(19) Europäisches Patentamt
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(11) **EP 2 346 303 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.07.2011 Bulletin 2011/29

(51) Int Cl.:
H05B 3/26 *(2006.01)*

(21) Application number: **10150774.7**

(22) Date of filing: **14.01.2010**

(84) Designated Contracting States:
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 SE SI SK SM TR
Designated Extension States:
AL BA RS

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(54) **Radiator panel for domestic and industrial applications based on heater with single sided FRTP insulation**

(57) The invention relates to a foil heater made from etched circuit (7) on a PEL-film (5).

According to the invention the foil heater is bonded with PP-based hot melt film (5) towards a continuous fibre reinforced thermoplastic (4) material based on PP and glass with a 0/90 configuration. The heater has a curved shape with a radius in the range of 0,3-2 m.

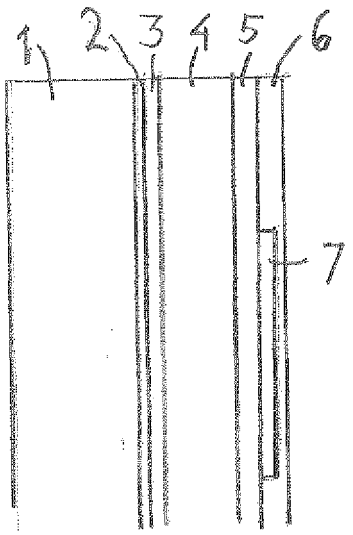

Fig. 1

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Description

[0001] Film heaters have been used as panel heaters for some time. The basic problem with film heaters is that when the size increases so are the capacitive leakage currents. This is mainly restricting the size of foil heaters attached on an electrically conductive material such as Steel or Aluminium. On radiator panels this has been solved by using a foam adhesive as in FR2875369 or by creating an air gap between the heater and conductive material in different ways. The above solutions all have the drawback that makes them difficult to use in mass production.

[0002] The innovation in this case will eliminated the need of foam adhesive when applying the film heaters towards the front panel and make the assembly of the heater simple and fool proof.

[0003] The innovation is based on foil heater made from etched circuit (7) such as Aluminium, Cu, Brass, Stainless steel or NiCr on a PET Film (6) carrier. The foil heater is bonded with PP-based hot melt film (5) towards a continuous fibre reinforced thermoplastic, FRTP (4) material based on PP and glass fibre with a 0/90 configuration. Two additional layers are needed when used in Class II products without protective grounding; with PP-based hot melt film (3) and PET film (2). The single sided lamination on a 0/90 laminated will give the heater curved shape with an inherent radius of 0,3-2 m. The curvature is used to provide a stress towards the metal front plate (1) when the heater is assembled in the front panel. In this way there is no need for any adhesive to keep the heater in place.

[0004] To prevent the heater from snapping back, steel or aluminium springs (8) are used. The springs have PET-layer (9) bonded with foam adhesive (10) to provide electrical insulation (Class II- heaters mainly) and abrasion resistance towards the circuit material.

[0005] The concept has proven leakage currents of 0,4 $mA/m^2$with 0,7 mm FRTP and will then be able to be used for radiant panels for class II up to 0,6 m^2 and class I up to 1,8m^2

Claims

1. A foil heater made from etched circuit (7) on a PET film (6), **characterized in that** the foil heater is bonded with PP-based hot melt film (5) towards a continuous fibre reinforced thermoplastic (4) material based on PP and glass fibre with a 0/90 configuration, and that the heater has a curved shape with a radius in the range of 0,3-2 m.

2. A foil heater according to claim 1, **characterized in that** the heater includes two additional layers, namely a PP-based hot melt film (3) and a PET film (2).

3. A foil heater according to claim 1 or 2, **characterized in that** the etched circuit is of a material selected from the group consisting of Aluminium, Cu, Brass, Stainless steel and NiCr.

4. A heater device including a radiator panel with a metal front plate (1), **characterized in that** the heater device includes a foil heater according to any of claims 1-3, whereby the curved shape of the foil heater is stressed towards the metal front plate (1).

5. A heater device according to claim 4, **characterized in that** it includes steel or aluminium springs, which springs (8) have PET-layer (9) bonded with foam adhesive.

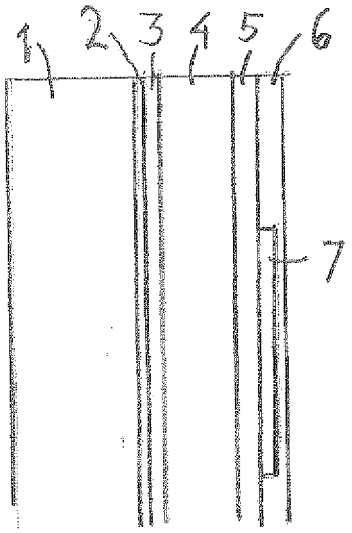

Fig. 1

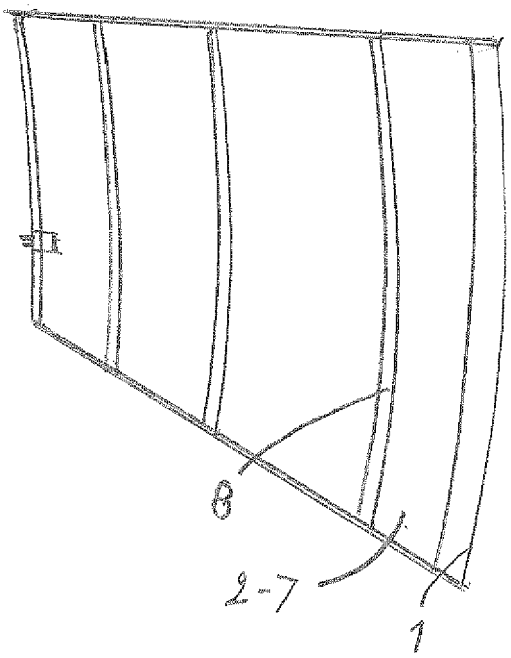

Fig. 2

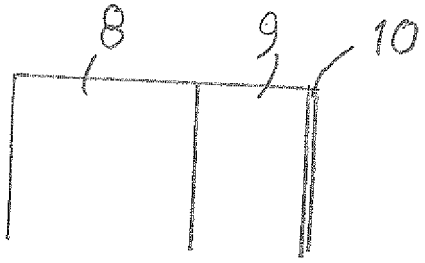

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 10 15 0774

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A	GB 1 481 014 A (HOECHST AG) 27 July 1977 (1977-07-27) * page 3, line 18 - line 40 *	1-5	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 June 2010	Gea Haupt, Martin

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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REFERENCES CITED IN THE DESCRIPTION

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