

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
19 December 2002 (19.12.2002)

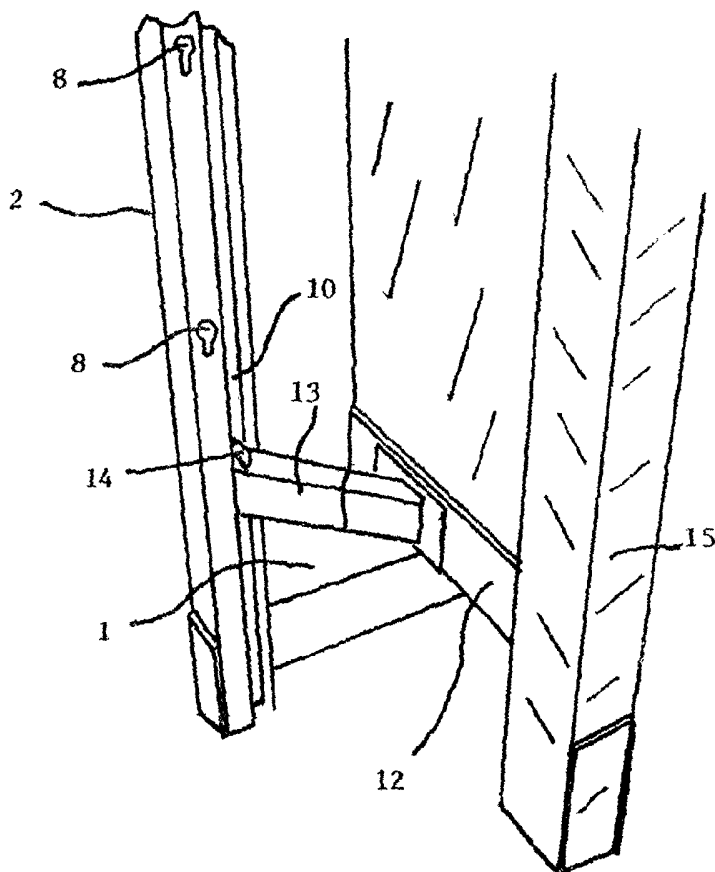
PCT

(10) International Publication Number
WO 02/100751 A1

- (51) International Patent Classification⁷: **B66B 7/02**, 2209 (AU). **HANSELL, Wayne, Stephen** [AU/AU]; 8 Willoughby Circuit, Camden, NSW 2570 (AU).
9/02, 9/04, 11/02
- (21) International Application Number: PCT/AU01/00693 (74) Agent: **ANDERSON-TAYLOR, Michael**; 10 Harrison Avenue, Bonnet Bay, NSW 2226 (AU).
- (22) International Filing Date: 12 June 2001 (12.06.2001) (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (25) Filing Language: English (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LI, LU, PT, RO, SI, SK, TR, UA, US, YU, ZA, ZW).
- (26) Publication Language: English
- (71) Applicant (*for all designated States except US*): **M.K.S. ENGINEERING PTY. LTD.** [AU/AU]; 47 Bonar Street, Arncliffe, NSW 2205 (AU).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): **WASELL, David, Ian** [NZ/AU]; 10 Levett Avenue, Beverly Hills, NSW

[Continued on next page]

(54) Title: IMPROVEMENTS IN ELEVATORS



(57) Abstract: There is an elevator for conveying passengers or goods between floors of a structure. The elevator includes a well (3, 4) and a cage (12) movable vertically therein on roller arms (13, 14) engaging in corner rails (11) of the well. There is a hydraulic ram (15) for the cage (12) acting from a base of the well so that a weight of the cage (12) is carried at the base and the corner rails (11) and walls of the well are constructed substantially from non weight-bearing components.



WO 02/100751 A1



IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*

IMPROVEMENTS IN ELEVATORS

FIELD OF THE INVENTION

This invention relates to lifting apparatus. More particularly although not exclusively it discloses an improved low cost passenger elevator.

BACKGROUND OF THE INVENTION

Existing elevators typically require the construction of a robust well which in addition to the weight of the cage is capable of carrying the hoisting apparatus located on top. Accordingly elevator installations are expensive and the well structure has to be put in place at the time of building construction. Therefore lower cost residential housing has generally not benefited from this convenience.

SUMMARY OF THE INVENTION

It is an object of this invention to ameliorate the aforementioned disadvantages and accordingly an elevator is disclosed for conveying passengers or goods between floors of a building, said elevator including a well and a cage movable vertically therein on roller means engaging in corner rails of said well, lifting means for said cage acting from the base of said well whereby the weight of said cage is carried at said base and said well being constructed substantially from non load-bearing components.

Preferably said well is constructed from panels of sheet metal fixed one upon another in a stacked configuration between said corner rails.

-2-

It is further preferred that said lifting means comprise hydraulic ram(s) acting on said cage from the base of said well.

BRIEF DESCRIPTION OF THE DRAWINGS

One currently preferred form of this invention will now be described with reference to the attached drawings in which:

Figure 1 is a schematic perspective view of the base of an elevator well according to this concept,

Figure 2 is an exploded view of part of the well structure of figure 1, and

Figures 3 and 4 are perspective views of parts of the elevator cage and well showing the corner roller arms, and

Figure 5 is a schematic plan view of the roller arm and corner rail of figure 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to figures 1 and 2 the elevator well may be constructed from sheet metal panels 1 of preferably 1.5 mm thickness which bolt between vertical corner rails 2. A rectangular structure is thus built up according to the number of panels used which extends from the ground to the top story of a building (not shown). The well structure comprises side walls 3, a back wall 4 and an open front 5 for entrance through doors to a passenger cage (not shown). Although for simplicity of illustration only two sets of vertically stacked panels are shown the well in practice

-3-

would be built to any required height by extending the length of the corner rails and fitting additional panels.

In accordance with this invention a novel fastening system is proposed for assembling the panels and corner rails. The abutting edge flanges 6, 7 of the panels and rails are formed with keyhole shaped apertures 8 which align when the components are assembled as shown figure 2 and 5. Carriage bolts or the like 8A with nuts threaded thereon are initially fitted inserted through the enlarged upper portions of the keyhole apertures and then moved down into and tightened across the narrow portions to hold the panels and rails together. This method has been found to greatly speed up the on-site assembly of the well. In order to improve access for fitting the bolts ports 9 may be provided adjacent the top of each panel as shown. This enables direct access to the keyhole apertures from the outside of the structure.

As will also be noted from figures 1 and 2 the corner rails 2 comprise a novel cross-section which in addition to the aforementioned flanges 7 includes inner facing slots 10 which open into vertical channels 11.

Turning now to figures 3 to 5 the floor or base 12 of the elevator cage is constructed with roller arms 13 extending diagonally out at or near each corner. These arms as shown in figures 4 and 5 extend into the aforementioned slots 10

-4-

of the corner rails so that the rollers 14 run in the vertical channels 11. Although not shown in the drawings a correspondingly placed set of four corner roller arms would also be fitted on or adjacent the top of the elevator cage. This arrangement has been found to provide an efficient stable track for the cage which is cheaper to construct than prior art elevators requiring centrally disposed rollers guides along each side. With the embodiment shown the cage is operated by hydraulic rams located to each side 15. These react against the base or support structure 15A of the elevator well so that no significant load is carried by the wall panels 1 or corner rails 2.

It will thus be appreciated that this invention at least in the form of the embodiment described provides an improved form of elevator particularly suited to low cost residential and commercial construction. The novel substantially non load-bearing construction of the well and the provision of corner rollers for tracking the cage enables a low cost installation that can be assembled on site from light weight modular components. This substantially reduces costs with new construction and also allows such elevators to be added to existing buildings without expensive structural modifications. Clearly however the example disclosed is only the currently preferred form of the invention and a wide variety of modifications may be made which would be apparent to a person skilled in the art. For example the shape and configuration of the elevator well, the construction materials used and the design of the hydraulic

-5-

lifting mechanism may be changed. In particular the non load-bearing cage and wall components of the well may be constructed from light weight materials other than sheet metal such as plastics, fibreglass or the like.

The claims defining the invention are as follows:

1. An elevator for conveying passengers or goods between floors of a structure, said elevator including a well and a cage movable vertically therein on roller means engaging in corner rails of said well, lifting means for said cage acting from the base of said well whereby a weight of said cage is carried at said base and the corner rails and walls of said well being constructed substantially from non weight-bearing components.
2. The elevator as claimed in claim 1 wherein said well in horizontal cross-section is rectangular and said walls are formed by sheet panels fitted between said corner rails.
3. The elevator as claimed in claim 2 wherein said vertical rails include inner facing slots which open into vertical channels and said roller means run in said vertical channels.
4. The elevator as claimed in claim 3 wherein said cage has a rectangular floor and at least some of said roller means are mounted on roller arms which extend out from at or adjacent corners thereof.
5. The elevator as claimed in claim 4 wherein abutting edge flanges of said sheet panels and vertical rails are formed with keyhole shaped apertures which align during assembly of the well whereby bolts or other fastening means can be

-7-

initially fitted through enlarged portions of said apertures and then moved into and tightened across narrow portions of said apertures.

6. The elevator as claimed in claim 5 wherein ports are formed in said panels to facilitate access to said apertures from the inside of said well.

7. The elevator as claimed in claim 6 wherein said well is constructed from light weight modular components.

8. The elevator as claimed in claim 7 wherein said lifting means includes a pair of hydraulic rams acting one on each side of said cage.

9. The elevator as claimed in claim 8 wherein said roller arms extend out one from adjacent each of said corners and additional roller arms with roller means extend out from at or adjacent upper corners of said cage above said floor.

10. The elevator as claimed in claim 9 wherein said panels and vertical rails are formed from sheet metal.

1/4

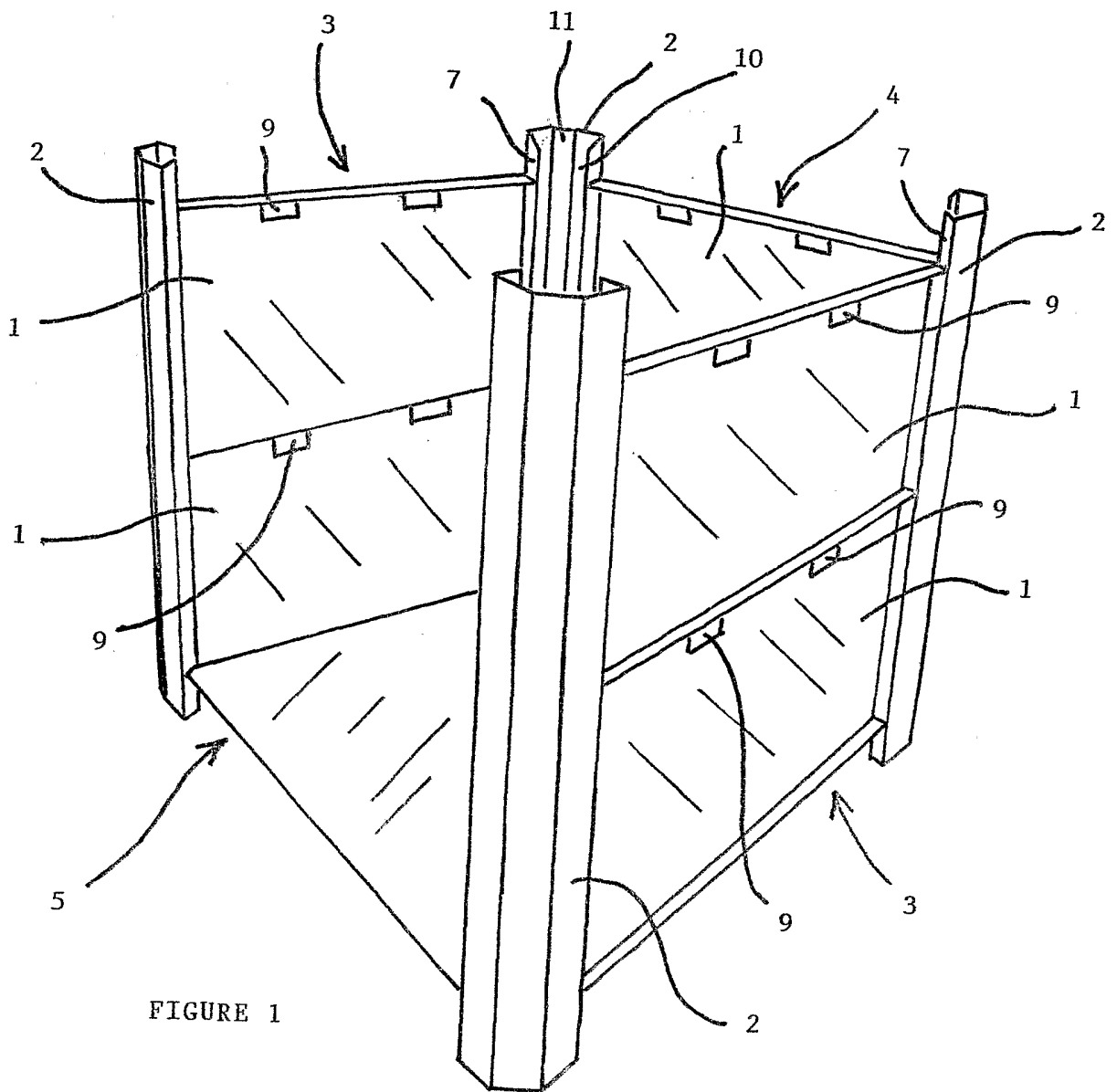


FIGURE 1

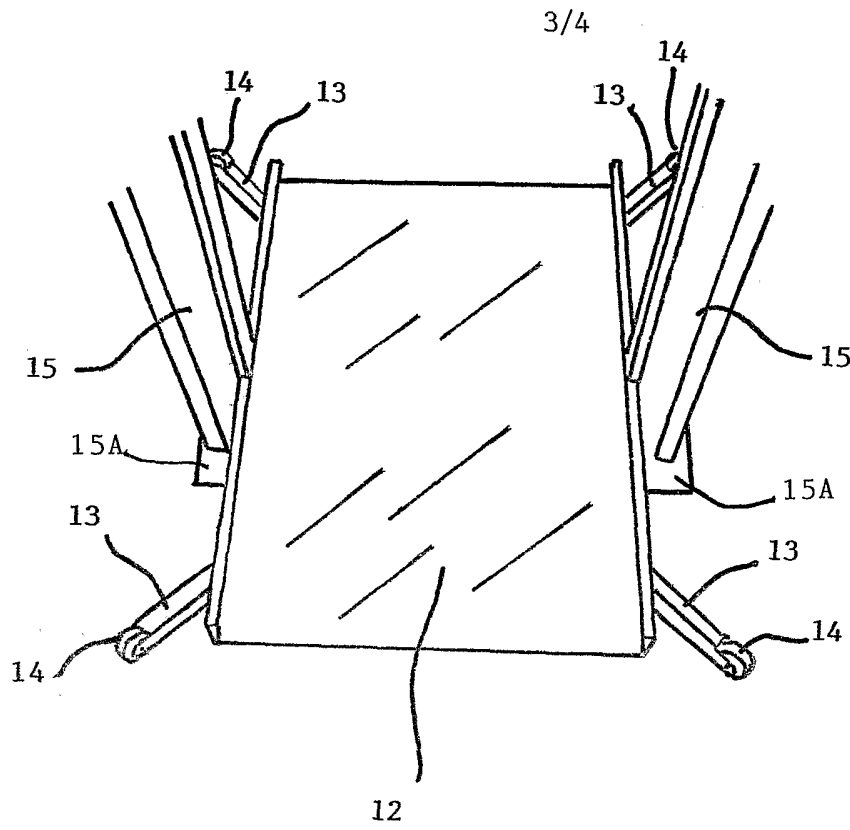


FIGURE 3

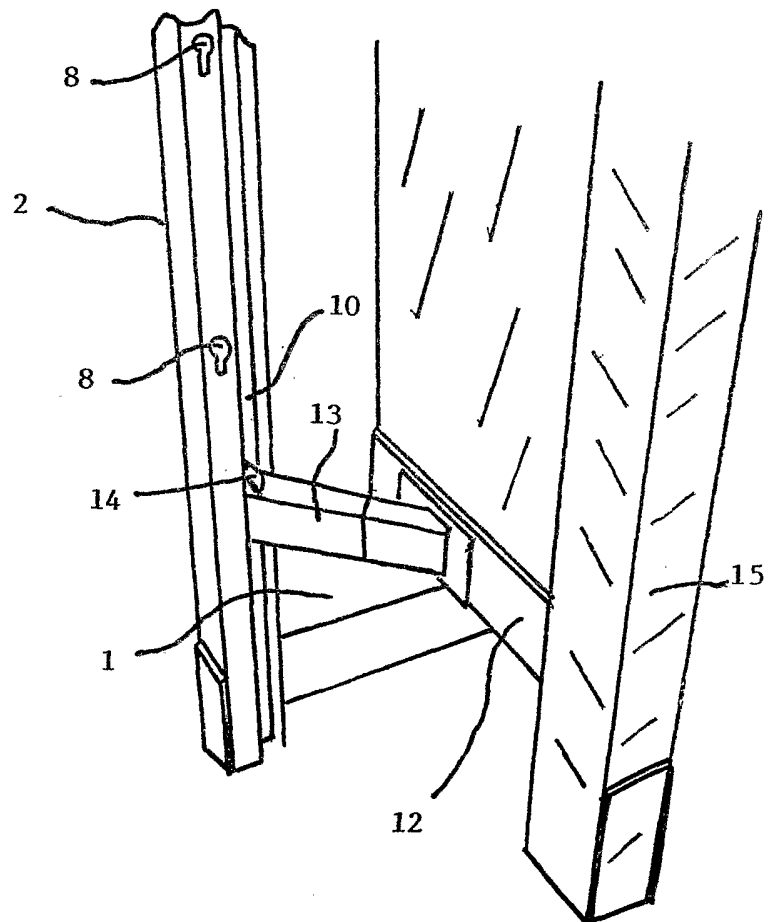


FIGURE 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU01/00693

A. CLASSIFICATION OF SUBJECT MATTER																	
Int. Cl. ⁷ : B66B 7/02, 9/02, 9/04, 11/02																	
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) IPC B66B 7/02, 9/02, 9/04, 11/02																	
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above																	
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT																	
C. DOCUMENTS CONSIDERED TO BE RELEVANT																	
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.															
A	US 5975249 A (TOMASETTI) 2 November 1999 Abstract	1															
A	Derwent Abstract Accession No. 99-004954/01, Class Q38 JP 10279227 A (HITACHI LTD) 20 October 1998 Abstract	1															
A	Derwent Abstract Accession No. 97-420421, Class Q38 JP 09188489 A (HITACHI LTD) 22 July 1997 Abstract	1															
<input type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex																	
<p>* Special categories of cited documents:</p> <table style="width:100%; border:none;"> <tr> <td style="width:30%;">"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td style="width:30%;">"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</td> <td style="width:40%;"></td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"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</td> <td></td> </tr> <tr> <td>"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)</td> <td>"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</td> <td></td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> <td></td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"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		"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family		"P" document published prior to the international filing date but later than the priority date claimed		
"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																
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family																
"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 16 July 2001		Date of mailing of the international search report <i>19 July 2001</i>															
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929		Authorized officer JASON PREMNATH Telephone No : (02) 6283 2127															

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU01/00693

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					
US	5975249	AU	59795/98	BR	9808197	EP	964827
		HU	200000813	NO	994284	PL	335460
		SK	1077/99	WO	9839242	ZA	9801774
END OF ANNEX							