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**Datasheet for the decision
of 6 December 2007**

Case Number: T 0668/03 - 3.2.04

Application Number: 96911433.9

Publication Number: 0822775

IPC: A47L 9/14

Language of the proceedings: EN

Title of invention:

Shock resistant high efficiency vacuum cleaner filter bag

Patentee:

MINNESOTA MINING AND MANUFACTURING COMPANY

Opponent:

Fiber Mark Gessner GmbH & Co./Eurofilters N.V.

Headword:

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Relevant legal provisions:

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Relevant legal provisions (EPC 1973):

EPC Art. 100(a), 104, 123(2)

Keyword:

"Main request - inventive step (no)"
"First auxiliary request - added subject-matter (yes)"
"Late filed second auxiliary request - not admitted"
"Apportionment of costs (refused)"

Decisions cited:

T 0153/85, T 0074/96

Catchword:

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Case Number: T 0668/03 - 3.2.04

D E C I S I O N
of the Technical Board of Appeal 3.2.04
of 6 December 2007

Appellant: MINNESOTA MINING AND MANUFACTURING COMPANY
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 3 April 2003
revoking European patent No. 0822775 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: M. Ceyte
Members: C. Scheibling
H. Preglau

Summary of Facts and Submissions

- I. By its decision dated 3 April 2003 the Opposition Division revoked the patent. On 10 June 2003 the Appellant (patentee) filed an appeal and paid the appeal fee simultaneously. The statement setting out the grounds of appeal was received on 13 August 2003.
- II. The patent was opposed on the grounds based on Articles 100(a) (54 and 56) EPC. The Opposition division found that the subject-matter of claim 1 of both the main and the auxiliary requests did not involve an inventive step.
- III. The following documents played a role during the appeal proceedings:
- D2: US-A-4 589 894
- D5: DE-C2-38 12 849
- D13: "Critical aerosol velocity in nonwoven filtration", 1991, Nonwoven Conference
- D14: "Aerosol technology", W.C. Hinds
- D15: "Automatisierter Test von Luftfiltermedien für Hochleistungsschwebstofffilter und Entstaubungsfilter", Staub Reinhaltung der Luft, Springer-Verlag, 1990
- D16: "Performance of agricultural vehicle cab filters measured with monodisperse aerosols", Particle Science and Technology, 1994

- D17: "Particle loading & kinetics of filtration in fibrous filters", International Workshop, Karlsruhe 2002
- D18: "Loading and filtration characteristics of filtering facepieces", 1993
- D19: "Abscheidung submikroskopischer Partikeln mit Tiefenfiltern aus elektrisch geladenen Fasern", Staub Reinhaltung der Luft, Springer-Verlag 1988
- D20: "F & S Filtrieren und Separieren", pages 166 and 167, 1991
- D21: "Enhancement of particle deposition in filters due to electrostatic effects", Filtration & Separation, 1987

IV. First oral proceedings before the Board took place on 19 September 2006 and were adjourned because the identity of one of the joint opponents had been drawn into doubt by the Appellant. With letter dated 18 April 2007 the Appellant (patentee) acknowledged that the Neenah Gessner GmbH was pursuing the opposition in the name of the previous opponent FiberMark Gessner GmbH & Co. Thus, the proceedings could be continued.

Second oral proceedings before the Board took place on 6 December 2007.

The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the

basis of claim 1 as submitted as auxiliary request on 19 February 2003 and claims 2 to 13 as granted (main request) or in the alternative on the basis of claims 1 and 12 filed together with the grounds of appeal and claims 2 to 11 as granted (first auxiliary request) or on the basis of claims 1 and 12, filed during the oral proceedings and claims 2 to 11 as granted (second auxiliary request). He further requested an apportionment of costs.

He mainly argued as follows:

D2 represents the closest prior art. However, it does not disclose a charged filter layer containing electrets. The problem to be solved can be seen in enhancing filtration under shock loading conditions. D5 does not relate to shock loading conditions and the filter bag disclosed therein comprises an outer layer with reduced air penetration capability to limit the air flow. A skilled person would not use a charged filter layer as disclosed in D5 without an outer layer limiting air penetration, since it is known in the art that the efficiency of charged layers diminishes with increasing air velocity.

The amendments made in claim 1 of the first auxiliary request find a basis in the application as filed, pages 14 and 20 as well as in claim 13.

As a response to the Board's communication, claim 1 of the second auxiliary request has been amended so as to include the material of the inner layer, in order to overcome any possible objection under Article 123(2) EPC.

Additionally, an apportionment of costs would be justified, since the second oral proceedings were occasioned by the behaviour of the Respondent.

The group of common Respondents (common opponents) countered the Appellant's arguments and mainly argued as follows:

The vacuum filter bag of claim 1 differs from that known from D2 in that a charged filter layer containing electrets is provided. According to the patent in suit, the problem to be solved is to provide a filter bag with good fine particle removal efficiency over an extended period of time without filter binding, which also has superior fine particle removal efficiency under shock loading conditions. However all vacuum cleaner bags are designed to resist shock loading conditions. Furthermore, D5 teaches that a layer with a permanent electrostatic charge improves removal of fine particles. Therefore, a skilled person would be prompted to apply the teaching of D5 to a filter bag according to D2. The fact that an electrically charged layer additionally performs better under shock loading conditions is to be seen a bonus effect.

The additional features of claim 1 according to the first auxiliary request have been taken in isolation either from a group of features of the description or from claim 13 as filed so that the requirements of Article 123(2) EPC are not met.

The second auxiliary request is to be rejected as late filed. Amended claim 1 of this request does not clearly meet the requirements of Article 123(2) EPC.

An apportionment of costs is not justified since the problem concerning the identity of one of the opponents could have been solved beforehand in writing, if the Appellant had raised this issue in due time.

The common Respondents requested that the appeal be dismissed and the request for apportionment of costs be refused.

V. Claim 1 according to the main request reads as follows:

"1. A vacuum cleaner filter bag (20) resistant to shock loading comprising a flat filter laminate composite formed into the filter bag having at least one air inlet defining means in said flat filter laminate composite and at least one seam forming said flat filter laminate composite into said filter bag said flat filter laminate composite comprising;

a) an outer support layer (12) of a porous material having an air permeability of at least $50 \text{ m}^3/\text{min}/\text{m}^2$,

b) at least one charged fibrous filter layer (13) containing electrets, and

c) an inner diffusion layer (14) which is unbonded to said filter layer except at the at least one seam (25), wherein the diffusion layer (14) has an air permeability of at least $50 \text{ m}^3/\text{min}/\text{m}^2$, a tensile strength of at least $0.1 \text{ kg}/\text{cm}$, and is formed of fibers having an effective fiber diameter of at least $10 \text{ }\mu\text{m}$."

Claim 1 according to the first auxiliary request reads as follows:

"1. A vacuum cleaner filter bag (20) resistant to shock loading comprising a flat filter laminate composite formed into the filter bag having at least one air inlet defining means in said flat filter laminate composite and at least one seam forming said flat filter laminate composite into said filter bag said flat filter laminate composite comprising;

a) an outer support layer (12) of a porous material having an air permeability of at least $50 \text{ m}^3/\text{min}/\text{m}^2$,

b) at least one charged fibrous filter layer (13) containing electrets, and

c) an inner diffusion layer (14) which is unbonded to said filter layer except at the at least one seam (25), wherein the diffusion layer (14) has an air permeability of at least $50 \text{ m}^3/\text{min}/\text{m}^2$, a tensile strength of at least 0.1 kg/cm , and is formed of fibers having an effective fiber diameter of at least $10 \text{ }\mu\text{m}$,

wherein said filter bag (20) reduces shock loading particle emissions by at least 40 percent compared to a similar bag without said inner diffusion layer."

Claim 1 according to the second auxiliary request reads as follows:

"1. A vacuum cleaner filter bag (20) resistant to shock loading comprising a flat filter laminate composite formed into the filter bag having at least one air inlet defining means in said flat filter laminate composite and at least one seam forming said flat filter laminate composite into said filter bag said flat filter laminate composite comprising;

a) an outer support layer (12) of a porous material having an air permeability of at least $50 \text{ m}^3/\text{min}/\text{m}^2$,
b) at least one charged fibrous filter layer (13) containing electrets, and
c) an inner diffusion layer (14) which is unbonded to said filter layer except at the at least one seam (25), wherein the diffusion layer (14) is a spun bond or carded web and has an air permeability of at least $50 \text{ m}^3/\text{min}/\text{m}^2$, a tensile strength of at least $0.1 \text{ kg}/\text{cm}$, and is formed of fibers having an effective fiber diameter of at least $10 \text{ }\mu\text{m}$, wherein said filter bag (20) has a shock loading particle emissions reduction of at least 40 percent compared to a similar bag without said inner diffusion layer (14)."

Reasons for the Decision

1. The appeal is admissible.
2. *Identity of the common Opponents:*
 - 2.1 The Appellant expressed doubts about whether the Opponents Eurofilter N.V. and Papierindustrie Limburg N.V. did still exist, because all shares of Airflo Europe N.V. which was alleged to own these Opponents might have been sold.
 - 2.2 The common Respondents answered that the Opponents in question did still exist and that they were not owned by Airflo Europe N.V.

Apart from a letter dated 23 March 2007 stating that Airflo Europe N.V. will be sold in the near future, the Appellant did not provide further evidence, neither to establish that the Opponents were owned by Airflo Europe N.V., nor that they ceased to exist.

2.3 The Board considers therefore, that the evidence submitted by the appealing patent proprietor is not sufficient to raise serious doubts about the existence of the opponents Eurofilter N.V. and Papierindustrie Limburg N.V.

3. *Claim 1 of the main request - inventive step:*

3.1 In agreement with the parties, the Board considers that D2 represents the closest prior art.

It was undisputed that the vacuum cleaner bag of claim 1 differs from that disclosed in D2 in that it comprises at least one charged fibrous filter layer containing electrets.

3.2 The problem to be solved by the invention as stated in the patent is suit is to provide a filter bag with good fine particle removal efficiency over an extended period of time without filter blinding, which also has superior fine particle removal efficiency under shock loading conditions (page 2, lines 42 to 44).

The Appellant considered that the objective problem underlying the invention is to provide a filter bag which has superior fine particle removal efficiency under shock loading conditions.

However, the features that distinguish the object of claim 1 from the prior art are not specific to filtration under shock loading conditions. Therefore, there is no reason to depart from the problem as stated in the patent in suit and to exclude improved fine particle removal under "normal" conditions from the objective problem.

Accordingly, there is no reason to disregard D5 because it does not expressly refer to shock loading conditions, as stated by the Appellant.

3.3 D5 discloses a vacuum cleaner filter bag comprising three layers (figure 1a, version A) wherein the intermediate layer is a charged layer containing electrets to improve fine particle removal (page 3, lines 35 to 39).

3.4 The Appellant argued that the charged intermediate layer of D5 is disclosed in combination with an outer layer of low air permeability. Therefore, a skilled person would not use the charged layer of D5 with an outer layer of high permeability as used in D2.

However, it is specified in D5 (page 3, lines 37 to 39) that beside the mechanical filtration there is provided in addition an electrostatic filtration. This means that there are two separate modes of action a mechanical one and in addition thereto an electrostatic one. There is no indication in this document that the use of a charged layer is bound to the use of an outer layer of a given low permeability.

3.5 The Appellant further argued that the benefit of charged layers under shock loading conditions is unpredictable and that the filtration efficiency of charged layers under such conditions can even be worse than that of uncharged layers. He referred in this respect to D13 to D18.

In D13 which relates to non-woven filters it is said that the electrostatic mechanism is important only for particles from 0,01 to 5 μm and decreases with aerosol velocity (page 126, middle of the right hand column).

D14 solely relates to the size of particles.

In D15 the efficiency of filters containing electrets is said to decrease when the air flow velocity and the particle size increases (page 315, lines 9 to 31).

D16 indicates (page 387, fourth paragraph) "Electrically charged materials ... carry a permanent electric charge on the fibres, which augments the filtration efficiency considerably" however "loading [clogging] may cause deterioration in efficiency".

D17 was published in 2002 and thus is not part of the state of the art at the filing date of the patent in suit.

D18 states (first page, left hand column, lines 3 to 5) "Because of the addition of this electrical removal force, the filtration efficiency can be significantly increased without increasing the air pressure drop inside the respirator".

3.6 Further documents (D19 to D21) relating to electrostatically charged filters have been provided by the Respondent:

D19 refers to the use of charged filter in vacuum cleaners and indicates that a better removal of particles with respect to conventional filters (paragraph 6 "Schlußfolgerungen").

D20 refers to the use of charged filter in vacuum cleaners and indicates (page 167, left hand column, penultimate paragraph) that charged non-woven webs exhibit extremely low pressure drop and a high retention capability.

D21 does not relate to vacuum filter bags but states that "Electrostatic effects enhance the collection efficiency of fibrous filters without increasing the pressure drop".

3.7 Thus, the general teaching of these documents is that electrically charged filters are efficient for small particles, but that their efficiency decreases when particle size increases, when air velocity increases and when clogging of the filter increases. These findings do not alter the fact that all these documents acknowledge that filter layers containing electrets improve removal efficiency of small particles and none of them alleges that under shock loading conditions a charged filter layer performs worse than an uncharged.

3.8 The Appellant also provided evidence in the form of test results, see Appendix II. However, it is unclear whether the results are significant when considering the

inherent margin of error of the emission count. Furthermore, these tests have been performed by the Appellant after the priority date of the patent in suit and thus, are not representative of the common knowledge of a skilled person in the field of vacuum cleaner filter bags at the filing date.

3.9 Accordingly, the cited documents do not show any common understanding that filter layers containing electrets should not be used under shock loading conditions. Thus, since D5 specifically refers to improved fine particles retention, a skilled person would have been prompted to use a charged layer as disclosed in D5 in a filter bag according to D2 and thus would have arrived in an obvious manner at the subject-matter of claim 1 of the main request.

3.10 Accordingly, the subject-matter of claim 1 according to the main request does not involve an inventive step.

4. *Claim 1 according to the first auxiliary request - added subject-matter:*

4.1 In addition to the features of claim 1 of the main request, this claim specifies that "... said filter bag (20) reduces shock loading particle emissions by at least 40 percent compared to a similar bag without said inner diffusion layer."

4.2 The Appellant considered that these features are disclosed in the description as filed (WO-A-96/32878) page 14, first paragraph and page 20, lines 13 to 19 as well as in claim 13 as filed.

4.3 The passage in question reads "... the combination of supported filter laminates of electret filter media with an unbonded (/) spun bond inner diffusion layer provide superior performance ..." and that of page 20 reads "The results show that various spun bond inner diffusion layers and also a carded web provided superior particle emission reductions ..."

Thus, in both cited passages superior performance is obtained in combination with specific inner diffusion layers. Accordingly these passages do not form a basis for claiming a reduction of particle emission of at least 40% independently from the type of inner diffusion layer used.

4.4 Claim 13 as filed reads "... wherein the inner diffusion layer reduces shock loading particle emissions by at least 40 percent compared to a similar bag without said inner diffusion layer and the filter has a quality factor of at least about 2.0."

According to the description of the patent in suit, page 8, lines 14 and 15, the filter quality factor is the percent emission reduction value divided by the percent flow reduction during the test.

The Appellant argued that although the quality factor is a function of the particle emission reduction, the particle emission reduction is independent from the quality factor and can thus be claimed in isolation.

4.5 The sole passage of the description which relates to the emission reduction as well as to the quality factor is Table 6 of the patent in suit. According to this table,

all tested filters having an emission reduction of at least 40% exhibit a quality factor of more than 2 and conversely the filter which does achieve an emission reduction of 40% has a quality factor of 1.1.

Consequently, there is no support in the patent specification for a particle emission reduction which is independent from the filter quality factor.

Accordingly, claim 13 as filed does not form a basis for claiming the particle emission reduction independently from the filter quality factor.

4.6 Consequently, the amendments in claim 1 of the first auxiliary request do not meet the requirements of Article 123(2) EPC.

5. *Claim 1 according to the second auxiliary request - admissibility:*

5.1 The second auxiliary request was filed for the first time at a very late stage of the appeal proceedings, namely during the oral proceedings before the Board.

Compared with the first auxiliary request, claim 1 of the second auxiliary request contains the added feature that the inner diffusion layer is a spun bond or carded web.

5.2 It is well established in the jurisprudence of the Boards of Appeal that the admissibility of amended claims into appeal proceedings, particularly when the amendments are first submitted at oral proceedings, is at the discretion of the Board; see for instance

T 153/85, OJ EPO 1988, 1 and T 74/96 of 21 November 2001, not published. Reference is also made to Article 10b(1) of the Rules of Procedure of the Boards of Appeal (RPBA), according to which any "amendment to the party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion", wherein the "discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy".

The Appellant argued that the second auxiliary request was an honest attempt to address the issue of added subject-matter raised in the Board's communication dated 24 March 2006.

However it is observed that the Appellant entirely ignored the Board's express invitation in its communication dated 14 June 2007 accompanying the invitation to oral proceedings to file amended claims at least one month before the date fixed for the oral proceedings. No reasons have been given for the filing of this auxiliary request not within the above time limit but at the very last stage of the appeal proceedings namely during the oral proceedings before the Board.

The Board in exercising its discretion decided not to admit the second auxiliary request of the Appellant having regard to the fact that it was filed during the oral proceedings without any proper justification for such late filing and also having regard to the Board's view, set out below, that amended claim 1 of this second

auxiliary request was not clearly allowable having regard to the requirements of Article 123(2) EPC.

- 5.3 In the application as filed the carded web used as diffusion layer in example 11 is a point bonded polypropylene carded web and according to page 8 first paragraph, the carded webs which are suitable as diffusion layers are "consolidated carded webs such as point bonded carded webs of polyolefin (e.g. polypropylene) staple fibers". The additional feature in claim 1 that the diffusion layer is a carded web generates new technical information which is not directly and unambiguously derivable from the application as filed, namely that the diffusion layer can be made of a carded web which is not a consolidated carded web.
- 5.4 Amended claim 1 thus contains added subject-matter and therefore does not comply with the requirements of Article 123(2) EPC.
- 5.5 More importantly, amended claim 1 of the second auxiliary request contains the same amendment as claim 1 of the first auxiliary request, according to which "said filter bag (20) reduces shock loading particle emissions by at least 40 percent compared to a similar bag without said inner diffusion layer." As has been explained in point 4.5 above, this amendment is not supported by the application as filed and does not comply with the requirements of Article 123(2) EPC. It follows that amended claim 1 of the second auxiliary request also contains added subject-matter and is therefore obviously not clearly allowable.

5.6 For all these reasons the Board in exercising its discretion under Article 10b(1) RPBA has decided not to admit the second auxiliary request into the proceedings.

6. *Apportionment of costs:*

The Appellant furthermore requested an apportionment of costs in view of the fact that oral proceedings had to be held for a second time. As a matter of fact, the former oral proceedings had to be adjourned because the identity of one of the opponents had been drawn into doubt by the Appellant during the first oral proceedings. It is true that it was the duty of the Respondent to make clear throughout the procedure who belongs to the group of common opponents. However, had the Appellant raised this issue before the first oral proceedings, it could have been dealt with in writing and thus, the costs for further oral proceedings could have been avoided.

Therefore, the Board cannot detect any reasons of equity which could be used to order a different apportionment of costs (Article 104(1) EPC). Accordingly, the Appellant's request for a different apportionment of costs is refused.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Magouliotis

M. Ceyte