(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 300 091 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
09.04.2003 Bulletin 2003/15

(51) Int Cl.[7]: **A43B 9/18**, A43B 9/02, A43B 7/12

(21) Application number: **01830630.8**

(22) Date of filing: **05.10.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **Calzaturificio Orion S.p.A.**
35023 Bagnoli Di Sopra (PD) (IT)

(72) Inventor: **Meneghin, Graziano**
35021 Agna-Padova (IT)

(74) Representative: **Petruzziello, Aldo et al**
Racheli & C. S p A
Viale San Michele del Carso, 4
20144 Milano (IT)

(54) Waterproof footwear and manufacturing method

(57) The new footwear comprises an upper (12), a lining (14) with a waterproof, vapour-permeable membrane (24), a sole (18) of injection moulded plastic material; the bottom edge of the upper is spaced outwardly with respect to the edge of the lining and stitched to one edge of a non-porous tape (20) provided with a layer of heat-reacting glue on one side, the opposite edge of the non-porous trip is stitched to the lining and to the insole, and the glue of the tape bonds together the tape and the lining.

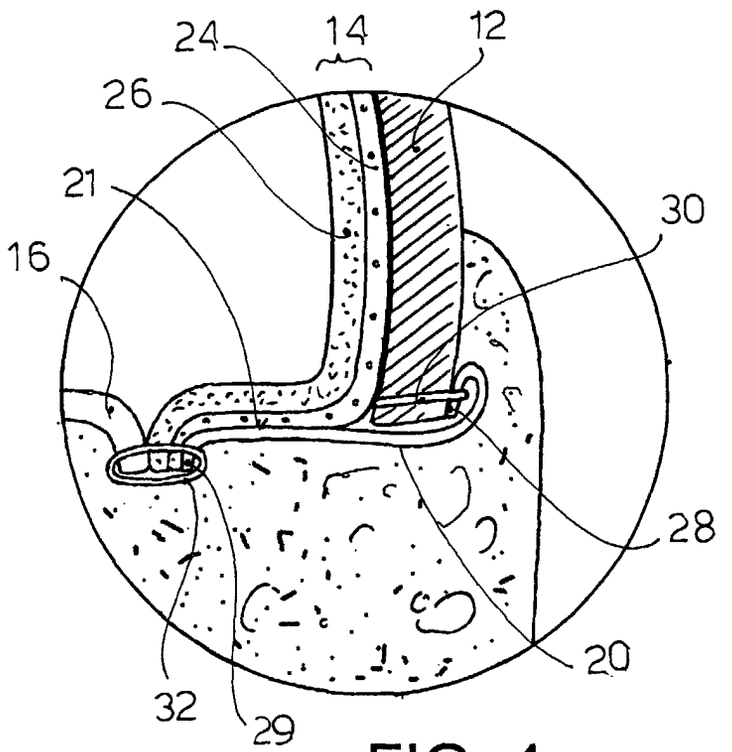


FIG. 4

EP 1 300 091 A1

Description

[0001] The present invention refers to the manufacture of waterproof footwear, particularly waterproof and vapour-permeable (breathable) footwear.

[0002] Waterproof, vapour-permeable footwear, that is to say footwear able to protect the foot from the entry of water, though allowing regular evaporation of perspiration meet with widespread public favour at present. To obtain the desired characteristic of watertightness and vapour-permeability, a layer or sheet of material impervious to water and pervious to vapour, that is, vapour-permeable, per se known and available on the market, is generally incorporated. The sheet is generally incorporated into the footwear as a lining or part of the lining of the upper. Footwear of this type generally have a vapour-permeable upper and a waterproof sole injection-moulded so as to be joined to the insole and to the upper.

[0003] The known footwear are made with one or more seams to join together the upper and the lining and possibly the insole. Problems arise at these seams as far as watertightness is concerned because the stitching forms a break in the continuity of the waterproof, vapour-permeable membrane and water can enter the inside of the footwear through the stitching holes. The problem is particularly serious if the upper is made of leather (as is desirable on other counts) in that the sheet of leather, even if it does not allow direct passage of water through the leather, easily conveys the water impinging thereon by capillarity in the direction in which the sheet extends, up to the edges thereof, from which the water can pass inside the footwear, possibly through the stitching holes.

[0004] Attempts have been made to remedy the problem in various ways. European patent EP 0 298 360, for instance, teaches a footwear provided with a lining with a waterproof, vapour-permeable layer and an injection moulded sole, wherein the edge of the upper is positioned at a distance with respect to the edge of the lining; the edge of the upper is stitched to one side of a porous tape, the other side of which is stitched to the lining. During injection moulding the material of the sole passes through the holes in the porous tape and forms a waterproof layer between the stitching involving the upper, which could allow moisture to pass, and the stitching involving the lining, and thus the inside of the footwear.

[0005] Said system has the drawback, however, of being relatively complex and costly.

[0006] An object of the present invention is to overcome the problems of the prior art.

[0007] Another object is to make a footwear of the type with a waterproof, vapour-permeable lining, in which the outside water cannot pass in any way to the inside of the footwear through the components thereof, and to achieve this with an economically advantageous system that is easy to apply.

[0008] The objects have been achieved with a footwear as stated in claim 1 and a method as stated in claim 5.

[0009] In other words, the new footwear comprises an upper, a lining with a waterproof, vapour-permeable membrane, a sole made of injection-moulded plastic material, wherein the bottom edge of the upper is spaced outwardly with respect to the lining edge and stitched to one side of a non-porous tape provided with a layer of heat-reactive adhesive on one side, the opposite side of the non-porous tape is stitched to the lining and to the insole, and the adhesive of the tape bonds together at least the tape and the lining.

[0010] According to the method, the terminal area or edge of the outer upper is made shorter than the terminal area or edge of the lining with membrane; the terminal or edge part of the upper is joined by stitching, generally a reversed sewing or zig-zag stitching, to the non-porous tape with one side coated with heat-reactive adhesive or glue, the other side of the same tape is sewn to the lining and to the insole, the adhesive of the tape is then activated to bond or stick together the tape and the lining. The latter stage is preferably performed at the same time as forming the plastic material sole and exploits the heat thereof.

[0011] The invention achieves the above objects, in particular allowing fully waterproof footwear to be made at limited cost.

[0012] The invention will be described, by way of a non-restrictive example, with reference to the attached drawings, in which:

Figure 1 is a part-sectional axonometric view of a footwear according to the present invention;
Figure 2 is a bottom view of the upper-lining-insole-tape assembly of the footwear of Figure 1, stitched together;
Figure 3 is a cross sectional view of the footwear complete with the sole of plastic material;
Figure 4 is an enlarged view of the detail circled in Figure 3.

[0013] With reference to the figures, a shoe or footwear according to the invention is designated as a whole with reference numeral 10 and comprises at least an upper 12, a lining 14, an insole 16, a sole 18 of plastic material formed directly on the other elements, and a non-porous tape 20.

[0014] The upper 12 is made of sheet material, of any type suited to the purpose, for example leather, and is cut so as to have its bottom edge 22 ending at a distance, that is more outward, with respect to the edge of the lining, as shown in the figures.

[0015] The lining 14 comprises a layer or membrane 24 of waterproof and vapour permeable, or breathable, material and preferably further comprises one or more complementary layers or sheets 26 (only one is illustrated in the figures) with thermal, aesthetic and shock-absorbing functions, as is usual. The bottom edge of the lining 14 is cut so as to be "longer" than the upper, so that it can be turned in along the bottom part of the foot-

wear.

[0016] The insole 16 is made of conventional sheet material for insoles, for example needled fabric, and is cut so as to have an outline which defines a smaller area than the entire bottom inside area of the footwear.

[0017] The tape or band 20 is made of non-porous material, for example U.A. 014 from Uno Art, and has a layer of heat-reactive or thermo-reacting adhesive (per se known) on one side, precisely the side 21 facing upward, toward the lining, in the figures. The tape 20 is sewn, with a longitudinal margin or edge 28 thereof, to the bottom edge of the upper; said seam is designated by 30 in Figure 4. The seam is preferably of the reversed or rolled type. The other longitudinal edge, 29, of the tape 20 is sewn together with the bottom edge of the lining 14 and the edge of the insole 16. The sewing or seam is preferably of the pinching or chain-stitch Strobel type and is designated by reference numeral 32. The side 21 of the tape in the finished footwear is adherent to a strip of lining near the bottom edge thereof.

[0018] The footwear 18 is made of waterproof elastomeric material formed directly integral with the upper, the insole and the tape, by means of any per se know forming method, such as injection moulding, extrusion or other.

[0019] The fotwear manufacturing method will now be described.

[0020] In the first place, the upper 12 and the lining 14 are made or provided, cut so that the bottom peripheral edge of the lining extends a certain distance beyond the peripheral bottom edge of the upper, as well as the non-porous tape or band 20. The upper can be of any known sheet material suited to the use, for example leather. The lining comprises, in a per se known manner, a sheet or membrane of waterproof and vapour-permeable material, designated by 24, and preferably one or more further sheets coupled thereto, to perform other functions, for example to give better thermal insulation or greater comfort, or even for aesthetic purposes. The tape 20 is preferably made of a closely woven fabric of synthetic thread, coated on at least one side with a layer of glue that is heat-activated. The tape is thus non-porous. An adhesive not incorporated into the non-porous tape could also be used.

[0021] The bottom edge of the outer upper is joined to the tape by stitching; a rolled seam is preferably used, as denoted by 30 in the figures. The stitching 30 involves only the tape and the upper, not the lining. The side of the tape coated with adhesive faces toward the lining of the footwear.

[0022] The tape, the lining and the edge of the insole are then joined together by stitching, preferably by a Strobel or chain sewing referenced 32.

[0023] The plastic material sole 18 is then hot moulded onto the assembly consisting of the insole, lining, upper and tape, so as to be in contact and engaged with the insole, tape and upper. Hot moulding of the sole causes activation of the adhesive on the tape, which adheres against the opposite surface of the lining, thus forming a peripheral seal against possible entry of moisture along the seam 30, along the entire perimeter of the bottom part of the shoe. Alternatively, the adhesive of the tape could be activated with a separate operation preliminary to forming of the sole.

[0024] Variations and changes can be made to what has been described; it is understood that changes and modifications within the reach of a person skilled in the art are encompassed by the scope of the present invention as defined in the claims.

Claims

1. Footwear comprising an upper, a lining with a waterproof, vapour-permeable membrane, an insole, a sole of plastic material formed integrally at least with said upper and said insole, **characterized in that**:

   - the upper (12) and the lining (14) are cut so that the bottom peripheral edge of the lining extends beyond the bottom peripheral edge of the upper;
   - the bottom edge of the lining spaced apart from the upper is sewn to the insole (16) along the periphery thereof;
   - and **in that** it comprises a tape (20) of non-porous material, said tape having one edge (28) joined to the upper and not to the lining by means of a first seam (30) and the other edge (29) joined to the lining and the insole but not to the upper by means of a second seam (32) and being sticking at least to the lining along the entire perimeter of the footwear, so as to form a seal against entry into the footwear of any moisture seeping through the first seam.

2. A shoe according to claim 1, **characterized in that** the non-porous tape (20) is coated with heat-reacting adhesive on at least the side (21) facing toward the lining.

3. A shoe according to claim 1 wherein the first seam (30) is a reveresed or rolled seam.

4. A shoe according to claim 1 wherein the second seam (32) is a Strobel-chain stitching seam.

5. A method of manufacturing waterproof, vapour-permeable footwear comprising an upper (12), a lining (14) with a waterproof, vapour-permeable membrane (24), an insole (16), a sole (18) formed directly in contact with at least the upper and the insole, **characterized in that** it comprises the stages of:

   - preparing the upper (12) and the lining (14) so

that the bottom edge of the upper is spaced apart from the bottom edge of the lining, and the lining extends beyond the upper along the entire perimeter,

- preparing a tape (20) of non-porous material,
- joining an edge of the tape to the bottom edge of the upper and not to the lining by means of a first seam (30),
- joining the other edge of the tape to the lining and/or to the insole but not to the upper by means of a second seam (32) spaced apart from the first,
- joining said tape and said lining and/or insole by watertight adhesion along the entire perimeter of the lining and/or insole,
- hot forming the sole.

6. A method according to claim 5 wherein the tape is coated on at least one side with heat-reacting adhesive, and the stage of joining by adhesion takes place during hot forming of the sole.

7. A method according to claim 5 wherein the first seam (30) is a rolled or zig-zag seam and the second seam (32) is a pinched or Strobel-chain type seam.

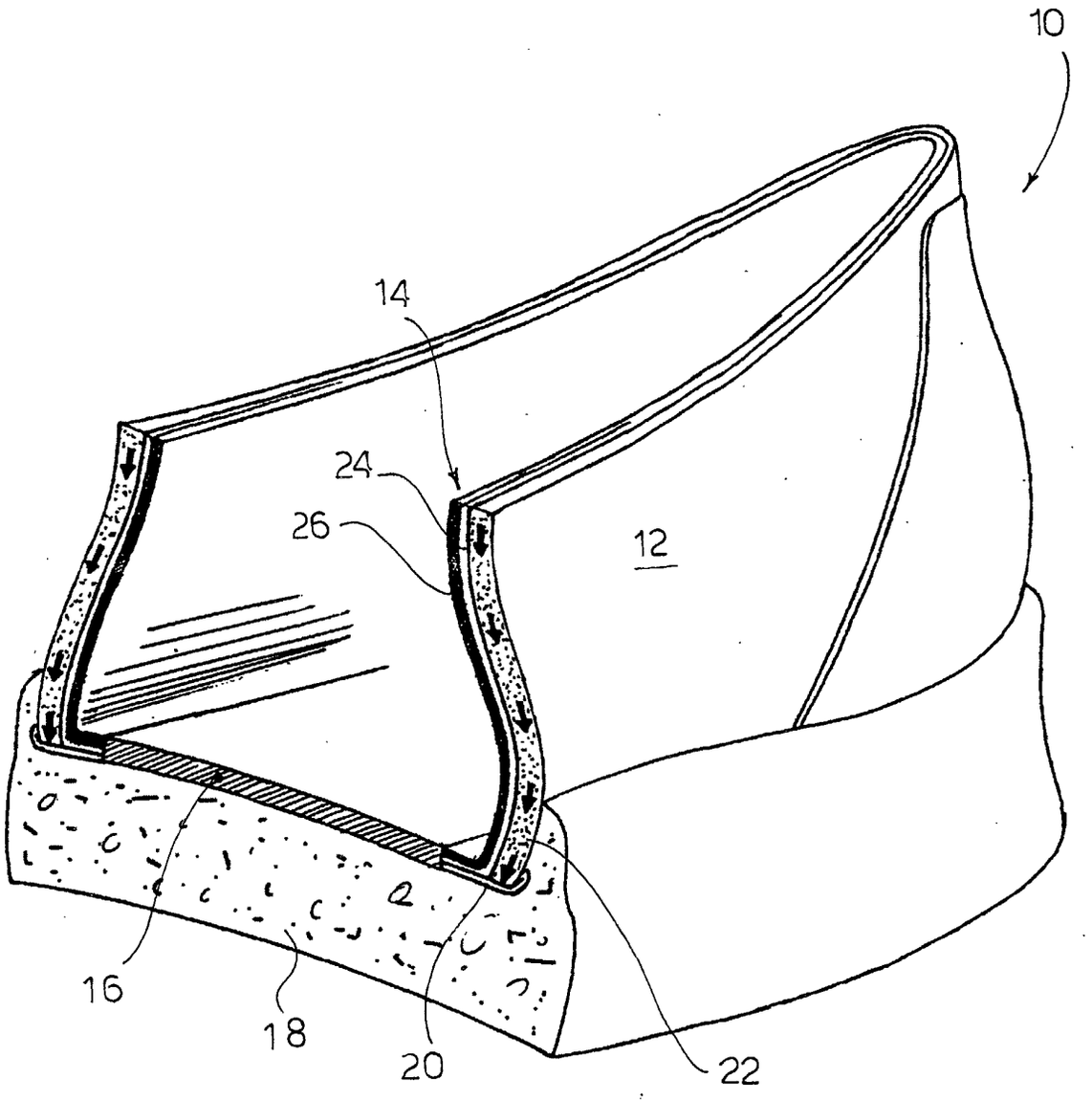
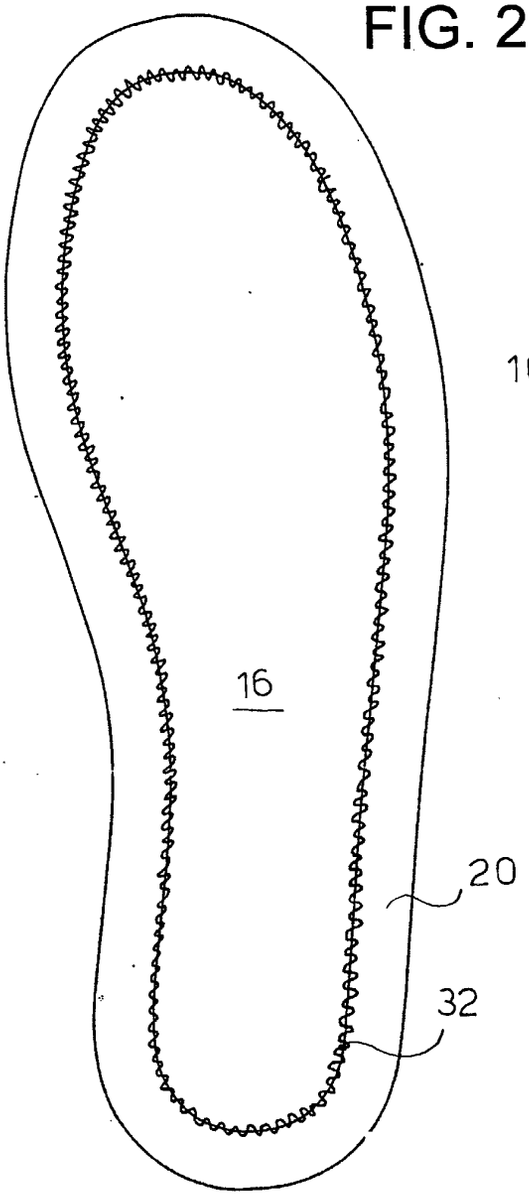


FIG. 1

FIG. 2



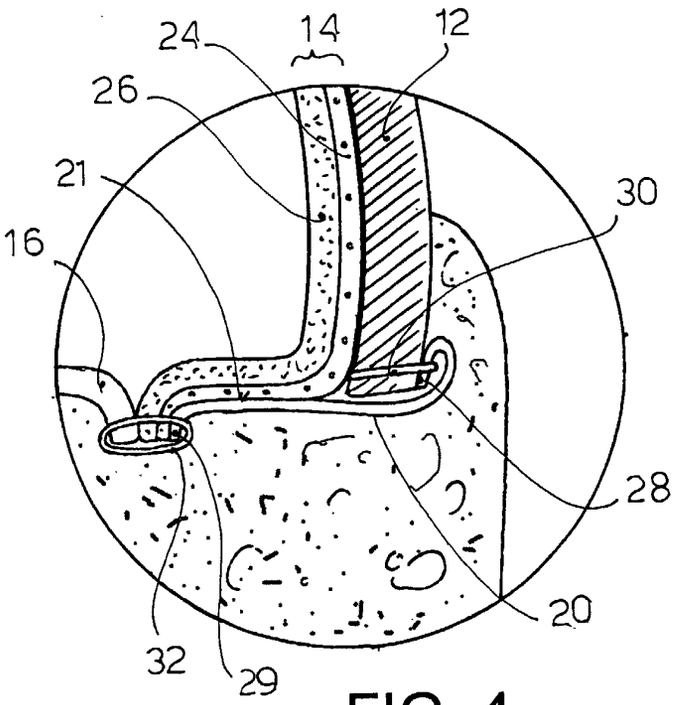
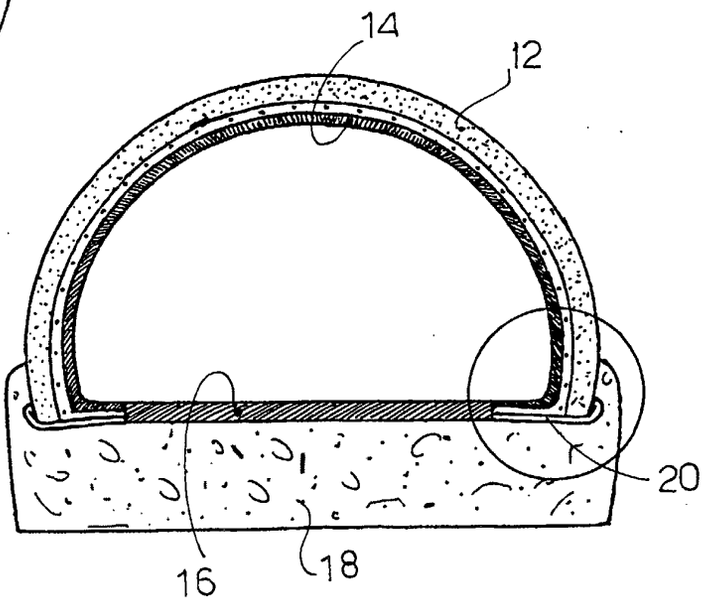


FIG. 4

FIG. 3



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 83 0630

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 40 04 674 A (LEMM & CO GMBH IND WERKE) 22 August 1991 (1991-08-22) * column 2, line 45 - line 61 * * column 3, line 15 - line 33 * * figure 1 *	1-7	A43B9/18 A43B9/02 A43B7/12
X	US 5 285 546 A (HAIMERL FRANZ) 15 February 1994 (1994-02-15) * column 7, line 52 - column 10, line 6; figures 3,5 *	1-7	
A	US 5 433 021 A (MAHLER ROLF-DIRK) 18 July 1995 (1995-07-18) * the whole document *	1,5	
A	US 6 088 935 A (HADERLEIN MANFRED ET AL) 18 July 2000 (2000-07-18) * column 4, line 10 - column 5, line 58; figure 4 *	1,5	
A	WO 01 12003 A (GORE ENTERPRISE HOLDINGS INC) 22 February 2001 (2001-02-22) * page 10, line 33 - page 12, line 9; figure 1 *	1,5	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 March 2002	Cianci, S

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 83 0630

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European 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.

19-03-2002

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 4004674	A	22-08-1991	DE	4004674 A1	22-08-1991
US 5285546	A	15-02-1994	DE	3840087 A1	31-05-1990
			AT	81753 T	15-11-1992
			DE	58902579 D1	03-12-1992
			WO	9006067 A1	14-06-1990
			EP	0445198 A1	11-09-1991
US 5433021	A	18-07-1995	AT	145318 T	15-12-1996
			DE	59304533 D1	02-01-1997
			DK	594029 T3	14-04-1997
			EP	0594029 A1	27-04-1994
			ES	2094445 T3	16-01-1997
			JP	6277101 A	04-10-1994
US 6088935	A	18-07-2000	DE	19749455 C1	17-06-1999
			EP	0916275 A2	19-05-1999
WO 0112003	A	22-02-2001	AU	6642100 A	13-03-2001
			WO	0112003 A1	22-02-2001

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82