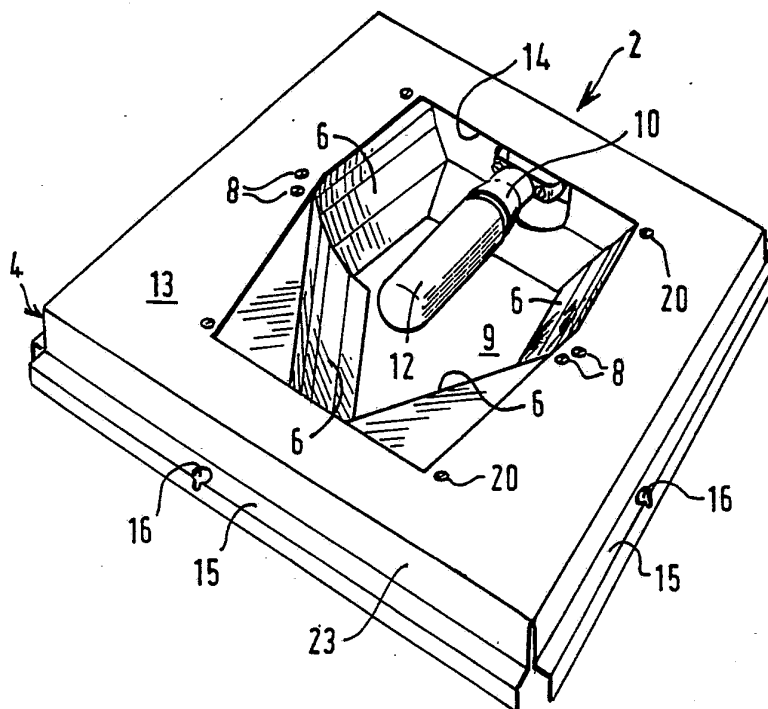




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : F21V 17/02	A1	(11) International Publication Number: WO 93/06414 (43) International Publication Date: 1 April 1993 (01.04.93)
(21) International Application Number: PCT/GB92/01720 (22) International Filing Date: 18 September 1992 (18.09.92) (30) Priority data: 9120129.3 20 September 1991 (20.09.91) GB (71) Applicant (for all designated States except US): D.W. WINDSOR LIMITED [GB/GB]; Marsh Lane, Ware, Hertfordshire SG12 9QL (GB). (72) Inventor; and (75) Inventor/Applicant (for US only) : RICHARDS, Malcolm, John [GB/GB]; "Ashendon", Chalkshire Road, Butlers Cross, Aylesbury, Buckinghamshire HP17 0TJ (GB). (74) Agent: GALLAFENT & CO.; 8 Staple Inn, London WC1V 7QH (GB).		(81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: LUMINAIRES**(57) Abstract**

A luminaire (2) has at least four reflectors (6) which may be individually pivoted about an axis provided by a screw (8) so that the distribution of light emitted by a lamp (12) located within the envelope of the reflectors may be altered and fixed to suit the environment that the luminaire is to illuminate.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FI	Finland	MN	Mongolia
AU	Australia	FR	France	MR	Mauritania
BB	Barbados	GA	Gabon	MW	Malawi
BE	Belgium	GB	United Kingdom	NL	Netherlands
BF	Burkina Faso	GN	Guinea	NO	Norway
BG	Bulgaria	GR	Greece	NZ	New Zealand
BJ	Benin	HU	Hungary	PL	Poland
BR	Brazil	IE	Ireland	PT	Portugal
CA	Canada	IT	Italy	RO	Romania
CF	Central African Republic	JP	Japan	RU	Russian Federation
CG	Congo	KP	Democratic People's Republic of Korea	SD	Sudan
CH	Switzerland	KR	Republic of Korea	SE	Sweden
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovak Republic
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CS	Czechoslovakia	LU	Luxembourg	SU	Soviet Union
CZ	Czech Republic	MC	Monaco	TD	Chad
DE	Germany	MG	Madagascar	TG	Togo
DK	Denmark	ML	Mali	UA	Ukraine
ES	Spain			US	United States of America

- 1 -

LUMINAIRES

This invention relates to luminaires, specifically to those for use in lighting situations in which it is not
5 desired to achieve equal lighting at all positions illuminated by the luminaire. By the term 'luminaire' is meant an apparatus which distributes, filters and/or transforms light from one or more lamps mounted in the apparatus.

10

It is known that in some lighting situations it is desired not to light uniformly the complete surroundings to a luminaire, but to direct the light in particular
15 directions, for example the luminaire for a street light specifically directs in a downwards direction most of the light emitted by the lamp. The distribution of the light is fixed by the luminaire.

20

In some situations the fixed light distribution does not prove to be a problem. There are, however, lighting situations, such as in a subway, where a luminaire of fixed light distribution may result in either a large wastage of light to ensure that all the area is adequately illuminated, which in a subway results in a

- 2 -

higher than necessary degree of illumination of the walls and certain parts of the floor surface, or it may result in inadequate lighting of the entire area but not wastage of light.

5

Theoretically it would be possible individually to manufacture each luminaire so as to give the light distribution best suited to the proposed position in which the luminaire is to be mounted. This option, however, is not feasible economically.

10

It is known to manufacture luminaires with two reflectors of which each can swivel relative to a fixed lamp, to vary the distribution of illumination. It is also known to vary the distribution of illumination by moving the light source relative to the reflectors.

15

Neither of these options gives a very satisfactory range of light distribution.

20

According to the present invention there is provided a luminaire comprising a frame, four or more reflectors mounted on the frame to circumscribe a light source and to reflect light emitted therefrom, wherein the reflectors are pivotally mounted on the frame and associated with means for fixing their position with respect to the frame.

25

The luminaire may be adapted to be located about a fixed lamp, or it may itself include a socket for a lamp. The socket (and thus the lamp) may be fixed or it may be movable in the frame relative to the reflectors to vary the pattern and distribution of illumination.

30

- 3 -

The present invention will be further described and explained by way of example with reference to the accompanying drawings, in which:

5 Figure 1 shows a perspective view of a luminaire according to the present invention in a preferred embodiment;

10 Figure 2 shows a side elevation of a lantern fitted with a luminaire of the present invention;

15 Figure 3 is a side elevation of the luminaire of Figure 1 in a position in which it throws light down, and

Figure 4 is a scrap perspective view of one reflector in position.

20 Referring to the drawings, a luminaire 2 comprises a frame 4 on to which are pivotally attached four reflectors 6, each being attached by, and pivoting about the main axis of, a pivot screw 8, being locked in position by a lock screw 20. Also attached to frame 4 is a lamp holder 10, in which is a lamp 12. Although screws
25 are described, other forms of pivots and clamps could be used. Figure 1 is a perspective view of what would be the underside of the luminaire when mounted, as is usual, to direct downwards the light from lamp 12.

30 Frame 4 is in the form of a metal box, with a hexagonal aperture 14 in the base 13 of the box. The walls 23 of the box 4 are formed with flanges 15 in which are holes 16 by means of which screws or the like may be used to mount the luminaire in a lantern 21 (Figure 2) able to be

- 4 -

mounted at an appropriate height above the path or other surface to be lit at night.

5 Frame 4 may, in other embodiments, be of any substantially hollow form determined by the final desired shape of the luminaire.

10 Secured to, or integral with, the frame 4 is a U-shaped bracket 22 to which the lampholder 10 may be secured and of which an inside surface 9, opposite the aperture 14, is of a reflective white material or paint.

15 Each reflector 6 extends from near the rear reflective surface 9 to base 13, and is attached by at least the pivot screw 8 at one end of the reflector to the base adjacent to an edge of aperture 14.

20 The reflectors 6 and screws 8 are arranged so that on each side of the median axis of aperture 14 there are two reflectors 6 fixed with their screws 8 adjacent to each other and the reflectors extending away from each other.

25 As shown in Figure 4, each reflector 6 has a substantially-triangular base 17 having the individual reflective facets 18 formed by folding the material of the reflector, such as polished aluminium sheet, about parallel fold lines 19.

30 When its respective pivot screw 8 is not tight, each reflector 6 is able to be pivoted about the main axis of the screw, the axis being substantially perpendicular to the base 13, with the base 17 of each reflector in sliding contact with the base 13. Each reflector 6 is of sufficient length for its base at all angular positions

- 5 -

to overlap the edges of aperture 14. Each reflector 6 is of sufficient width, in the plane perpendicular to base 13, for its depth to be substantially the same as that between the base 13 and surface 9. In the preferred
5 embodiment, each reflector comprises four substantially-rectangular plane facets angled to each other about a fold line, the major axis of each facet running substantially parallel to base 13. Preferably reflectors 6 are specular reflectors.

10

The lamp holder 10 is located between two free ends of the two adjacent reflectors 6.

In use, when the pivot screws 8 are loosely done up, the
15 reflectors 6 may easily be pivoted to alter the light distribution from the luminaire 2. When the desired light distribution 2 has been achieved, either by trial and error or by way of predetermined settings, the pivot screws 8 are tightened and holes for lock screws 20
20 drilled and tapped, and the lock screws 20 inserted and tightened so that each reflector is held in position by two screws.

The lock and pivot screws hold each reflector in position
25 during storage, transit and installation. If the reflector as so held is distributing light where needed, then lock screw 20 is kept in place, but otherwise it is removed to permit adjustment of each reflector by pivotal movement of the reflector about its pivot screw 8.

30

It may be seen that the ability to alter the position of the reflectors 6 enables a wide range of light distribution patterns to be achieved.

- 6 -

The range of light distribution patterns achieved may be further widened by the use of different configurations for the reflector surfaces. All the reflectors in one luminaire may have identically-configured surfaces, but
5 it is within the present invention for the reflectors to have different surface configurations and/or reflectivities.

A further widening of the range of light distribution
10 patterns may also be achieved by allowing the position of the lamp holder, and hence the position of the lamp to be adjustable relative to the bracket 22 and to the frame 4.

The provision of more than four reflectors in one
15 luminaire is also possible, to give a greater versatility to the range of light distribution patterns possible.

The frame 4 as shown in square in plan, and is able to be secured to a four-sided lantern 21 by means of screws
20 (not shown) extending through the apertures 16 into tapped holes in the lantern body. The lantern body 21 comprises a metal or other framework 26 which has a base from which extends an electric cable 28 for the lamp circuitry. While each face of the lantern may have an
25 individual pane of glass 30, it is preferred to insert into the framework a four-sided body of clear plastics material. The cap 24 is preferably pivotally mounted in body 21, so as to give ready access to the lampholder and reflectors.

30

- 7 -

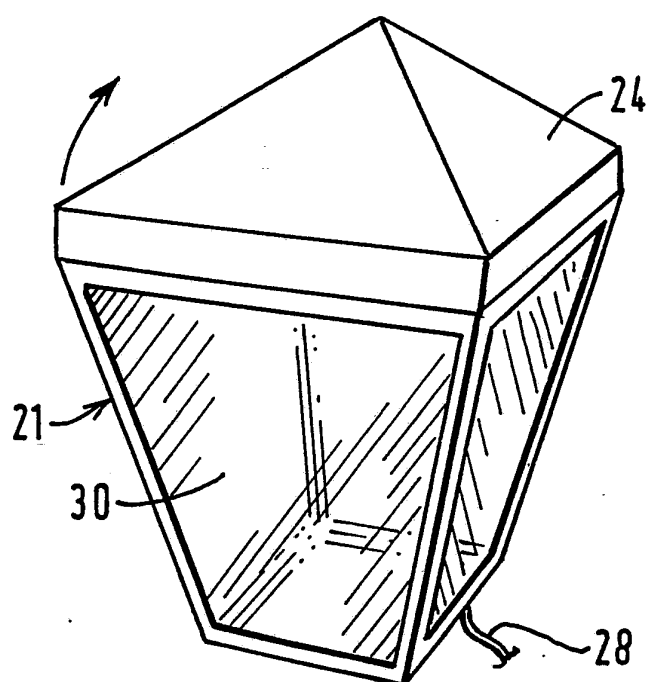
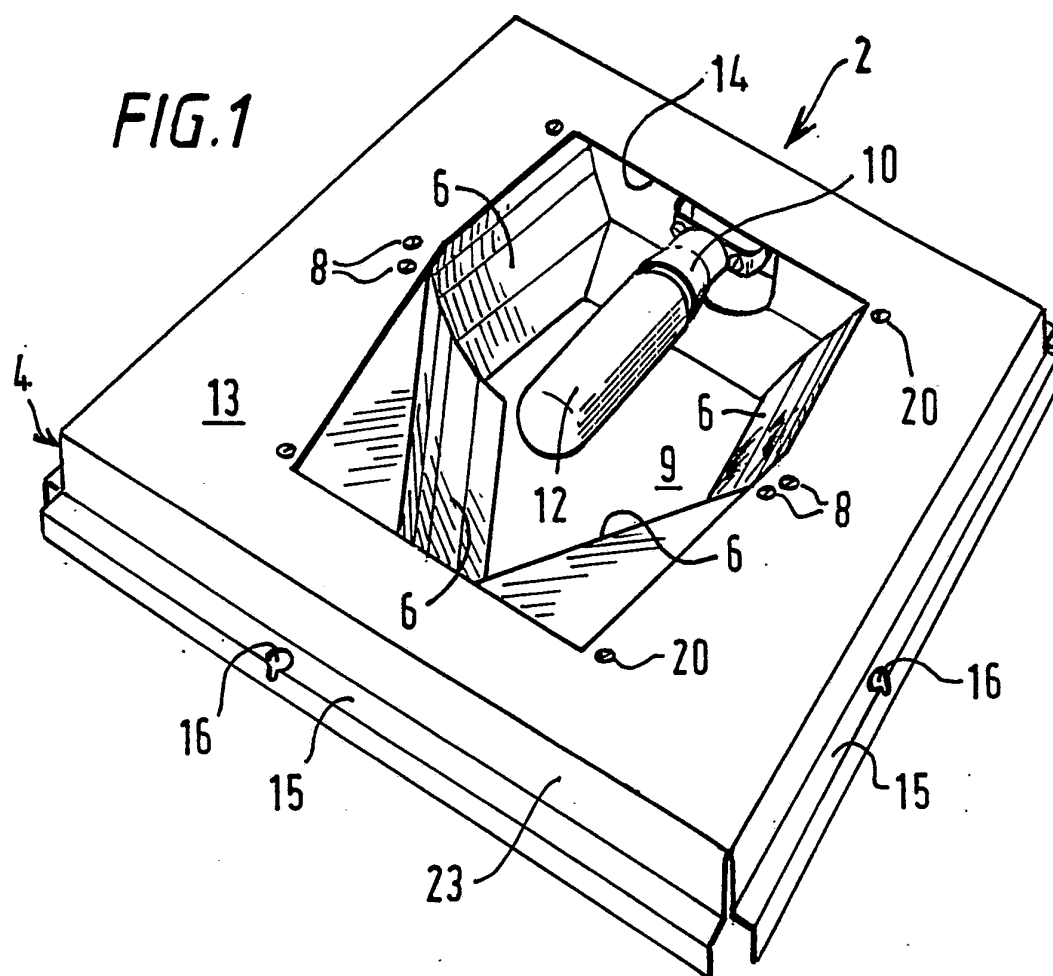
CLAIMS

1. A luminaire comprising a frame, four or more reflectors mounted around an aperture in the frame to circumscribe a lamp position and to reflect light emitted therefrom, wherein the reflectors are pivotally mounted on the frame and are associated with means for fixing their position with respect to the frame.
2. A luminaire according to claim 1, including a lamp holder arranged to locate a lamp substantially centrally to four reflectors arranged in a diamond shape around the lamp position.
3. A luminaire as claimed in Claim 1 or 2, in which each reflector has a substantially-triangular base in slidable contact with one surface of an apertured base member of the frame, and in which the adjacent ends of a pair of reflectors on each side of a median axis of the aperture are engaged by one of a pair of contiguous pivot members.
4. A luminaire as claimed in Claim 3, in which at least one of the reflectors is adapted to be engaged by a lock member for preventing it from pivoting about its pivot member.
5. A luminaire as claimed in any preceding Claim, in which the aperture in the base member is overarched by a bracket having its ends fast with the frame and carrying a lampholder.
6. A luminaire as claimed in any preceding Claim, in

- 8 -

which each reflector is of polished metal having two or more facets in the shape of a parallelogram.

1/2



2/2

FIG.3

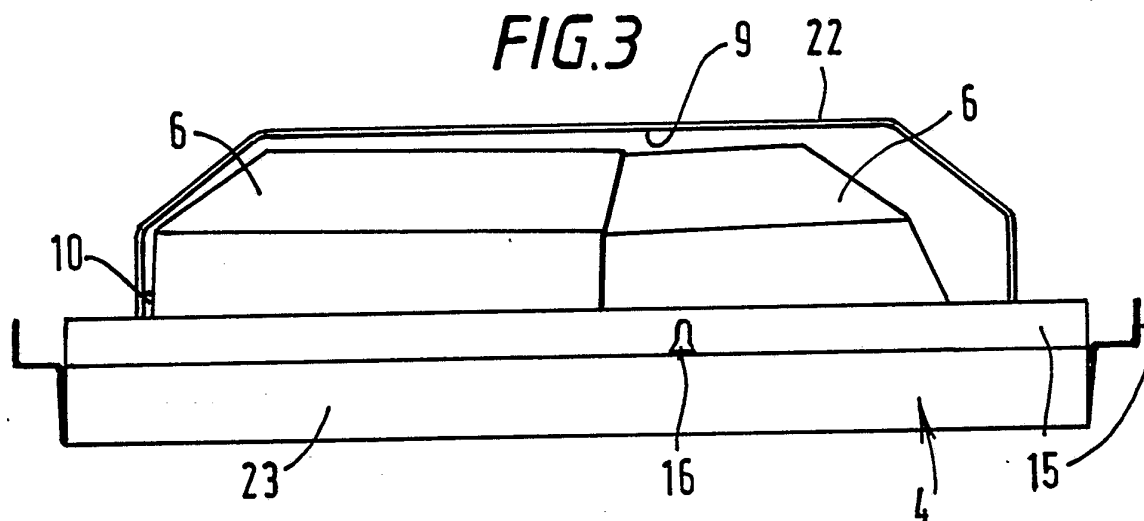
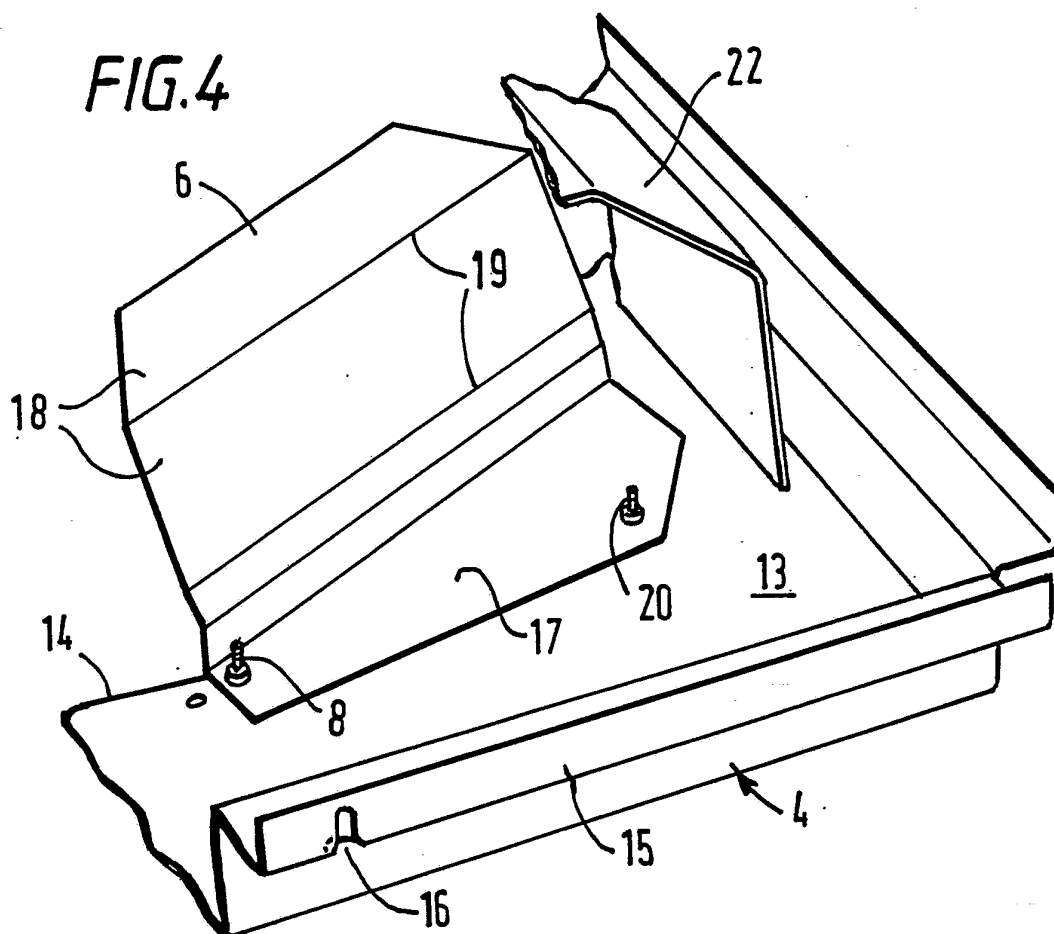


FIG.4



INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 92/01720

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.C1. 5 F21V17/02		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.C1. 5	F21V ; F21S	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	DE,A,1 904 982 (SIEMENS AG) 20 August 1970 see claims 1,8; figures 1-3,14 ---	1,2
X	BE,A,348 944 (JOHNSON & TURNER LIMITED) 31 March 1928 see page 4, line 9 - line 26; figures 1-5 ---	1
A	CH,A,370 039 (TRANSELECTRIC RUBELI, SCHENKER & CIE) 15 August 1963 see page 1, line 5 - line 33 see page 1, line 64 - line 70; figures 1,2 -----	1
<p>¹⁰ 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>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
13 JANUARY 1993	20.01.93	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	MARTIN C.P.A.	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

GB 9201720
SA 64668

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 13/01/93

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-1904982	20-08-70	AT-A- 301686 CH-A- 502551 SE-C- 350325	15-08-72 31-01-71 22-11-79
BE-A-348944		None	
CH-A-370039		None	