereby providing a stable stack. As an additional  
15 safeguard, one or more of the rollers may be provided with a brake mechanism which can be applied when the pallet has formed part of the stack or has been moved into a shipping container.

To assist movement of the pallet into a shipping container, it is provided with four  
20 corner rollers 20 mounted above the corner castings, the corner rollers being rotatable about an axis perpendicular to the plane of the floor.

Rotatable drums 22 with ratchet mechanisms 23 as are known in the art are provided in the longitudinally extending perimeter beams 5. One end of the rotatable drum is  
25 provided with a round member having a series of holes 24. The holes may be used in association with an elongate bar to turn the drum and hence tighten or loosen webbing 40 which may be wound around the drum.

The webbing may pass through the webbing slot 25 as is shown in Figure 7 to hold  
30 down articles loaded on the pallet. Whilst the drawings show five drums for webbing on opposed longitudinal sides of the pallet, it is to be appreciated that more or fewer such rotatable drums with webbing may be used depending on the requirements of a

user. However, typically it is to be anticipated that between two and ten such drum and webbing mechanisms may be used for each lengthwise side of a pallet.

To assist with tying articles on the pallet, a number of tie rings 29 and chain dogging bars 30 are also provided at various locations around the floor 3 as is known in the art.

A pair of draw bars 32, each joined to the end perimeter beam 5 by a universal joint 33 are provided at the forward end of the pallet. The draw bars 32 are foldable towards each other so that they lie flat within the front perimeter beam 25 when they are not in use.

Adjustable positioners 34 are also provided at the front perimeter beam. These may be used to locate the pallet within a shipping container by abutment against a wall or to assist with a transport vehicle. The positioners 34 may be provided with a screw threaded shaft co-operable with screw threaded sockets provided at the end of the pallet.

A number of slots 35 are provided around the pallet floor proximate the perimeter. These slots are positioned so as to receive tabs of panels 38 which may be used to erect a wall around the perimeter of the pallet. The panels may be designed so that they may be mounted one atop the other to form a double height wall. They also may have edge joining means to join adjacent panels for forming the full wall as is known in the art. The panels may be erected after items have been located on the shipping container and tied down with webs 40 and ties 42 and optionally dogging chains (not shown).

Whilst the above description includes the preferred embodiments of the invention, it is to be understood that many variations, alterations, modifications and/or additions may be introduced into the constructions and arrangements of parts previously described without departing from the essential features or the spirit or ambit of the invention.

It will be also understood that where the word “comprise”, and variations such as “comprises” and “comprising”, are used in this specification, unless the context requires otherwise such use is intended to imply the inclusion of a stated feature or features but is not to be taken as excluding the presence of other feature or features.

5

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that such prior art forms part of the common general knowledge in Australia.

## Claims

1. A pallet comprising,  
a generally planar weight bearing floor of generally square or rectangular  
5 plan,  
at least two reinforcing parallel members extending transversely beneath the  
floor at locations on opposite sides of and generally parallel to a line bisecting the  
floor, the reinforcing parallel members providing a box section,  
an opening for two of the at least two reinforcing parallel members provided  
10 in the vicinity of an edge of the pallet to allow access of a tyne of a forklift into the  
box section, and  
locomotion means beneath the floor extending to a level below the box  
section, the locomotion means being adapted to facilitate movement of the pallet over  
a surface.  
15
2. The pallet according to claim 1 having a length between 5,800mm and  
5,900mm and a breadth between 2,300mm and 2,400mm.
3. The pallet according to claim 1 or claim 2 wherein the floor comprises sheet  
20 steel having a stippled surface.
4. The pallet according to any one of the preceding claims wherein the  
locomotion means comprise a plurality of rollers mounted beneath the floor, the axes  
of rotation of the rollers being generally parallel to the line bisecting the floor.  
25
5. The pallet according to claim 4 wherein there are at least six rollers.
6. The pallet according to claim 4 or claim 5 wherein the floor comprises an  
access opening above each roller.  
30
7. The pallet according to claim 6 comprising a removable cover for each access  
opening.

8. The pallet according to claim 6 or claim 7 wherein the access openings are arranged to receive rollers of an identical pallet stacked thereon.
9. The pallet according to any one of the preceding claims comprising a reinforcing perimeter beam provided along each of the four edges of the pallet.
10. The pallet according to claim 9 wherein the perimeter beam comprises at least one of a channel shaped member, an L-shaped member and a box section.
11. The pallet according to claim 9 or claim 10 comprising additional pairs of access openings for receiving the tynes of a forklift.
12. The pallet according to any one of the preceding claims comprising an alignment wheel mounted at each of the four corners of the pallet, each alignment wheel extending beyond the corners of the pallet and being rotatable about an axis generally perpendicular to the plane of the floor.
13. The pallet according to any one of the preceding claims comprising adjustable positioning means for adjusting the length of the pallet so that it is located substantially in abutment with opposite walls of a shipping container.
14. The pallet according to any one of the preceding claims comprising a foldable towing assembly provided at one end of the pallet.
15. The pallet according to claim 14 wherein the towing assembly comprises a pair of draw bars foldable into registry with the one end of the pallet.
16. The pallet according to any one of the preceding claims comprising four wall panels attachable about the perimeter of the pallet.
17. A pallet substantially as hereinbefore described with reference to any one of the accompanying drawings.

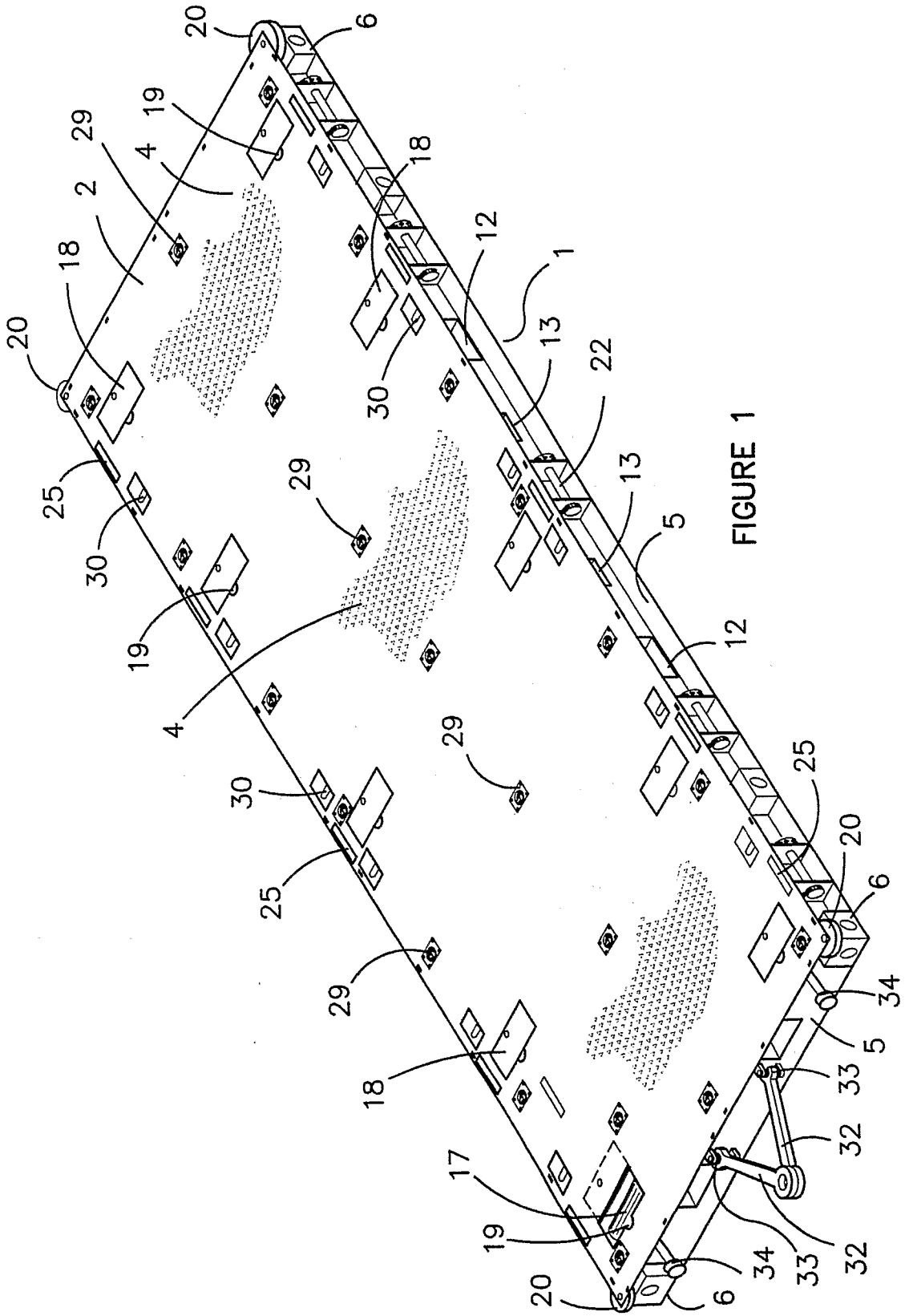


FIGURE 1

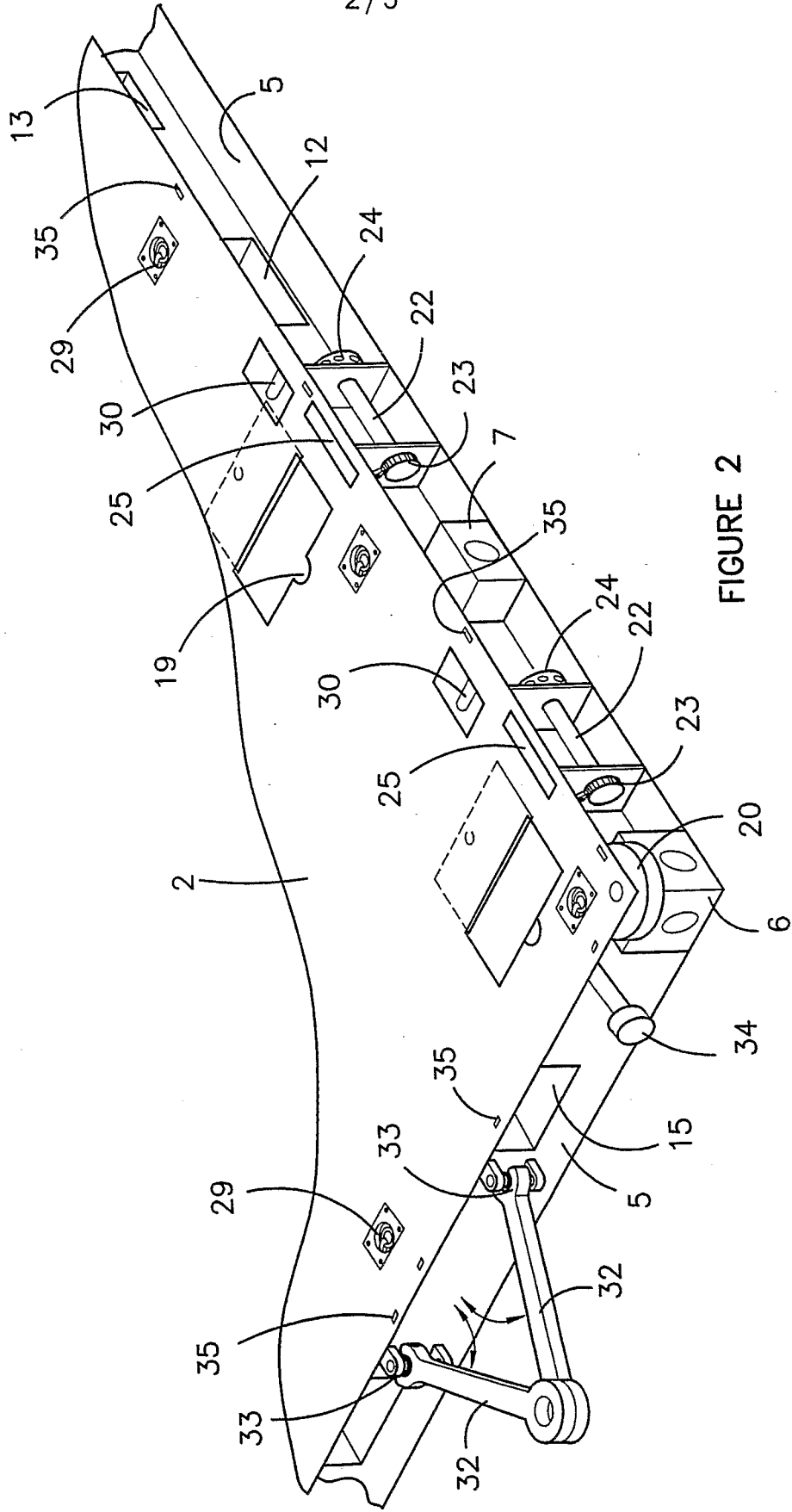
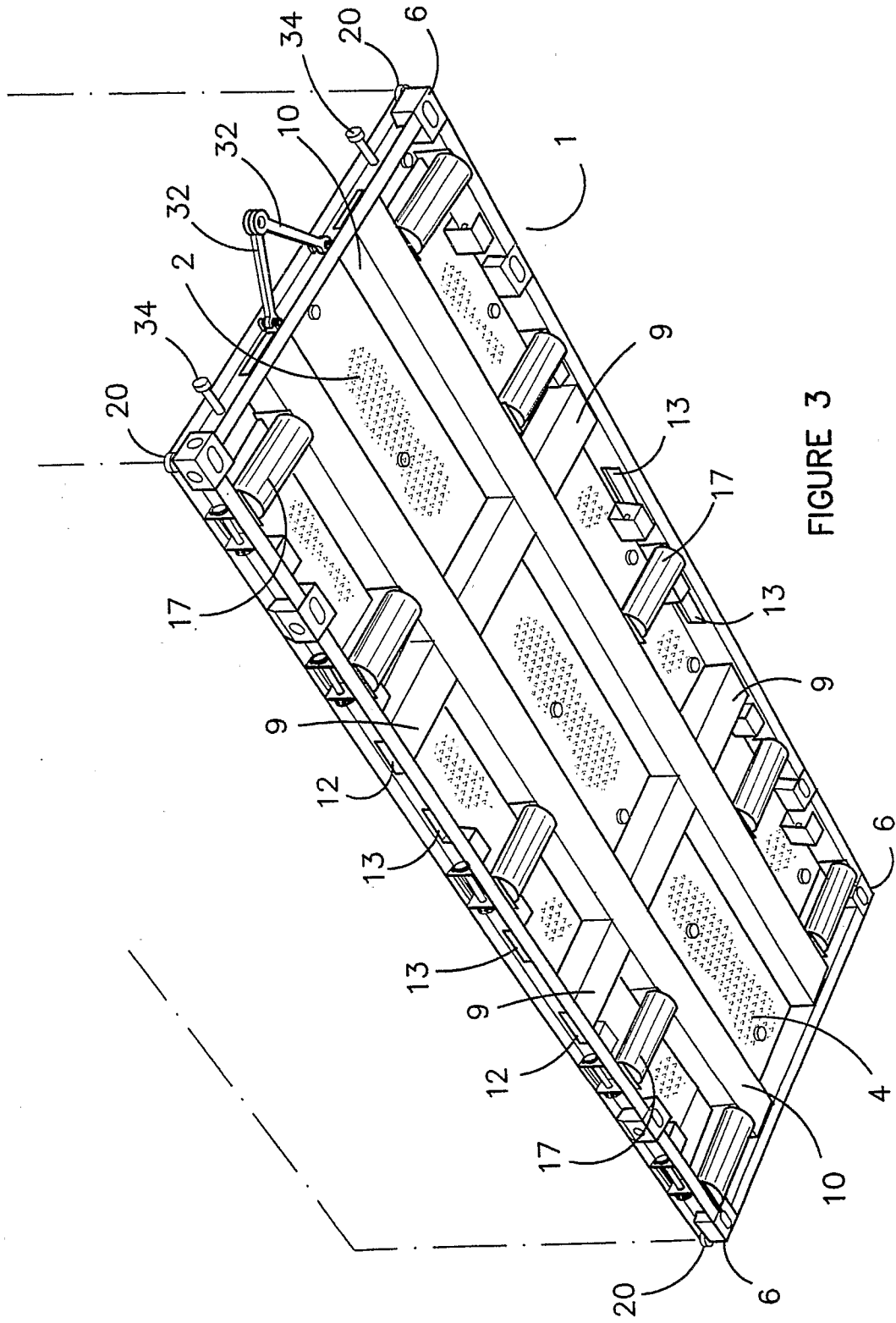


FIGURE 2



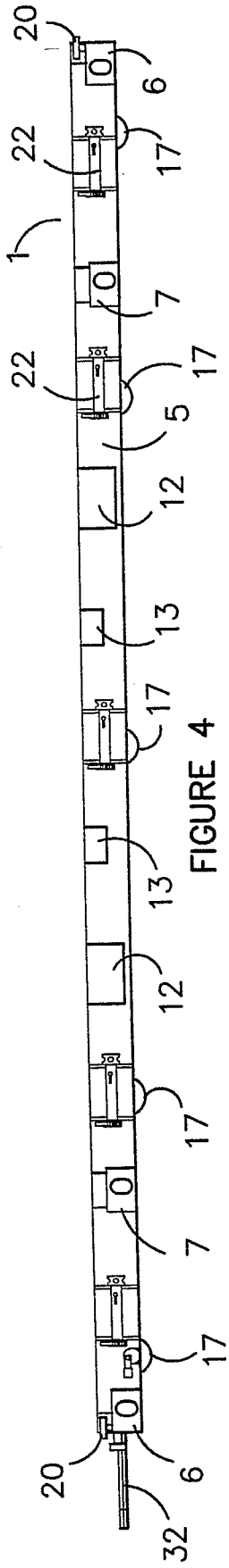


FIGURE 4

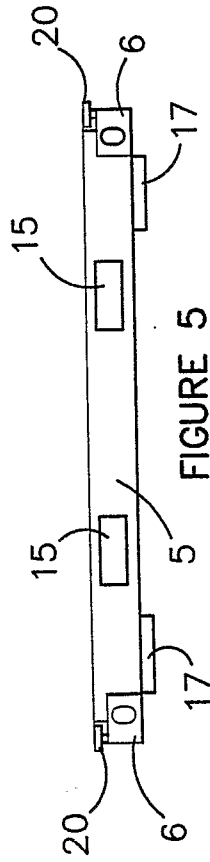


FIGURE 5

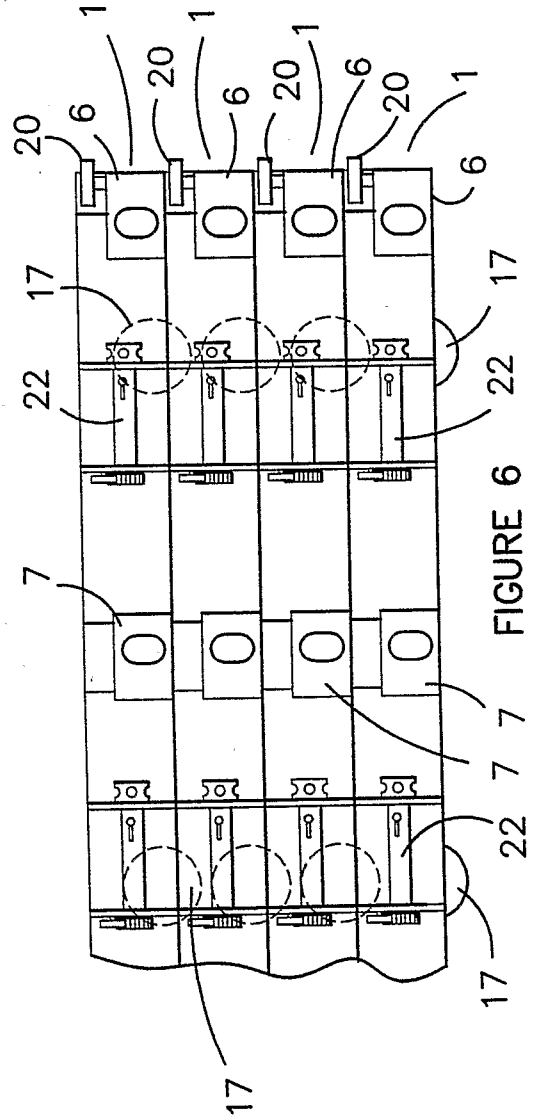


FIGURE 6



**INTERNATIONAL SEARCH REPORT**

International application No.

**PCT/AU2006/001480**

**A. CLASSIFICATION OF SUBJECT MATTER**

Int. Cl.

**B65D 19/42** (2006.01)      **B65D 21/032** (2006.01)      **B65D 90/18** (2006.01)  
**B65D 19/38** (2006.01)      **B65D 88/12** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI IPC: B65D 19/-, B65D 88/-, B65D 90/- with keywords: pallet, roller, move, opening, cover & similar words  
 ESPACE & USPTO with keywords: pallet, position, access, opening, tow, fold, draw, bars & similar terms

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4347794 A (NORDSTROM) 7 September 1982 Whole document	1-5, 9-11, 16, 17
Y	Whole document	6-8, 12-15
X	US 6694894 B1 (DARNELL) 24 February 2004 Whole document	1-5, 9-12, 16, 17
Y	Whole document	6-8, 12-15
Y	US 6327984 B1 (MCCANN ET AL) 11 December 2001 Abstract; figure 1	6-8

Further documents are listed in the continuation of Box C

See patent family annex

* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
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"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search  
**09 November 2006**

Date of mailing of the international search report  
**20 NOV 2006**

Name and mailing address of the ISA/AU  
 AUSTRALIAN PATENT OFFICE  
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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2006/001480

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CA 2289271 A1 (ROY) 8 April 2001 Abstract; figure 1	6, 8
Y	US 5706738 A (RAPELI) 13 January 1998 Figure 1	13
Y	US 2909349 A (MORRIS) 20 October 1959 Figure 1	13
Y	US 2942827 A (EDSON) 28 June 1960 Figure 1	13
Y	US 3704900 A (GERBER) 5 December 1972 Figures 1-3	14, 15
Y	US 3774949 A (EGER) 27 November 1973 Figures 1-7	14, 15
Y	US 4139212 A (BEEBE) 13 February 1979 Figures 1-4	14, 15
Y	US 2995386 A (PETERSON) 8 August 1961 Figures 1-3	14, 15
	<p>Note: For Y indications, any one of the fifth, sixth and seventh documents can be combined with any one of the first two documents for claim 13; any one of the last four documents can be combined with any one of the first two documents for claims 14, 15; third and fourth documents can be combined with any one of the first two documents for claims 6-8 &amp; claims 6, 8 respectively; second document can be combined with the first document for claim 12.</p>	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

**PCT/AU2006/001480**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Member					
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US 6327984						
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	EP 0680435	FI 930351	FI 953595			
	PL 310043	PL 310044	WO 9416937			
	WO 9416938					
US 2909349						
US 2942827						
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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.						
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