

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

D E C I S I O N
of 5 November 2003

Case Number: T 0293/01 - 3.3.5

Application Number: 93915164.3

Publication Number: 0649335

IPC: B01D 46/52

Language of the proceedings: EN

Title of invention:

Filter device for the filtration of fluids

Patentee:

MINNESOTA MINING AND MANUFACTURING COMPANY

Opponent:

Carl Freudenberg KG

Headword:

Filter/3M

Relevant legal provisions:

EPC Art. 54(1), 54(3), 56

Keyword:

"Novelty -yes"

"Inventive step - yes, non-obvious solution to a technical problem"

Decisions cited:

-

Catchword:

-



Case Number: T 0293/01 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 5 November 2003

Appellant 1: Carl Freudenberg KG
(Opponent) Höhnerweg 2-4
D-69469 Weinheim/Bergstrasse (DE)

Representative: Ackermann, Joachim, Dr.
Patentanwalt Dr. Ackermann
Postfach 11 13 26
D-60048 Frankfurt am Main (DE)

Appellant 2: MINNESOTA MINING AND MANUFACTURING COMPANY
(Proprietor of the patent) 3M Center
P.O. Box 33427
St. Paul
Minnesota 55133-3427 (US)

Representative: VOSSIUS & PARTNER
Siebertstrasse 4
D-81675 München (DE)

Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
10 January 2001 concerning maintenance of
European patent No. 0649335 in amended form.

Composition of the Board:

Chairman: M. M. Eberhard
Members: G. J. Wassenaar
J. H. Van Moer

Summary of Facts and Submissions

I. European patent No. 0 649 335, was opposed by appellant 1 (opponent). The patent comprised 12 claims of which claim 1 read as follows:

"A filter device for the filtration of gases and/or fluids, and particularly for the filtration of air streaming into the passenger cabin of a motor vehicle, comprising:

- a filter element (12) including a filter medium (20) pleated in zig-zag manner, wherein said filter medium (20), on its two longitudinal sides extending in the pleating direction, is provided with stabilizing strips (34) for stabilizing the zig-zag-shaped pleated configuration of the filter medium (20), said stabilizing strips (34) being bonded to the longitudinal edges (38) of the filter medium (20), and wherein the two stabilizing strips (34), on each of their outer sides (39) facing away from the filter medium (20), are provided with a sealing medium (42),
- a filter element holding frame (14) having longitudinal and transverse frame portions (44, 46) and being adapted for insertion of the filter element (12) therein and for removal of the filter element (12) therefrom, said filter element holding frame (14) having receiving means (66) for freely inserting therein and freely removing therefrom the end portions of the filter element(12) at its transverse sides,
- wherein, when the filter element (12) is inserted in the filter element holding frame (14), the sealing medium (42) is in abutment with the inner sides of said longitudinal frame portions (44) of the filter

element holding frame (14) and the end portions (40) of the filter medium (20) on its transverse sides are inserted in the receiving means (66) provided on said transverse frame portions (46) of the filter element holding frame (14)."

II. The opposition division maintained the patent in amended form. Claim 1 as granted was rejected on the ground of lack of novelty with respect to document

E8: WO 93/12858,

which was a prior art document within the meaning of Article 54(3) EPC.

III. Appellant 1 and Appellant 2 (proprietor) both lodged an appeal against the decision of the opposition division to maintain the patent in amended form. During the appeal proceedings appellant 1 maintained that the subject-matter of claim 1 as granted lacked novelty and did not involve an inventive step. With respect to the issue of inventive step, *inter alia*, the following documents were cited:

E1: EP-A-0 450 299

E2: US-A-3 712 033

E3: US-A-3 246 457

O3: Letter from Mr Dieter Linse to Mr Massimo Nalon, dated 21 May 1992, with drawing.

09: Report of Mr Volker Bräunling dated 19 February 1992.

- IV. Appellant 2 maintained that E8 did not destroy the novelty of claim 1 as granted and that the other citations did not render the subject-matter of claim 1 obvious. It was further argued that documents O3 and O9, relating to an alleged prior use, were not available to the public before the priority date of the patent in suit and thus did not belong to the state of the art within the meaning of Article 54(2) EPC. Three amended sets of claims were submitted as auxiliary requests with the letter dated 30 September 2003, the claims of the first auxiliary request being identical to those maintained by the opposition division.
- V. During oral proceedings, which took place on 5 November 2003, appellant 1 only relied on the above mentioned citations in support in his submissions with respect to claim 1 as granted.
- VI. The arguments of appellant 1 can be summarized as follows.

Lack of novelty

The wording of the description of the filter system in E8 might be different in some respects but there was no difference in substance. Although the tensioning bands mentioned in E8 were flexible, they nevertheless stabilised the zigzag-shaped filter, at least in its stretched position. From the use of the same material having the same thickness it followed that the function of the tensioning bands in E8 was effectively the same

as that of the stabilizing strips in the patent in suit. Moreover, granted claim 1 did not require that the filter element comprising the stabilizing strips could not be compressed. The presence of a locking mechanism as shown in Figures 1 to 5 of E8 was only an optional feature. Without this optional feature, the filter element could be freely removed from the holding frame. In the position as shown in Figure 3, even in the presence of the locking mechanism, the filter element could be freely removed from the holding frame. Thus E8 effectively disclosed all the features of claim 1.

Lack of inventive step

The closest prior art was E2, from which the filter system according to claim 1 essentially differed in the presence of the stabilizing strips at the longitudinal edges of the filter medium. Such strips were, however, well-known in the art, as shown in E1, E3 and O3. The presence of a gasket was also shown in E1 and O3 and a reference to such a sealing could be found in O9. Although the filter as illustrated by the figures of E2 included a protective screen, such a screen was only optional. The sealing of the filter element could be performed by a sponge material. Thus E2 also disclosed an embodiment in which the filter element could be freely removed from the holding frame.

VII. The arguments of appellant 2 with respect to the subject-matter of claim 1 can be summarized as follows.

Novelty

The filter device of granted claim 1 differed from that of E8 at least by the presence of the stabilizing strips and the feature that the filter element could be freely removed from the holding frame. The tensioning bands according to E8 did not stabilize the zigzag-shaped pleated configuration of the filter medium. The tensioning bands in E8 allowed the pleated filter to be compressed like a harmonica. It could not be derived from the fact that the tensioning bands could have the same thickness and could be made from the same polymer as the stabilizing strips according to the patent in suit, that they had the same mechanical properties. According to E8 the tensioning bands were made from a non-woven spun-bonded polymer fibre, whereas the stabilizing strips of the patent in suit consisted of a solid polymer body. The locking means in E8 were essential; otherwise the filter would have jumped out of the holding frame.

Inventive step

E2 concerned a filter assembly whereby a zigzag-folded filter was built into a box-like filter housing moulded from a plastic material. End walls were provided to seal the ends of the filter element and to hold the side walls in position. After the sealing the filter could not be removed from the housing, so that if the filter element had to be replaced the whole housing had to be discarded. The invention as claimed was based on a different concept, whereby, after use, only a filter element needed to be discarded and replaced and not the whole filter device. In this way the amount of non-

filtering material which had to be disposed was reduced. E2 did not provide a hint to transform the filter device disclosed therein in such a manner that, after use, only the filter element could be replaced, let alone measures how to do it. Apart from the different concept the claimed filter device comprised at least two different features, i.e. the presence of stabilizing strips bonded to the longitudinal edges of the filter medium, and a holding frame having receiving means for the end portions of the filter element from which these end portions could be freely removed. Although stabilizing strips bonded to the filter edges were known in the art, as shown in E1, there was no obvious reason to apply them to a device according to E2. The feature of freely removing the end portions of the filter element from their receiving means was not disclosed in any cited prior art document and would be contradictory to the general teaching of E2.

VIII. Appellant 1 requested that the decision under appeal be set aside and the patent be revoked.

Appellant 2 requested, as the main request, that the decision under appeal be set aside and that the patent be maintained as granted, or as the first auxiliary request that the appeal of the opponent be dismissed, or as the second or third auxiliary request that the decision under appeal be set aside and that the patent be maintained on the basis of claims 1 to 12 according to the second or third auxiliary request, both filed with the letter dated 30 September 2003.

Reasons for the Decision

1. The appeals are admissible.
2. *Novelty (claim 1 as granted; main request)*
 - 2.1 Appellant 1 maintained its novelty objection only on the basis of E8. This document discloses a filter system comprising a filter element arranged in zig-zag-shaped folds. The longitudinal edges of the filter element are connected to tensioning bands for limiting the stretching of the filter element. When the filter element is stretched, these tensioning bands are subjected to tension and, in their stretched condition, fulfil the function of fixing the filter element folding portions in the zigzag shape. The filter element is thus given shape stability by stretching. Since the tensioning bands are flexible they allow compression of the filter element in a direction opposite to their stretching direction (page 2, line 26 to page 3, line 20; page 11, line 25 to page 12, line 3; claim 1; Figures 1 to 4).
 - 2.2 According to present claim 1 the zig-zag-pleated filter medium is provided with stabilizing strips for stabilizing the zig-zag-shaped configuration. In the board's opinion, a skilled person reading claim 1 would understand that said stabilizing strips must be sufficiently stiff to stabilize themselves the zigzag-shaped configuration of the filter medium, thus giving the filter element a mechanically stable pleated configuration. This understanding from the wording of claim 1 itself is confirmed by the description of the patent in suit, according to which the thickness of the

stabilizing strips need only be selected in such a manner that the filter medium is given a consistent or regular mechanically stable pleated configuration (column 2, lines 25 to 30) and that the stabilizing strip must safeguard a sufficiently consistent, self-supporting mechanically stable pleated configuration for the filter element (column 6, lines 1 to 9). According to column 2, lines 19 to 23, the stabilization of the pleated configuration is effected only by two stabilizing strips and the patent in suit contains no information suggesting that the stabilized configuration might be compressed without damaging the stabilizing strips.

- 2.3 The appellant 1's argument that the filter element shown in Figure 1 of E8 has the same geometry as that of the filter shown in the patent in suit and that the material of the stabilizing strips according to the patent in suit is the same as that of the tensioning bands according to E8 so that, despite the different wording, the function in both cases must be the same, is not convincing.

According to the explanation of Figure 1 in E8 the filter element **10** can be stretched or compressed in the direction of the twin arrow **16** and the tensioning bands limit the extent to which the filter element **10** is stretched and serve for stabilizing and maintaining the wave shape of filter element in the condition wherein the filter element is stretched to the limit (page 11, lines 20 to 35). Thus according to E8 the tensioning bands stabilize the filter configuration only if they are stretched to the limit and maintained in this stretched condition. Complete stretching is achieved by

fastening means, which are part of the holding frame (page 13, lines 4 to 12 and Figures 3 and 4). According to present claim 1, however, the filter element is stabilized by the stabilizing strips and is introduced into the holding frame in its already stabilized form. According to E8 the tensioning bands may comprise the same material as the cover layer of the filter medium. This cover layer comprises a non-woven spun-bonded material, preferably having a thickness of 0.22 mm, produced from polymer fibres, preferably polypropylene fibres (page 18, lines 15 to 27). According to the patent in suit the stabilizing strips are preferably also made of polypropylene having a thickness of only 0.2 to 0.5 mm (column 6, lines 6 to 9). The essential difference is, however, that according to E8 the tensioning bands are made from a fibrous material comprising air between the fibres and having a basis weight per surface unit such that they form a flexible band or web at the given thickness (page 3, lines 11 to 20; page 18, lines 15 to 24), whereas the stabilizing strips according to the patent in suit must be made from a more dense material having sufficient stiffness to provide a filter element having a self-supporting, mechanical stable, pleated configuration (column 6, lines 1 to 6).

The board, therefore, concludes that the filter device according to claim 1 as granted differs from the filter device disclosed in E8 at least by a filter element having stabilizing strips for stabilizing the zig-zag-shaped pleated configuration of the filter element. Thus E8 does not destroy the novelty of the subject-matter of claim 1 as granted.

3. *Inventive step (Claim 1 as granted; main request)*

3.1 Appellant 1 regarded E2 as representing the closest prior art. E2 concerns an air filter comprising a plastic moulded housing for a panel filter. The housing includes a bottom wall with some form of aperture therein. A pair of side walls with hinged upper portions extends upwardly from the opposite sides of the bottom wall. Each upper portion includes a lip that extends over the edge of the filter element to hold the filter element between the lip and the bottom wall. After the filter element and a protective screen are mounted in the housing between the side walls, the upper portion is swung into the operative position. End walls are then fitted over the ends of the housing and mechanically locked and adhesively secured to the ends of the pleated filter. The end walls seal the ends of the pleated filter and also act to hold the side walls in operative position. In a first embodiment the end walls are separate, cap-like members that fit over the ends of the housing and are mechanically locked and adhesively secured thereto. In a second embodiment the two end walls are hinged to the bottom wall so that after the filter element and hinged portions of the side walls are in position, the two end walls are simply swung upwardly and over the ends of the side walls and filter element. Again a mechanical lock and adhesive or pliable sealing material is used to complete the assembly. In the first embodiment the bottom wall is formed to provide an air distribution compartment between the filter element and the small air inlet (Figures 1 to 6). In the second embodiment, the bottom wall provides a flat surface around the bottom aperture that can be engaged with a gasket to

prevent leakage between the filter housing and the duct work to which it is attached (Figures 7 to 9); see column 1, line 50 to column 2, line 21. It is further indicated that the disclosed air filters comprise a sturdy, easily moulded, inexpensive plastic housing for a panel filter employing a pleated filter element and protective screens, and that many manufacturers of small engines are utilizing disposable units, in which not only the filter element but the entire filter is thrown away when filled with dirt (column 1, lines 9 to 13, and column 5, lines 20 to 23).

3.2 Appellant 1 pointed to the sentence in column 3, lines 25 to 26 of E2, according to which in small units a screen may not be required and derived therefrom that the filter element could be freely removed from the housing.

However, according to independent claims 1, 10 and 11 of E2, which do not mention a screen to hold the filter medium, the lip portion of the side walls extend over an edge of the filter means to aid in holding the filter means in the housing (claims 1 and 10, point d and claim 11, point e). The possible absence of a screen, therefore, does not mean that the lip portions **11d** and **12d** of the side walls, which hold the filter means in position, are also absent (see Figure 4 and column 3, lines 47 to 51).

Appellant 1 further pointed to the sentences in column 4, lines 21 to 26 of E2, according to which pads of sponge material may be situated between the filter ends and the end caps instead of using hot melt thermoplastic material to seal the ends of the pleated

filter element. Appellant 1's conclusion that it follows therefrom that the filter element could be freely removed from the housing cannot be accepted. In the summary of the invention of E2 it is indicated that after the filter element is mounted in the housing between the side walls and the lip portions swung into the operative position, end walls are fitted over the ends of the housing and mechanically locked and adhesively secured to the ends of the pleated filter. In the first embodiment the end walls are separate cap-like members that fit over the ends of the housing and are mechanically locked and adhesively secured thereon (column 1, line 62 to column 2, line 5). Appellant 1's citation relates to this embodiment. The way by which the end caps are connected to the side walls **11** and **12** is not affected by the way the filter element is sealed to the end caps **13** and **14**, be it by a hot melt adhesive or by pads of sponge material. As shown in Figures 3 and 5 the top portion **14b** of the end cap **14** is bent over the filter element and the side walls and attached to the lips of the side walls by snapping inwardly extending ridges **14c** into corresponding grooves in the lip portions of the side walls (column 3, line 57 to column 4, line 2). The top of the filter element is thus completely enclosed by the top portions of both the side walls and the end caps (Figure 5).

- 3.3 The board, therefore, concludes that E2 only discloses a filter element, which is tightly secured into an inexpensive housing made of plastics, from which it is not intended to be removed after use, but to be disposed together with the housing.

3.4 Starting from E2 the problem underlying the invention can be seen in providing a filter device wherein the quantity of material which is not used for the cleaning of gases and/or fluids, but which must be disposed nonetheless when replacing a spent filter medium, is reduced (see patent in suit, column 1, lines 35 to 42). It is proposed to solve this problem by the filter device as defined in claim 1. This filter device differs from the filter of E2 in that

- (i) the pleated filter medium of the filter element, on its two longitudinal sides extending in the pleated direction, is provided with stabilizing strips bonded to the longitudinal edges of the filter medium,
- (ii) the stabilizing strips are provided with a sealing medium on each of their outer sides,
- (iii) the filter element is placed into a holding frame from which it can be freely removed.

By making the filter element self-supporting through the stabilizing strips and using a holding frame from which it can be freely removed, it is possible to only dispose the filter element after use and to continue using the holding frame and the housing for a fresh filter element. In this way the amount of material which must be disposed after use is thus reduced compared with a filter assembly according to E2, which must be disposed as a whole after use. The board is, therefore, satisfied that the problem stated above has actually been solved by the claimed filter device.

3.5 The above-mentioned problem is not addressed in E1. This document deals with the problem of sealing the sides of a pleated filter element and providing the sealed sides of the filter element with an elastic sealing to install the filter element in a filter housing. A pleated filter with a stiff sealing frame should be achieved in a simple way (column 1, line 50 to column 2, line 3). E1 discloses the use of stabilizing strips of aluminium which may be provided with a sealing medium on each of their outer sides. E1 further acknowledges that it is known to provide the longitudinal edges of a pleated filter medium with sealing strips (claims 1, 4 and 10; column 1, lines 46 to 49; column 2, lines 45 to 56; column 3, lines 15 to 22; Figure 1). It would, however, make no sense to apply the aluminium stabilizing strips disclosed in E1 in a filter assembly according to E2. In E1 the aluminium strips are a part of the frame (column 2, line 57 to column 3, line 4; claims 7 and 8). In E2 the filter medium is already stabilized by the housing in which it is fitted. The use of additional strips in the filter assembly of E2 would in fact be contradictory to the problem to be solved because it would increase the amount of material to be disposed. Since applying the teaching of E1 to the air filter assembly of E2 does not solve the problem underlying the invention, the skilled person would not have considered E1 for solving this problem.

3.6 E3 relates to the problem underlying the invention. In order to minimize the quantity of materials it proposes to provide a pleated air filter cartridge comprising a frame for mounting in the air inlet duct. The filter medium is glued to support strips and a tape is glued

to the ends of the support strips after the folding operation (claim 1, column 1, line 71 to column 2, line 12, column 3, lines 25 to 45, column 4, lines 18 to 32 and Figures 1 to 6). The tapes **32** have some resemblance to the stabilizing strips according to present claim 1 in that they maintain the zigzag-shaped configuration of the plies of the filter medium (column 6, claim 4). However, the filter medium is further stabilized by gluing the tapes to the inner sides of the folded cardboard frame (column 5, lines 5 to 28 and Figure 6). The solution to the problem proposed in E3 is thus quite different from the solution as defined in present claim 1. Instead of providing a filter element which can be freely removed from its holding frame as claimed in the patent in suit, the filter element according to E3 is glued to an inexpensive frame, which is disposed together with the spent filter element. The concept of the filter cartridge according to E3 is, in fact, comparable to that of the filter assembly according to the second embodiment of E2; compare Figures 6 to 8 of E3 with Figures 7 to 9 of E2. A combination of E3 with E2, therefore, cannot give the skilled person any indication towards a filter device according to present claim 1.

- 3.7 It is questionable whether document O9 itself, which is an internal report of a meeting with a client, was made available to the public before the priority date of the patent in suit. Concerning the transmission of the drawing enclosed with document O3 to the Italian client, the question arises whether or not there existed a restriction on confidentiality implied by the circumstances of the case. However, these issues need

not be decided since even if documents 03 and 09 were considered to be publicly available, this would not change the outcome of the present decision (see reasons hereinafter). Therefore, for the sake of argument, documents 03 and 09 are, in appellant 1's favour, considered here as belonging to the state of the art within the meaning of Article 54(2) EPC.

Document 03 discloses on page 2 an air filter comprising a pleated filter fleece in a housing but does not mention any technical problem it intends to solve. Stabilizing strips are not clearly shown and their presence was contested by appellant 2. The sealing of the pleated fleece is provided by a gasket of PU-foam situated in the housing in engagement with the end portions of the filter fleece. These end portions are pressed by fastening means into the PU-foam of the gasket. These fastening means prevent the filter element from being freely removable from the housing.

In the board's opinion the skilled person had no obvious reason to consider document 03 to solve the problem underlying the invention, but even if he would have taken it into consideration it did not provide any incentive for features (i), (ii) and (iii) of present claim 1, mentioned under point 3.4.

Document 09 does not disclose a specific filter. It contains references to some projects, which are not further described, and some details of a filter assembly, without disclosing the overall configuration. From the mentioning of receiving means ("Stege") for the end portions of the pleated filter element it

cannot be derived that the filter element can be freely removed from these receiving means, which appear to be situated in the filter housing. The presence of sealing means is mentioned only with reference to an undisclosed drawing. In the board's opinion document O9 therefore does not disclose any of the features (i) to (iii) mentioned under point 3.4. Therefore, documents O3 and O9, even combined with the teaching of document E2, could not have lead to the claimed filter device.

3.8 The other prior art or alleged prior art documents on file do not contain information which, in combination with the teaching of the preceding documents, would render the claimed filter device obvious. Since they were no longer relied on during the oral proceedings there is no need to discuss them here.

3.9 For these reasons the board holds that, in view of the prior art documents on file, the filter device according to claim 1 as granted is not only new but also is not obvious to a skilled person. Claim 1 as granted thus meets the requirements of Articles 52(1), 54(1) and 56 EPC. Claim 1 being allowable, the same applies to dependent claims 2 to 12, whose patentability is supported by that of claim 1.

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:

G. Rauh

M. M. Eberhard