

(19)



(11)

EP 2 574 848 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

03.04.2013 Bulletin 2013/14

(51) Int Cl.:

F24C 1/10 (2006.01)

F24C 15/22 (2006.01)

(21) Application number: **11183524.5**

(22) Date of filing: **30.09.2011**

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

Designated Extension States:

BA ME

(72) Inventor: **Nissen, Kerstin**

3500 Værløse (DK)

(74) Representative: **Høiberg A/S**

St. Kongensgade 59 A

1264 Copenhagen K (DK)

(71) Applicant: **Rockwool International A/S**

2640 Hedehusene (DK)

(54) **A patio heater with a layer of mineral wool insulation**

(57) The present invention concerns a patio heater comprising a base portion adapted to accommodate a heat source, a heat generator above the base portion, and a metal reflector dome above the heat generator for reflecting the heat downwards, wherein a layer of mineral wool insulation is arranged above the reflector dome.

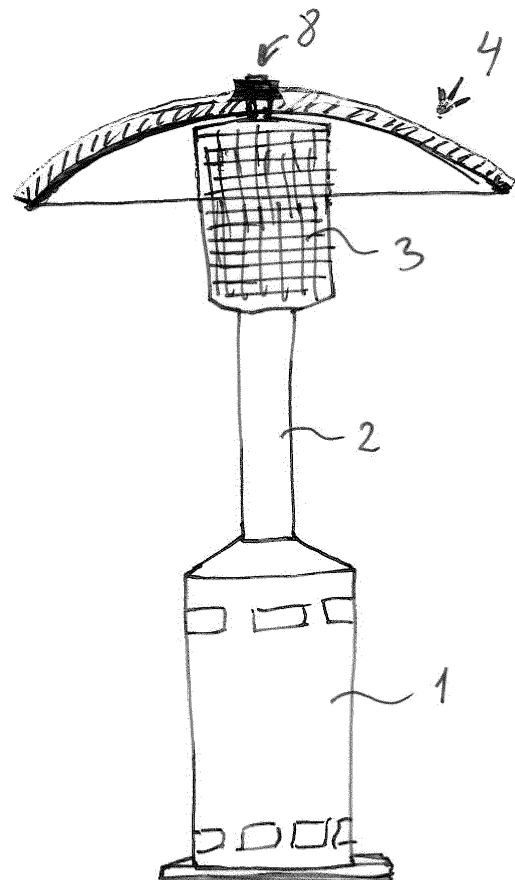


Fig. 1

EP 2 574 848 A1

Description

[0001] The present invention relates to a patio heater comprising a base portion adapted to accommodate a heat source, a heat generator above the base portion, and a metal reflector dome above the heat generator for reflecting the heat downwards.

[0002] Propane-fuelled heaters are widely used for heating outdoor spaces. These so-called patio heaters are used to provide heat in outdoor areas in restaurants, taverns or domestic outdoors facilities or similar hospitality environments for instance in chilly evenings. Residential use of patio heaters have grown over the years and are also used for semi-outdoor hospitality occasions e.g. for providing heat in an open tent or a pavilion, whereby the comfort of the heat provided by the patio heater is combined with a shelter in case of rain.

[0003] However, the metal reflector dome of the patio heater becomes hot due to the contact with the hot gases generated by the combustion of the gas. The hot gasses tend to rise and thereby heat the dome. If the heater is positioned close to a tent, the tent fabric in the near vicinity of the patio heater might be damaged or even be set alight. Such tents are typically made of a polymeric material which will melt or wrinkle if subjected to a heat above a certain temperature which can easily be reached by the gas-fuelled burner of the heater. Moreover there is typically no use for the generated heat rising above the dome of the patio heater.

[0004] One way of attempting to reflect the heat downwards and prevent surplus heat above the dome of the patio heater is known from WO 2009/146421 where a double dome is provided with an air gap between the two domes. However, this solution does not fully prevent heat build-up above the double dome and that the metal dome gradually becomes hot during use whereby the risk of damaging tent fabric or other materials close to the top of the heater is increased.

[0005] It is therefore an object of the present invention to provide a safe guard towards excessive heat generation above the upper surface of the reflector dome of the patio heater.

[0006] This object is achieved by a patio heater comprising a base portion adapted to accommodate a heat source, a heat generator above the base portion, and a metal reflector dome above the heat generator for reflecting the heat downwards, wherein a layer of mineral wool insulation is arranged above the reflector dome.

[0007] Hereby, a thermal insulation is provided which effectively shields the surroundings from the heat from the upper surface of the reflector dome. It is found that the temperature above the layer of mineral wool insulation can be kept at a "hand warm" temperature level. This effectively prevents wrinkling or melting of a polymeric tent fabric arranged above the patio heater, and it also avoids discomfort in case someone accidentally get too close the reflector dome. By the invention it is moreover realised that the use of a layer of mineral wool insulation

does not incur any fire risk as the mineral wool fibre insulation slabs are fire-resistant.

[0008] In a first embodiment of the invention the layer of mineral wool insulation is generally shaped as the reflector dome and is supported by an upper surface of the reflector dome. Moreover, an upper support layer may be arranged on top of the layer of mineral wool insulation. This support layer may preferably be made of a metal sheet material, in particular steel or aluminium. By providing the mineral wool fibre slabs on a support layer, a low density insulation product may be used.

[0009] The reflector dome may be made in a sandwich construction with a lower and upper support layer with a slab of the mineral wool insulation therebetween. This may be advantageous as the mineral wool insulation board then is protected by the support layers and thereby is prevented from deteriorating. The at least one support layer and the mineral wool insulation layer may be bonded together by glue, which preferably is heat resistant and inflammable. As an alternative, the at least one metal layer and the mineral wool insulation layer are mechanically fixed to each other, such as by a threaded mounting assembly.

[0010] In an embodiment of the invention, the upper support layer of the dome is made of a wire mesh. Hereby, a reflector with a low amount of metal may be provided which results in less material which is heat conductive.

[0011] An outer rim of the reflector dome and an outer rim of the upper support layer may preferably be interconnected. Alternatively or in addition, the reflector dome and the layer of mineral wool insulation may be mechanically fixed to each other, such as by a threaded mounting assembly. Hereby, there is achieved an insulated reflector dome which is held together as one unit.

[0012] In another embodiment, the layer of mineral wool insulation is supported by a lower support layer arranged above the reflector dome. The lower support layer may be made of a metal wire mesh. Moreover, an upper support layer may be arranged on top of the layer of mineral wool insulation, wherein the upper support layer may be made of a metal wire mesh. Hereby, suitable reflector domes having a thermal insulation provided thereon may be achieved.

[0013] By the invention it is found sufficient in order to achieve the necessary heat insulation that the layer of mineral wool insulation has a thickness of between 10 and 100 mm, preferably between 15 and 60 mm, more preferably between 20 and 50 mm.

[0014] A second aspect of the invention concerns a use of a mineral wool insulation board as a heat shield for a patio heater, wherein the mineral wool insulation board is arranged above an upper surface of a reflector dome of the patio heater. According to this aspect of the invention, existing patio heaters may be improved by having a mineral wool insulation board arranged above the reflector dome.

[0015] In the following, the invention is described in more detail with reference to the drawings, in which:

figure 1 is a schematic side view of a conventional patio heater;

figure 2 is a detailed cross-sectional side view of a first embodiment of the invention;

figure 3 is a detailed cross-sectional side view of a second embodiment of the invention;

figure 4 is a schematic side view of a third embodiment of the invention;

figure 5 is a top view of the embodiment shown in fig. 4 or 5,

figure 6 is a perspective view of the embodiment shown in fig. 4 or 5 and

figure 7 is a schematic side view of a fourth embodiment of the invention.

[0016] With reference to figure 1, a conventional patio heater is shown. The patio heater comprises a base portion with a housing 1 wherein a heat source, such as a propane gas vessel, may be accommodated. A pole 2 extends above the base portion and on the distal top end of the pole 2 a heat generator 3 is provided. The heat generator may be a gas burner which is fuelled from the heat source in the housing 1 via a supply hose (not shown) inside the pole 2. Above the heat generator 3 the patio heater is provided with a cap in the form of a metal reflector dome 4 which reflects the heat radiation from the heater downwards. The reflector dome 4 is attached to the heat generator 3 and the pole 2 by suitable fastening means 8. The reflector dome 4 has an upper surface 11 and since the reflector dome conventionally is made of a metal sheet the upper surface 11 becomes hot during use. The heat emitted from the upper surface 11 of the reflector dome 4 is normally wasted.

[0017] According to a first embodiment of the invention and as shown in fig. 2, the reflector dome 4 is provided with a layer of mineral wool insulation 5 which in this embodiment is sandwiched between an outer, upper support plate 6 and the upper surface 11 of the reflector dome 4. The layer of mineral wool insulation 5 is preferably provided as a mineral wool insulation board comprising mineral fibres bonded together in conventional manner. The upper support plate 6 and the layer of mineral wool insulation 5 are mechanically fixed to the reflector dome 4 by a threaded mounting assembly 8. Alternatively, the upper support plate 6 may be fixed to the mineral wool insulation layer 5 by an adhesive bonding, e.g. by a heat-resistant glue. Thereby the heat bridge from the reflector dome 4 to the upper support plate 6 can be eliminated.

[0018] The outer rim of the reflector dome 4 and of the upper support plate 6 may be interconnected 6 (not shown), so that the layer of mineral wool insulation 5 is completely enveloped. This reduces or even eliminates any tendency of the mineral wool insulation to disintegrate as a result of wear and tear. The upper plate 6 is provided with a shape corresponding to the shape of the reflector 4. The mineral wool insulation 5 may also be preshaped in the desired form but may also be provided

in a conventionally flat shape with a relative low density whereby the mineral insulation 5 may be easily shaped by the upper support plate 6.

[0019] In another embodiment, as shown in fig. 3, the layer of mineral wool insulation 5 is provided as a mineral wool insulation board with a relative high density and preformed and therefore self-contained. The mineral wool insulation board is glued to the upper surface 11 of the reflector dome 4. The edges of the mineral wool insulation board are preferably provided with a surface treatment to reduce disintegration of the edge regions. Such surface treatment may include coating or painting with a heat resistant material.

[0020] Other alternatives are shown in figures 4 to 7, where the layer of mineral wool insulation 5 is arranged in a generally flat shape above the reflector dome 4. As shown in figure 4 to 6, an upper and lower wire mesh 9, 10 are provided on each side of the mineral wool insulation 5. The upper and lower wire mesh 9, 10 and the mineral wool insulation layer 5 are sandwiched together and assembled by a treaded fastening assembly 8, preferably a bolt and a nut with suitably shaped washers. The threaded fastening assembly also connect the assembly (wire mesh 9, 10 and mineral wool insulation 5) to the reflector dome 4 of the patio heater.

[0021] The embodiment shown in fig. 7 differs from the embodiment shown in figures 4 to 6 only in that the upper wire mesh 9 is replaced by an upper support plate 6.

[0022] In figures 4 to 7, the layer of mineral wool insulation 5 and the supporting wire mesh 9, 10 and upper support plate 6 are shown in flat configuration. However, it is realised that the wire mesh 9, 10 and the mineral wool insulation 5 may be formed to any shape that is desired for the reflector dome 4. Similarly, the outer shape is shown as square in fig. 6 and 7, but it is realised that it may be cut into any suitable shape.

[0023] The present invention is described above with reference to some preferred embodiments. However, it is realised that other variants and equivalent solutions may be provided without departing from the scope of the invention as defined in the accompanying claims.

Claims

1. A patio heater comprising
a base portion adapted to accommodate a heat source,
a heat generator above the base portion, and
a metal reflector dome above the heat generator for reflecting the heat downwards, **characterized in that**
a layer of mineral wool insulation is arranged above the reflector dome.
2. A patio heater according to claim 1, wherein the layer of mineral wool insulation is generally shaped as the reflector dome and is supported by an upper surface

of the reflector dome.

3. A patio heater according to claim 2, wherein an upper support layer is arranged on top of the layer of mineral wool insulation. 5
4. A patio heater according to claim 3, wherein the upper support layer is made of a metal wire mesh.
5. A patio heater according to claims 3, wherein the upper support layer is made of a metal sheet material. 10
6. A patio heater according to claim 5, wherein an outer rim of the reflector dome and an outer rim of the upper support layer are interconnected. 15
7. A patio heater according to any of claims 2 to 6, wherein the upper surface of the reflector dome and the layer of mineral wool insulation are bonded together by glue. 20
8. A patio heater according to any of claims 2 or 6, wherein the reflector dome and the layer of mineral wool insulation are mechanically fixed to each other, such as by a threaded mounting assembly. 25
9. A patio heater according to claim 1, wherein the layer of mineral wool insulation is supported by a lower support layer arranged above the reflector dome. 30
10. A patio heater according to claim 9, wherein the lower support layer is made of a metal wire mesh.
11. A patio heater according to claim 9 or 10, wherein an upper support layer is arranged on top of the layer of mineral wool insulation. 35
12. A patio heater according to claim 11, wherein the upper support layer is made of a metal wire mesh. 40
13. A patio heater according to any of claims 9 to 12, wherein the reflector dome and the layer of mineral wool insulation are mechanically fixed to each other, such as by a threaded mounting assembly. 45
14. A patio heater according to any of the preceding claims, wherein the layer mineral wool insulation has a thickness of between 10 and 100 mm, preferably between 15 and 60 mm, more preferably between 20 and 50 mm. 50
15. Use of a mineral wool insulation board as a heat shield for a patio heater, wherein the mineral wool insulation board is arranged above an upper surface of a reflector dome of the patio heater. 55

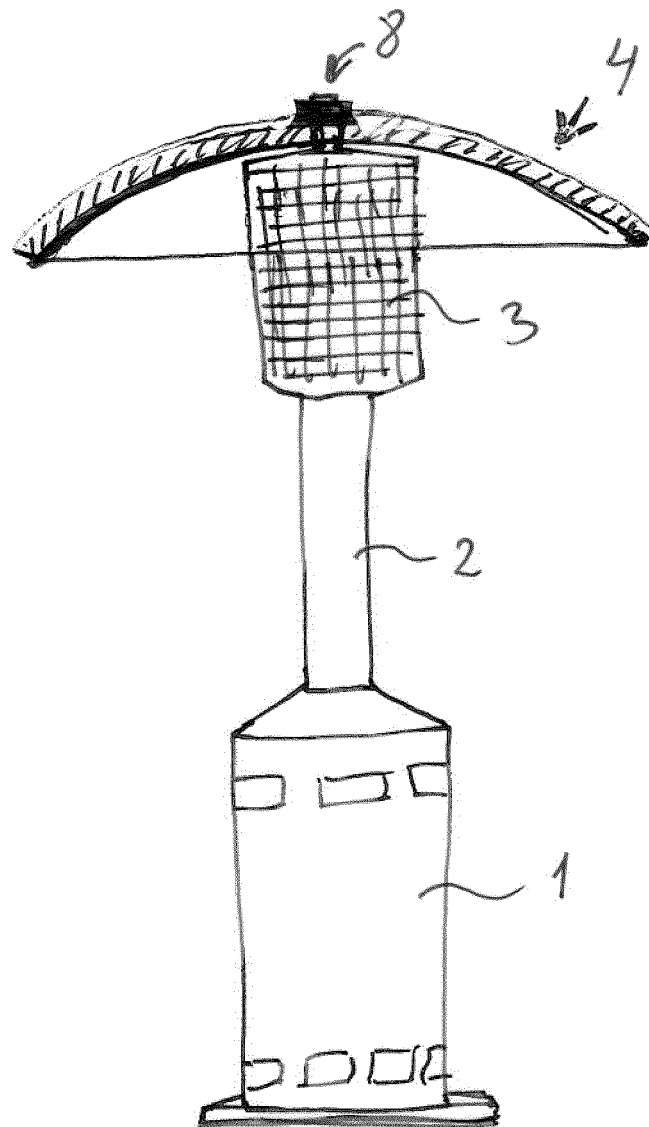
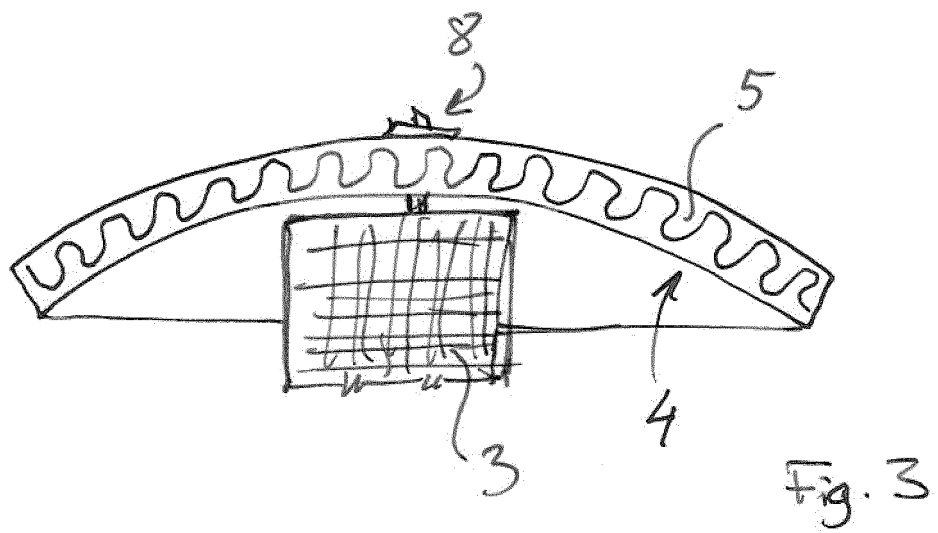
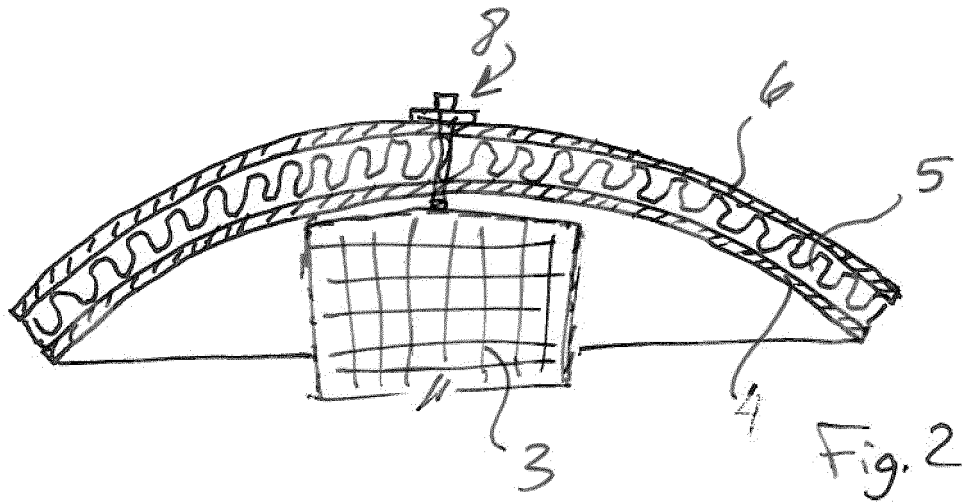


Fig. 1



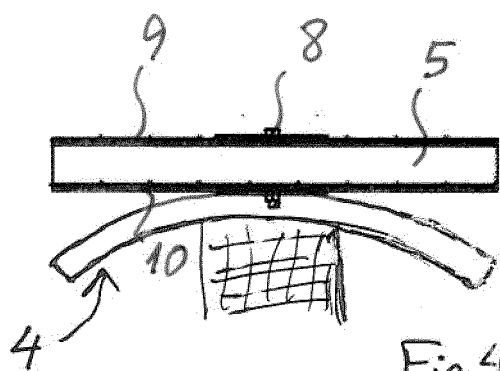


Fig. 4

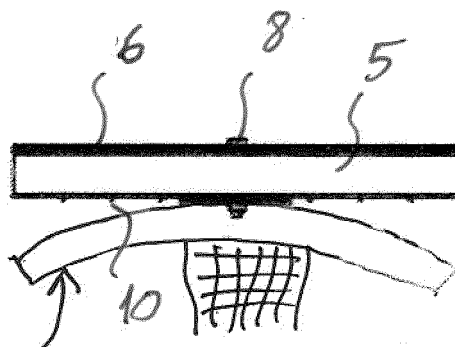


Fig. 7

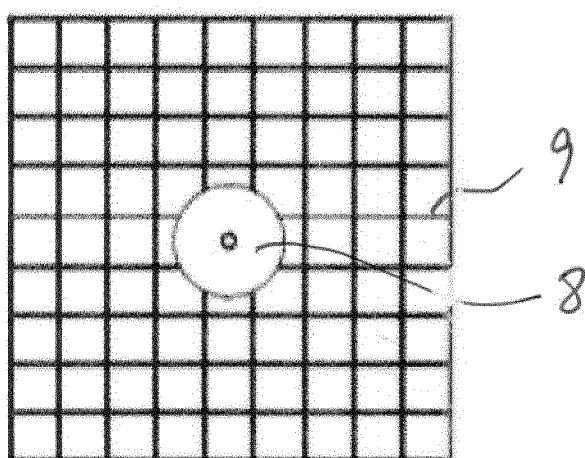


Fig. 5

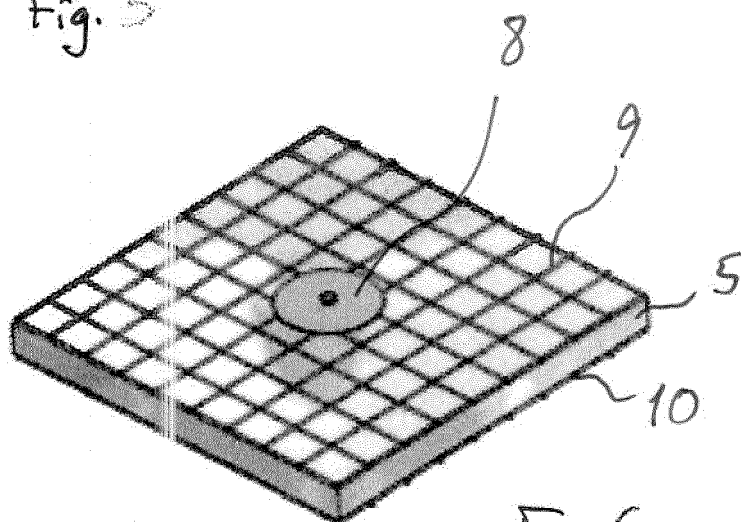


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 11 18 3524

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 336 450 B1 (COLLET JEAN [FR]) 8 January 2002 (2002-01-08)	1,4,7,9,15	INV. F24C1/10
Y	* column 4, line 60 - line 67 *	2,3,5,6,8	F24C15/22
Y	----- DE 296 07 829 U1 (KEMNA STEFAN [DE]) 1 August 1996 (1996-08-01) * page 4, paragraph 2; figure 1 *	2,3,5,6,8	
Y	----- DE 39 40 155 A1 (GOGAS GOCH GMBH & CO [DE]) 6 June 1991 (1991-06-06) * column 2, line 60 - line 65; figure 2 *	2,3,5,6,8	
A	----- DD 263 557 A1 (BERLIN ENERGIEKOMBINAT [DD]) 4 January 1989 (1989-01-04) * page 2, last paragraph; figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 May 2012	Examiner Verdoodt, Luk
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			

2
EPO FORM 1503 03.82 (P04C01)

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

EP 11 18 3524

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.

02-05-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6336450	B1	08-01-2002	AT 208482 T 15-11-2001
		DE 69802400 D1	13-12-2001
		DE 69802400 T2	22-08-2002
		EP 0991900 A1	12-04-2000
		ES 2167913 T3	16-05-2002
		FR 2764677 A1	18-12-1998
		JP 2002510381 A	02-04-2002
		US 6336450 B1	08-01-2002
		WO 9858211 A1	23-12-1998

DE 29607829	U1	01-08-1996	CA 2252608 A1 30-10-1997
		DE 19615770 A1	23-10-1997
		DE 29607829 U1	01-08-1996
		EP 0894223 A1	03-02-1999
		WO 9740319 A1	30-10-1997

DE 3940155	A1	06-06-1991	NONE

DD 263557	A1	04-01-1989	NONE

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2009146421 A [0004]