



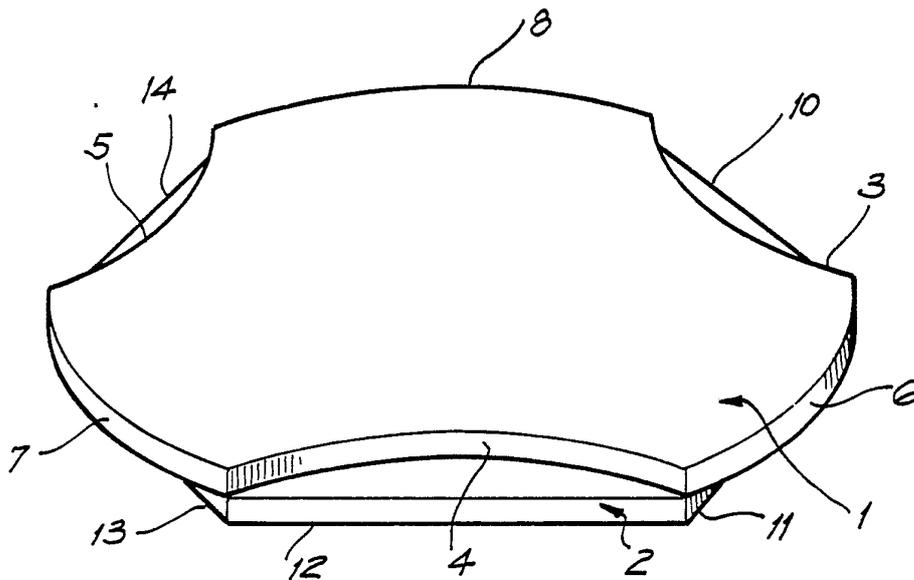
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: INTERLOCKABLE SURFACE COVERING ELEMENT



(57) Abstract

An interlockable surface covering element comprises a first planar portion (1) and a second planar portion (2) arranged to provide a series of interlockable protrusions and undercuts which may be used to connect together a number of elements into an interlocked array. One planar portion has a circular envelope and is divided into six sectors, each alternate sector (3, 4, 5) being a re-entrant of the same radius. The second planar portion is a hexagon. The elements are generally made of wood and can be interconnected in the manner of parquet to provide an interlocked surface covering.

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"INTERLOCKABLE SURFACE COVERING ELEMENT"FIELD OF THE INVENTION

5           The invention provides an interlockable surface covering element of generally circular shape which can be fitted and interlocked with other such elements to provide a complete surface covering having no gaps. In particular, the element is preferably formed from rounds  
10 of wood which may be fitted together in the manner of parquet.

PRIOR ART

15           Parquetry and other surface covering materials have been used as floor and wall coverings in many forms and sizes. To avoid the wood raising and buckling, parquet is commonly interlocked by means of a tongue and groove construction. Other surface covering elements such as  
20 tiles are generally cemented in place. The elements have been provided in a variety of shapes, such as squares, rectangles, hexagons, diamonds etc., the shape being dictated by the need to cover the surface completely without leaving any gaps. Circular elements cannot be  
25 used alone since when abutted they leave generally triangular shaped gaps.

AIM OF THE INVENTION

30           It is the aim of the present invention to provide an interlockable surface covering element of generally circular shape but which can be fitted and interlocked with other such elements to provide a surface covering without gaps.

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SUMMARY OF THE INVENTION

The invention provides an interlockable surface covering element for interlocking with other such elements to completely cover the surface, which comprises:

5 a first planar portion on one side of the element and extending partway through the thickness of the element; and

a second planar portion on the other side of the element and extending partway through the thickness of the element;

10 each planar portion having a shape of threefold rotational symmetry about a central axis perpendicular thereto, the shape being capable of fitting together with other such shapes without leaving any gaps; and

15 the first and second planar portions being in such relationship to each other as to provide interlockable protrusions and undercuts, whereby the element can be interlocked into an array with othe such elements.

20 Thus, the elements have protrusions and undercuts so that they may be interlocked together (in the manner of a tongue and groove interlock) so as to prevent lifting or buckling of the elements of the array.

Generally, one or both planar portions are generally circular and have an outer periphery whose envelope has a radius  $r$ , the periphery being divided into 6 sectors each of  $60^\circ$  and each alternate sector being re-entrant and also having a radius  $r$ . Thus, when elements are fitted together, the non-re-entrants of one element are accepted by the re-entrants of another element to create a complete covering without any gaps.

30 By providing both planar portions in this shape but disposed  $60^\circ$  out of phase to one another, a series of interlockable protrusions and undercuts are provided.

In another embodiment, the second planar portion may be a hexagon whose sides coincide with the sectors of the first planar portion.

35 Although the thicknesses of the two portions may

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differ, it is generally convenient that each portion extend halfway through the thickness of the element.

The array of elements can be used to provide a non-buckling wall or floor covering. In fact, it is not  
5 necessary to attach the array to a surface in order to maintain its integrity, since the interlocking of the elements provides an array which is self supporting.

The element may be moulded from a ceramic or plastics material. The element may also be made from marble,  
10 stone, slate or brick. However, the construction is most appropriate for use with wood which may buckle as it expands and contracts under the effects of heat and moisture. The wood may be used with its grain running along the plane of the element. However, a particularly  
15 pleasing appearance is obtained by using rounds cut across a wooden log so as to exhibit the tree ring structure. Used in this way, there is need to remove only a minimal amount of wood from the circular round thereby minimising wastage.

20 The interlocking nature of the elements also minimises the need for sanding the array to provide a smooth surface.

#### DESCRIPTION OF PREFERRED EMBODIMENTS

25

Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings wherein

Figure 1 is a plan view of an element which is  
30 generally circular on one side and hexagonal on the other side,

Figure 2 is an elevation in the direction shown,

Figure 3 is a further elevation in the direction shown,

35 Figure 4 is a further elevation in the direction shown,

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Figure 5 is a section along line A-A.

Figure 6 is a section along line B-B.

Figure 7 is a perspective view of the element.

Figure 8 is a perspective view of an element which is  
5 generally circular on both sides, and

Figure 9 shows how the elements may be fitted  
together.

Figures 1 to 7 show an element which is generally  
circular on one side (having a series of lobes and  
10 re-entrants) and is hexagonal on the other side. The  
element comprises a first planar surface portion 1 and a  
second planar portion 2. The first planar portion is  
generally circular having an envelope of radius  $r$  and  
being divided into six sectors each of included angle  
15  $60^\circ$ . The periphery of each alternate sector is a  
re-entrant 3, 4, 5 also of radius  $r$ ; the other sectors  
being in the form of lobes 6, 7, 8. The first planar  
portion 1 extends halfway through the thickness of the  
element.

20 The second planar portion 2 (which is underneath as  
viewed according to Figure 1) is a hexagon concentric with  
the first planar portion and whose maximum diameter is  
 $2r$ . The hexagon has six sides 10 to 15 which coincide  
with the six sectors of the first planar portion.

25 Where a re-entrant 3, 4, 5 coincides with hexagon  
sides 10, 12, 14 an undercut is created. Where lobes 6,  
7, 8 overlies hexagon sides 11, 13, 15 a protrusion is  
created. Since the configuration of the protrusions and  
undercuts is complementary, the elements may be fitted  
30 together.

Figure 8 shows a further embodiment which has a  
circular envelope of lobes and re-entrants on both sides,  
the re-entrants 20, 21, 22 of the first planar portion 1  
overlying the lobes 23, 24, 25 of the second planar  
35 portion 2. Thus, it differs from the first embodiment  
only in that the second planar portion is generally  
circular rather than hexagonal.

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Figure 9 shows how the generally circular first planar portions of seven elements 30 to 36 according to the first embodiment may be fitted together to provide a surface free of gaps. For example lobe 41 fits neatly into re-entrant 40. On the underside, the hexagonal second planar portions fit neatly together in a hexagonal array. Element 36 is a typical element formed from a round of wood. It is locked in position by the surrounding elements 30 to 35 by means of the interlocking protrusions and undercuts.

Thus, elements can be interlocked to provide either the circular pattern shown in Figure 9 or the reverse hexagonal array, thereby providing a choice of surface patterns.

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CLAIMS:

1. An interlockable surface covering element for interlocking with other such elements to completely cover  
5 the surface, which comprises

a first planar portion on one side of the element and extending partway through the thickness of the element, and  
a second planar portion on the other side of the element and extending partway through the thickness of the  
10 element;

each planar portion having a shape of threefold rotational symmetry about a central axis perpendicular thereto, the shape being capable of fitting together with other such shapes without leaving any gaps; and

15 the first and second planar portions being in such relationship to each other as to provide interlockable protrusions and undercuts, whereby the element can be interlocked into an array with other such elements.

20

2. An element according to claim 1 wherein the first planar portion has an outer periphery whose envelope is circular of radius  $r$ ,

25 the periphery being divided into six sectors each of  $60^\circ$ ,

each alternate sector being re-entrant and also of radius  $r$ ;

30 so as to form a shape which may be fitted with other such shapes without leaving any gaps.

3. An element according to claim 2 wherein  
35 the second planar portion has the same shape as the first planar portion;

the first and second planar portions being concentric

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and at an angle of 60° to each other, whereby the re-entrants of one portion underlie the non-reentrants of the other portion.

5

4. An element according to claim 2 wherein the second planar portion is a hexagon which is concentric with the first planar portion and has a maximum diameter  $2r$ , the six sides of the hexagon underlying the six sectors of the first planar portion.

15

5. An element according to claim 1 wherein each planar portion extends halfway through the thickness.

20

6. An element according to claim 1 which is a wooden floor-covering or wall-covering element.

25

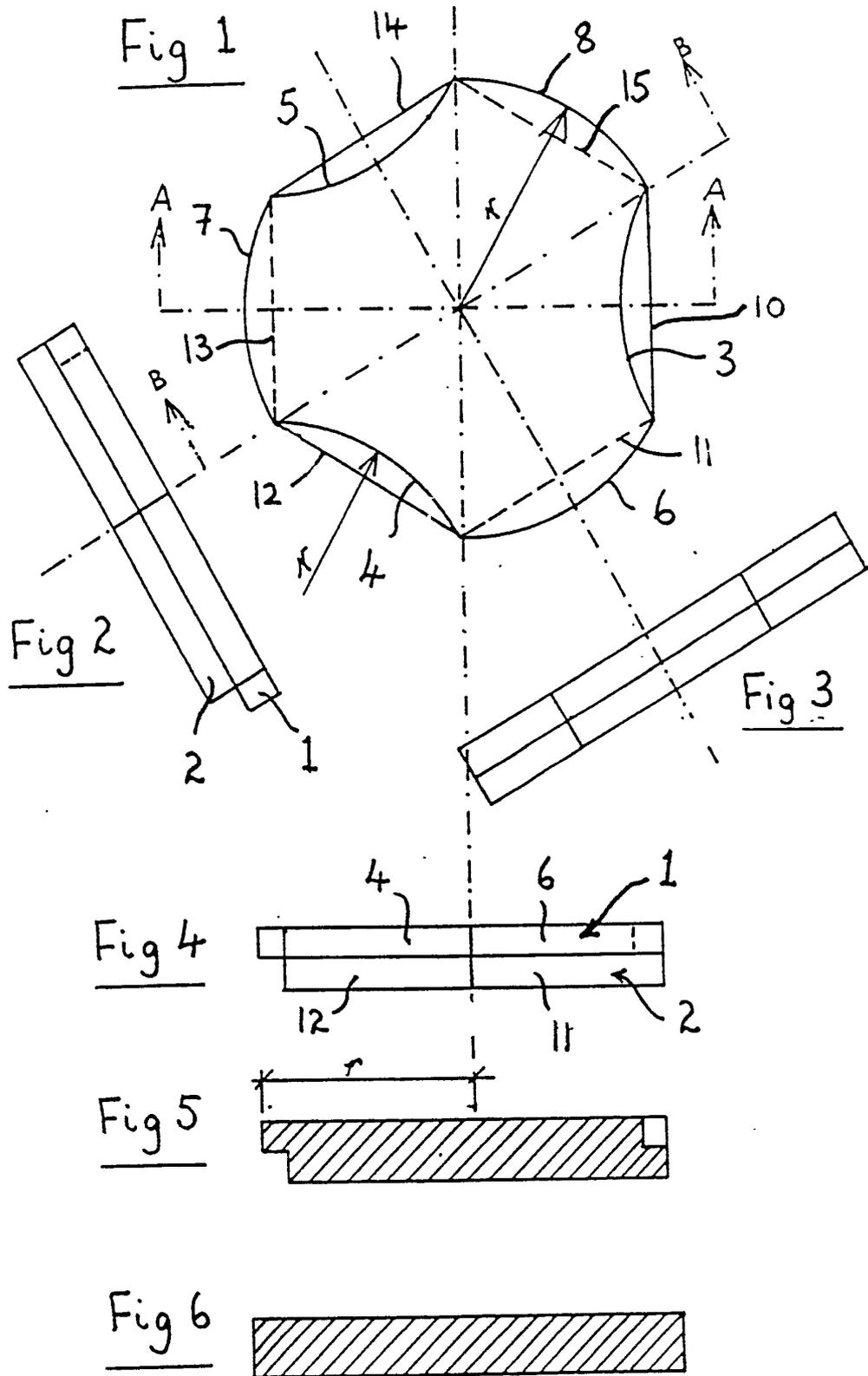
7. An element according to any claim 5 formed from a round cut across a wooden log.

30

8. An element according to claim 1 which has been moulded from a ceramic or plastics material; or is formed of marble, stone, slate or brick.

35

9. An array of interlocked surface covering elements according to claim 1.



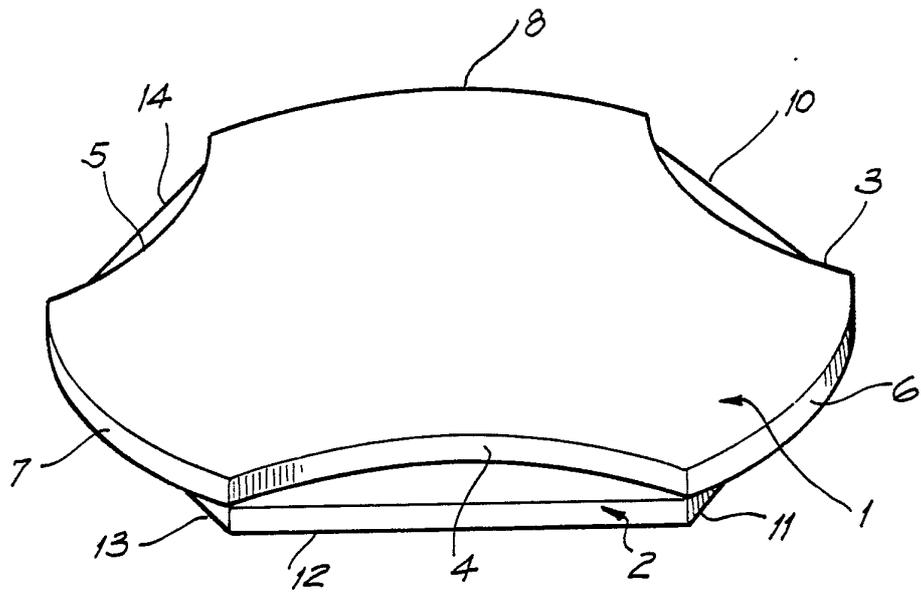


FIG. 7

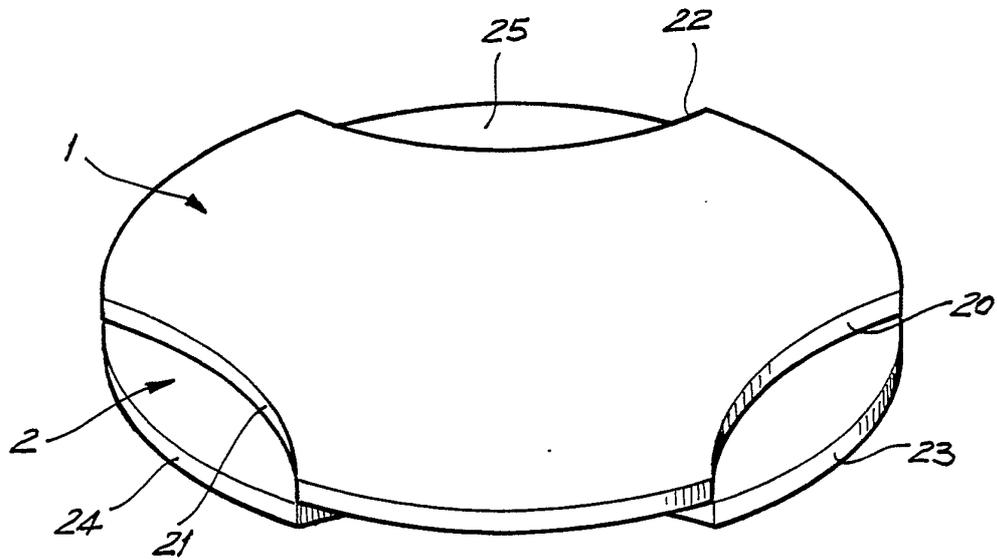


FIG. 8



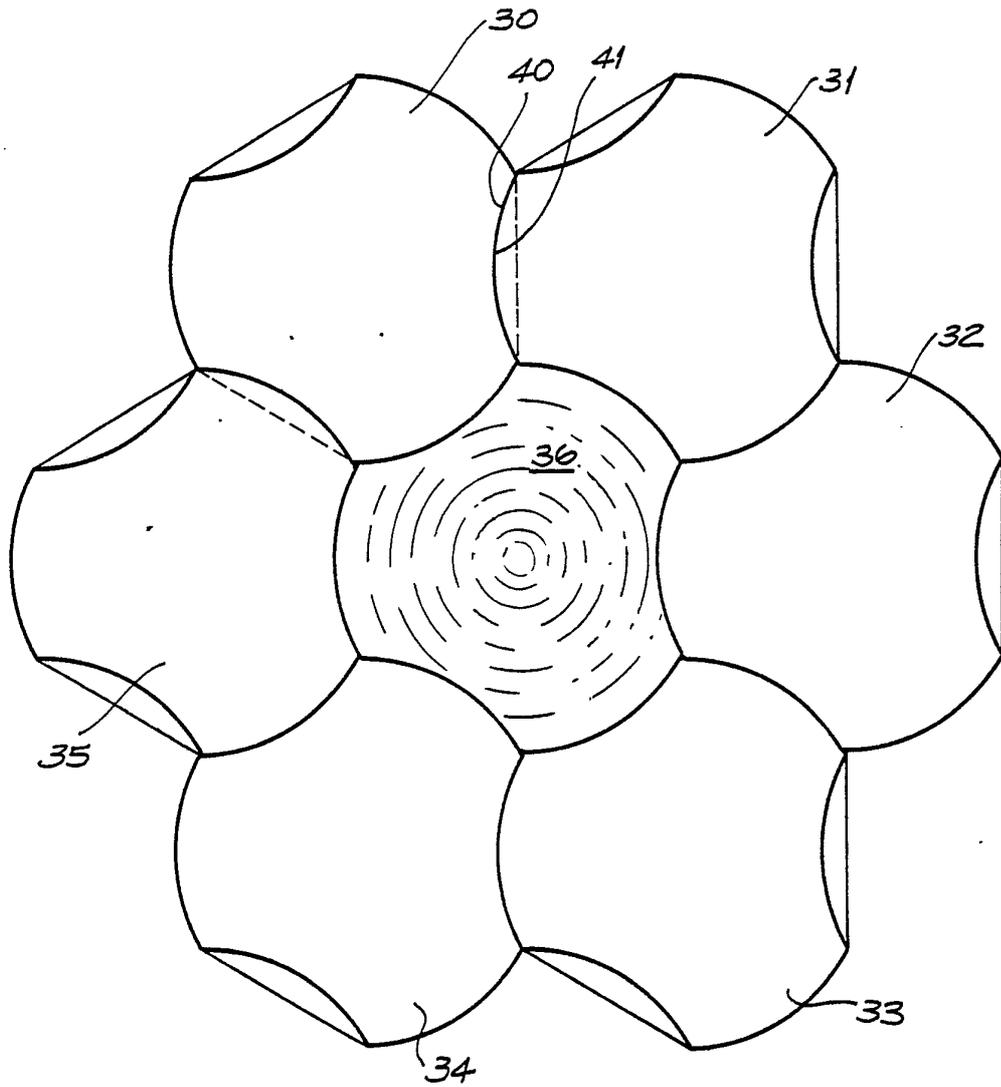


FIG. 9



# INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 86/00355

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. <sup>4</sup> E04F 15/02, 15/022		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
IPC	E04F 15/02, 15/022, 15/04	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
AU; IPC as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	GB,A, 222,746 (RUTHERFORD) 9 October 1924 (09.10.24)	(1-9)
Y	FR,A, 2,165,315 (MOGICA) 20 November 1971 (20.11.71)	(1-3,5-9)
Y	FR,A, 1,589,345 (REIMBURT) 30 April 1970 (30.04.70)	(1,5-9)
Y	DE,A, 1,814,533 (STEINHAUER et al) 25 June 1970 (25.06.70)	(1,5-9)
A	US,A, 1,437,304 (HEALY) 28 November 1922 (28.11.22)	
<p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
24 February 1987 (24.02.87)	12.3.1987 (12-MARCH 1987)	
International Searching Authority	Signature of Authorized Officer	
Australian Patent Office	 T.J. SAUNDERS	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 86/00355

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.

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Patent Document  
Cited in Search  
Report

Patent Family Members

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FR 2165315

BE 792979  
NL 7217424

DE 2261675

GB 1403590

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END OF ANNEX