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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
3 November 2005 (03.11.2005)

PCT

(10) International Publication Number
WO 2005/103387 A1

(51) International Patent Classification[7]: E01F 9/06

(21) International Application Number:
PCT/GB2004/003726

(22) International Filing Date:
2 September 2004 (02.09.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0409198.9 26 April 2004 (26.04.2004) GB

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, 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, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

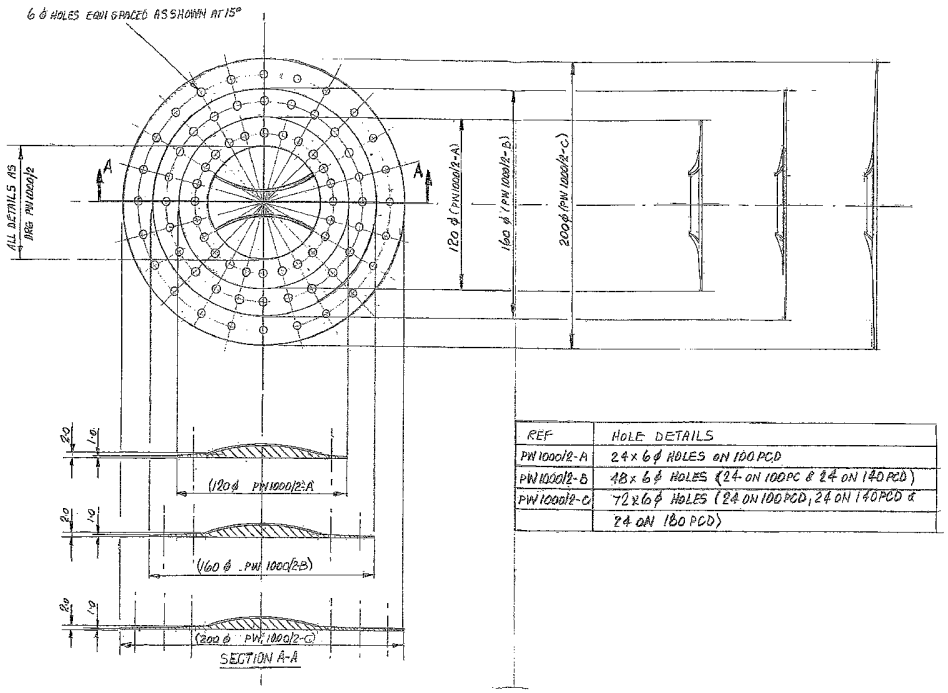
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv)) for US only*

Published:
— *with international search report*

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.

(54) Title: LOW COST LIGHT REFLECTOR



REF	HOLE DETAILS
PW1000/2-A	24 x 6ø HOLES ON 100 PCD
PW1000/2-B	48 x 6ø HOLES (24 ON 100PC & 24 ON 140 PCD)
PW1000/2-C	72 x 6ø HOLES (24 ON 100 PCD, 24 ON 140 PCD & 24 ON 180 PCD)

(57) Abstract: The objective of the design is to make the product more robust than temporary road studs, and robust enough to use on Snow prone American and Canadian roads. In the event that the road stud unit is pulled from the road, it should be inexpensive to allow for immediate replacement and providing substantially more comprehensive safety cover for the road. The unit can also be made out of re-cycled material.

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LOW COST LIGHT REFLECTOR

Current

The current situation provides for cats eye type units, which are placed into the road and reflect light from vehicle headlights, to guide drivers to follow the road line safely. These are solid devices, and while they are proven to work, are very expensive to maintain and replace when removed (aka "popped") from the road by traffic wear and tear - and especially in snow prone regions by snow plough blades. Very often complete stretches of road are left without cats-eye cover when they are "popped" due to the expense of replacement.

Solution

This invention seeks to provide a very cheap solution to this problem; providing a light reflector, particularly for use on roadways, and seeks to provide a very low cost, very low profile, easily replaced solution to this problem.

Preferably the dome-shaped base member in cross-section inclines upwards (with concave edges) and then rounds off at the top with a minimum top surface area to reduce contact with road tyres and snow plough blades.

The attachment to the road surface is made easily and cheaply by the use of thin membrane "tabs" integrally moulded to each side of the cats eye base, and which extends either side of the main body of the road stud. The extent of the tab may vary from tabs on two sides, through to a circular tab, encircling the central road stud.

The material will be high visibility allowed by local regulations, preferably day-glow for maximum visibility in poor visibility, such as mist and fog, to provide best safety road vision whenever possible.

A very high visibility marine grade reflector is contained within a very low profile, highly visible (day-glow) "jelly type" base, made of a material. This may be silicon rubber, perhaps rubber or plastic, designed to be below snow blade height, but to flex and "give in" to the forces acting on it in the rare event that it does become an obstacle. After lateral forces have passed over the base unit and compressed it, the base material will revert (spring) back to it's original shape, and continue to present the high visibility reflector as a safety aid.

The design uses "tabs" encircling the road stud. This can perhaps make use of wings on either side of the road stud, and using permutations of perforated membrane, can be extended to a full membrane encircling the entire road stud. The membrane is embedded within tarmac which acts as a compressible sandwich, keeping the road stud under white lines or under tarmac, and reduces the risk of the road stud unit being sprung out.

Under test, this is performing satisfactory on a public highway, and is withstanding weather conditions from below freezing to immersion in cold winter rain water.

CLAIMS

1. A highly reflective light reflector housed in a high visibility casing, offering safer road vision viewing capability in most weathers, and secured to the surface of a road or other transport related surface.

2. A light reflector as claimed in item 1, which is low profile (being below the height of most active snow-plow blades).

3. A light reflector as claimed in item 1, which has a very low top surface area, which flexes ("gives") when sideways or top forces act upon it, and presents the minimum obstruction to any moving object passing over it. Reflector then returns to it's original position after forces has been reduced.

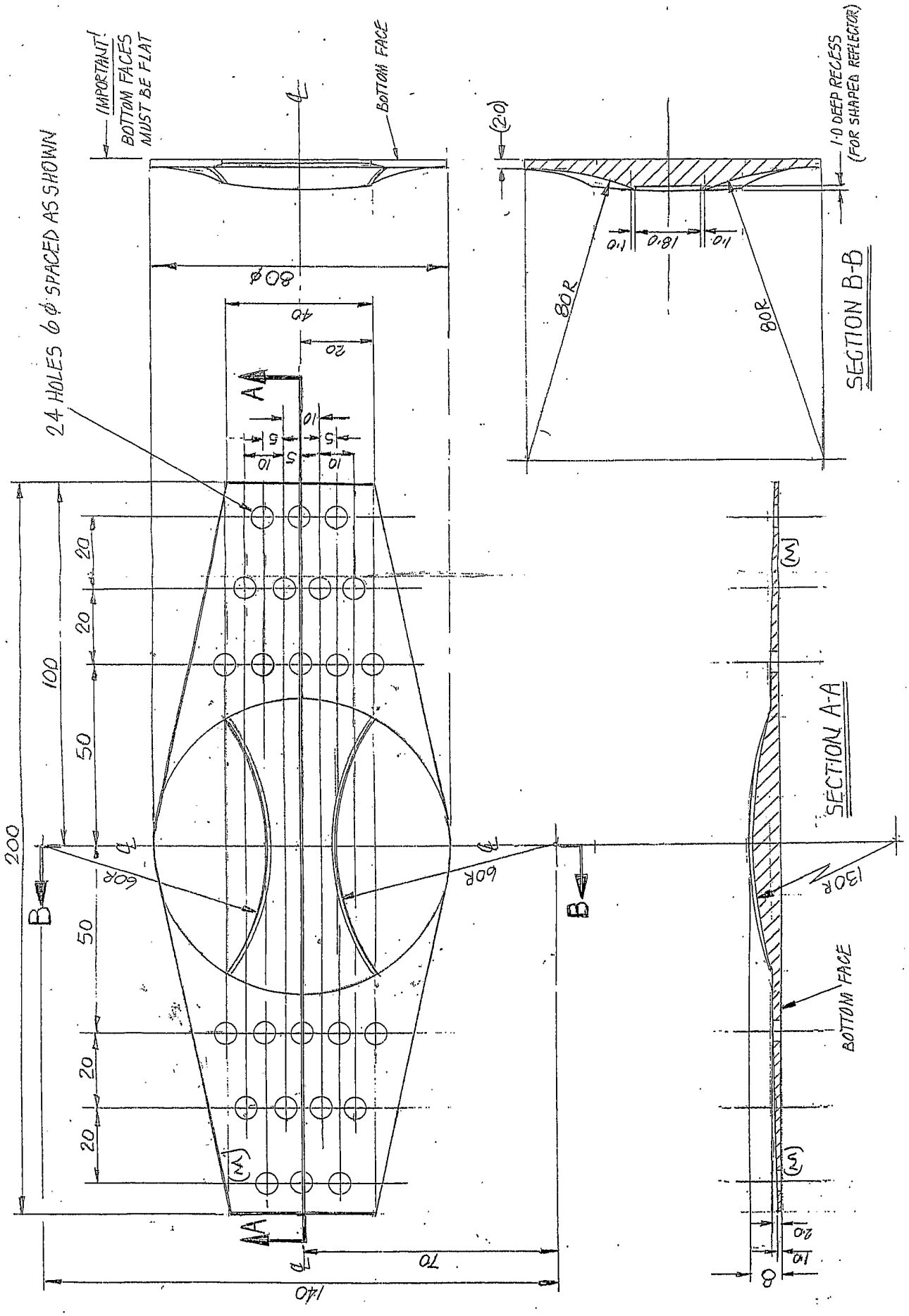
4. A light reflector as claimed in any proceeding claim, which is made of, plastics material, rubber, silicon rubber, polished glass and polished metal, or perhaps ultimately "intelligent plastic" (which remembers its moulded shape when distorted), or a combination of all of these materials.

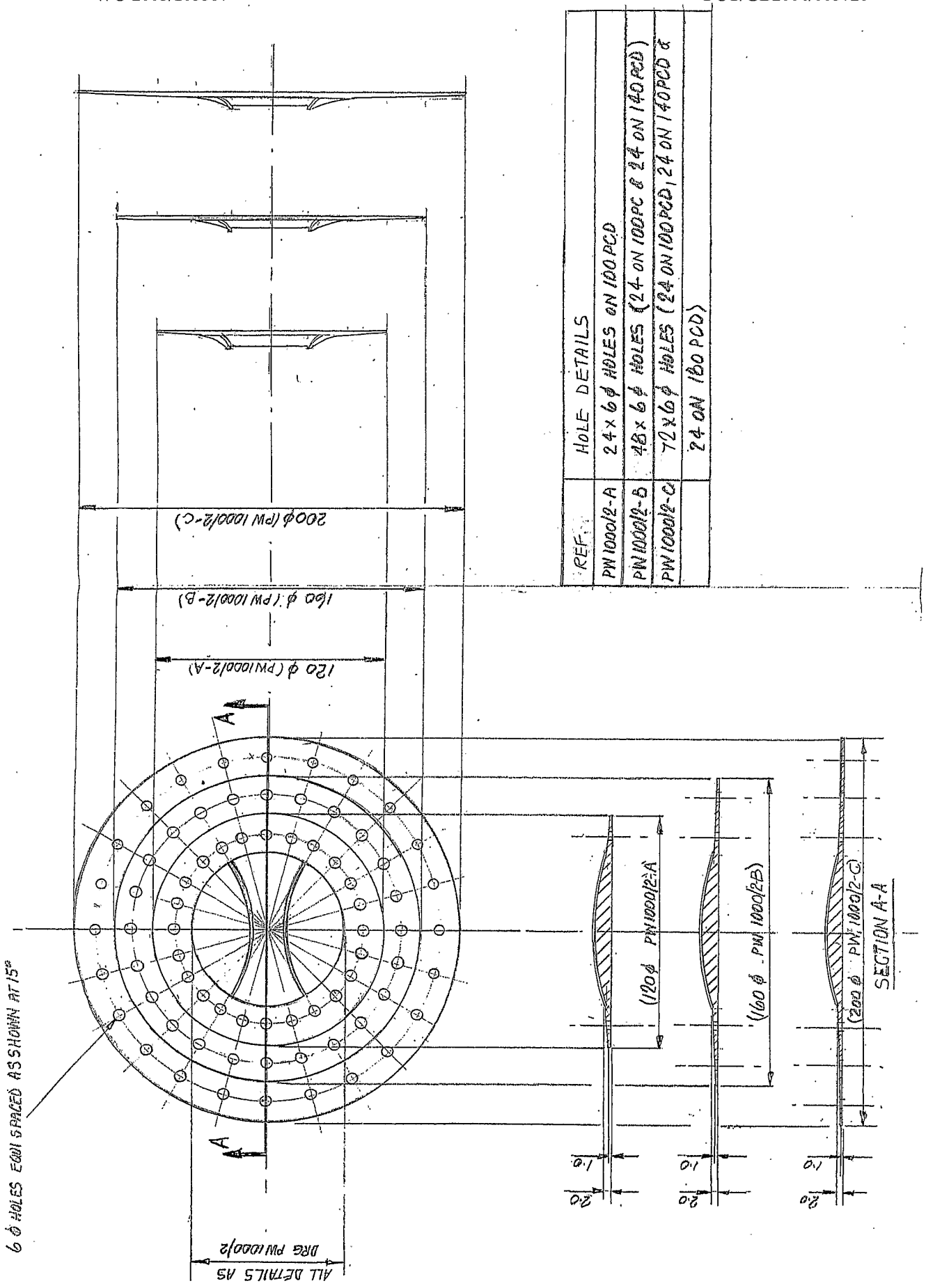
5. A light reflector which may be easily and cheaply applied to the highway, aircraft taxi-way by the use of high power adhesive, a mechanical device such as an industrial staple gun

6. The light reflector may also be secured by the use a thin membrane "tab" integrally moulded to the base of the cats-eye, and which extends either side of the main body of the cats eye.

   The tabs contain offset holes spread evenly across the tabs. The tab is secured to the road surface by painting it onto surface as part of the white lining process. This is achieved by using the bonding power of white line paint to swamp the tab, allowing the paint to enter the offset holes and "capture" the tabs onto the road surface. If there are no white lines, then tarmac can be used to paint the cats eye tabs onto the road surface by swamping the tabs and "capturing" them within the tar applied to the road surface; like a sandwich.

7. A light reflector substantially as herein described and illustrated in the accompanying drawing attached.


IMPORTANT!
BOTTOM FACES
MUST BE FLAT
BOTTOM FACE
24 HOLES 6Φ SPACED AS SHOWN
80Φ
40
20
A
A
10
5
5
10
100
20
20
50
50
20
20
200
60R
60R
B
B
70
140
(2·0)
1·0 DEEP RECESS
(FOR SHAPED REFLECTOR)
0·1
0·81
1·0
80R
80R
SECTION B-B
SECTION A-A
130R
BOTTOM FACE
2·0
1·0
8


HOLE DETAILS
REF.
PW 1000/2-A
24 x 6 ϕ HOLES ON 100 PCD
PW 1000/2-B
48 x 6 ϕ HOLES (24 ON 100PC & 24 ON 140 PCD)
PW 1000/2-C
72 x 6 ϕ HOLES (24 ON 100 PCD, 24 ON 140PCD & 24 ON 180 PCD)
200ϕ (PW 1000/2-C)
160 ϕ (PW 1000/2-B)
120 ϕ (PW1000/2-A)
A
A
6 ϕ HOLES EQUI SPACED AS SHOWN AT 15°
ALL DETAILS AS DRG PW 1000/2
(120ϕ PW 1000/2-A)
(160 ϕ PW 1000/2B)
(200 ϕ PW 1000/2-C)
SECTION A-A
2.0
1.0
2.0
1.0
2.0
1.0

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB2004/003726

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E01F9/06

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 7 E01F

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 634 310 A (CLARKE ET AL) 6 January 1987 (1987-01-06) column 2, line 59 - column 3, line 50 figures 1-4	1-3
X	US 3 975 108 A (SUHR ET AL) 17 August 1976 (1976-08-17) column 5, line 43 - line 52 figure 1	4,6
A	US 4 659 248 A (FLANAGAN ET AL) 21 April 1987 (1987-04-21) the whole document	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 January 2005	07/02/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Geivaerts, D

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2004/003726

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 5,7
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 5,7

Claims 5 and 7 lack technical features, contrary to Rule 6.3 PCT

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/GB2004/003726

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4634310 A	06-01-1987	CA 1207174 A1	08-07-1986
US 3975108 A	17-08-1976	NONE	
US 4659248 A	21-04-1987	NONE	