PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :
B29C 63/02, E04F 13/00, E04C 2/12, 2/24, E04B 1/26

A1

(11) International Publication Number: **WO 96/25286**

(43) International Publication Date: 22 August 1996 (22.08.96)

(21) International Application Number: PCT/NL96/00062

(22) International Filing Date: 9 February 1996 (09.02.96)

(30) Priority Data:
9500261 13 February 1995 (13.02.95) NL

(71) Applicant *(for all designated States except US)*: MAROLIAN B.V. [NL/NL]; Langendijk 14, NL-5652 AX Eindhoven (NL).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: LIEBREGTS, Franciscus, Wilhelmus, Maria [NL/NL]; Eimerick 54, NL-5653 RN Eindhoven (NL).

(74) Agents: VAN KAN, J., J., H. et al.; Algemeen Octrooibureau, World Trade Center, P. Petersstraat 160, NL-5612 LV Eindhoven (NL).

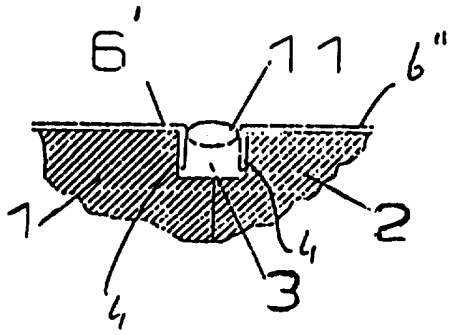
(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AZ, BY, KG, KZ, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, 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.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.
In English translation (filed in Dutch).

(54) Title: A METHOD FOR AFFIXING A COATING FILM PROVIDING PROTECTION AGAINST WEATHER INFLUENCES TO A WOODEN BUILDING ELEMENT AS WELL AS A WOODEN BUILDING ELEMENT

(57) Abstract

A method for affixing a coating film providing protection against weather influences to a wooden building element, wherein a plastic foil is affixed to at least one surface of said building element. A groove is formed between parts of the building element before a foil film is affixed. Then mutually separated foil parts are adhered to the surface of the building element on either side of said groove, and the two opposed end edges of the foil parts are folded into the groove and adhered to the walls thereof. Finally the groove is sealed with a sealant.



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.

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

A method for affixing a coating film providing protection against weather influences to a wooden building element as well as a wooden building element.

The invention relates to a method for affixing a coating film providing protection against weather influences to a wooden building element, wherein a plastic foil is affixed to at least one surface of said building element.

The invention also relates to a building element produced in this manner.

Wooden building elements are for example doors, casings, windows and frames.

Wooden building elements in buildings are constantly exposed to damaging influences of a varying nature, such as damage to the wood under the influence of the sun, wind and rain, and mechanical damage caused by people occupying the building. It has been aimed at for years to protect the wood in the best possible manner against said damage by applying one or more coats of paint.

A drawback of this is that painting is a relatively labour-intensive and thus costly process. Moreover, paintwork requires restorative maintenance on a regular basis, because its durability is not completely satisfactory. As an alternative it is possible to affix a plastic foil to the wooden building element instead of paint. The plastic foil provides wooden building elements with a greater resistance to weather influences, in particular moisture, and is furthermore sufficiently resistant to mechanical loads emanating from normal use of the building.

It is known, inter alia from Belgian patent BE-85.695, to affix a plastic foil to a wooden base. However, the method according to said patent is limited to affixing a foil to plate-shaped building elements. The known method is not suitable for affixing a foil to objects having a more complicated shape, for example a wooden casing. At the location of the junctions between various parts of the wooden building element, for example at the junction between a horizontal jamb and a vertical jamb of the casing, the seam present at the junction will shrink as a consequence of the warping of the wood. When a foil is affixed over the seam the risk of cracks being formed in the foil as a result of said warping of the wood cannot be excluded.

The object of the present invention is to provide a method wherein the above drawbacks are avoided.

This object is achieved by the method according to the invention in that a groove is formed between parts of the building element before a foil film is affixed, mutually separated foil parts are adhered to the surface of the building element on either side of said groove, and the two opposed end edges of the foil parts are folded into the groove and adhered to the walls thereof, after which the groove is sealed with a sealant.

In this manner the warping of the various wooden parts does not affect the separate foil films. The expansion and shrinking of the interconnected parts is met by the sealant provided in the groove.

The advantage of plastic foil films as a coating material for wooden building elements over paintwork is in particular the fact that the former materials have a greater resistance to weather influences and damage and can be readily affixed in a uniform thickness by using the method according to the invention, also in those places where grooves are present, that said materials require less maintenance and that it is possible to achieve a low and relatively stable moisture content in the wooden building elements.

One embodiment of the method according to the invention is characterized in that said groove is formed by milling.

In this way the groove can be formed in a simple manner.

The invention also relates to a wooden building element, whereby one side of the building element is provided with a foil film having a water vapour permeability of 0 - 25 $g/m^2/24$ hours, and an opposite side thereof is provided with a foil film having a water vapour permeability of 25 - 75 $g/m^2/24$ hours.

The use of foil materials having different vapour permeability (WVP) values makes it possible to achieve that the water vapour moves more readily in the one direction than in the opposite direction. This results in a more or less continuous flow-through of the water vapour which is constantly present in the wooden building elements. This is of importance in connection with preventing wood rot and enhancing the durability of the wood.

The WVP value of a foil material is indicated by the number of grammes of water vapour which pass a film of the material of

a particular thickness and a surface area of 1 m^2 in 24 hours with a relative humidity difference of 85% and a temperature of 23 °C. The WVP value is measured according to DIN 53122.

The side having the lower WVP value must be turned towards a room having a relatively high humidity level, so that the humidity level on the side having the higher WVP value is lower. Thus there will be hardly any accumulation of moisture in the wood, as a result of which the occurrence of wood rot is prevented. In case of a casing or a door in a building this means that the side having the lower WVP value is located inside the building, whilst the side having the higher WVP value is located outside. In particular during the winter period the air humidity will be considerably higher inside a building than outside. The affixed foils ensure that there will be hardly any accumulation of moisture in the wood. The small amount of moisture which has accumulated during the winter and which has found its way into the wood from the room inside the building will exit the wood again through the outward side in the summer.

The invention will be explained in more detail hereafter with reference to a drawing, in which:

Figure 1 is a perspective view of a corner of a building element;

Figure 2 is a cross-sectional view of the building element shown in Figure 1, seen in the direction indicated by arrow II;

Figure 3 is a cross-sectional view of the building element shown in Figure 1, seen in the direction indicated by arrow III.

Like parts are numbered alike in the Figures.

Figure 1 shows a left-hand top corner of a wooden window casing. The window casing is provided with a vertical lateral jamb 1 and a horizontal upper jamb 2 connected thereto. The junction between the two jambs 1, 2 is provided with a groove 3 formed by means of a milling operation. The bottom of the groove 3 is indicated by the hatched area 5. The jambs 1, 2 support a glass window pane 7.

Figure 2 shows a cross-section II of the horizontal upper jamb of the window casing shown in Figure 1. The window pane 7 is on either side provided with a cell tape 10 of foamed neoprene at the location of its abutment against the horizontal upper jamb 2. The window pane 7 is connected to the upper jamb 2 by means of a glazing bead 9. Near the window pane 7 the plastic foil 6 is folded into a groove present

between the window 7 on the one hand and the glazing bead 9 and the upper jamb 2 on the other hand. The grooves are furthermore provided with a sealant 8. The sealant 8 preferably has a permanent elasticity of 25%.

Figure 3 shows a cross-section III of the junction between the vertical lateral jamb 2 and the horizontal upper jamb 2. A groove 3 has been formed between lateral jamb 1 and upper jamb 2 by means of a milling operation. Foils 6', 6'' have been glued onto the jambs 1, 2 on either side of groove 3. The ends of the foil 6', 6'' have been folded into groove 3. Following that groove 3 has been sealed by means of a sealant 11.

Embodiment

The procedure prior to the affixation of a foil film is as follows. Nail holes and grooves caused by splintering are levelled with a two-component filler. Wood rot is removed and the holes formed are filled with a two-component wood repair paste (Woodfill or Paint Repair Paste). All surfaces of the wooden casing are thoroughly sanded with P60 and finish-sanded with P120 to obtain a smooth surface. Then the grooves between the horizontal and vertical jambs are milled out to a width of 4 mm and a depth of 6 mm. Then the casing is freed from dust with a soft brush and degreased with a cloth moistened with UNIVERSOL.

A PVC foil having a thickness of 50 μm is used for coating the casing, to which foil a film of Scotch Grip glue is applied, which is marketed in the Netherlands by 3M Nederland B.V. Correctly dimensioned parts of foil are cut, whereby 1 : 1 working drawings of the casing are used. After the protective foil has been removed from the adhesive film the foil parts are affixed to the casing jambs in a tile-wise overlapping relationship from the bottom to the top, the amount of overlap being 4 mm. It is important thereby that the foil is smoothed out from the centre of a jamb towards the outsides with a soft cloth. Final smoothing of the foil takes place by means of a soft rubber spatula. In the corners the foil is firmly pressed on by means of a spatula of a hard plastic material with rounded side edges in order to prevent the foil from being damaged. The foil parts of jambs 1 and 2 are folded into the milled-out groove 3 as shown in Figure 3. Finally the grooves 3 and the clearances between the window pane on the one hand and the glazing beads and the rebates on the other hand are sealed with a sealant 8, 11.

Various techniques may be used for adhering a foil to a surface of the wooden building elements. If desired a film of a thermoplastic foil is directly adhered to a smooth surface, whereby said foil is heated and a pressure is exerted. Better results are obtained, however, when an intermediate film of an adhesive material is used when affixing a foil to the smooth, level surface of a wooden building element, which may or may not be pre-treated with paint. A film of a liquid-diluted adhesive material is applied to at least one surface of the building element or to the foil to be affixed, or to both, and following that the foil is affixed to the surface of the building element. Said liquid-diluted adhesive may be any one of several suitable commercially available types of adhesive to be used for adhering plastic films to wood. As a rule said adhesives consist of a solution or a dispersion of an adhesive material in a volatile solvent.

Preferably a film consisting of a plastic foil, to which an adhesive film was already applied at the time of its production, is affixed to the smoothed surface of a building element. A foil material of this kind consists of three films, viz. the actual plastic foil, a dried adhesive film and a neutral foil serving as a temporary coating film, which only slightly adheres thereto. The protective coating film is pulled off the adhesive film before said latter foil material is used, and the foil material is ready to be adhered to the surface of a building element. When relatively large building elements are used it will be impossible to avoid using several foil parts. It is preferred to cut said separate parts from the foil material in such dimensions that successive parts slightly overlap. It is recommended to place the foil parts in a tile-wise overlapping relationship in order to prevent water from finding its way to the building element.

Junctions between the parts of the wooden building elements, for example at the transitions from horizontal to vertical parts, first need to be provided with a groove, for example by means of a milling operation. Then the parts positioned on either side of the milled-out groove are coated with two mutually separated foil parts, whereby each foil part is folded into the groove and attached to the wall thereof, after which the groove is sealed with a sealant. The advantage of this in comparison with coating the junction with a continuous foil is that no cracks are formed in the foil near the junction by the warping of the

wood and the consequent shrinking and expansion of said wood.

The material for the plastic foil may be a commercially available foil material. It is preferred to select a foil of a thermoplastic plastic material, because this material can be readily processed. Thermoplastic plastic materials melt upon being heated, but do not decompose and can be readily welded, therefore. This is advantageous when two separate films of foil material are interconnected along a line. It is also possible to use a foil material of a thermosetting plastic material, if desired, a drawback being the fact that generally this material cannot be welded, because it decomposes upon being heated and does not melt.

A suitable thermoplastic foil material having good weather resisting properties is a material from the group consisting of:

polyvinyl chloride (PVC), polyethylene (PE), polytetrafluor ethylene (PTFE), polymethyl methacrylate (PMMA), polycarbonate (PC), polyamide (PA), poly-(acrylonitrile/styrene/acrylate) ASA - mixed and stirred - and silicon (SI).

Particularly preferred is a foil comprising an adhesive film, for example of the trademarks Foilcoat, Avery Denisson, 3M, Gravitype, MACal 9800 and CSR 100 of MACtac, or Filmolux 100-300 of Neschen International. Foil materials having a film thickness of 25-250 μm are preferred.

Furthermore it is advantageous for the foil material to contain an anti-oxidant, soot, or a UV-absorbing material or mixtures thereof. Additives of this kind enhance the weather resistance of the material.

CLAIMS

1. A method for affixing a coating film providing protection against weather influences to a wooden building element, wherein a plastic foil is affixed to at least one surface of said building element, characterized in that a groove is formed between parts of the building element before a foil film is affixed, mutually separated foil parts are adhered to the surface of said building element on either side of said groove, and the two opposed end edges of said foil parts are folded into said groove and adhered to the walls thereof, after which said groove is sealed with a sealant.

2. A method according to claim 1, characterized in that said groove is milled out.

3. A building element produced in accordance with the method according to claim 1 or 2.

4. A building element according to claim 3, characterized in that one side of said building element is provided with a foil film having a water vapour permeability of 0 - 25 $g/m^2/24$ hours, and an opposite side thereof is provided with a foil film having a water vapour permeability of 25 - 75 $g/m^2/24$ hours.

5. A building element according to claim 3 or 4, characterized in that said foil film consists of a foil material of the trademarks Foilcoat, Avery Denisson, 3M, Gravitype, MACal 9800 and CSR 100 of MACtac or Filmolux 100-300 of Neschen.

Figure 1

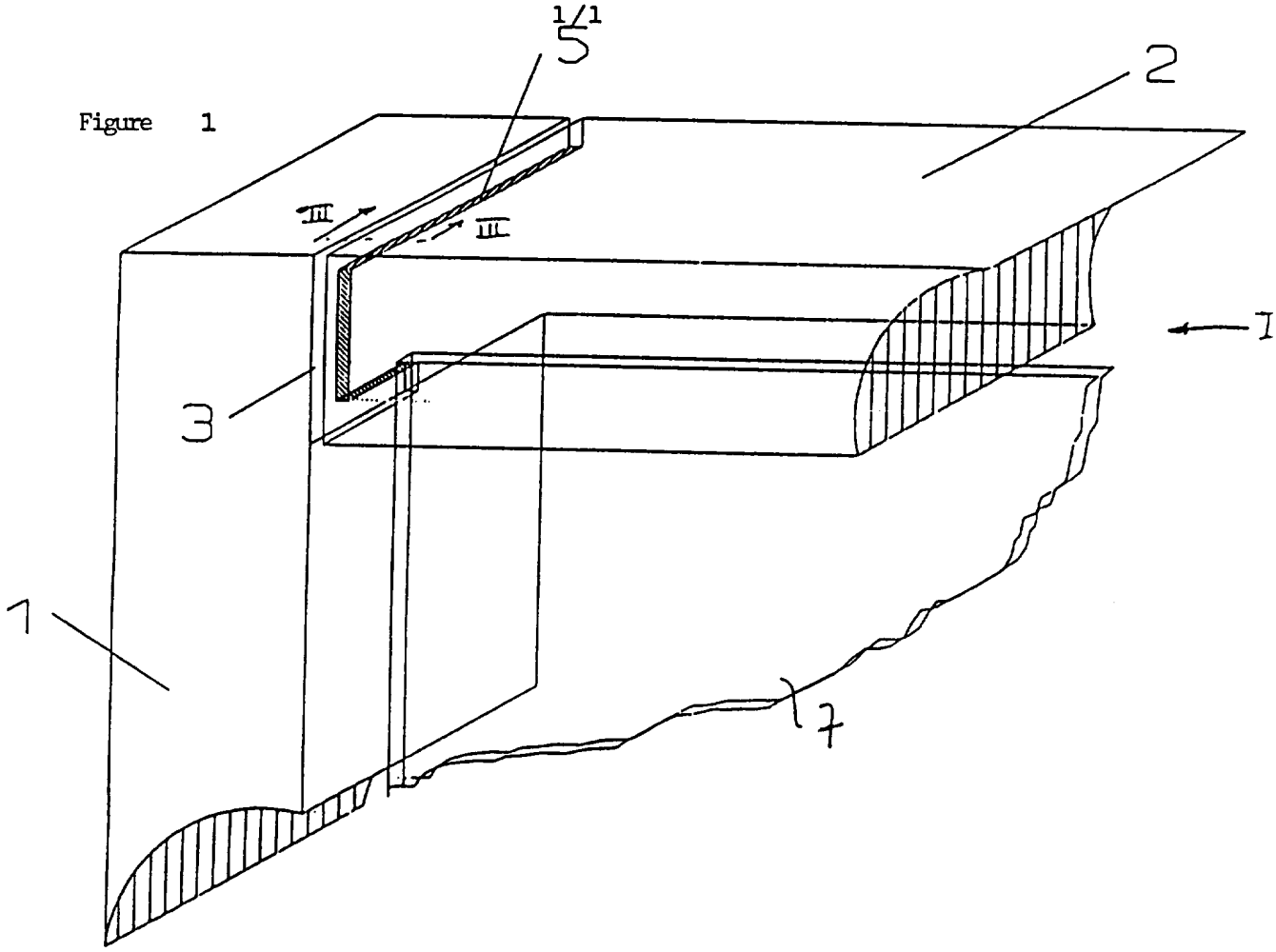


Figure 2

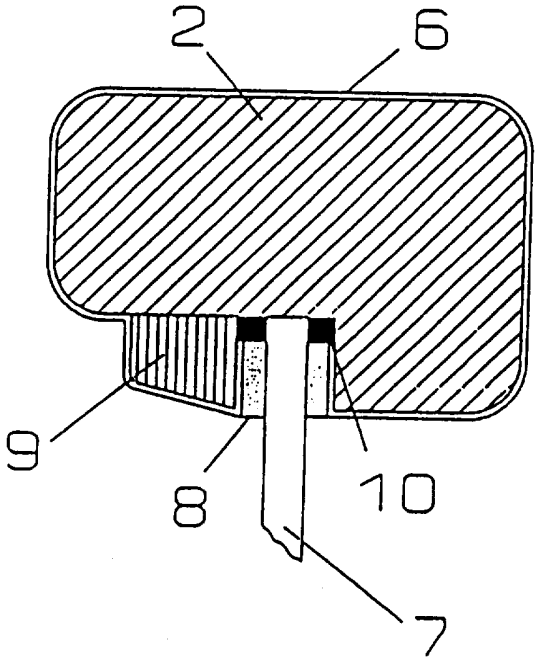
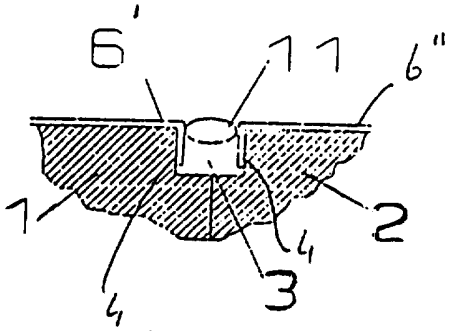


Figure 3



INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/NL 96/00062

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B29C63/02 E04F13/00 E04C2/12 E04C2/24 E04B1/26

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 B29C E04F E04C

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.
X	DE,C,35 27 006 (DUROPAL-WERK EBERH. WREDE GMBH & CO KG) 17 July 1986 see column 6, line 17 - line 38; figure 2 ---	1-3
A	BE,A,660 497 (DISPERGER GMBH. SPEZIALMASCHINEN FÜR INDUSTRIE UND HANDWERK) 1 July 1965 see page 7, line 25; claim 1; figure 3 ---	1-3
A	DE,B,17 79 692 (GÖHLFENNEN & SPICKA GMBH) 16 June 1971 see column 2, line 41 - column 4, line 59; figures 2-4,10 ---	1-3
A	BE,A,852 695 (TENNECO PLASTICS N.V.) 18 July 1977 see the whole document ---	1,3

-/--

[X] Further documents are listed in the continuation of box C.

[X] 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

1

Date of the actual completion of the international search	Date of mailing of the international search report
3 June 1996	14.06.96

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	Van Nieuwenhuize, O

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE WPI Week 9308 Derwent Publications Ltd., London, GB; AN 93-062237 XP002004610 & JP,A,05 010 016 (IG GIJUTSU KENKYUSHO KK) , 19 January 1993 see abstract	1,3
A	DATABASE WPI Week 9404 Derwent Publications Ltd., London, GB; AN 94-031514 XP002004611 & JP,A,05 338 395 (IG GIJUTSU KENKYUSHO KK) , 21 December 1993 see abstract	1,3
A	US,A,5 070 664 (A. ANTHONY GROH ET AL) 10 December 1991 see column 2, line 63 - column 3, line 34; claim 1; figures 1-6	1,3
A	DATABASE WPI Week 9429 Derwent Publications Ltd., London, GB; AN 94-238165 XP002004612 & JP,A,06 170 945 (SEKISUI CHEM IND CO LTD) , 21 June 1994 see abstract	1,3
A	DATABASE WPI Week 7940 Derwent Publications Ltd., London, GB; AN 79-72761b XP002004613 & JP,A,54 108 887 (MATSUSHITA ELEC WORKS) , 25 August 1979 see abstract	1,3
A	WO,A,91 01873 (LUCIANO BERGAMO) 21 February 1991 see claim 1; figures 1-7	1,3
A	DE,B,12 96 296 (FA. DR. MARCEL EBNÖTHER) 29 May 1969 see column 1, line 18 - line 21; claim 1; example 1	1,3
1 A	DE,A,31 48 436 (HUBERT VON BLÜCHER) 21 July 1983 see page 6, paragraph 3; claims 1,2,4-6	4

-/--

INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/NL 96/00062

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE WPI Week 9130 Derwent Publications Ltd., London, GB; AN 91-218984 XP002004614 & JP,A,03 140 384 (SEKISUI CHEM IND KK) , 14 June 1991 see abstract -----	4

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
PCT/NL 96/00062

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-C-3527006	17-07-86	EP-A- 0210491	04-02-87
		JP-A- 62070002	31-03-87
		US-A- 4751125	14-06-88
BE-A-660497	01-07-65	CH-A- 432309	
		DE-A- 1571070	08-01-70
		GB-A- 1083366	
		LU-A- 48102	01-07-65
		NL-A- 6502509	03-09-65
DE-B-1779692	16-06-71	NONE	
BE-A-852695	18-07-77	NONE	
US-A-5070664	10-12-91	NONE	
WO-A-9101873	21-02-91	AT-T- 123688	15-06-95
		AU-B- 6159790	11-03-91
		DE-D- 69020170	20-07-95
		DE-T- 69020170	30-11-95
		EP-A- 0593429	27-04-94
		ES-T- 2073581	16-08-95
DE-B-1296296		NONE	
DE-A-3148436	21-07-83	NONE	