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Datasheet for the decision of 27 November 2014

Case Number: T 0582/10 - 3.4.03

Application Number: 03009848.7

Publication Number: 1363484

IPC: H05K5/02, F21V31/03

Language of the proceedings: EN

Title of invention:
Ventilation member and vented housing using the same

Applicant:
NITTO DENKO CORPORATION

Headword:

Relevant legal provisions:
EPC 1973 Art. 54(1), 56
EPC Art. 123(2)

Keyword:
Inventive step - after amendment (yes)

Decisions cited:

Catchword:

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Case Number: T 0582/10 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 27 November 2014

Appellant: (Applicant)	NITTO DENKO CORPORATION 1-2, Shimohozumi 1-chome Ibaraki-shi Osaka (JP)
Representative:	Grünecker, Kinkeldey, Stockmair & Schwanhäusser Leopoldstrasse 4 80802 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 19 October 2009 refusing European patent application No. 03009848.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Eliasson
Members:	T. M. Häusser
	T. Karamanli

Summary of Facts and Submissions

I. The appeal concerns the decision of the examining division refusing the European patent application No. 03 009 848 for lack of novelty (main request and auxiliary requests 1 to 3 then on file) and lack of inventive step (auxiliary request 4 then on file).

II. Reference is made to the following documents:

D1: EP 1 202 616 A1,
D8: EP 1 102 002 A2.

III. At the oral proceedings before the board the appellant requested that the decision under appeal be set aside and that a patent be granted in the following version:
- Claims: Nos. 1 to 12, filed during oral proceedings of 27 November 2014;
- Description: pages 1 to 3, 5 to 9, 13 and 15 to 29 as originally filed, and pages 4, 10, 11, 12, and 14, filed at the oral proceedings of 27 November 2014,
- Drawings: sheets 1 to 14, filed with letter dated 25 June 2003.

IV. The wording of independent claim 1 of the sole request is as follows (board's labelling "(i)", "(ii)", "iii)", "(iv)"):

"1. A ventilation member comprising:
a breathable film (4) transmitting gas passing through an opening portion (8) of a housing (7) in a state in which said breathable film (4) is fixed to said opening portion (8); and
a support (2) including a supporting portion (2a) for supporting said breathable film (4)

(i) and an insertion portion (2b) to be inserted into said opening portion (8) of said housing (7);

(ii) wherein a lock structure (2c,2p) for locking said support (2) in said housing (7) by rotating said support (2) around a central axis of said support (2) is formed in said insertion portion (2b),

the material of the breathable film (4) is at least one kind from fluororesin porous materials and polyolefin porous materials, and

said breathable film (4) is subjected to a liquid repellent treatment using a polymer having a perfluoro alkyl group, wherein a reinforcement material (5) having a pore size larger than that of the breathable film (4) and superior in gas permeability is laminated to the side of the breathable film (4) facing the opening portion (8) of the housing (7)

(iii) by adhesion lamination, thermal lamination, heating deposition or ultrasonic deposition,

(iv) wherein the reinforcement material (5) is a non-woven fabric and wherein the reinforcement material (5) is fixedly attached to the support (2) by heating deposition or ultrasonic deposition."

V. The appellant argued essentially as follows:

a) Amendments

The additional features of the newly filed claim 1 of the sole request were based on the description, page 11, lines 4-9 and page 12, lines 7-16.

b) Novelty and inventive step

Document D1 disclosed that the membrane 8 might be bonded on one or both sides to a backing material, which might be a perforated plate or a mesh. However, it was not disclosed that the backing material was a non-woven fabric. Furthermore, there was no disclosure in what manner the backing material was in fact bonded to the membrane 8. Moreover, there was no disclosure that the backing material was fixedly attached to the support by heating deposition or ultrasonic deposition.

When starting from document D1 as the closest state of the art, the objective technical problem was to provide good adhesion between the laminate and the support. This was achieved by the distinguishing features which allowed molten resin of the support to flow into the gaps between the fibers which randomly overlapped each other.

Document D1 was leading away from using a backing material as it was described that the membrane 8 preferably had no backing material. Furthermore, the specific disclosure in D1 related to a membrane which was molded into the support structure. There was merely a general statement that thermal welding might also be used to attach the membrane to the venting duct 12, without providing any guidance on how to do this in detail. Multiple steps were necessary to achieve at the claimed invention.

Document D8 related to a similar device for venting a housing but had a different design comprising an elastomeric cylindrical body which was pulled over a tube of the housing. Therefore, the cylindrical body had to be flexible enough to achieve this, which was incompatible with the locking structure of document D1.

Reasons for the Decision

1. The appeal is admissible.

2. Amendments

Claim 1 is based on claim 1 as originally filed and on the description as originally filed (page 10, lines 16-21; page 11, line 4 - page 12, line 19).

Dependent claims 2 to 12 are based on original claims 2 to 11 and 14, respectively. The description has been brought into conformity with the amended claims and supplemented with an indication of the relevant content of the prior art without extending beyond the content of the application as filed.

Accordingly, the board is satisfied that the amendments comply with the requirements of Article 123(2) EPC.

3. Novelty

3.1 Document D1

3.1.1 Document D1 discloses (see paragraphs [0001], [0040]-[0047], [0072]-[0080], and [0086]) a venting element for electronic housings comprising a plastic body 2 having a fastening part 9 and a support part 5. The fastening part 9 has the task of fastening the plastic body in an electronic housing 1 and may be designed, for example, as a thread 32. The support part 5 serves for receiving a waterproof and gas-permeable membrane 8. In the center of the plastic body 2 there is a venting duct 12 which runs through the support part 5

and fastening part 9 and is closed in the support part 5 by the membrane 8.

Suitable materials for the membrane are among others polyolefins or preferably fluoropolymers. The membrane must have a very low surface energy and should be highly fluorinated or provided with a highly fluorinated coating, which may be chosen from the group of amorphous copolymers with a fraction of 10-40 mol % tetrafluoroethylene and 60-90 mol % perfluoro 2,2-dimethyl-1,3-dioxole.

The membrane may be bonded on one side or both sides to a backing material, which may be a perforated plate or a mesh.

3.1.2 Using the wording of claim 1 document D1 discloses therefore a ventilation member (venting element) comprising:
a breathable film (waterproof and gas-permeable membrane 8) transmitting gas passing through an opening portion of a housing (electronic housing 1) in a state in which said breathable film (membrane 8) is fixed to said opening portion; and
a support (plastic body 2) including a supporting portion (support part 5) for supporting said breathable film (gas-permeable membrane 8) and an insertion portion (fastening part 9) to be inserted into said opening portion of said housing (electronic housing 1);
wherein a lock structure (thread 32) for locking said support (plastic body 2) in said housing (electronic housing 1) by rotating said support around a central axis of said support (implicit due to thread 32) is formed in said insertion portion (fastening part 9),
the material of the breathable film (gas-permeable membrane 8) is at least one kind from fluororesin

porous materials and polyolefin porous materials (membrane 8 made from polyolefin or preferably fluoropolymer material), and said breathable film (gas-permeable membrane 8) is subjected to a liquid repellent treatment using a polymer having a perfluoro alkyl group (coating of membrane 8 being chosen from the group of amorphous copolymers with a fraction of 10-40 mol % tetrafluoroethylene and 60-90 mol % perfluoro 2,2-dimethyl-1,3-dioxole), wherein a reinforcement material (backing material) having a pore size larger than that of the breathable film and superior in gas permeability (implicit as the backing material may be a perforated plate or a mesh) is laminated to the side of the breathable film (gas-permeable membrane 8) facing the opening portion of the housing (implicit as the membrane may be bonded on both sides to the backing material).

The appellant contested that it had been disclosed in document D1 that the backing material was *laminated* to the membrane 8, which implied that the layers constituted a uniform structure; it had merely been disclosed in D1 that the layers were *bonded* to each other. However, such an understanding of the term "lamination" is contrary to the description of the application on page 11, lines 4-15. In that passage it is stated that as for the method for laminating the reinforcement material 5 to the breathable film 4, they may simply be put on top of each other or joined to each other. For example, in the case of thermal lamination, a part of the reinforcement material 5 may be heated and melted to be bonded to the breathable film 4. The term "lamination" is thus used in the application in a very broad sense even including the mere juxtaposition of the two layers to be laminated together. This is in line with the function of the

reinforcement material to prevent the breathable membrane from breaking due to external influences. Therefore, it has to be concluded that it has been disclosed in document D1 that the backing material is *laminated* to the gas-permeable membrane 8 within the meaning of that term in claim 1.

3.1.3 However, there are no details provided in document D1 as to the manner in which the backing material is bonded to the gas-permeable membrane 8. Furthermore, there is no disclosure in document D1 regarding the constitution of the backing layer or the manner in which that layer is attached to the plastic body 2.

Therefore, features (iii) and (iv) of claim 1 (see point IV. above) have not been disclosed in document D1. The subject-matter of claim 1 is therefore new over document D1.

3.2 Document D8

3.2.1 Document D8 discloses (see paragraphs [0001], [0019], [0023], [0028], and [0045]; Figures 1-4) an air-permeable cap to be mounted on a housing for an automobile headlamp for ventilating the housing. The air-permeable cap comprises a substantially cylindrical body 2, which is made of an elastomer, fitted in a closed-end cover member 1. By fitting the mounting portion 4 of the cylindrical body on the mounting opening 50a formed on the neck portion of the device housing 50, the air-permeable cap can be mounted on the device housing 50. Once the air-permeable cap has been mounted on the device housing 50, the device housing 50 is vented to communicate between the interior and the exterior thereof through an air passage 3 of the air-permeable cap.

The air-permeable cap may comprise an air-permeable filter member 10 covering the bottom opening of the cylindrical body 2. Specifically, it is disclosed that the filter member is a laminate of a porous membrane of polytetrafluoroethylene and a non-woven polyolefin fabric. In order to attach it to the cylindrical body 2, the filter member 10 is placed on the lower end of the cylindrical body 2 such that the non-woven fabric side comes in contact with the bottom of the cylindrical body 2. The laminate is then pressed at a temperature of 150°C and a certain pressure for 10 seconds to cause heat fusion.

3.2.2 When the air-permeable cap is mounted on the housing 50, the mounting portion 4 of the cylindrical body 2 is therefore surrounding the neck portion of the device housing 50. The skilled person would understand that the cylindrical body, being made of an elastomer, can simply be pushed onto the neck portion of the device housing 50 in order to mount the air-permeable cap on the housing 50.

Therefore, document D8 does not disclose that the air-permeable cap comprises an insertion portion to be inserted into an opening portion of the housing. That the insertion portion comprises a lock structure is thus necessarily not disclosed, either.

Consequently, features (i) and (ii) of claim 1 (see point IV. above) have not been disclosed in document D8. The subject-matter of claim 1 is therefore also new over document D8.

3.3 Other documents and conclusion

The remaining prior-art documents on file are not closer to the subject-matter of claim 1 than documents D1 and D8. Claims 2 to 12 are dependent on claim 1.

Accordingly, the subject-matter of claims 1 to 12 is new (Article 52(1) EPC and Article 54(1) EPC 1973).

4. Inventive step

4.1 Document D1 as closest state of the art

Document D1 discloses subject-matter that is conceived for the same purpose as the invention, namely for providing a ventilation member, and has many relevant technical features in common with it, as detailed above, and is regarded to be a realistic starting point when considering obviousness. Inventive step is thus to be assessed starting from document D1 as the closest state of the art.

4.1.1 Distinguishing features, objective technical problem

As shown above, the subject-matter of claim 1 differs from the device of document D1 in comprising features (iii) and (iv).

The appellant argued that it was the objective technical problem to provide good adhesion between the laminate and the support. Indeed, feature (iv) has the effect that molten material of the support flows into the gaps between the fibers of the fabric constituting the reinforcement material. As the fabric is non-woven, the fibers overlap each other randomly, so that there is no preferred direction along which the support could easily detach from the fabric. The result is thus a strong bond between the support and the reinforcement

material. Similarly, the effect of feature (iii) is that the breathable film is strongly bonded to the reinforcement material; this is considered to hold also in the case of the claimed adhesive lamination in which case it is the adhesive which provides the strong bond between the breathable film and the randomly overlapping fibers of the fabric.

Consequently, the objective technical problem is to provide good adhesion between the laminate and the support.

4.1.2 Obviousness

It is mentioned in document D1 that the membrane 8 is adhesively bonded, thermally welded, molded or clamped into or molded onto the venting duct 12 (D1, paragraph [0090]). However, there is no disclosure whether and how these methods of attaching the membrane to the venting duct could be used when a backing material was used in combination with the membrane.

Furthermore, the only embodiment of the venting element described in detail in document D1 is that of Figures 1 to 5 and the "exemplary embodiment" described in paragraphs [0091] to [0095], which relate to different aspects of that embodiment. In that embodiment the membrane 8 is molded without any backing material into the cylindrical venting duct 12 in the upper part of the support part 5 such that it is curved in the form of a spherical cap. Such an arrangement is also explicitly described as preferred (see D1, page 9, lines 8 and 29).

The skilled person would also understand that a strong bond between the support and the membrane with backing

layers attached on both sides would in fact be achieved by molding the combination of membrane and backing layers into the cylindrical venting duct in the upper part of the support part, irrespective of what the characteristics of the backing material are. On the other hand, in relation to the other attachment methods mentioned above, it is not evident for the skilled person whether they can be used for the combination of membrane and backing layers since the backing material is expected to be stiffer and thicker than the membrane and may also have a different composition from that of the membrane.

Document D8 is also concerned with the ventilation of housings and would therefore be considered by the skilled person when attempting to solve the posed problem. As described above, the cylindrical body 2 of the air-permeable cap disclosed in document D8 is made of an elastomer, which enables the body 2 to be easily pushed onto the neck portion of the device housing. This is in contrast to the venting element of document D1, whose plastic body is made of a rigid material. In the embodiment of document D1 described in detail, the plastic body 2 is produced in an injection-molding process and is made up of a highly flame-retardant polymer with a 30% glass fibre content. The rigidity allows the venting element to be properly handled when it is screwed into the electronic housing 1 (cf. paragraph [0043] of document D1) and prevents the metal layer 10 of the venting element from peeling off. In view of these differences it would not be evident for the skilled person whether the hot press method of attaching the filter member 10 to the cylindrical body 2 of document D8 is also usable in the device of document D1, especially since the temperature and

pressure used in the method of D8 are intimately linked to the employed materials.

Furthermore, in contrast to the arrangement in document D1 with the curved membrane 8 in the form of a spherical cap being molded into the support part 5 and also being supported by a curved cross-shaped member (see D1, Figure 1), the filter member 10 of D8 is flat and is only attached to the rim of the cylindrical body 2 by means of the hot press method. Due to these structural differences the method of attaching the filter member 10 disclosed in D8 would have to be modified significantly in order to be applicable for the device of document D1.

In view of these considerations it would - in the board's judgement - not be obvious for the skilled person, when starting from document D1 and attempting to solve the corresponding objective technical problem, to arrive at features (iii) and (iv).

4.2 Document D8 as closest state of the art

Document D8 also discloses subject-matter that is conceived for the same purpose as the invention and has many relevant technical features in common with it. That document is therefore also regarded to be a realistic starting point when considering obviousness. Accordingly, before any decision confirming inventive step can be taken, it also has to be examined whether the claimed invention is obvious when starting from document D8 as the closest state of the art.

4.2.1 Distinguishing features, objective technical problem

As shown above, the subject-matter of claim 1 differs from the device of document D8 at least in comprising features (i) and (ii).

The effect of these features is to attach the ventilation member more securely to the housing. It is therefore considered to be the objective technical problem to achieve this effect.

4.2.2 Obviousness

In all embodiments of the invention according to document D8 as well as in all comparative examples described in that document the air-permeable cap is mounted on the housing that is to be vented by fitting the mounting portion of a cylindrical body on the mounting opening formed on a neck portion of the housing. Structurally, this is the only way of attaching the air-permeable cap to the housing disclosed in document D8. The "pulling force" indicating how strongly the air-permeable cap is fitted to the housing is also indicated in document D8 for the examples of the invention and for the comparative examples described in detail in D8. For all the examples of the invention, a value of 19.6 N was measured for that force, whereas for two of the comparative examples the measured value was 7.84 N (paragraphs [0041], [0046], [0048], [0050], [0052], and [0054]).

Therefore, the disclosure of document D8 would not lead the skilled person to considering other ways of mounting the air-permeable cap on the housing than the one described D8. The skilled person would - in order to secure the cap more securely to the housing - merely consider measures related to the mounting method

described in D8, such as a different choice of the elastomer material and different dimensions of the cylindrical body. The natural starting points in this respect would be those examples yielding a higher value for the pulling force.

For reasons corresponding to those mentioned above, the skilled person would consider document D1 when attempting to solve the posed problem. However, as mentioned above, the device described in D1 differs from the device of document D8 in being made of a rigid material, which allows the venting element of D8 to be properly handled when it is screwed into the housing. The skilled person would understand that the cylindrical body 2 of the device of D8, being made of an elastomer, could not be adapted to comprise a screw portion like the device of D1, since the resulting device could not be properly handled. On the other hand, replacing the cylindrical body 2 of D8 by a rigid body comprising a screw portion would not be favoured by the skilled person as it is not evident whether the hot press method of attaching the filter member 10 to the cylindrical body 2 would still be usable with the modified cylindrical body, for the reasons mentioned above.

In view of these considerations the board concludes that it would not be obvious for the skilled person, when starting from document D8 and attempting to solve the corresponding objective technical problem, to arrive at features (i) and (ii).

4.3 Conclusion

For the above reasons the subject-matter of claim 1 is not obvious for the skilled person. Claims 2 to 12 are dependent on claim 1.

Accordingly, the subject-matter of claims 1 to 12 involves an inventive step (Article 52(1) EPC and Article 56 EPC 1973).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent in the following version:

   - Claims: Nos. 1 to 12, filed during oral proceedings of 27 November 2014;
   - Description: pages 1 to 3, 5 to 9, 13 and 15 to 29 as originally filed, and pages 4, 10, 11, 12, and 14, filed at the oral proceedings of 27 November 2014,
   - Drawings: sheets 1 to 14, filed with letter dated 25 June 2003.

The Registrar: The Chairman:

S. Sánchez Chiquero G. Eliasson

Decision electronically authenticated