PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H01R 13/46, 43/16

A1

(11) International Publication Number: **WO 98/47205**

(43) International Publication Date: 22 October 1998 (22.10.98)

(21) International Application Number: PCT/GB98/01124

(22) International Filing Date: 17 April 1998 (17.04.98)

(30) Priority Data:
9707789.5 17 April 1997 (17.04.97) GB

(71) Applicant *(for all designated States except US)*: STRIX LIMITED [GB/GB]; Forrest House, Ronaldsway, Isle of Man IM9 2RG (GB).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: TAYLOR, John, Crawshaw [GB/GB]; Cronk my Chree, Arbory Road, Castletown, Isle of Man IM9 1HA (GB). GARVEY, Vincent, Joseph [IE/GB]; Leataoibh, Meadow Field Road, Bradda, Port Erin, Isle of Man IM9 6PH (GB).

(74) Agent: LECKEY, David; Frank B. Dehn & Co., 179 Queen Victoria Street, London EC4V 4EL (GB).

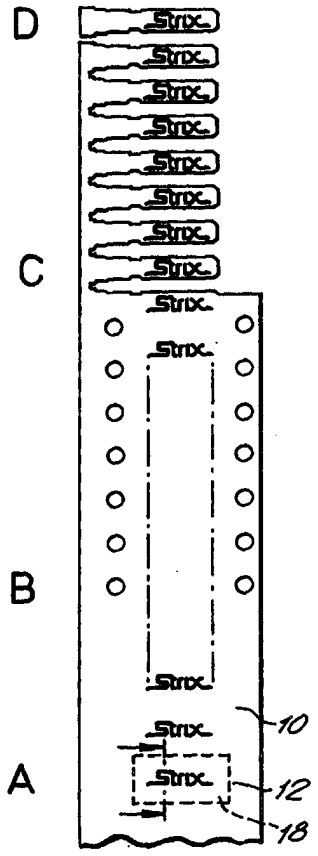
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, 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, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: TERMINAL PINS FOR ELECTRICAL APPLIANCES

(57) Abstract

A terminal pin (2) for an electrical appliance is disclosed wherein a surface of the pin is provided with an impression (8) indicative of the origin of the pin. The surface of the pin around the impression is substantially flat, to allow a proper electrical contact to be obtained with a corresponding socket connector. This is achieved by pressing into the surface of the pin a die having an impression forming projection upstanding from a land, the die being pressed into the surface to the extent that the said land contacts and controls the deformation of the surface around the impression formed by the projections.



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.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

Terminal Pins for Electrical Appliances

The present invention relates to terminal pins for electrical appliances, and in particular for electrical liquid heating appliances such as kettles and hot water jugs.

Typically, a kettle or hot water jug is provided with two or three terminal pins for engagement in a power socket connector. The pins may be mounted in a power inlet for the appliance, or more usually form an integral part of a thermally responsive control unit for the appliance, such as one disclosed in GB 2181598.

Unfortunately, such controls are susceptible to unauthorised copying. Such counterfeits are of poor quality and often dangerous, so it is of importance that a purchaser of a kettle or jug can establish that a genuine control has been used. In use the body of the control is concealed behind a cover, so it is not apparent if the control is genuine. There is thus a need for a simple way in which a purchaser of a kettle or jug can ascertain the origin of the control used. This is achieved in accordance with the invention by impressing on the pin a mark indicative of the manufacturer, as the pin will normally be visible to a user.

From a first aspect, therefore, the invention provides a terminal pin for an electrical appliance wherein a surface of the pin is provided with an impression indicative of the origin of the pin.

From a second aspect, the invention provides a thermally sensitive control unit for an electrical appliance, said unit comprising a terminal pin having a surface provided with an impression indicative of the origin of the pin.

The invention also extends to an electrical

appliance having a pin or control in accordance with the invention.

The configurations of the appliance inlet and the connector are determined in accordance with national and international standards, depending on the type of appliance, the current to be handled by the coupling and the maximum temperature of the inlet pins.

In the case of electric kettles and jugs, one coupling commonly used up to now has traditionally been one which complies with standard No. 320 of the International Electrical Commission Sheets C15 and C16 (320 IEC 1981). This relates to earthed electrical equipment rated at 10A, 250V in which the temperature of the pins does not exceed 120°C.

According to this standard, a terminal pin should have a cross-section of 4mm ± 0.1 by 2mm ± 0.05. If the pin does not meet that tolerance, it must be rejected. Furthermore, most socket connectors have a sleeve into which the terminal pin extends, with a face to face contact being formed between the pin and the socket. Accordingly, pins have to be made within tight tolerances.

The problem then arises that if an impression were simply to be stamped on the pin, the surface of the pin would be deformed upwardly into a ridge around the impression. Not only would this mean that the pin may be deformed to lie outside the required tolerance band, but also it will result in the terminal pin making electrical contact with its socket only along these raised ridges, rather than along the whole surface of the pin, which gives an unsatisfactory electrical connection. Thus the terminal pin should have a substantially planar surface surrounding the inscription permitting a surface contact with a socket connector to be achieved.

To achieve this, the impression is produced using a die having a land from which extend impression forming

projections, and the die is pressed into the pin sufficiently for the land to come into contact with the surface of the pin around the impression. In this way, the deformation of the pin surface is controlled by the land, preventing substantially the formation of ridges around the impression. In effect, the land planishes the surface. From a further aspect, therefore, the invention provides a method of forming an impression on the surface of an electrical terminal pin comprising pressing into the surface a die having an impression forming projection upstanding from a land, the die being pressed into the surface to the extent that the said land contacts and controls the deformation of the surface around the impression formed by the projections.

Preferably, the land extends over a substantial part, and preferably over substantially all of the contact forming portion of the pin surface. Thus, for example, the die land may be made to extend over the whole contact surface of the pin.

To minimise the distortion caused by the impressing process, the impression forming projection may be relatively shallow, for example less than 0.5mm, preferably around 0.25mm deep.

Preferably the sides of the projection are substantially parallel and at right angles to the land.

This is in contrast to normal stamping dies which have tapering sides. The advantage of using parallel sided impression means is that should, for whatever reason (for example tool-wear), the die not complete a full stroke relative to the pin surface, the impression formed will still be of the requisite width. This is an important feature in its own right, so from a yet further aspect, the invention provides a method of making an impression on a terminal pin for an electrical appliance using a die having an impression forming projection upstanding from a land, the upstanding sides of said projection being substantially parallel to each

other.

The impression may be formed on a finished pin, but for ease of manufacture, it is preferably formed before the pin is finished. Terminal pins are usually stamped out of strip material in a continuous multi stage process. Conveniently, therefore the impression may be formed on the strip material before the pins are stamped therefrom. The impressing step may be suitably synchronised with the other steps in the process.

An impression may be formed on just one side of the pin, but preferably it is provided on both sides. Furthermore the inscription on the opposed sides are preferably inverted, so that irrespective of the orientation with which the pins are inserted in an inlet or a control housing, the impression will be legible.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 shows a terminal pin in accordance with the invention;

Figure 2 shows, schematically, a process for producing the pin of Figure 1;

Figure 3 shows, schematically, a first stage in the impression forming process taken along the line A-A of Figure 2;

Figure 4 shows a second stage in the impression forming process; and

Figure 5 shows a third stage in the impression forming process.

Referring firstly to Figure 1, a terminal pin 2 for use in one of the applicant's control units, for example in one of its R7 series of controls is illustrated. The pin has a contact portion for engaging in a socket connector and a mounting portion 6 for mounting the pin 2 in the control or an appliance inlet.

The outline shape of the pin is already known, and the cross sectional dimensions of its contact forming

portion 4 are in accordance with standard No. 320 of the International Electrical Commission Sheets C15 and C16 (320 IEC 1981), i.e. 4mm ± 0.1 by 2mm ± 0.05.

An impression 8 of the Applicant's name is provided on both faces of the pin 2. The impression on the underside of the pin is inverted with respect to the impression shown.

As can be seen in Figure 2, the terminal pin 2 is formed from a strip 10 of material, usually brass or copper.

The strip is fed off a roll, not shown, and passed through a number of manufacturing stages A to D in a progression tool. The strip 10 is kept in registry through the various stages by virtue of index holes 12 which are punched in the strip at stage B. Suitable indexing means(not shown) engage in the index holes to move the strip in a stepwise manner through the progression tool.

The impression 8 is formed on the strip of material at stage A prior to the pins being blanked out from the strip 10 by a press tool at stage C and then finally being separated from the end of the strip at stage D.

The impression 8 is formed using a die 12. As can be seen in Figures 3 to 5, the die 12 comprises upper and lower parts 14,16. Each die part 14,16 comprises a land 18 from which are upstanding impression forming projections 20. The outline of the land 18 is illustrated in phantom in Figure 2, form which it can be seen that it extends over substantially the whole of the contact forming part 4 of the pin 2.

The projections are relatively shallow, being around 0.25mm deep, and the sides 24 of the projection are substantially parallel and perpendicular to the land 18.

As shown in Figure 4, to make the impression 8, the die parts 14, 16 are brought together by appropriate press means so that the projections 20 press into the

surface 22 of the strip 10. The die parts 14,16 are moved together to the extent that the land 18 surrounding the projections 20 on both die parts are pressed against the surface of the strip 10 around the impression 8 being formed so as to control distortion of that surface. As can be seen from Figures 4 and 5, that surface is maintained substantially flat. If the land does not quite contact the pin surface 22, the impression 8 will still be of the requisite width, since the sides 24 of the impression forming part of the die are parallel.

The die parts 14, 16 can then be separated as shown in Figure 5, and the strip 10 then indexed through the machine for the next impression 8 to be made.

It will be appreciated that various modifications may be made to the above embodiment without departing from the scope of the invention. For example, the impressions for more than one pin may be produced at one time.

Claims

1. A method of forming an impression on the surface of an electrical terminal pin comprising pressing into the surface a die having an impression forming projection upstanding from a land, the die being pressed into the surface to the extent that the said land contacts and controls the deformation of the surface around the impression formed by the projections.

2. A method as claimed in claim 1 wherein the land extends over a substantial part of the contact forming portion of the pin.

3. A method as claimed in claim 2 wherein the land extends over substantially the complete contact forming portion of the pin.

4. A method as claimed in claim 1, 2 or 3 wherein the pin has a cross-section of 4mm ± 0.1 by 2mm ± 0.05.

5. A method as claimed in any of claims 1 to 4 wherein the impression forming projection is less than 0.5mm deep.

6. A method as claimed in claim 5 wherein the impression forming projection is about 0.25mm deep.

7. A method as claimed in any of claims 8 to 12 wherein the sides of the impression forming projection are substantially parallel.

8. A method of making an impression on a terminal pin for an electrical appliance using a die having an impression forming projection upstanding from a land, the upstanding sides of said projection being substantially parallel to each other.

9. A method as claimed in any preceding claim wherein the pins are produced from a strip of material and the impression is formed on the strip material before the pins are separated therefrom.

10. A terminal pin for an electrical appliance wherein a surface of the pin is provided with an impression indicative of the origin of the pin.

11. A pin as claimed in claim 10 wherein the surface of the pin around the impression is substantially flat.

12. A pin as claimed in claim 10 or 11 wherein the pin has a cross-section of 4mm ± 0.1 by 2mm ± 0.05.

13. A pin as claimed in any of claims 10 to 12 wherein the impression is less than 0.5mm deep.

14. A pin as claimed in claim 13 wherein the impression is around 0.25mm deep.

15. A pin as claimed in any of claims 10 to 14 wherein the impression has parallel sides.

16. A pin as claimed in any preceding claim wherein an impression is formed on both sides of the pin.

17. A thermally sensitive control unit for an electrical appliance, said unit comprising a terminal pin as claimed in any of claims 10 to 16.

18. An electrical appliance comprising a terminal pin or control unit as claimed in any preceding claim.

19. A terminal pin substantially as hereinbefore described with reference to the accompanying drawings.

20. A method of forming an impression on the surface of an electrical terminal pin substantially as hereinbefore described with reference to the accompanying drawings.

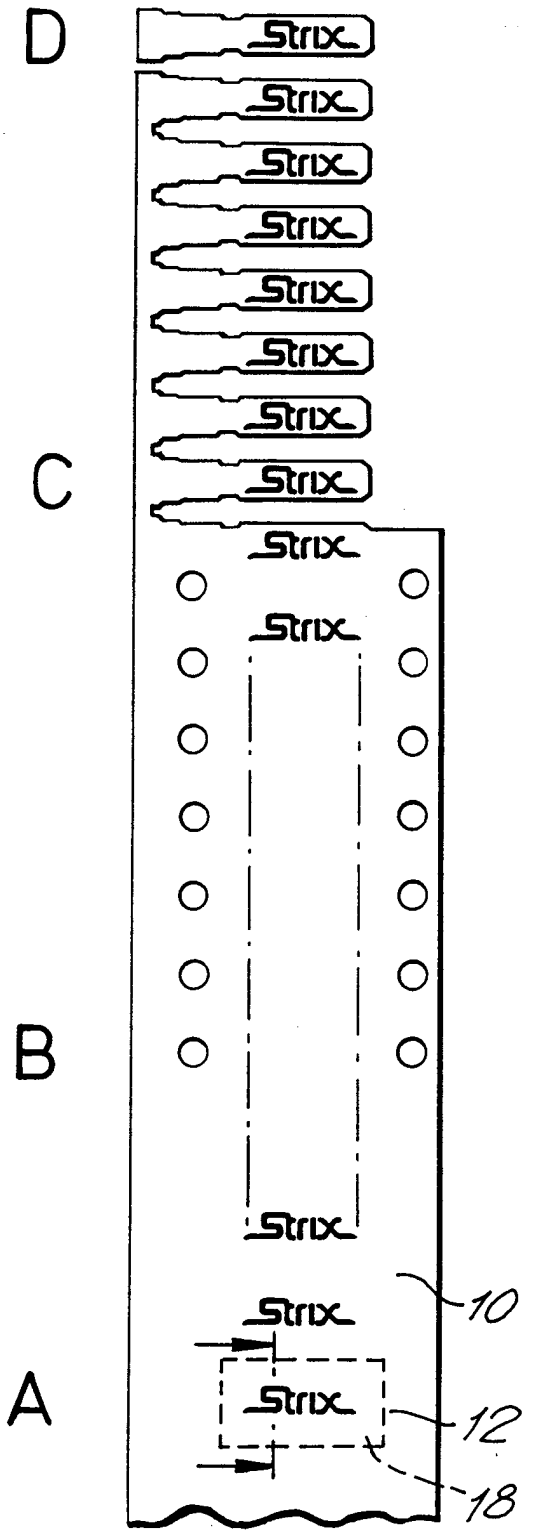


FIG. 2.

FIG. 1.

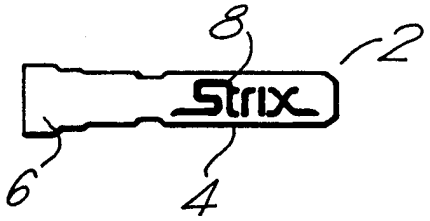


FIG. 3.

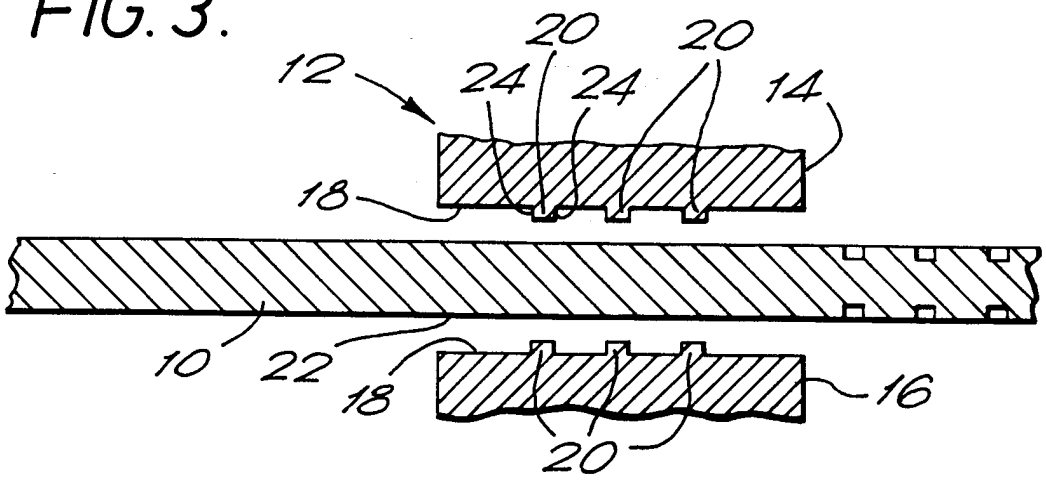


FIG. 4.

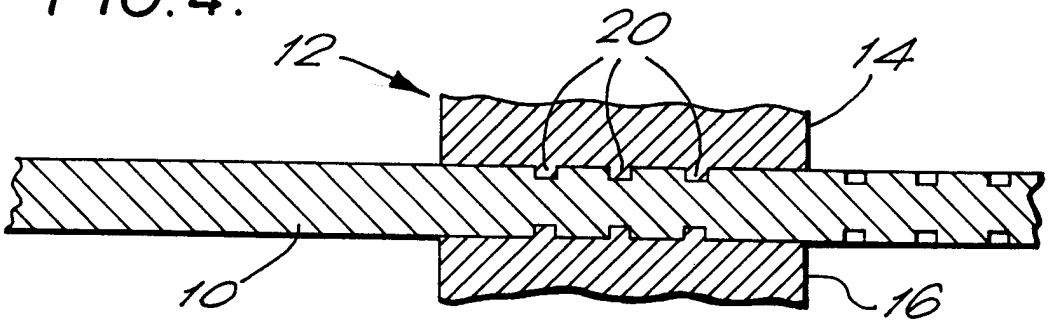
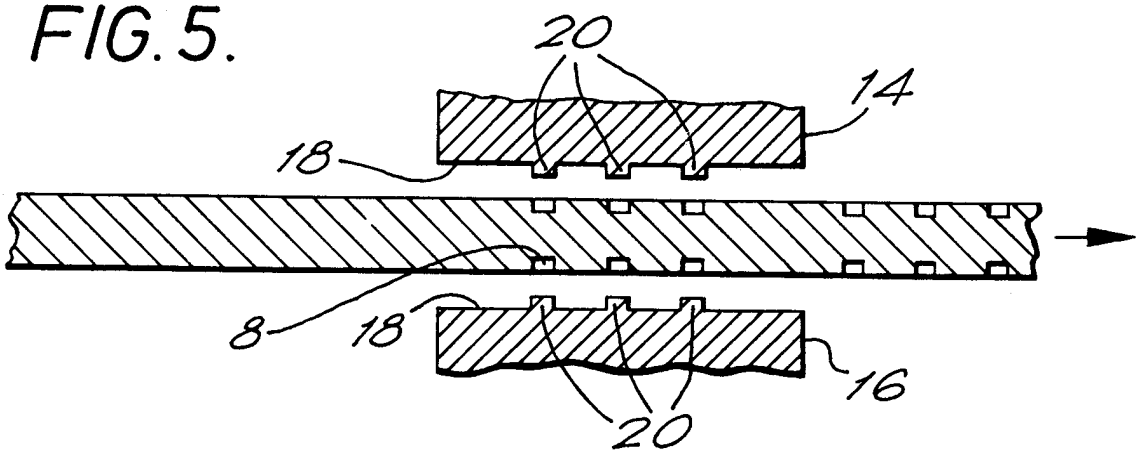


FIG. 5.



INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/GB 98/01124

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01R13/46 H01R43/16

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 6 H01R B44B

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 269 090 A (INGBER ET AL.) 26 May 1981 see column 1, line 8 - line 20 see column 2, line 23 - column 3, line 39; figures	1-3,8,10
A	GB 2 181 598 A (STRIX LIMITED) 23 April 1987 cited in the application see abstract; figure 1	10,17,18
A	WO 89 07846 A (TRW DAUT + RIETZ GMBH & CO KG) 24 August 1989 see figure 1	4,10
A	GB 2 165 100 A (MANLEY, N.M.) 3 April 1986 see page 3, line 33 - line 72; figure 1	10

☐ 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
1 July 1998	09/07/1998

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	Kohler, J

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. ational Application No
PCT/GB 98/01124

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4269090 A	26-05-1981	NONE	
GB 2181598 A	23-04-1987	AU 582470 B	23-03-1989
		AU 6340286 A	09-04-1987
		BE 905550 A	02-02-1987
		CA 1265831 A	13-02-1990
		DE 3633759 A	09-04-1987
		DE 3645341 C	09-04-1998
		HK 37992 A	04-06-1992
WO 8907846 A	24-08-1989	DE 3804977 A	31-08-1989
		AT 106615 T	15-06-1994
		DE 58907753 D	07-07-1994
		EP 0356478 A	07-03-1990
		US 4992064 A	12-02-1991
GB 2165100 A	03-04-1986	NONE	