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Datasheet for the decision of 30 October 2024

Case Number: T 1877/22 - 3.3.09

Application Number: 16728093.2

Publication Number: 3412035

IPC: B32B5/26, B32B7/04, B32B7/14, H04R1/02, H04R1/08, H04R25/00

Language of the proceedings: EN

Title of invention:
COMPOSITE MULTILAYER FILTERING CONSTRUCTION FOR USE AS A SUBCOMPONENT IN ACOUSTIC AND ELECTRONIC PRODUCTS IN GENERAL

Patent Proprietor:
Saati S.p.A.

Opponent:
Sefar AG

Headword:
Filtering construction/SAATI

Relevant legal provisions:
EPC Art. 54(2), 56, 83, 123(2)
RPBA 2020 Art. 12(4)

Keyword:
Main request: added subject-matter - (no); sufficiency of disclosure, novelty, inventive step - (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
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Office européen des brevets

Beschwerdekammern

Boards of Appeal

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Case Number: T 1877/22 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 30 October 2024

Appellant: (Patent Proprietor)	Saati S.p.A. Via Milano, 14 22070 Appiano Gentile CO (IT)
Representative:	Rastelli, Franco Dott. Franco Cicogna & C. SRL Via Visconti di Modrone, 14/A 20122 Milano (IT)
Respondent: (Opponent)	Sefar AG Hinterbissaustrasse 12 9410 Heiden (CH)
Representative:	Wunderlich & Heim Patentanwälte PartG mbB Irmgardstraße 3 81479 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 14 June 2022 revoking European patent No. 3412035 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	A. Haderlein
Members:	A. Veronese
	A. Jimenez

Summary of Facts and Submissions

I. The appeal was filed by the patent proprietor (appellant) against the opposition division's decision revoking the European patent.

II. Claim 1 of the opposed patent reads:

"*1. A composite multilayer filtering construction for use in filtering applications requiring a high filtering efficiency for particles of the order of microns and a high permeability of the filtering medium, and for use as a sub-component within acoustic and electronic products, in particular microphones and speakers, characterized in that said multilayer construction comprises at least a first layer of polymeric nanoporous membrane (M) and at least a second layer of a synthetic monofilament precision fabric (T), said first polymeric nanoporous membrane layer (M) being coupled to said second precision fabric layer (T) by a laminating method thereby providing an integral filtering medium adapted to prevent a passage therethrough of particles and pressurized liquids.*"

III. With its notice of opposition, the opponent had requested revocation of the patent in its entirety on the grounds under Article 100(a) (lack of novelty and lack of inventive step), 100(b) and 100(c) EPC.

IV. The documents submitted during the opposition proceedings included:

D1: WO 2010/124899 A1
D6: US 2009/0268928 A1

D7: US 4 949 386

D12: "Complete Textile Glossary", Celanese Acetate, US, 1 January 2001, 1-210, XP008122244, retrieved from the internet: URL:http://www.vectranfiber.com/pdf/vectran fiber 2.pdf

D13: D.B. Purchas et al., "Handbook of filter media", Referex, Elsevier Advanced Technology, 28 October 2002, 1-549, XP040426287, retrieved from the internet: URL: https://ebookcentral.proquest.com/lib/epo-ebooks/detail.action?docID=316908&query=978-1-85617-375-9

V. In its decision, the opposition division found, *inter alia*, that, for the patent as granted, the invention was sufficiently disclosed, claims 1 and 2 did not contain added subject-matter, and the subject-matter of claim 1 was not novel over D1.

VI. With its statement of grounds of appeal, the appellant filed auxiliary requests 1 to 12. By letter dated 29 February 2024, it submitted an amended version of auxiliary request 10.

VII. The proprietor/appellant's arguments can be summarised as follows.

- Neither the deletion of the expression "even 1-2 µm" in claim 1 as granted nor the definition of the lamination method in claims 1 and 2 generated subject-matter extending beyond the content of the application as filed.

- The claimed invention was sufficiently disclosed. The patent taught how to prepare the claimed filtering construction. It was clear that the construction could not completely prevent the

penetration of particles of any size and fluids at any pressure.

- The claimed filtering construction was obtained by lamination and could be distinguished from that of D1, which was obtained by electrospinning and did not contain a polymeric nanoporous membrane layer distinct from a synthetic monofilament precision fabric layer. The membrane was embedded in the precision fabric.

- The claimed invention involved an inventive step. D1, not D6 or D7, was the closest prior art. The claimed filtering construction involved an inventive step over D1, alone or in combination with D6 and D7. The claimed filtering construction, obtained by lamination of preformed layers, differed substantially from that of D1, obtained by electrospinning. Electrospinning onto a fabric played an essential role according to D1. Thus, even taking into account D6 and D7, when confronted with the problem of providing an alternative filtering construction, the skilled person would not have replaced electrospinning with lamination. Thus, it would not have provided the claimed filtering construction.

VIII. The opponent/respondent's arguments may be summarised as follows.

- The deletion of the expression "even 1-2 µm" in claim 1 and the characterisation of the lamination process in claims 1 and 2 created originally undisclosed subject-matter. The same meaning of the expression "lamination" should be applied when assessing the disclosure of the application

documents as filed and the patentability of the claimed subject-matter.

- The claimed invention was insufficiently disclosed. The patent did not teach how to make a multilayer filtering construction containing pores which blocked the passage of particles of any size and water at any pressure.

- The claimed subject-matter was not novel over D1, which disclosed both the claimed membrane and the synthetic monofilament precision fabric. The claimed construction was indistinguishable from that disclosed in D1.

- The claimed subject-matter did not involve an inventive step starting from D1, or D6 or D7, as the closest prior art. Starting from D1 and confronted with the problem of providing an alternative filtering construction, the skilled person would have considered combining two preformed layers by lamination instead of forming a membrane by electrospinning on a fabric. Similar conclusions applied starting from D6 or D7.

- The figure on page 6 of the appellant's statement of grounds of appeal should not be admitted.

The requests

IX. The appellant requested that the decision under appeal be set aside and that the patent be maintained as granted or, alternatively, on the basis of one of auxiliary requests 1 to 9, 11 and 12 filed with the statement setting out the grounds of appeal or on the

basis of auxiliary request 10 filed with the letter dated 29 February 2024.

X. The respondent requested that the appeal be dismissed.

Reasons for the Decision

Main request

1. *Amendments*

Claim 1

1.1 The respondent argued that the deletion of the expression "even of 1-2 µm" in the last line of claim 1 created originally undisclosed subject-matter. In its opinion, after this deletion, the claim required that no particle pass through the filtering system, irrespectively of its size. Since this requirement was not disclosed in the application as filed, claim 1 contained added subject-matter.

1.2 The respondent's view is not convincing. The preamble of claim 1 requires that the filtering construction have high filtering efficiency for particles in the order of microns. This means that, even after the deletion of the aforementioned expression, the skilled person would understand that the filtering construction is not meant to filter any possible particle, as argued by the respondent. Rather, the skilled person would understand that the system is suitable for filtering particles in the order of microns, including those of 1 to 2 µm. Furthermore, that the wording "even 1-2 µm" (emphasis by the board) used in claim 1 provides just an example of the particles defined by the expression "in the order of microns" in the preamble of

claim 1. This is confirmed by the passage from page 4, line 19 to page 5, line 8 of the description, where the invention is defined without reference to particles of 1 to 2 µm.

1.3 For this reason, as decided by the opposition division, the deletion of the expression "even 1-2 µm" in claim 1 does not create originally undisclosed subject-matter.

Claims 1 and 2

1.4 The respondent argued that the addition in claim 1 as granted of the indication that the coupling of the layers is performed by "*lamination*", together with the amended expression "*laminating method comprising one of a reactive polyurethane (PU) method, and ultrasound (US) method, and other conventional laminating methods*" in claim 2 as granted, created originally undisclosed subject-matter.

1.5 In its opinion, the reactive polyurethane method and the ultrasound method were disclosed as alternatives to a lamination method in claim 2 as filed. Conversely, claim 2 as granted defined these as particular types of lamination. Thus, the amendments caused a change in the technical teaching of claims 1 and 2 and created subject-matter not disclosed in the application as filed.

1.6 During the oral proceedings, the respondent also argued that were "lamination" to be understood as anything other than a simple coupling, the amendments went beyond the teaching of the application as filed.

1.7 The board is not persuaded by the respondent's arguments and agrees with the opposition division and

the appellant that the respondent's interpretation of the claims as filed focuses on the syntax of the claims, without taking into account how the skilled person would read those claims.

1.8 The reference to lamination in claim 1 as granted has a literal basis in claim 2 as filed and several passages of the application as filed (e.g. page 5, line 4). The skilled person would understand lamination as a process in which two preformed layers of materials are laid one on top of the other and then bonded or "coupled" as argued by the respondent. While the board agrees with the respondent that "lamination" as such does not necessarily entail a particular method of coupling, it requires, at least, that two or more layers are preformed prior to being bonded or "coupled" together. This applies to both the application as filed and to the patent as granted.

1.9 Furthermore, despite the apparent reference to polyurethane coupling and ultrasound as alternatives to lamination, the skilled person would understand that the application envisages laminating methods in which the two layers are joined together using a polyurethane adhesive or the heat generated by an ultrasound source. This is confirmed by the fact that the relevant sentence of claim 2 as filed reads "and other conventional laminating methods" and because page 5, line 4 refers to "ultrasound (US) lamination". This last passage explicitly refers to the ultrasound method as a lamination method.

1.10 For these reasons, as decided by the opposition division, claims 1 and 2 do not contain subject-matter extending beyond the content of the application as filed (Article 123(2) EPC).

2. *Sufficiency of disclosure*

2.1 The respondent disputed the opposition division's finding that the claimed invention is sufficiently disclosed. In its opinion, claim 1 required the multilayer filtering construction to contain pores and, at the same time, to block the passage of particles of any size and the passage of liquids at any pressure. Since these requirements could not be reconciled, the skilled person would not have been able to carry out the invention.

2.2 These arguments are not convincing. As decided by the opposition division, claim 1 does not require the filtering construction to completely prevent the passage of particles and pressurised liquids. This is clear from the fact that claim 1 refers to a "filtering construction" and to a "membrane". As observed by the appellant during the oral proceedings, any filtering construction or membrane allows the passage of some particles and liquids, e.g. water, at a certain pressure. Furthermore, claim 1 requires a "high filtering efficiency for particles in the order of microns" (emphasis added). This is an indication of the size of particles whose passage should be substantially limited.

2.3 As argued by the appellant, the person skilled in the relevant field would read the claims taking into account the type and the purpose of the claimed multilayer filter: a filtering construction to be used in an acoustic device, such as a microphone, to allow the transmission of sound but also to prevent the penetration of undesired particles, e.g. dust and water. They would understand that the claimed film does

not, and would not be expected to, have an "absolute" resistance to the penetration by particles of any possible size or by fluids at any possible pressure. The skilled person would also understand that the claimed filtering construction is meant to prevent the passage of liquids, in particular water, at a pressure slightly above atmospheric pressure, to which acoustic devices such as microphones may be exposed during normal use.

2.4 For these reasons, it is concluded that the claimed invention is sufficiently disclosed (Article 83 EPC).

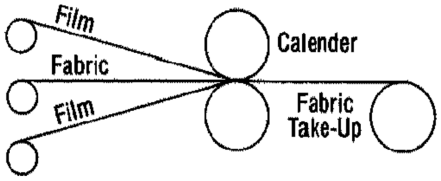
3. *Novelty*

3.1 The opposition division decided that the composite multilayer of claim 1 was not novel over D1. It considered, *inter alia*, that the claimed product, obtainable by lamination, could not be distinguished from that of D1, which was obtained by electrospinning. This is also the position of the respondent.

3.2 The board does not agree. Claim 1 defines a product comprising two distinct layers: a polymeric nanoporous membrane and a synthetic monofilament precision fabric. It further states that these layers are coupled by lamination. The relevant issue for establishing novelty is whether a product such as that described in D1, obtained by electrospinning, may have the same structure of one which, as specified in claim 1, is obtained, or is at least obtainable, by lamination. To address this issue, how lamination and electrospinning are carried out must be considered.

3.3 During lamination, two or more preformed layers of the same or different materials are laid one on top of the

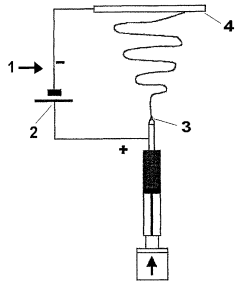
other and then bonded (see, e.g. D13, the passage bridging pages 65 and 66 and page 515, "Lamination, laminated" entry). The figure on page 90 of D12 shown below, mentioned by the appellant during the oral proceedings, confirms that lamination involves the use of separate preformed layers.



Laminated Fabric Formation

3.4 Hence, the skilled person reading the claims would understand that the claimed composite multilayer filtering construction is manufactured carrying out a lamination process starting from preformed layers.

3.5 Electrospinning is a process for generating a non-woven web of micro- or nanofibres which is carried out in an apparatus having the arrangement shown in Figure 1 of D1. In the process, an electrostatic force generated by a high voltage is used to eject at high speed a polymer solution through a tiny nozzle (3), which also operates as electrode. After ejection, the solvent evaporates and creates the fibres, which are deposited on a collector (4), which operates as a counter-electrode. This technique allows coating the surface of a material with a web of fibres.



3.6 In the electrospinning process of D1, the single-thread (monofilament) precision fabric is interposed on the counter-electrode (page 9, lines 24 to 26 of D1).

3.7 D1 teaches that the nanofibre layer is "overlapped or coated" on the single-thread fabric support by electrospinning and that the "nanofiber layer or membrane" is formed on the monofilament supporting precision fabric (page 2, lines 17 to 20 and page 5, line 26). However, page 2, lines 17 to 21 of D1 also states that the nanofibre layer is "embedded in the supporting structure" (emphasis by the board).

3.8 It can be expected that during the electrospinning process of D1, part of the nanofibres will be formed and remain on the surface of the monofilament fabric. However, it is credible that, as submitted by the appellant, when the polymeric solution is ejected at high speed toward the monofilament fabric and the collector behind it, part of that solution will penetrate in the space within the fibres. Consequently, it is credible that the generated nanofibres will become embedded within the fabric structure. This in particular because, as noted by the appellant during the oral proceedings, the size of the nanofibres created by electrospinning, which is in the nanometre range, is considerably smaller than that of the meshes of the monofilament fabric. The mesh size of the fabric

in the exemplified products is 47 or 55 µm (see page 11, line 28 and page 12, line 8 of D1).

3.9 During the oral proceedings, referring to the passage bridging pages 9 and 10 of D1, the respondent argued that this document envisaged a process in which the nanofibres were completely dry when they contacted the monofilament fabric. In its opinion, in this case, since the nanofibres were endless and were sprayed in alternating longitudinal directions across the fabric, they were deposited over the fabric, without penetrating the spaces between the filaments.

3.10 These arguments are not convincing. The cited passage, and in particular page 10, lines 8 to 13, does not imply that the sprayed nanofibres are completely solidified and rigid when they reach the monofilament fabric. Thus, it is credible that, as submitted by the appellant during the oral proceedings, the nanofibres projected at high speed toward the counter-electrode will, at least to some extent, penetrate and become embedded within the large spaces between the filaments of the interposed monofilament precision fabric. This is confirmed by page 2, lines 17 to 21 of D1, stating that the nanofibre layer is "embedded in said supporting fabric, thereby forming a single or cohesively bound filtering means or media". It is further confirmed by claim 2 of D1.

3.11 This interpretation is compatible with the structure shown in the second photograph on page 6 of the appellant's statement of grounds of appeal. It is credible that the photograph represents a structure in which at least a part of the nanofibres penetrated the space between the filaments of the precision fabric. During the oral proceedings, taking into account the

indicated magnification, the respondent argued that the photograph did not represent the structures exemplified in D1. The respondent also requested that the photograph not be admitted in the proceedings. However, this photograph was filed in direct response to the statement in the impugned decision that the proprietor had not substantiated any evidence that the different process results in another product. It is credible that, as submitted by the appellant, the structure in the photograph was obtained by electrospinning. No counter-evidence has been provided. Thus, the photograph, which was filed with the statement setting out the grounds of appeal, is highly relevant. For this reason, and considering that it does not cause a shift in the debate detrimental to procedural economy, the photograph is admitted into the appeal proceedings (Article 12(4) RPBA).

3.12 The respondent argued that the photographs in Figures 9 and 10 of D1 showed that nanofibres were only present on the surface of the precision fabric described in this document. This argument is not convincing. Since these photographs were taken focusing on the surface of the precision fabric, they do not provide information on the structure within the spaces between the filaments of the precision fabric.

3.13 Concerning the patent, it is reasonable to assume that, if the claimed filtering construction is formed by lamination, the nanofibres of the preformed membrane, which are already intermingled with each other, will not penetrate the spaces within the filaments of the monofilament precision fabric. In other words, it can be assumed that the nanofibres will not become embedded within the structure of the precision fabric, unlike those formed during the electrospinning process of D1.

3.14 Thus, the multilayer filtering device of claim 1 differs and is distinguishable from that described in D1, obtained by electrospinning.

3.15 The respondent noted that paragraph [0035] of the opposed patent mentions electrospinning. However, this passage of the patent relates to a case in which electrospinning is used to preform a self-supporting nanoporous layer, which is then combined with the monofilament precision fabric in the lamination process mentioned in claim 1.

3.16 The respondent also noted that page 3, line 24 and page 6, line 12 of D1 mention "laminated". However, reading D1 it is clear that the filtering construction described in this document is produced by electrospinning deposition and that the mention of "laminated" is inaccurate, not reflecting the commonly accepted meaning in the relevant field.

3.17 For these reasons, the claimed multilayer construction differs and is distinguishable from that of D1. Hence, the subject-matter of claim 1 is novel over D1 (Article 54(2) EPC).

4. *Inventive step*

4.1 The claimed invention is a composite multilayer filtering construction intended for acoustic and electronic products. The construction is made to transmit sound through the pores of a porous material and, at the same time, protect against the penetration of particles and liquids, water in particular.

The closest prior art

4.2 The opposition division decided that D1 is the closest prior art. The respondent considered D1 or, alternatively, D6 and D7 as starting points for discussing inventive step.

4.3 Like the opposed patent, D1 discloses a fabric material composite construction for use as a filter. The construction is meant to allow the passage of sound while preventing the entry of particles in devices such as cellular phones (see page 1, lines 17 to page 2 line 8). Like the patent, D1 aims to prevent the passage of particles having a size of around 1 to 2 µm (page 14, lines 19 to 26). Moreover, like the patent, D1 focuses on the components making up the filtering construction and on the process for its manufacture.

4.4 The construction of D1 contains, like the claimed one, a synthetic single-thread (i.e. monofilament) precision fabric (page 2, lines 14 to 16). The precision fabric is coated with a nanofibre layer or membrane created by electrospinning (see page 5, lines 21 to 26).

4.5 Thus, D1 aims essentially at the same objective as the opposed patent using a filtering device similar to the claimed one. For this reason, as already decided by the opposition division, D1 is the closest prior art.

4.6 In its reply to the statement setting out the grounds of appeal, the respondent mentioned D6 and D7 as alternative starting points for discussing inventive step. However, the inventive-step objections starting from these documents are extremely concise, and the problem-solution approach is not even applied. The respondent did also not explain why D6 or D7, rather

than D1, should be the closest prior art. For these reasons alone, the objections set out in writing are not convincing. During the oral proceedings, the appellant drew attention to the features disclosed in these documents. However, a closer analysis of D6 and D7 confirms that these documents are not the closest prior art for the following reasons.

4.7 D6 describes a sound-permeable film comprising a porous membrane allowing the passage of sound but not foreign objects, including water (see paragraphs [0001], [0004] to [0006] and [0031] and the claims). The membrane comprises pores having a diameter in a range between 0.1 and 1 000 µm (paragraph [0025]). However, the gist of the invention disclosed in D6 is the manufacture of a heat-resistant membrane which can be subjected to reflow soldering (see paragraphs [0006] to [0017]). The focus is on the properties of a polytetrafluoroethylene material which resists high temperatures rather than on the arrangement of the layers in a filtering device and on its manufacturing process (paragraphs [0025], [0027] and [0031] and claim 1). D6 does not focus on preventing the passage of particles of 1 to 2 µm and does not mention a supporting synthetic monofilament precision fabric either. As support material, D6 mentions a net, mesh, non-woven fabric or woven fabric, not a monofilament precision fabric (paragraph [0031]). Thus, D6 aims at a different purpose and is more remote than D1 from the claimed invention. Consequently, it is not the closest prior art.

4.8 D7 discloses a waterproof in-ground audio speaker enclosure for mounting an audio speaker in the earth. The enclosure comprises a membrane filter allowing the sound to be dispersed while preventing the entry of moisture or other materials (see column 3, lines 5

to 12). Column 3, lines 47 to 62 mentions a membrane filter made of a polyester woven or non-woven fabric and a substrate layer made of filmed Teflon. However, the focus is not on preventing the entry of particles of 1 to 2 µm, and the filmed Teflon used to prepare all exemplified membranes is not a monofilament precision fabric. Furthermore, D7 is silent on the process for joining the membrane to a support. The focus is on the construction of the audio speaker rather than on the filtering membrane. Thus, D7 is not the closest prior art either.

Distinguishing features

4.9 The claimed multilayer filtering construction differs from the filtering construction of D1 in that it comprises two distinct layers - a nanoporous membrane layer and a synthetic monofilament precision fabric. The claimed construction is obtainable by lamination, i.e. the bonding or coupling of two preformed layers, rather than by coating by electrospinning, a process which, as discussed above, results in an at least partially embedded membrane structure.

Technical effect and underlying problem

4.10 The opposed patent provides evidence that, when interposed between a speaker and a microphone, the claimed multilayer construction transmits the sound efficiently, inducing a minimal acoustical attenuation, while preventing the penetration of water (see paragraphs [0038] to [0048] and [0075] and the results of the tests shown in Figures 2 and 3 of the patent).

4.11 However, the properties of the claimed construction have not been compared with those of the filtering

construction of D1. Hence, there is no evidence that the claimed multilayer filtering construction induces any improvement over the prior art.

4.12 For these reasons, the underlying technical problem is the provision of an alternative filtering construction suitable for transmitting sound while preventing the passage of particles having a size in the order of microns and pressurised liquids.

Non-obviousness of the claimed solution

4.13 The board concurs with the appellant that neither D1 nor the other cited documents provide to the skilled person any prompt to modify the construction described in D1 with one obtained by lamination, according to the claimed invention.

4.14 D1 discloses a filtering construction comprising a nanofibre filtering membrane which is at least in part embedded into a supporting fabric. This embedded structure is created by electrospinning (page 2, lines 17 to 21). As argued by the appellant, electrospinning and the formation of an embedded structure play an essential role for the invention disclosed in D1. Accordingly, the skilled person confronted with the underlying problem would not have departed from the teaching of D1 and would not have provided a filtering construction having a substantially different structure, let alone by joining preformed layers by lamination.

4.15 For this reason, starting from D1, the skilled person would not have considered, as suggested by the respondent, preforming a nanoporous membrane depositing by electrospinning a nanofibre on a collector and

coupling by lamination the preformed nanoporous membrane to a monofilament precision fabric.

4.16 For this same reason, the skilled person would not have taken into account D6 or D7 when confronted with the underlying technical problem. Furthermore, as mentioned above, D6 focuses on the provision of a heat-resistant membrane which can be subjected to reflow soldering and on a material which can used to make that membrane. It does not focus on the steps for assembling the filtering construction. Neither lamination nor a monofilament precision fabric is mentioned.

4.17 D7 does not point toward the claimed solution either. As mentioned above, this document does not mention any process for joining the membrane to a support. The focus is on the construction of the audio speaker, not on the filtering membrane and its attachment to a support.

4.18 For these reasons, the claimed subject-matter involves an inventive step over the teaching of the prior art (Article 56 EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained as granted.

The Registrar: The Chairman:

K. Götz-Wein A. Haderlein

Decision electronically authenticated