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Bezeichnung der Erfindung: Grease Filter
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : B01D 45/16, B08B 15/00

**ENTSCHEIDUNG / DECISION**
**vom / of / du** 14 March 1989

Anmelder / Applicant / Demandeur : Halton OY (Fi)

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

**EPÜ / EPC / CBE** Article 56 EPC

Schlagwort / Keyword / Mot clé : "Inventive step (Yes)"

**Leitsatz / Headnote / Sommaire**

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Case Number : T 434/88

# D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 14 March 1989

Appellant : Halton OY
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Representative : Dipl.-Ing. H. Tiedtke
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Decision under appeal : Decision of Examining Division 031 of the European Patent Office dated 20 May 1988 refusing European patent application No. 85 901 450.8 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : K. Lederer
Members : E. Turrini
C. Payraudeau

## Summary of Facts and Submissions

I. International patent application PCT/FI85/00025 published with the number WO85/04114 (European application number EP-A-85 901 450.8) was refused by decision of the Examining Division.

II. The reason for the refusal was that the subject-matter of Claim 1 lacked novelty within the meaning of Article 54 EPC having regard to the disclosure of prior art document GB-A-2 092 483 (D3).

III. The Appellant lodged an appeal against the decision.

IV. Oral proceedings were held, during which the Appellant addressed the Board and presented a brochure showing an embodiment of the invention.

At the end of the oral hearing he requested that the decision under appeal be set aside and that a patent be granted on the basis of Claims 1 to 6 as presented at the oral proceedings, of which Claim 1 reads as follows:

"Grease filter for air venting systems, comprising a purifier part (11) consisting of at least two air purifier modules (16) placed in parallel to each other and each having at least one vortex chamber (16a, 16b) operating on the centrifugal separation principle thus defining a centrifugal axis, each vortex chamber having an inlet opening (19) parallel to said axis and at least one outlet opening perpendicular to said axis so that the air flow (A) induced by a differential pressure ( p) across the air purifier modules proceeds through said vortex chamber (16a, 16b) in a constant helical motion directly towards said outlet opening without changing its general direction until

it leaves said vortex chamber (16a, 16b) while continuing its helical motion over a certain distance after leaving the air purifier module."

Claim 1 distinguishes over Claim 1 on which the decision under appeal was based essentially by the limitation of the subject-matter to grease filters for air venting systems and by detailed constructional features of the filter.

Claims 2 to 6 are dependent on Claim 1.

V. In support of the allowability of his request, the Appellant essentially argued that the invention is now restricted to grease filters functioning on the base of the centrifugal principle.

The filters of the type proposed in document D3, although being of the cyclone type and being therefore based on the same principle, would not be taken into consideration by the skilled man, firstly because they are intended for separating solids, and not oily liquids as grease, from the air, and secondly because they include an inner tube which forces the air stream to change its direction of 180° so that they would not function properly for the purpose of the invention.

The most pertinent prior art which forms the background of the invention, is represented by grease filters of the kind disclosed e.g. by prior art document US-A-3 834 135 (D4), wherein the air runs through the filter only a short distance corresponding to its thickness and escapes from the filter in a direction which is substantially the same as that of the incoming air.

The invention proposes a completely different solution according to which the air escapes from the filter at a

right angle to the direction in which it enters the filter and flows through the filter in a constant helical motion. The air which enters the central part of the filter has thus to flow a long distance before reaching the outlet, this resulting in an increase of the filtering efficiency.

Reasons for the Decision

1. The appeal is admissible.

2. There is no objection under Article 123(2) EPC to the present application documents.

3. Novelty.

3.1 The Examining Division refused the application in suit on the ground of lack of novelty of the subject-matter of the then valid Claim 1.

Document D3 refers to a centrifugal separator for separating solids from a gas stream.

Due to the limitation of the now valid Claim 1 to a grease filter comprising specific features adapted to separate grease from an air stream the objection of lack of novelty based on D3 is no more pertinent and need not be further discussed.

3.2 Document D4 discloses a grease filter for air venting systems (description: column 1, lines 3 to 7), comprising a purifier part consisting of more than one air purifier module (20) (Figure 1; column 2, lines 14 and 15) placed in parallel to each other and each having more than one vortex chamber (Figures 6 and 7: spaces between baffle plates) operating on the centrifugal separation principle

(column 3, line 52) thus defining a centrifugal axis, each vortex chamber having an inlet opening parallel to said axis (Figure 4: parallel slits) and one outlet opening (Figure 3) so that the air flow induced by a differential pressure across the purifier modules (see arrow "suction" on Figure 1) proceeds through the vortex chamber in a motion towards the outlet opening.

Thus, the subject-matter of Claim 1 distinguishes over the device disclosed in document D4 in that the outlet opening is perpendicular to the centrifugal axis (in the device of document D4 the outlet openings, i.e. the spaces between the plates 66, are parallel to the centrifugal axis), so that the air flow proceeds through said vortex chamber in a constant helical motion without changing its general direction until it leaves said vortex chamber while continuing its helical motion over a certain distance after leaving the air purifier module (in document D4 the direction of the air flow reverses itself as indicated in Figure 7 by the lines S).

3.3 Prior art documents US-A-3 910 782 and US-A-3 566 585 concern similar devices which do not come closer to the claimed invention as document D4 and therefore do not need to be discussed here.

3.4 EP-A-0 046 049 also describes cyclones for separating solids from a gas stream, working on the same principle as the device according to document D3.

3.5 The remaining documents cited in the course of the examining procedure do not come closer to the claimed subject-matter either.

3.6 For these reasons, the subject-matter of Claim 1 is considered to be novel within the meaning of Article 54 EPC.

4. Inventive step.

4.1 Starting from the nearest prior art, which in the Board's view is represented by document D4, the technical problem to which the invention affords a solution is to obtain grease filters of improved filtering capacity and simple construction.

4.2 This problem is solved by realising the outlet opening perpendicular to the centrifugal axis of the filter and by forming the vortex chamber in such a way that the air flow proceeds in a constant helical motion directly towards the outlet opening without changing its general direction until it leaves the vortex chamber while continuing its helical motion over a certain distance after leaving the air purifier module.

4.3 Concerning the solution to this problem, the skilled man would not necessarily restrict the search to the prior art referring to grease filters and he would indeed be expected to consider document D3.

It can be argued that he could theoretically consider to apply to a grease filter, like that known from D4, the teaching of D3 which suggests the realisation of the outlet opening perpendicular to the centrifugal axis (Figures 3 and 4).

However, he would then realise that the filter of document D3 is specifically designed for separating solids from a gas stream and is quite inappropriate for filtering grease. To adapt the filter of D3 to the separation of grease from

an air stream, the skilled technician would need more particularly to eliminate the inner tube (22) disclosed in document D3 so as to avoid changements in the general direction of the air stream and reduction of the cross-section. Only then, he could come to the subject-matter of Claim 1.

However, nothing in the prior art suggests that the elimination of this tube, which is an essential feature of the filter of D3, could be envisaged and the Board of Appeal is therefore of the opinion that in the absence of such a suggestion the skilled technician would consider the document D3 as irrelevant to the problem which the application in suit aims to solve.

4.4 The other cited documents of the prior art are far less relevant for judging of the inventive step.

4.5 Thus, the subject-matter of Claim 1 is considered to involve an inventive step within the meaning of Article 56 EPC and Claim 1 is, therefore, allowable under Article 52(1) EPC.

4.6 Claims 2 to 6, depending on Claim 1, correspond to particular embodiments of the invention. They are, therefore, also allowable under Article 52(1) EPC.

**Order**

**For these reasons, it is decided that:**

1. **The decision under appeal is set aside.**

2. **The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:**

2.1 Title and description pages 1 to 6 as presented on 14 March 1989 at the oral proceedings.

2.2 Claims 1 to 6 as presented on 14 March 1989 at the oral proceedings.

2.3 Drawings: sheets 1/2 and 2/2 as published on 26 September 1985.

The Registrar: The Chairman:

F. Klein K. Lederer