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**Datasheet for the decision
of 26 March 2010**

Case Number: T 2027/07 - 3.3.05

Application Number: 01968055.2

Publication Number: 1326697

IPC: B01D 46/12

Language of the proceedings: EN

Title of invention:

Filter structure with two or more layers of fine fiber having extended useful service life

Patentee:

DONALDSON COMPANY, INC.

Opponent:

Carl Freudenberg KG

Headword:

Fine filter medium/DONALDSON

Relevant legal provisions:

EPC Art. 84, 111(1), 123(2)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Main request: amendments directly and unambiguously derivable from application as filed: Remittal (yes)"

Decisions cited:

T 0397/89, T 0157/90, T 0770/90, T 0296/96, T 1067/97,
T 0931/00, T 1239/03

Catchword:

-



Case Number: T 2027/07 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 26 March 2010

Appellant: DONALDSON COMPANY, INC.
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted 12 October 2007
revoking European patent No. 1326697 pursuant
to Article 102(1) EPC 1973.**

Composition of the Board:

Chairman: G. Rath
Members: J.-M. Schwaller
C. Vallet

Summary of Facts and Submissions

- I. This appeal was lodged by the patentee (hereinafter "the appellant") against the decision of the opposition division revoking European patent 1 326 697 on the grounds of Art. 100(c), because claim 1 as granted extended beyond the content of the application as filed.
- II. In the contested decision, the examining division held that in the application as filed:
- the feature "a Frazier permeability of 0.03 m/s to 15 m/s" was only disclosed in combination with a coarse fibrous media as substrate;
 - the rounding from "0.0333..." to "0.03" represented a reduction of about 10% of the lower boundary value which was not encompassed by the word "about";
 - the claimed "efficiency between 20% to 80%" was only disclosed in relation with a substrate made from fibers and having a thickness of about 0.1 to 5 mm.
- III. Along with the grounds of appeal dated 22 February 2008, the appellant filed three sets of amended claims as main, first and second auxiliary requests, respectively.

Claim 1 of the main request reads as follows:

"1. A pleatable fine fiber filter medium, in particular for filtering air, consisting of:

(a) a single layer of coarse fibrous media as the filter substrate, the filter substrate having:

(i) a first surface and a second surface;

(ii) a Frazier permeability of 0.0333.. to 15 m-s⁻¹;
(iii) an efficiency of between 20% and 80%; and
(iv) a thickness of about 0.1 to 5 mm;
(b) the first surface and second surface each comprising at least one layer of polymeric fine fiber:
(i) the fine fiber having a diameter of 0.001 to 0.5 µm;
(ii) the layer of the fine fiber having a thickness of less than 5 µm
(iii) the layer of fine fiber formed in an amount effective to obtain:
(1) a pore size of about 0.001 to 5 µm
(2) an efficiency of about 50% to less than 90% in any one layer and to obtain
(c) an overall efficiency of greater than 90% in the layers combined;
wherein all efficiencies are measured under ASTM-1215-89 with monodisperse 0.78 µm polystyrene latex particles at 6.1 m/min velocity."

IV. Under cover of a letter dated 30 June 2008, the respondent cited decision T 931/00 and objected to the subject-matter of claim 1 of the above three requests under Article 123(2) EPC.

V. Oral proceedings took place on 26 March 2010. After discussion of the different objections raised under Articles 123(2) and 84 EPC, the appellant filed an amended set of claims as a new main request, with revised claim 1 reading as follows (amendments emphasized by the board):

"1. A pleatable fine fiber filter medium, in particular for filtering air, consisting of:

(a) a single layer of coarse fibrous media as the **woven or non-woven** filter substrate, the filter substrate having:

- (i) a first surface and a second surface;
- (ii) a Frazier permeability of 0.0333.. to 15 m-s⁻¹;
- (iii) an efficiency of between 20% and 80%; and
- (iv) a thickness of ~~about~~ 0.1 to 5 mm;
- (v) the fibers having an average diameter of at least 10 µm;

(b) the first surface and second surface each comprising at least one layer of polymeric fine fiber:

- (i) the fine fiber having a diameter of 0.001 to 0.5 µm;
- (ii) the layer of the fine fiber having a thickness of less than 5 µm
- (iii) the layer of fine fiber formed in an amount effective to obtain:
 - (1) a pore size of ~~about~~ 0.001 to 5 µm
 - (2) an efficiency of ~~about~~ 50% to less than 90% in any one layer and to obtain

(c) an overall efficiency of greater than 90% in the layers combined;

wherein all efficiencies are measured under ASTM-1215-89 with monodisperse 0.78 µm polystyrene latex particles at 6.1 m/min velocity."

VI. The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request filed at the oral proceedings before the board, or alternatively, according to one of the first or second auxiliary request dated 22 February 2008.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. *Main request - Amendments*

1.1 Under Article 123(2) EPC the respondent objected to the subject-matter of claim 1 of the main request. It argued as follows:

- there was no basis in the application as filed for replacing the "sheet like filter substrate" defined in claim 1 as filed by a "single layer of coarse fibrous media as the woven or non-woven filter substrate";
- the feature relating to the substrate "*made from a natural or synthetic fiber such as cellulose, polyester, ..., etc.*" had been omitted from the operative set of claims;
- the combination of the claimed Frazier permeability with the claimed efficiency was not directly and unambiguously derivable from the application as filed;
- there was no direct and unambiguous disclosure for combining the features "coarse fibrous material", "efficiency of between from 20% and 80%" and "thickness of 0.1 to 5 mm";
- according to document D1: WO 99/16534, the permeability of a filter was a function of overall

efficiency, number of layers and size of fibers. So, these features were inextricably linked;

- according to decisions T 157/90, T 397/89, T 770/90, T 296/96, T 1067/97, T 931/00 and T 1239/03, the combination of features claimed would not be directly and unambiguously derivable from the application as filed.

1.2 The board cannot accept the above arguments for the following reasons:

1.2.1 Under the heading "Brief Description of the Invention" (page 2 of the application as filed), the concept underlying the claimed invention is described in the following terms: "*... a first layer of fine fiber is placed on an upstream surface of the **substrate**, then a second layer is formed as a second surface typically downstream*" (lines 23 to 25). So, a fair reader understands that the so-called "substrate" is sandwiched between two layers of fine fiber. This understanding is confirmed by the inventors' explanations in the passages at page 4, lines 11 to 14 and 30 to 32: "*We found that the tendency of the fine fiber layers to obtain an increased pressure drop or to film over can be minimized by reducing the fine fiber coverage **on opposite sides of a substrate layer**. [...]. The combination of two layers of fine fiber on **opposite sides of a planar media layer**, each layer having a reduced efficiency, provides across the entire layered structure, a substantially high efficiency.*" (bold added by the Board).

It is thus beyond any doubt that the concept on which the filter of the claimed invention is based lies in an intermediate layer sandwiched between layers of fine fiber.

- 1.2.2 Concerning the intermediate layer supporting the fine fiber layers, the board observes that throughout the application as filed this layer is alternatively featured "*substrate*", "*substrate layer*", "*planar media layer*" (e.g. in the passages referred to in item 1.2.1), "*coarse fibrous media*" (e.g. in the passage at page 22 referred in point 1.2.4 or 1.2.7 hereinafter), or "*sheet-like filter substrate*", such as in independent claim 1 of the application as filed, reading:

"A fine fiber filter media comprising a sheet-like filter substrate, the sheet having a first surface and a second surface, the first surface and the second surface each comprising a layer of fine fiber having a diameter of about 0.001 to 0.5 microns, the layer having a thickness of less than 5 microns, the fine fiber formed in an amount effective to obtain an overall efficiency under ASTM-1215-89 with monodisperse 0.78 micron polystyrene latex particles at 20 ft/min velocity of less than 90% in any one layer and to obtain an efficiency of greater than 90% in both layers combined."

- 1.2.3 It is true that the terms or expressions: "*substrate*", "*substrate layer*", "*planar media layer*", "*sheet-like filter substrate*" or "*coarse fibrous media*" are *in abstracto* not interchangeable. However, a patent application being its own dictionary, these terms must be read in the context of the specification taken as a

whole with the wish to understand the invention. In this respect, the board is of the opinion that these terms mutually complete each other, and so the person skilled in the art of producing filters would directly and unambiguously understand from the description that these different terms feature the intermediate filter layer covered on each side by a layer of fine fibers, also called "single layer of coarse fibrous media" in claim 1 at issue.

- 1.2.4 The respondent argued that there was no basis in the application as filed for a "single" layer of coarse fibrous media as the intermediate layer.

This argument is not accepted because, despite the reference to a "first" and "second" layer of permeable coarse fibrous media at line 9, page 22 of the application as filed, nowhere else on page 22 and in the application as filed reference is made to a filter with two intermediate layers of coarse fibrous media sandwiched between layers of fine fibers. Further, Figure 6 shows the layered structure of the filter at issue consisting in "*fine fiber layers 61, 62 typically adhered intimately to the substrate 63 having no substantial space between the layers*", as disclosed in the corresponding description of Figure 6 at page 27, lines 18 to 20. So, it is apparent for the skilled person taking into account the application as filed as a whole that the filter under protection consists in a "single layer of coarse fibrous media" sandwiched between two fine fiber layers.

1.2.5 In this context, and with the term "media" further reading as defined at lines 3 to 6, page 6 of the application as filed, namely:

"a woven or non-woven sheet like substrate (emphasis added), having a thickness of about 0.1 to 5 mm and an efficiency of about 5% to 80%, often 20% to 80%, made from a natural or synthetic fiber such as cellulose, polyester, ..., etc.",

the board holds the combination of features as hereinafter defined in bold character as directly and unambiguously disclosed in the application as filed (*for ease of understanding, the non-bolded features materialise the differences with the subject-matter of claim 1 at issue*):

A pleatable fine fiber filter medium, in particular for filtering air, **consisting of:**

(a) a single layer of coarse fibrous media as the woven or non-woven filter substrate, the filter substrate having:

- (i) a first surface and a second surface;**
- (ii) a Frazier permeability of 0.0333.. to 15 m-s⁻¹;
- (iii) an efficiency of between 20% and 80%; and**
- (iv) a thickness of 0.1 to 5 mm;**
- (v) the fibers having an average diameter of at least 10 µm;

(b) the first surface and second surface each comprising at least one layer of polymeric fine fiber:

- (i) the fine fiber having a diameter of 0.001 to 0.5 µm;**
- (ii) the layer of the fine fiber having a thickness of less than 5 µm;**

(iii) the layer of fine fiber formed in an amount effective to obtain:

(1) a pore size of 0.001 to 5 μm ;

(2) an efficiency of 50% to less than 90% in any one layer and to obtain

(c) an overall efficiency of greater than 90% in the layers combined;

wherein all efficiencies are measured under ASTM-1215-89 with monodisperse 0.78 μm polystyrene latex particles at 6.1 m/min velocity.

1.2.6 The respondent argued that since the entire definition of the term "media" as referred to at page 6, lines 3 to 6 of the application as filed had not been taken over into the subject-matter of claim 1 at issue, the latter was in breach with Article 123(2) EPC in view of decision T 1067/97, wherein the amendment arose from features isolated from a preferred embodiment of the invention.

In the board's view, T 1067/97 does not apply to the present case, since the definition of a term - here the term "media" - cannot be compared to a preferred embodiment of an invention. The fact that the definition of the term "media" (see item 1.2.5 above, second paragraph) has not entirely been incorporated into operative claim 1 does further not mean that amended claim 1 at issue extends beyond the content of the application as filed for the following reasons:

- first of all, the feature relating to the substrate "*made from a natural or synthetic fiber such as cellulose, polyester, ..., etc.*" is redundant, in the sense that there is no other alternative as regards

the type of fiber to be used - it can only be natural or synthetic - and so, the omission of this feature cannot be regarded as an extension beyond the content of the application as filed;

- in the context of the application as filed (see "*a planar media layer*" (page 4, line 32) vs. "*the term 'media' refers to a woven or non-woven sheet like substrate ...*" (page 6, lines 3 to 4)), the skilled person would consider the term "*sheet-like*" as synonymous to the term "*layer*" presently defined in claim 1 at issue;
- the choice of the restricted range of "*20% to 80%*" as regards the efficiency of the substrate, and in consequence the omission of the broader range of "*about 5% to 80%*", is ordinary patent practice and cannot be seen as an extension beyond the content of the application as filed because the combination of this feature with the Frazier permeability is, as explained hereinafter, directly and unambiguously derivable from the application as filed.

Therefore the respondent's argument is rejected.

1.2.7 The respondent's argument that the **combination** of features (a)(i) and (a)(v) would not have a basis in the application as filed is not accepted for the following reasons:

1) The "*layer of coarse fibrous media*", which implicitly has a first surface and a second surface (feature (a)(i)), is defined in the passage at lines 3 to 21, page 22 of the application as filed as being

characterised inter alia as having "*a Frazier permeability of 0.0333... to 15 m-s⁻¹*" (feature (a)(ii)) and "*fibers having an average diameter of at least 10 μ m*" (feature (a)(v)). So, these features are directly and unambiguously disclosed in combination in the application as filed.

2) Furthermore, as explained in items 1.2.3 and 1.2.4, in the context of the application as filed the terms "*sheet-like filter substrate*" and (single) "*layer of coarse fibrous media*" feature the same entity, namely the intermediate fibrous layer. So, the skilled person directly and unambiguously understands that the features defined under 1) characterising the (single) "*layer of coarse fibrous media*" further characterise the "*sheet like filter substrate*" disclosed at page 6, lines 3 to 6 of the application as filed as having "*an efficiency of 20% to 80%*" (feature (a)(iii)) and "*a thickness of about 0.1 to 5 mm*" (feature (a)(iv)) (see item 1.2.6).

Therefore, in the board's view, the combination of features (a)(i) to (a)(v) defined in claim 1 at issue is directly and unambiguously disclosed in the application as filed.

1.2.8 The respondent argued that the ranges of values of the parameters ("permeability", "diameter of fibers") disclosed at page 22 of the application as filed could not arbitrarily be combined with the ranges, let alone with the preferred ranges, of values characterising the parameters (efficiency, thickness) disclosed at page 6 of the application as filed without modifying the mathematical relationship linking together these

parameters. As evidence for an inextricable link between these parameters, the respondent referred to the statement at page 39, lines 20 to 26 of document D1: WO 99/16534, that permeability was "*a function of the overall efficiency, number of layers and size of selected fibers*".

The board cannot accept this argument because the above statement purely and simply confirms common general knowledge in the field of filters that an increase in the fiber size, or in the thickness or in the number of filtering layers, automatically leads to an increase in filter efficiency and a decrease in filter permeability.

Furthermore, the appellant's counterargument that the efficiency of a filter may be varied without corresponding variation of the permeability or of the thickness of the filter by e.g. grafting electrostatic charges to the filter surface proves that the above features are not inextricably or mathematically linked.

This argument of the respondent is therefore rejected.

1.2.9 The decisions cited by the respondent do not apply to the present case for the following reasons:

Decisions T 397/89 (see reasons 2.12), T 157/90 (see reasons 2.4) and T 770/90 (see reasons 2.6 par.4) concern the generalisation of specific embodiments, which is of no relevance for the present case.

In T 296/96 (point 3.1 of the reasons), the board had to decide whether the definition for a substituent R¹ or

R² could be applied to a further substituent R, defined differently in the application as filed. The answer was negative. The board does not see any parallel between this prior case and the case at issue.

In T 1067/97 (point 2.1.3. of the reasons), it was concluded that if a claim was restricted to a preferred embodiment, it was not allowable under Article 123(2) EPC to extract isolated features from a set of features which in the application as filed were disclosed in combination in that embodiment. In the case at issue, the situation is different since the amendment does not result from the extraction of isolated features from a set of features disclosed in combination and representing one embodiment, let alone a preferred embodiment, but the amendment results from the combination of features found at different locations of the application as filed and defining in more details the filter subject of the invention.

T 931/00 (see reasons 2.1) concerns figures extracted from examples which had been used to limit a range. This is of no concern in the present case, as none of the features of amended claim 1 at issue has its origin in the examples of the application as filed.

In T 1239/03, the amendment concerned an amount defined in terms of a percentage in the claim, but from the disclosure of the application as filed it was impossible to consistently interpret the percentage as "weight percent" or as "mol percent". In the case at issue, the board does not see any parallel with this prior decision, because a recalculation involving different units is not at issue.

1.3 The remaining features in claim 1 at issue, which further characterise the combination of features disclosed hereinabove, and which by the way had not been contested under Article 123(2) EPC by the respondent, have the following basis in the application as filed:

- a "pleated", or "pleatable", structure (or filter) is disclosed at page 9, lines 17 and 18; page 23, lines 1 and 2 and at page 25, line 14;
- claim 11 discloses that the filter structure be used "in particular for filtering air";
- the value "0.0333... m-s⁻¹" has its origin in the value "1 meter/min" (page 22, line 18 of the application as filed), converted into the international SI unit "m-s⁻¹" during examination proceedings;
- the passage on page 3, lines 18 to 20 or page 9, line 3 discloses that the fine fiber be made of "polymeric" fine fibers;
- the passage on page 4, lines 4 to 6 discloses that the layer of fine fiber is formed in an amount effective to obtain "a pore size of 0.001 to 5 µm".

1.4 For the reasons indicated in items 1.2. and 1.3 above, claim 1 is not held as having been amended in such a way that it contains subject-matter which extends beyond the application as filed, and therefore the requirements of Article 123(2) EPC are met, at least as regards this claim.

2. *Main request - Clarity*

The deletion of the ambiguous term "about", on the one hand, and the clarification of the expression "coarse fibrous media" by the feature "the fibers having an average diameter of at least 10 μm ", on the other hand, overcomes the clarity objections raised at the oral proceedings against the features "about" and "coarse".

3. *Remittal*

Since the decision to revoke the patent did only address the Article 123(2) EPC issue, the Board considers it appropriate to exercise its power conferred to it by Article 111(1) EPC and remits the case to the first instance for further prosecution.

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 for further prosecution on the basis of the claims 1 to 20 according to the main request filed during the oral proceedings.

The Registrar:

The Chairman:

C. Vodz

G. Rath