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**Datasheet for the decision
of 11 March 2015**

Case Number: T 1886/12 - 3.3.06
Application Number: 96941491.1
Publication Number: 0865314
IPC: B01J20/28, A62B23/02, A62D9/00,
B01D39/00
Language of the proceedings: EN

Title of invention:

PERMEABLE, SHAPED STRUCTURES OF ACTIVE PARTICULATE BONDED WITH
PSA POLYMER MICROPARTICULATE

Patent Proprietor:

MINNESOTA MINING AND MANUFACTURING COMPANY

Opponents:

Carl Freudenberg KG
Blücher GmbH

Headword:

Composite structure / 3M

Relevant legal provisions:

EPC Art. 100(c), 100(b), 100(a), 52(1), 54, 56
EPC R. 115(2)

Keyword:

Amendments - added subject-matter (no)
Sufficiency of disclosure (yes)
Novelty - main request (yes)
Inventive step - main request (yes)

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 1886/12 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 11 March 2015

Appellant: Blücher GmbH
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 16 July 2012
rejecting the opposition filed against European
patent No. 0865314 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman B. Czech
Members: E. Bendl
 S. Fernández de Córdoba

Summary of Facts and Submissions

I. The appeal by opponent 2 lies from the decision of the opposition division to reject the two oppositions filed against European patent No. 0 865 314, granted on European patent application 96 941 491.1.

II. In the present case, a first appeal (case T 1164/01) had been filed against the refusal of the application by the examining division. The board entrusted with that case decided that the (amended) claims according to the then pending sole request met the requirements of Articles 123(2) and 84 EPC, and that their subject-matter was novel and inventive with regard to the prior art cited by the examining division, in particular the following documents (numbering as used later on by the opposition division):

- D1: EP 0 159 696 A2,
- D5: US 4 411 948 A and
- D11: US 5 078 132 A.

The case was thus remitted to the examining division with the order to grant a patent.

III. The independent claims 1, 12, 13, 14, 15 and 18 of the patent in suit, held allowable in decision T 1164/01 of 23 February 2006 and granted by the examining division (patent in suit) read as follows:

"1. A permeable self-supporting composite structure comprising a mass or agglomeration of active particulate bonded to each other with pressure-sensitive adhesive polymer microparticulate distributed in the mass of active particulate to adhere them together in a flexible composite structure, wherein the adhesive polymer microparticulate is smaller in size than the active particulate and

wherein the adhesive polymer microparticulate is 1 to less than 2000 micrometers in size."

"12. An air-purifying means having as a filter the structure according to claims 1-11."

"13. A respirator having as a filter the structure according to claims 1-11."

"14. An oil sorbent means comprising the structure according to claims 1-11 wherein the active particulate comprises clay sorbent."

"15. A method of making the structure of claim 1, which method comprises mixing active particulate with an aqueous dispersion of pressure-sensitive adhesive polymer microparticulate and shaping and bonding the resulting mixture of the particulates in the form of the structure."

"18. A method of purifying a fluid containing an undesired component, which method comprises passing the fluid through the structure of claims 1-11."

Claims 2 to 11, 16 and 17, and 19 are dependent on independent claims 1, 15 and 18, respectively, and refer to preferred embodiments of, respectively, the structure, the method of making said structure, or the method of purifying a fluid involving said structure, as defined in the independent claims.

IV. The patent in suit had then been opposed on the grounds of Article 100(a), (b) and (c) EPC. The opposition division rejected the two oppositions. The evidence cited in the course of the opposition procedure includes the following further documents:

- D7: WO 94/13751 A1,
- D8: US 5 374 698 A,
- D9: US 4 952 650 A,
- D10: US 4 833 179 A,
- D12: EP 0 714 696 A2,
- D13: EP 0 738 535 A1,
- D14a/b: WO 94/03270 A1 / US 5 332 426 B,
- D15: DE 42 38 142 A1,
- D16: DE 37 19 418 C1,
- D17: EP 0 172 714 A1,
- D18: US 5 395 428 B,
- D19: DE 34 43 900 A1,
- D20: DE 38 13 563 A1 and
- D23: www.answers.com/topic/adhesive, printed out on 14.01.2010, Keyword "Adhesives", 10 pages
- D25: Römpp Chemie Lexikon, page 1704, Keyword "Haftklebstoffe", publication date not indicated
- D26: Wikipedia printout of 19.04.2011: "Hot-melt adhesive"; pages 1/11 to 11/11
- D27: A. Rawle, "The basic principles of particle size analysis", pages 1-8, publication date not indicated.

V. In its statement setting out the grounds of appeal, the appellant (opponent 2) maintained objections under Articles 100(a), (b) and (c) EPC, referring *inter alia* to the documents mentioned above.

VI. In its reply of 7 June 2013, the respondent (proprietor of the patent) rebutted the objections raised. With said reply, it nevertheless submitted three sets of amended claims as auxiliary requests 1 to 3.

VII. The parties were summoned to oral proceedings.

VIII. By letter of 9 January 2015 the appellant withdrew its

earlier request for oral proceedings.

- IX. In preparation for the oral proceedings, the board issued a communication wherein it *inter alia* indicated issues possibly to be addressed. The communication also reflected the board's preliminary view that D5, rather than D1, D11, D15 or D17 appeared to be the most appropriate starting point for the assessment of inventive step and that the inventive step objections based on D16, D18, D19 and D20 did not appear to have been sufficiently substantiated.
- X. In its sole written submission (fax dated 3 February 2015) the party as of right (opponent 1) announced that it would not be attending the oral proceedings.
- XI. In its response (letter dated 11 February 2015) to the board's communication, the respondent rebutted the appellant's objections once again.
- XII. Oral proceedings took place on 11 March 2015 in the absence of both opponents (Rule 115(2) EPC). The debate focused on the allowability of the claims as granted (respondent's main request) in view of the objections raised by the appellant under Articles 100(a), (b) and (c) EPC.

The **appellant** (opponent 2) requested in writing that the decision under appeal be set aside and the patent be revoked.

The **respondent** (patent proprietor) requested that the appeal be dismissed or, in the alternative, that the patent be maintained on the basis of the claims according to one of the auxiliary requests 1 to 3,

submitted with the letter of 7 June 2013.

The party as of right (opponent 1) did not submit any request.

XIII. The arguments of the **appellant** of relevance as regards the patent as granted can be summarised as follows:

Articles 100(c)/123(2) EPC

- The range "*1 to 2000 micrometers*" (claim 1) was neither disclosed as such in the application as filed, nor in combination with the remaining features of this claim.
- The general feature "*mass of active particulate*" (claim 1) was not disclosed in the application as filed, as only concrete embodiments ("*shaped structure*") were described therein.
- The expression "*distributed in the mass of active particulate to adhere them together in a flexible composite structure*" (claim 1) found no basis in the application as filed, including claim 4 thereof.
- The introduction into claim 5 of the feature referring to "*higher vinyl esters ...*", extracted from a more specific context in the description, found no basis in the application as filed.
- Since the combination of features according to product claim 1 had no basis in the application as filed, the same was true as regards the method for producing such a structure (claim 15). Moreover, the introduction of the feature "*aqueous dispersion*" was also objectionable under Article 123(2) EPC.

Sufficiency of disclosure

- The claimed invention could not be carried out by

the skilled person without undue burden across the entire ambit of the claims, since the patent did not contain sufficiently detailed indications regarding e.g. the relative amounts of materials, particle sizes and types of active particles that may be used. The term "*active particle*" was not sufficiently defined.

- Definitions of the relative terms (parameters) "*flexible*" and "*permeable*" were insufficient or missing.
- Moreover, the patent did not indicate a standardised and reproducible method for the determination of the particle average or absolute size of the pressure sensitive adhesive polymer (hereinafter "PSA") microparticulate. As apparent from e.g. D27, different methods for particle size determination could lead to very different results.
- Since different methods for measuring the dimensions of a particle may lead to different results, the skilled person would not know which method to apply.
- Hence, the invention was insufficiently disclosed and the onus to show the contrary rested on the respondent.

Novelty

- The subject-matter of claim 1 lacked novelty in view of the respective disclosures of each of documents D5, D12, D13, D14a/b.
- D5: A PSA was applied to the adsorbent active particles, forming small particles of PSA on the surface thereof meeting the particle size criterion of claim 1. Only four different types of adhesive were disclosed in D5. Hence, a material as claimed, i.e. a PSA-containing

microparticulate, was disclosed without a selection from different lists.

- D12: This document described an adsorption filter containing adsorbing particles bonded together by much smaller particle of a binder, which may be polyacrylate, i.e. a PSA. Since the surface of the adsorbent particles would not be completely covered, the binder was necessarily present in the form of smaller particles.
- D13: Adsorbing particles with a size of from 100 to 5000 micrometers were bonded together with binder particles with an average size of 5 to 90% of the size of the adsorbent particles.
- D14a/b: These documents disclosed adsorbent particles bound by adhesive particles, which may be polyolefins or polyacrylates, the latter being pressure sensitive polymers, as apparent from e.g. D23.

Inventive step

- D11 was the closest state of the art. It disclosed porous and flexible filter structures comprising adsorbent particles bound together by smaller adhesive particles of polyurethane binder. As regards the alleged inherent flexibility of the polyurethane binder, reference was made to D26. D11 did not explicitly disclose a pressure-sensitive adhesive.
- Combinations of D11 with either of D5, D7, D8, D9 or D10 provided obvious solutions to the technical problem of merely providing an alternative composite structure.
- If not novelty-destroying, D5 would at least render the claimed subject-matter obvious.
- D1, D15 or D17 were also suitable starting points and led, in combined with the teachings of either

- of D8, D9 or D10, to the claimed subject-matter.
- D16, D18, D19 and D20 were also of relevance.

The arguments of the **respondent** of relevance as regards its main request (patent as granted) can be summarised as follows:

Article 123(2) EPC

- The particle size range "*1 to 2000 micrometers*", as defined in claim 1, found basis on page 14, lines 4 to 6, and in claim 3 of the application as filed.
- A "*polymer microparticulate distributed in the mass or agglomeration of active particulate*" (claim 1) was disclosed in the paragraph bridging pages 3 and 4 of the application as filed.
- Claim 5: The "*higher vinyl ester*" feature was not inextricably linked to the "*glass transition temperature*" feature mentioned on page 12, lines 7 to 8 of the application as filed.
- The method for producing the structures according to the invention (claim 15) was generally disclosed on page 5, lines 5 to 9, of the application as filed.

Sufficiency of disclosure

- The patent in suit gave sufficient information on how to carry out the present invention across the full ambit of the claims.
- Neither the use of the terms "*permeable*" or "*flexible*", nor the alleged lack of detailed information concerning particles size determination justified an insufficiency objection.
- The skilled person knew how to determine the size of PSA particles, e.g. by optical methods and

particle size analysers.

- The objections regarding the allegedly insufficient indications as regards the features "*permeable*", "*flexible*" and "*active particle*" rather concerned clarity than sufficiency of disclosure.
- The appellant had not discharged the burden of proof resting on it in this respect.

Novelty

- None of documents D5, D12, D13 and D14a/b was novelty-destroying. Regarding the meaning of PSA, reference was made to paragraph [0027] of the patent and to D25.
- D5 did not unambiguously disclose adhesive particles, adhesive coating films were rather formed.
- D12 did not disclose that the polyurethane binder used was pressure-sensitive.
- D13 disclosed the use of hot melt adhesives rather than of PSAs.
- D14a/b also did not disclose the use of a PSA as required by claim 1 at issue. Instead, it disclosed the use of thermoplastic hot-melt adhesive. This was evident for a person skilled in the art, since the binder had to be preheated above its melting point for being used.

Inventive step

- D11 did not teach or suggest the use of PSA microparticulate.
- D8, D9 or D10 taught that upon formation of an adhesive composition the bead configuration was destroyed and resulted in a continuous film of pressure adhesive polymer. Therefore, these

documents could not hint at the use of PSA particles.

- D7 disclosed adhesive microspheres, but did not disclose any composite structure.
- The features distinguishing D5 from the claimed subject-matter could not be found in any of the available prior art documents and there was no motivation for the skilled person to modify the structures disclosed in D5 such as to arrive at a structure falling within the ambit of claim 1.
- The claimed subject-matter was, likewise, not obvious, in view of one of D1, D15 or D17 taken as closest prior art since even taking into account D8, D9 or D10, invoked by the appellant, the claimed subject-matter was not obvious.
- D16, D18, D19 or D20 were not of no relevance at all, and D26 was not prior art.

Reasons for the Decision

Main request

Allowability of the pre-grant amendments

1. For the board, the objections under Article 100(c) EPC maintained by the appellant against the claims as granted are not convincing for the following reasons. Those parts of the application as filed (published as WO 97/20628 A1) forming basis for the amendments made during substantive examination are referred to as "original ..." herein below.

2. Claim 1 as granted
- 2.1 Regarding the feature "*the adhesive polymer microparticulate is 1 to less than 2000 micrometer in size*"
 - 2.1.1 According to original page 14, lines 4 to 6, the adhesive polymer microparticulate is generally "*larger than **1** micrometer and **less than 1000 to 2000** micrometers*" in size. The exact value of 1 micrometer is disclosed as a lower limit for the particulate size in original claim 3. Nothing in the original application indicates that the value of exactly 1 micrometer is to be excluded as the lower limit of the range.
 - 2.1.2 In the Board's judgement, the range "*1 to less than 2000 micrometers*" is thus disclosed in a general manner in the application as filed and, therefore, also its combination with the other features of claim 1.
- 2.2 Regarding the feature "*a mass or agglomeration of active particulate*"
 - 2.2.1 This feature is disclosed *verbatim* on original page 4, lines 1 to 4, where it is indicated that "*the structure comprises a mass or agglomeration of active (or functional) particulate [...] bonded together with pressure-sensitive adhesive polymer microparticulate distributed in the mass of active particulate.*"
 - 2.2.2 Moreover, the paragraph bridging pages 3 and 4 and comprising the sentence quoted above not only refers to some specifically shaped structures, but describes also the structures in general (see "*a permeable, self-supporting, shaped structure*" on page 3, lines 29 to

30). Although specific applications (e.g. a "filter mask") are exemplified in this paragraph, it expresses no limitation to embodiments having **specific** three-dimensional shapes.

2.3 Regarding the feature "*distributed in a mass of active particulate to adhere them together in a flexible composite structure*"

2.3.1 The appellant argued that this feature was only originally disclosed in combination with the additional requirement that the microparticulate had to be present in an amount sufficient to enable adhesion of the active particulate.

2.3.2 The feature in question finds basis *inter alia* in the passage quoted under 2.2.1, *supra*. Moreover, the structure according to claim 1 must be "*self-supporting*" and contain the "*active particulate bonded to each other the with pressure-sensitive adhesive polymer*".

Hence, the board holds that the amount of adhesive must be sufficient to achieve this effect. Said "additional requirement" is thus at least implicitly met by the composite structures of claim 1.

3. Claim 5 as granted

3.1 Regarding the feature "*a higher vinyl ester of the formula $CH_2=CHOCR$ where R is a straight or branched alkyl group having at least 2 carbon atoms*"

3.1.1 The use of a "*higher vinyl ester*" in general is disclosed in original claim 8. The more specific class of higher vinyl esters referred to by the feature in

question is disclosed on original page 12, lines 7 to 13.

3.1.2 For the board, the specific glass transition temperature range specified in the sentence on page 12, lines 10 to 11, for the homopolymer of such higher vinyl ester is not inextricably linked with the feature in question, i.e. the structure " $CH_2=CHOO CR$ where R is a straight or branched alkyl group having at least 2 carbon atoms", since said sentence is preceded by the wording "*but preferably*" (line 9).

4. Claim 15 as granted

4.1 Regarding the combination of features resulting from the back-reference to claim 1

4.1.1 Since claim 1 is fairly based on the original application (see point 2, *supra*), the method for the production of the composite structure is also originally disclosed (see original claim 19).

4.1.2 In addition, the passage on page 5, lines 5 to 9, describes a method for making structures according to the invention comprising the mixing of an active particulate with an aqueous dispersion of PSA and shaping and bonding the resulting mixture to form a structure.

4.1.3 Thus, the subject-matter of claim 15, which refers back to claim 1, is not considered to go beyond the original disclosure.

5. The board thus concludes that the subject-matter of the claims according to the main request does not extend beyond the content of the application as filed and that

the patent is not, therefore, objectionable under Article 100(c) EPC.

This conclusion is also in line with the *ratio decidendi* of previous decision T 1164/01 regarding the allowability under Article 123(2) EPC of the same set of claims.

Sufficiency of disclosure

6. The appellant raised several objections concerning the alleged insufficiency of disclosure, but did not discharge the burden of proof resting on it in this respect. For the board, the arguments presented by the appellant (*infra*) do not justify shifting the burden of proof to the respondent.

6.1 For the board, the appellant's assertion that the claimed invention could not be carried out over the entire range claimed is, in essence, based on the argument that the claimed structure could not be obtained using undefined components, of any size and shape, in any relative amounts.

6.2 The board observes that a sufficiency objection requires that there are serious doubts, based on technical considerations and/or substantiated by verifiable facts. The mere fact that a claim is broad (as in the present case by virtue of terms such a "**active particulate**" and "*comprising*" is usually not in itself a ground for considering that there is insufficiency of disclosure.

However, despite the positive finding of the opposition division regarding sufficiency, the appellant did not submit any concrete evidence convincingly showing that

- the skilled person was not in a position to provide structures as claimed across the full ambit of the claims.
- 6.3 More particularly, the appellant did not dispute that the concrete examples contained in the patent in suit can be reproduced by the skilled person. Instead, it argued, but without providing supporting evidence, that skilled person would not be able to implement further embodiments of the invention, differing from those exemplified in the patent.
- 6.4 As regard the terms "*permeable*" and "*flexible*", the appellant did not dispute that they have a certain general meaning in the technical field of composite structures. This meaning may be rather broad, and the board accepts there may be situations where, for a given composite material, it may not be easy to decide whether or not said material clearly qualifies as being both "*permeable*" and "*flexible*", even taking into account its intended field of application. However, for the board, the use of these relative terms may at most result in some ambiguity (lack of clarity) as regards the boundaries of the claimed subject-matter, but this ambiguity certainly does not permeate the whole claim. The board is thus convinced that the skilled person is able to prepare, based on the indications and examples given in the patent in suit and without undue burden, further composite structures as defined in claim 1 at issue (for given purposes) which doubtlessly meet the criteria of permeability and flexibility.
- 6.5 The appellant also based its sufficiency objection on the absence, in the patent in suit, of a reference to a method permitting to determine whether the PSA

microparticulate met the size criterion defined in claim 1.

- 6.5.1 In this respect, the board observes that the microparticulate is not defined by some unusual parameter, but is characterised in that it *"is 1 to less than 2000 micrometers in size"*. It was not disputed *per se* that particle sizes can be determined, but it was rather argued that various known methods would lead to different results, and that therefore the skilled person would not know which method to choose.
- 6.5.2 The board accepts that the application of different methods for determining a particle size may lead to variations in the results obtained. The skilled person is, however, familiar with this fact, as apparently also confirmed also by D27 (see e.g. page 3, middle column, first paragraph, first sentence), cited by the appellant itself (without providing the publication date).
- 6.5.3 In the present case, however, methods are available to the skilled person for measuring a parameter (particle size) which is usually relied upon in characterising particulates. Moreover, the patent in suit (see e.g. paragraph [0011]) comprises references to documents illustrating the preparation of suspensions of suitable PSA microparticulate, as well as preparation examples.

However, the appellant did not provide any evidence (e.g. based on the reproduction of an example of the patent) showing that the skilled person would regularly be confronted with undue difficulties in determining, using any well-known method that he would consider to be fit for purpose and to give meaningful results in terms of particle size, whether or not a given PSA

particulate meets the size criterion of claim 1.

7. Based on the above considerations, the board does not find the insufficiency objection convincing and concludes that the patent as granted is not objectionable under Article 100(b) EPC.

Novelty

8. The appellant argued that the claimed subject-matter lacked novelty with regard to each of D5, D12, D13 and D14a/b. The objections raised did not convince the board for the following reasons.

8.1 D5

- 8.1.1 D5 discloses an air-cleaning (thus permeable) filter element comprising particulate activated carbon, preferably grains from 0.5 to 10 mm in diameter (column 2, lines 4 to 15) bonded to and between two elastic-flexible webs with an adhesive agent (column 1, lines 7 to 9 and 45 to 52). The adhesive agent may be solvent-, pressure-, heat- or reaction-sensitive (column 2, lines 19 to 22) and may be applied to the elastic webs by direct brushing, roller- or calender coating, spray coating or any other suitable procedure (column 3, lines 11 to 14).

- 8.1.2 More particularly, example 3 of D5 relates to a vinyl pressure sensitive adhesive applied, in form of a solution (see "dissolved") to the two webs by means of a coating brush.

From this example it cannot, however, be directly and unambiguously derived that in the finished filter element, the adhesive polymer is present in the form of

a microparticulate which is 1 to less than 2000 micrometers in size, rather than in form of a film coating the webs and providing adhesion of the active carbon.

For the board, the appellant's mere assumption, disputed by the adverse party, that particles would inevitably be formed when drying the applied PSA solution is not a sufficient proof in this respect. Moreover, it appears to be more than questionable that the active carbon particles will be "*bonded to each other with pressure-sensitive adhesive polymer microparticulate distributed in the mass of active particulate to adhere them together ...*"

- 8.1.3 For the board, the remaining disclosure of D5 provides no teaching of more relevance regarding novelty.
- 8.1.4 The board concludes that a composite structure with all the features of claim 1 is not directly and unambiguously, not even implicitly, disclosed by D5.
- 8.1.5 This conclusion is also in line with the *ratio decidendi* of previous decision T 1164/01 regarding novelty over D5 and the same set of claims.
- 8.2 D12
 - 8.2.1 This document was cited by the appellant as prior art under Article 54(3) EPC and relates to air filters comprising adsorbent particles ranging between 100 and 7000 micrometers in size (page 2, line 56), bonded together by a molten binder (page 3, lines 55 to 60). Polyacrylate is mentioned among other possible binding agents. Example 1 describes the use of active carbon particles with a size of between 300 and 800

micrometers and thermoplastic polyurethane particles (before melting) of between 10 and 350 micrometers. The other examples also mention thermoplastic polyurethane powder.

8.2.2 No proof was submitted by the appellant that thermoplastic polyurethane or polyacrylates always had pressure sensitive adhesive properties (see point 8.4.2, *infra*, concerning D23). This was disputed by the respondent with reference to paragraph [0027] of the patent in suit where these properties (inherent tack, adhesive at room temperature, only light pressure required for bonding) are indicated in more detail, and to common general knowledge, as apparently illustrated by the encyclopedia excerpt D25 despite the lack of an indication regarding its publication date. Even though polyacrylates feature among the list of possible adhesives in D12, no evidence has been filed demonstrating PSA properties for the polyurethanes used according to the examples of D12.

8.2.3 Therefore, D12 does not unambiguously disclose a composite structure with all the features of claim 1.

8.3 D13

8.3.1 D13 was cited by the appellant as state of the art under Article 54(3) EPC and relates to flexible filters comprising adsorbing particles of 100 to 5000 micrometers (column 2, lines 22 to 24) bonded together by adhesive particles with an average particle size of 5 to 90% of the adsorbent particles. The exemplified binder is a thermoplastic polyurethane with a melting range between 130 and 140 °C (column 3, lines 19 to 21). Polyacrylates are generally mentioned as being

"flexible", as are thermoplastic or curable elastomers (column 3, lines 6 to 13).

8.3.2 Again no proof has been presented that the thermoplastic polyurethane exemplified has pressure sensitive properties.

8.3.3 Hence, D13 does not unambiguously disclose a composite structure with all the features of claim 1.

8.4 D14a/b

In the following paragraphs reference will be made to document D14a. Document D14b, a continuation-in-part of the application from which D14a claims priority is similar in content and not more relevant.

8.4.1 D14a discloses a self-supporting filter structure having good adsorption capacities while providing low pressure drops (figures 1 and 2; page 3, lines 32 to 36). The adsorbent material is preferably activated carbon with particles sizes of 10 to 100 mesh (2 to 0.15 mm). The adsorbent particles are bonded together by binder particles with a size which is at least 20% less than the average granular adsorptive particle size (page 5, lines 26 to 31). The binders may be thermoplasts such as polyolefins or polyacrylates or thermoplastic elastomers such as polyurethanes (page 6, lines 1 to 6). The actual binding is done by heating above the melting point (claim 12).

8.4.2 However, although polyacrylates and polyolefins are mentioned, no proof has been submitted that ones used in D14a are necessarily pressure sensitive. Besides the fact that the date of the first publication of the information contained in D23 is unknown, this document

does not establish that every thermoplastic polyolefin or polyacrylate adhesive or thermoplastic polyurethane elastomer is necessarily a "*pressure sensitive adhesive*" within the conventional meaning of the term (point 8.2.2, *supra*).

8.4.3 Thus, a composite structure with all the features of claim 1 is not unambiguously derivable from D14a/b.

9. Summarising, as none of prior art documents discloses directly and unambiguously a composite structure with all features of claim 1 of the main request, the subject-matter of claim 1 is novel (Articles 100(a), 52(1) and 54 EPC).

Consequently, the subject-matter of claims 2 to 11 dependent on claim 1, the means according to claims 12 to 14 comprising the inventive composite structure of claim 1, the methods of making such a structure according to claims 15 and 16, and the method for purifying a fluid using said structure according to claims 18 and 19 also also meet the requirement of novelty.

Inventive step

10. The invention

The patent in suit (see paragraph [0001]) relates to permeable, self-supporting composite structures comprising active particulate bonded to each other by a binder. Such a structure may for instance (see paragraph [0002]) be used for filtering fluids like gases or liquids, by using a sorbent as the active particulate.

11. Closest prior art

11.1 Considering the similarities between D5 and the patent in suit in terms of the nature, properties and purpose or field of application of the composite structures concerned, the board holds that D5 is the most appropriate starting point for the assessment of inventive step.

11.2 Indeed, as already mentioned under point 8.1 *et seq.*, *supra*, D5 relates to an "air-cleaning filter element", e.g for a filter mask, prepared by bonding an adsorbent material to and between a plurality of elastic-flexible webs with an adhesive agent" (column 1, lines 5 to 10), which adhesive agent may be a PSA (column 2, line 20).

11.3 More particularly, example 3 of D5 describes a filter element comprising activated carbon pellets bound between to webs by a vinyl PSA. This filter element can be considered to represent the closest prior art.

However, D5 is silent on the distribution of the adhesive in the mass of active particulate and does not mention that the PSA adhesive forms particles with the specific dimensions defined in claim 1.

12. Technical problem

12.1 The appellant argued in its statement of grounds (page 65, last paragraph), that the patent in suit contained no indication with respect to advantages, if any, of the claimed invention as compared to the closest prior art. For the board too, compared to the structure according to the closest prior art (point 11.3, *supra*), the structure as defined in claim 1 provides no

unexpected effect or demonstrated advantage across the full ambit of claim 1.

- 12.2 The technical problem to be solved by the claimed invention in the light of the closest prior art can thus merely be seen in providing an alternative permeable self-supporting composite structure comprising active particulate.

13. Solution

As a solution to this technical problem the patent in suit proposes the self-supporting and permeable composite structure according to claim 1, which is characterised in particular in that it comprises *"a mass or agglomeration of active particulate **bonded to each other** with pressure-sensitive adhesive polymer **microparticulate distributed in the mass of active particulate to adhere them together**"* and in that *"the **adhesive polymer microparticulate** is smaller in size than the active particulate and **...is 1 to less than 2000 micrometers in size**"* (emphasis added by the board).

14. Success of the invention

The board is satisfied the technical problem posed is plausibly solved by the provision of an alternative composite structure according to claim 1. This was not disputed by the appellant.

15. Non-obviousness of the solution

It thus remains to be assessed whether the claimed invention was obvious to the person skilled in the art having regard to the state of the art.

15.1 Document D5 taken alone

15.1.1 Although D5 refers to the use of a PSA, this adhesive is applied to the webs by means of direct brushing, roller- or calender coating or spray coating (D5, col. 3, lines 11 to 14). The adhesive coated webs are then bonded to the active carbon particles.

Thus, D5 does not suggest admixing the PSA particles with the active particulate such as to obtain a structure wherein the adsorbent particles are "bonded to each other with pressure-sensitive adhesive polymer microparticulate distributed in the mass of active particulate to adhere them together in a flexible composite structure", which is already "self-supporting" by itself, as required by claim 1 at issue.

15.1.2 D5 taken alone contains no hint to modify the fabrication method disclosed in example 3 thereof, or in other parts thereof, in a way leading to a composite structure according to claim 1 at issue.

15.2 Combinations of D5 with either of D8, D9 or D10

15.2.1 Although D8, D9 and D10 concern the preparation of PSA "beads", none of them unambiguously discloses the actual use of the adhesive in the form of particles. In this respect, reference is made to D8, representative for these three documents, wherein it is stated at column 9, lines 59 to 63: "*In order to make adhesive compositions the copolymer beads may be coated from water or solvents or extruded. Such coating or extruding **destroys the bead configuration and results in a continuous film** of pressure sensitive adhesive.*" (emphasis added by the board). The same

statement can be found in D9 (column 5, lines 24 to 28) and D10 (column 5, lines 25 to 29).

15.2.2 In any case, none of these three documents contains elements of information inducing the skilled person unaware of the present invention to modify the preparation methods disclosed in D5 such as to obtain structures differing from those disclosed in D5, wherein the active particulate is adhered to a web by the PSA, by the features quoted under 15.1.1, *supra*.

15.3 Thus, in the board's judgement, the structure according to claim 1 is not obvious to the skilled person in the light of D5 taken alone or in combination with or its combination with either of D8, D9 or D10 does not render the claimed subject-matter obvious.

15.4 Objections based on D11 as closest prior art

15.4.1 The appellant regarded D11 as a suitable starting point for the assessment of inventive step.

15.4.2 D11 (column 3, lines 20 to 2 and 26 to 32; column 4, lines 6 to 11) discloses a porous composite structure wherein adsorbent granules are joined by smaller binder particles (figure 4 and column 4, lines 33 to 35), particularly suited for the filtration of gases and vapours, which are made by mixing adsorbent granules and polymeric binder granules, followed by compacting and heat bonding (column 4, lines 6 to 10).

15.4.3 However, the board does not consider D11 as a more appropriate starting point than D5, since, as conceded by the appellant (statement of grounds, page 68, first full paragraph) a PSA was not mentioned in D11. Moreover, flexibility of the filter elements 20 so

obtained and shown in the figures does not appear to be an issue in D11. The appellant alleged, with reference to D26, an inherent flexibility of the polymeric polyurethane binders used according to some of the examples of D11. However, the publication date of the contents of D26 itself is unknown, and the references ([24][25][26]) cited D26 (page 6 of 11) in support of the information presented in the latter with respect to polyurethanes in the context of hot-melt adhesives appear to be taken from textbooks published years after the filing date of the patent in suit (see D26, page 10 of 11: 2007, 2010 and 2002). D26 is thus not suitable to establish that the specific polyurethanes particles used according to the examples of D11 actually provide flexibility to the filter elements so prepared.

15.4.4 Combination of D11 with any of D8, D9 or D10

As already noted D8, D9 and D10 do not unambiguously disclose or suggest adhering two substrates to each other by means of PSA particles (point 15.2.1, *supra*). Moreover, D11 explicitly teaches to use "heat bonding" (column 4, line 9) by thermoplastic and thermosetting hot-melt type binders (column 4, lines 41/42 and line 45 to 69) without addressing the flexibility of the composite obtained.

15.4.5 Combination of D11 with D7

D7 discloses PSA microspheres and a sheet material having coated thereon a PSA, but it is not clear whether in the latter material still comprises microspheres. Hence, for the board, D7 is not more relevant than any of D8 to D10.

15.4.6 Combination of D11 with D5

D5 does not disclose, let alone suggest the preparation of a composite comprising PSA microparticulate (see 15.1, *supra*).

15.4.7 Based on the above considerations, the board concludes that without the benefit of hindsight, providing composite structure according to claim 1 was not obvious to the skilled person starting from D11 and taking into account the teachings of any of D5, D7, D8, D9 or D10.

15.5 Objections based on D1, D15 or D17 as closest prior art

The board is also convinced that the skilled person unaware of the present invention would not be induced by any of D8, D9 or D10 to replace the binders mentioned D1 (hot-melt thermoplastic), D15 (thermoplastic; hot-melt; "no defined particles exist" after heating) or D17 (hot-melt thermoplastic; "no well defined binder particles exist" after heating) for binding together sorbent particles by a PSA according to D8 to D10, to thereby obtain a flexible, composite structure with all the features of claim 1.

15.6 Documents D16, D18, D19 and D20

These documents were only briefly cited in the appellant's statement of grounds without, however, substantiating objections by referring to specific passages of the documents and/or setting out their possible relevance within the framework of a problem-solution-approach (as noted in the board's communication, point 3.2).

In its reply to the statement of grounds, the respondent indicated in detail why these documents were not relevant at all. The board has no reason to call into question the assessment of their relevance by the respondent.

16. Summarising, the appellant has not convincingly shown that composite structures according to claim 1 were obvious to the person skilled in the art in the light of the prior art documents relied upon, taken alone or in combination.
17. In the board's judgement, the subject-matter of claim 1 of the main request thus involves an inventive step (Articles 52(1) and 56 EPC).
- 17.1 Consequently, the subject-matter of claims 2 to 11 dependent on claim 1, the means according to claims 12 to 14 comprising the inventive composite structure of claim 1, the methods of making such a structure according to claims 15 and 16, and the method for purifying a fluid using said structure according to claims 18 and 19 also involve an inventive step.

Conclusion

18. None of the grounds for opposition under Article 100 EPC prejudices the maintenance of the patent as granted.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



D. Magliano

B. Czech

Decision electronically authenticated