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Datasheet for the decision of 7 July 2021

Case Number: T 2022/17 - 3.3.06

Application Number: 09724134.3

Publication Number: 2259921

IPC: B32B38/10, H05K3/04, G06K19/077

Language of the proceedings: EN

Title of invention:
METHOD FOR MANUFACTURING LAMINATED CIRCUIT BOARD

Patent Proprietor:
Tecnomar Oy

Opponent:
AVERY DENNISON CORPORATION

Headword:
Tecnomar/laminated circuit

Relevant legal provisions:
EPC Art. 100(a), 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

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Case Number: T 2022/17 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 7 July 2021

Appellant: (Opponent)	AVERY DENNISON CORPORATION 150 North Orange Grove Boulevard Pasadena, California 91103-3596 (US)
Representative:	Müller-Boré & Partner Patentanwälte PartG mbB Friedenheimer Brücke 21 80639 München (DE)
Respondent: (Patent Proprietor)	Tecnomar Oy Verkkokuja 7 B Espoo 02230 (FI)
Representative:	Zimmermann & Partner Patentanwälte mbB Postfach 330 920 80069 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 17 July 2017 rejecting the opposition filed against European patent No. 2259921 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	J.-M. Schwaller
Members:	S. Arrojo
	C. Brandt

Summary of Facts and Submissions

I. The appeal from the opponent is directed against the decision to reject the opposition against European patent No. 2 259 921, with claim 1 thereof reading:

"1. A method for manufacturing a circuit board featuring conductive patterns, comprising the following steps of:

i) affixing a conductive layer, such as a metal foil (3), to a substrate material (1) selectively, such that a part of the conductive layer, such as the metal foil (3), comprising desired areas (3a) for the final product and narrow areas (3c) between the final product's conducting areas, is affixed to the substrate material (1) by means of a bond (2), and removal-intended more extensive areas (3b) of the conductive layer, for example the metal foil (3), are left substantially unattached to the substrate material in such a way that the removable area (3b) is in attachment with the substrate material (1) by not more than its edge portion to be patterned in a subsequent step ii) and possibly by areas which preclude a release of the removable areas prior to a step iii);

ii) patterning, by a removal of material, the conductive layer, such as the metal foil (3), from narrow gaps between the desired conducting areas (3a), and from an outer periphery of said extensive areas (3b) removable in a solid metallic state, for establishing conductor patterns;

iii) removing the removable areas (3b), not affixed to the substrate material (1), from the conductive layer,

such as the metal foil (3), in a solid metallic state after the conductive layer's edge area, which was removed from the removable area's outer periphery during the course of step ii), no longer holds the removable areas (3b) attached by their edges to the substrate material."

II. In the statement of grounds of appeal, the appellant requested to set aside the decision and to revoke the patent on the grounds under Articles 100(a) and (c) EPC.

III. In its reply, the proprietor and respondent requested to dismiss the appeal and to maintain the patent as granted or, as an auxiliary measure, on the basis of one of auxiliary requests A, B, C, D or E filed with this reply.

IV. In a communication under Article 15(1) RPBA, the board expressed its preliminary opinion that the patent as granted appeared to meet the requirements of the EPC.

V. At the oral proceedings, which took place on 7 July 2021, the board deviated from its preliminary opinion and concluded that the subject-matter of claim 1 was not inventive in view of document O2 (EP 0 790 123 A2). In response to this conclusion, the proprietor proposed to submit an amended version of auxiliary request E. After the board indicated that there were no exceptional circumstances pursuant to Article 13(2) RPBA 2020 which would justify the submission of a new request at that stage, the proprietor withdrew all its auxiliary requests. Before the debate was closed, the **final requests of the parties** were established to be as follows:

The opponent and appellant requested to revoke the patent in its entirety.

The proprietor and respondent requested to dismiss the appeal and to maintain the patent as granted.

Reasons for the Decision

1. Main request - Inventive step

The opposition ground under Article 100(a) EPC in combination with Article 56 EPC prejudices the maintenance of the patent as granted.

1.1 Closest prior art

Document O2 discloses a method of laminating an electrical circuit (col. 3, lines 15-16) with a technique (from now on "technique a)") comprising the steps of affixing a conductive layer to a substrate and patterning this layer by laser vaporisation (col. 5, lines 14-21; col. 17, lines 8-13; claim 47). Furthermore, when the circuit includes extended areas which are functionally non-conductive, these can be diced to form a plurality of individual conductive islands separated by dielectric material (col. 17, lines 13-19).

Document O2 further discloses (col. 4, lines 40-47 and col. 4 line 54 - col. 5, line 5; claim 1) a technique of forming a laminate (from now on "technique b)") by selectively applying an adhesive to subsequently cut and remove the non-adhered portions.

The board agrees with the parties in that the embodiment concerning the manufacturing of an

electrical circuit using technique a) represents the closest prior art, because it is the most promising starting point both from a structural and from a substantial point of view.

The board also considers that document O2 does not include any clear and unambiguous disclosure of a combined application of techniques a) and b) for manufacturing an electrical circuit.

The subject-matter of claim 1 therefore differs from the disclosure in O2 in that the two techniques are combined for manufacturing an electrical circuit, or, expressed in a different way, it differs from the embodiment of O2 applying technique a) to manufacture an electrical circuit, in that technique b) is used for dealing with the extensive non-functional areas of the conductive layer.

1.2 Problem solved by the invention

There is general agreement that technique b) provides the effect of facilitating the reusing/recycling of the conductive layer, as it is evident that the selective application of the adhesive facilitates the removal of the non-adhered portions from the laminate.

The proprietor argued that the invention would give rise to further technical effects, namely (in view of par. [0025] of the patent) providing "a more readily controlled and more efficient process, even in the event that the pattern layout contains extensive areas without conductors", "avoiding the problems caused by an adhesive coating left in the non-conductive area", providing an "economically viable and reliable manufacture of electrical circuits", simplifying the

process and reducing "the amount of manufacturing-produced hard-to-recycle scrap".

Even under the assumption that the invention would provide each of the above technical effects, the board considers that these are either directly derivable from the improved recycling/reuse effect (i.e. an efficient process, economically viable or reduced scrap) or merely represent bonus effects (i.e. simplified process, readily controllable or avoidance of residual adhesive).

The board therefore agrees with the appellant in that the problem solved by the invention is how to provide a method for manufacturing a circuit board which facilitates the recycling/reuse of materials.

1.3 Obviousness

1.3.1 The proprietor argued that the invention was based on the realisation that two known lamination techniques (i.e. techniques a) and b)) could be combined to synergistically benefit from the precision provided by patterning while also enabling a simple and efficient removal of non-functional extensive areas of the conductive layer by means of a selective adhesive application. Even though both techniques were formally described in O2, there was no incentive to combine them, as this required a purposeful selection of certain features from different embodiments. The fact that in the cited prior art (including O2) the electrical circuits were manufactured using either technique a) or technique b) with no hint to a possible combination, should be regarded as a hint that these techniques were considered as mutually exclusive alternatives, and that their combination was not

trivial. In this respect, a skilled person starting from a process using technique a) would have multiple alternatives for dealing with the extensive areas, so there would be no reason to select technique b) in particular for this purpose. In fact, document O2 explicitly proposed a different solution based on dicing the extensive areas of the conductive layer, which effectively taught away from considering other alternatives such as technique b). Furthermore, there was no reason to consider technique b) in particular, as this was clearly linked to the manufacturing of food packages for microwaves, which was far removed from the relevant field of electrical circuits. Consequently, a skilled person would only contemplate combining techniques a) and b) with the benefit of hindsight.

1.3.2 In the board's view, technique b) is not necessarily linked to the embodiment of food packages for microwaves, as O2 also discloses this lamination process in a general context (col. 4, lines 40-47 and col. 4 line 54 - col. 5, line 5; claim 1) and explicitly indicates that it is applicable to the objects of the invention (col. 4, lines 36-37), one of which is the provision of manufacturing methods for an electrical circuit (see col. 3, lines 15-18). However, it will be assumed for the sake of the argument (in the proprietor's favor) that there is no disclosure of technique b) within the context of electrical circuits.

1.3.3 Even under the above assumption, the board considers that the subject-matter of claim 1 is not inventive in view of O2 for the following reasons:

In the embodiment of O2 regarded as the closest prior art (col. 17, lines 8-21), there is an explicit differentiation between the patterned area and the non-

functional extensive area of the circuit ("...the circuit includes extended areas which are functionally non-conductive"). Unlike the patterned areas, these extended areas are not vaporised with the laser beam, but are diced to form isolated portions using a die cutter or the laser beam itself. So the closest prior art already anticipates the use of different techniques to treat the patterned area and the extended non-functional areas.

The board disagrees with the proprietor's argument that the dicing technique proposed in O2 would teach away from the solution in claim 1 or that it would constitute a disincentive to explore other alternatives, because the underlying technical problem is to provide a process which improves recycling/reuse of the conductive layer, for which the dicing technique clearly represents a sub-optimal solution. Furthermore, in O2 the dicing technique is presented (col. 14, lines 44-55, "... without the necessity for completely removing the metal foil in those regions ...") as an alternative to the removal of the conductive layer using technique b). Although this passage concerns the food package embodiment, it provides a hint that both techniques represent alternative options for dealing with the extensive non-functional areas of the conductive layer for laminates in general.

Having established that there are no clear reasons to disregard technique b) in O2 as an alternative to the dicing technique in the closest prior art embodiment, it remains to be seen whether the skilled person would contemplate this solution in particular to solve the underlying technical problem.

It is first noted that O2 explicitly describes technique b) (col. 8, lines 48-50) as a way of facilitating the removal and recycling of the metal foil, which is already a strong hint to consider this alternative to solve the problem of improving the recycling/reuse of the conductive layer in the electrical circuit. Thus the only question is whether a skilled reader would contemplate this teaching, considering that the step of recycling is presented within the context of a laminate used in food packages for microwaves.

In the board's view, there is no reason to conclude that the preferred used of technique b) in the embodiment of food packages is related to any technical difference with respect to the laminates used for the electrical circuit. Instead, this seems to be more of a scale issue, as it is clear that food packaging tends to be significantly larger than electrical circuits, which arguably makes recycling/reuse more interesting. However, it would be obvious to a person skilled in the art that the technical effects and advantages achieved with laminates for food packaging also apply to the manufacture of electrical circuits, albeit on a smaller scale. In other words, the skilled person would recognise that the application of technique b) to the various embodiments would differ quantitatively, but not qualitatively/technically.

In view of the above argumentation, the board concludes that a skilled reader starting from the closest embodiment in O2 (i.e. the process to manufacture an electrical circuit using technique a)) would consider technique b) (i.e. the selective application of adhesive and the subsequent removal of non-adhered extensive portions from the conductive layer in a solid

metallic state) as an obvious solution to the underlying problem of improving the recycling/reuse of the conductive layer.

The subject-matter of claim 1 is therefore considered to be rendered obvious by the combined teachings of document O2.

2. Since the only request maintained by the proprietor-respondent does not meet the requirements of the EPC, the opponent's appeal succeeds.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

B. ter Heijden J.-M. Schwaller

Decision electronically authenticated