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D E C I S I O N
of 19 September 2003

Case Number: T 0928/01 - 3.3.5

Application Number: 93203298.0

Publication Number: 0601627

IPC: B01D 33/04

Language of the proceedings: EN

Title of invention:
Continuously operating filtering device

Applicant:
Pannevis B.V.

Opponent:
-

Headword:
Filtering device/PANNEVIS

Relevant legal provisions:
EPC Art. 56, 84, 123(2)

Keyword:
"Inventive step; main request - no, obvious solution of the problem; 7th auxiliary request - yes"

Decisions cited:
-

Catchword:
-



Case Number: T 0928/01 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 19 September 2003

Appellant: Pannevis B.V.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 7 March 2001
refusing European application No. 93203298.0
pursuant to Article 97(1) EPC.

Composition of the Board:

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

Summary of Facts and Submissions

- I. European patent application No. 93 203 298.0, publication No. 0 601 627, was refused by a decision of the Examining Division.
- II. During the examination procedure ten prior art documents were cited, of which the following remained relevant for this decision:
- D1: GB-A-2 174 014
D5: NL-A-83 03016
D6: US-A-4 351 726
- III. Claim 1 according to the main request then on file was considered to comprise subject-matter which extended beyond the content of the application as filed (Article 123(2) EPC). Its subject-matter was also considered to lack novelty over D6 (Article 54(1) EPC). The claims according to the auxiliary request were rejected under Rule 86(3) EPC.
- IV. The appellant lodged an appeal against this decision. With the statement of grounds new sets of claims were filed together with copies of various pages from the Handbook "Plastics" of Dr. A.E. Schouten, ninth edition, DELTA PRESS, hereinafter referred to as D11.
- V. In a communication the board inter alia expressed its preliminary opinion that the subject-matter of claim 1 according to the requests designated "first" and "second auxiliary" requests seemed to lack an inventive step over D5 or D6 in combination with D1.

- VI. In reply the appellant argued with respect to inventive step that D1 taught away from the solution as proposed by the present application and that this solution overcame a technical prejudice. A further auxiliary request and a leaflet of Pannevis B.V. were filed.
- VII. In reply to the summons to attend oral proceedings new sets of claims according to a first to eighth request, replacing the claims on file, were submitted together with an affidavit of Mr Pennewaard (Annex 1), reports concerning the production and sale of a CDV (Continuous Dual Vacuum) belt (Annex 2) and a statement of Mr Derenthal (Annex 3).
- VIII. During oral proceedings, which took place on 19 September 2003, new sets of claims according to a main request and eight auxiliary requests were submitted. Furthermore a sample of the carrier belt used in the filtering device according to the patent application was presented.

Claim 1 of the main request reads as follows:

"Continuously operating filtering device comprising a transversely ribbed carrier belt (3) movable around guide rollers (4) and at least one drive roller (5), and a filter belt (6) supported thereby, means (9) for supporting the carrier belt and suction boxes situated on either side of the carrier belt (3), said transversal ribs being separated from one another by respective channels (18) extending transverse to the moving direction of the carrier belt (3) and feeding into the suction boxes (8), **characterized in that** the carrier belt (3) is of plastic."

Claim 1 of the first auxiliary request differs therefrom in that the characterizing portion reads:
"the carrier belt is of thermoplastic plastic".

Claim 1 of the second auxiliary request differs from claim 1 of the main request in that the characterizing portion reads:

"the carrier belt (3) is substantially of plastic".

Claim 1 of the third auxiliary request differs from claim 1 of the main request in that the characterizing portion reads:

"the carrier belt (3) is completely of plastic".

Claim 1 of the fourth auxiliary request differs from claim 1 of the main request in that the characterizing portion reads:

"the carrier belt (3) is of plastic, excluding a carrier belt a substantive part of which is made of a non-plastic material".

Claim 1 of the fifth auxiliary request differs from claim 1 of the main request in that the characterizing portion reads:

"the carrier belt (3) is of thermoplastic plastic, excluding a carrier belt a substantive part of which is made of non-thermoplastic plastic".

Claim 1 of the sixth auxiliary request differs from claim 1 of the main request in that the characterizing portion reads:

"the carrier belt (3) is of one plastic".

Claim 1 of the seventh auxiliary request differs from claim 1 of the main request in that the characterizing portion reads:

"the carrier belt (3) is of plastic and in that said channels (18) are formed with an inclination from the middle of the belt (3) to the side so as to subject liquid particles to a driving force towards one of the suction boxes (8) as a result of the force of gravity".

IX. The appellant's arguments with respect to inventive step of the subject-matter as claimed may be summarized as follows.

State of the art was a filtering device as disclosed in D5 comprising a carrier belt consisting of canvas reinforced rubber. Such a belt had several disadvantages such as low flexibility, requiring rollers with a large diameter, high friction, requiring lubrication and high driving power, and low chemical and wear resistance. The applicant had found that these problems could be overcome by using a carrier belt of plastic. The use of a plastic carrier belt was not disclosed or suggested in the prior art. The only document disclosing a carrier belt which may comprise plastic material was D1. In this document plastics material was mentioned as a possible material in a layered structure of dissimilar materials having

different mechanical properties. There was no hint that the problems caused by a belt of reinforced rubber could be overcome by a belt consisting essentially of plastic.

- X. The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the main request filed during oral proceedings or one of the auxiliary requests 1 to 8 also filed during oral proceedings.

Reasons for the Decision

- 1. The appeal is admissible.
- 2. None of the documents on file discloses in combination all the features of any claim on file. The subject-matter of the claims is therefore novel. Since novelty is undisputed it is not necessary to give further arguments in this respect.
- 3. *Main request*
 - 3.1 Present claim 1 differs from claim 1 as originally filed in that the device additionally comprises suction boxes situated on either side of the carrier belt, and the carrier belt is transversely ribbed, these ribs being separated from one another by respective channels extending transverse to the moving direction of the carrier belt and feeding into the suction boxes. These additional features are disclosed in their claimed relationship in original claims 5 and 8, page 2, lines 31 to 32, page 3, lines 15 to 21 of the description and

Figures 2, 4 and 5 as originally filed. Claim 1 according to the main request therefore fulfils the requirements of Article 123(2) EPC.

- 3.2 The board accepts the appellant's position that D5 represents the closest prior art document. It undisputedly discloses a continuously operating filtering device according to the pre-characterizing part of claim 1. In the general description and the claims of D5 no particular attention is drawn to the material of the carrier belt. Only in the discussion of Fig. 1 of D5 is it indicated that the carrier belt consists of canvas reinforced rubber (page 6, lines 23 to 24).
- 3.3 The board does not dispute that at the publication date of D5 (18 March 1985) canvas reinforced rubber was the traditional material for carrier belts and that such belts had the disadvantages indicated in column 1, lines 6 to 30 of the published application (EP 0 601 627 A1). In agreement with the presentation in the patent application (see page 1, lines 6 to 24), the submissions made by the appellant in its letter of 18 August 2003 (point 18) and during oral proceedings the problem underlying the invention can be seen in providing a filtering device of reduced size, requiring less lubrication liquid and driving power, and comprising a carrier belt with improved resistance against chemical and mechanical wear. The appellant proposes to solve said problem by providing a filtering device comprising a carrier belt of plastic according to claim 1.

3.4 According to the patent application the plastic may be a thermoplastic or a thermosetting plastic. The application does, however, not disclose a specific kind of plastic nor a specific internal structure. During oral proceedings it was confirmed that a filtering device comprising the CDV belt produced by Ammeraal (Annexes 1 and 2) was intended to be encompassed by the wording of present claim 1. From the description of the belt in said annexes and the sample shown during the oral proceedings it was evident that these CDV belts have a composite structure with an inlay of a fabric of substantial thickness. The board must therefore conclude that the characterizing feature of claim 1 - that the carrier belt is of plastic - is not limited to a belt consisting of only one homogeneous piece of plastic, but covers any composite structure made of the same or different plastics.

3.5 According to the declaration of Mr Derenthal (Annex 3) a carrier belt entirely made of polyester or polyester/polyethylene installed in CDV filters at Merck KGaA production facilities had the following advantages compared to belts made of rubber:

- Very good chemical resistance.
- No aging effect.
- Smooth surface resulting in very good sliding characteristics and reduction of lubrication water.
- Smaller drum diameters.

Most of these advantages are also mentioned in the leaflet of Pannevis.

On the basis of the declarations in the annexes 1 to 3 it is credible that the above-mentioned problem is actually solved by a belt of a composite structure of at least two different plastics, comprising a fabric inlay of a high tensile strength plastic yarn. The board has, however, doubts that the said problem can be solved by a belt of any plastic or any combination of plastics as covered by claim 1. This issue need not be decided since assuming for the sake of argument in the appellant's favour that the claimed filtering device actually solves the above-mentioned problem on the whole ambit of claim 1, the solution as claimed is considered to be obvious to a person skilled in the art for the reasons given below.

- 3.6 The skilled person trying to solve the above-mentioned problem will consider recent patent literature in the same technical field, especially those documents published after the publication of D5, like D1. This document, which was published on 29 October 1986, relates to a moving belt filter with suction boxes situated under the carrier belt or primary belt as it is called in D1. It discloses that the carrier belt is required to be fairly substantial in order to perform its support function while at the same time being sufficiently flexible to traverse the drums on which it is mounted. The continuous flexing and straining of the belt is said to produce wear in the belt structure, while the stiffness of the belt requires substantial driving power from the driven drum (page 1, lines 36 to 45). Thus D1 deals with the problems of size reduction, wear reduction and power reduction, which are also aspects of the problem underlying the present invention.

The skilled person will therefore consider the solution for the said problems given in D1.

3.7 According to D1 these problems can be solved by a carrier belt having an inner section providing tensile strength and an outer section of relatively flexible material and of relatively low strength. The belt may comprise inner and outer sections of rubber or plastic material bonded together and may include reinforcing members between the inner and outer sections (page 1, lines 48 to 62). According to the description of the belt as shown in Figure 2 the inner section of material providing substantial tensile strength may consist of terylene, carbon fibre, devlar, rayon, steel, nylon or fibreglass etc., while the outer section is formed from a more flexible material having low tensile strength, e.g., natural rubber, synthetic rubber, polyurethane, polyamide, synthetic elastomers (page 1, lines 121 to 130). The reinforcing member between the two sections may consist of a woven sheet of a high tensile strength material such as nylon (page 2, lines 19 to 24). Terylene, rayon, nylon, polyurethane, polyamide and synthetic elastomers are plastics. Thus, although D1 does not exclude other material compositions for the carrier belt, it clearly suggests the use of a carrier belt consisting of two plastic layers bonded together with a plastic reinforcing member between these layers, just as described in the Annexes 1 and 2 and shown during oral proceedings.

3.8 The board does not dispute that according to D1 the bottom layer of the belt should be different from the top layer, whereas in the carrier belt according to the annexes 1 to 3 and in the sample shown during oral

proceedings the bottom layer under the fabric structure seemed to be of the same kind of plastic. Claim 1, however, does not exclude a carrier belt made of different plastic materials but also encompasses a belt comprising two layers of plastics having different mechanical properties as suggested by D1. The appellant's argument that D1 teaches away from the invention because it required a belt having an outer layer which is different from the inner layer is not relevant in this case where the main claim does not exclude the presence of plastic layers having different properties. For these reasons the board holds that the subject-matter of claim 1 does not involve an inventive step within the meaning of Article 56 EPC.

4. *First auxiliary request*

4.1 Claim 1 requires that the carrier belt is of thermoplastic plastic. This feature is based on original claim 2 so that no objections under Article 123(2) EPC arise here.

4.2 The term "thermoplastic plastic" is not expressly mentioned in D1. The plastics mentioned in D1 as examples for the inner layer are terylene, rayon and nylon. Terylene is a trade mark for polyethylene terephthalate, which is a saturated linear polyester. Rayon is a cellulose derivate, which can be made of cellulose acetate. Nylon is a polyamide. These plastics are well known to be thermoplastic plastics. With respect to cellulose acetate and polyamide see e.g. D11, wherein these plastics are classified as thermoplasts (page 17). As examples of a flexible material for the flexible outer layer D1 mentions natural rubber,

synthetic rubber, polyurethane, polyamide and synthetic elastomers (page 1, lines 126 to 130). Polyurethane can be a thermosetting or a thermoplastic plastic depending on the degree of cross-linking. Synthetic rubbers or synthetic elastomers can also have thermoplastic properties; see D11, page 17, Table 1.1, citing "thermoplastic rubbers" under the heading "synthetic rubbers". Polyamides are thermoplastic. Because the outer section of the belt according to D1 must be more flexible than the inner section, the skilled person would regard thermosetting plastics to be not suitable for the required purpose. The skilled person would therefore choose from the groups indicated in D1 for the outer layer only those polymers having thermoplastic properties. Thus no inventive step can be seen in the selection of thermoplastic plastics for the carrier belt.

5. *Second auxiliary request*

According to claim 1 of the second auxiliary request the carrier belt is substantially of plastic. The term "substantially" has not been used in this context in the original application. Moreover, in the absence of a further explanation or examples in the original application, this term has no clear meaning. This amendment, therefore, not only extends the application beyond the content of the patent application as originally filed, but also renders the scope of the claim unclear. Claim 1 of the second auxiliary request is thus neither acceptable under Article 123(2) nor under Article 84 EPC.

6. *Third auxiliary request*

According to claim 1 of the third auxiliary request the carrier belt is completely of plastic. The term "completely" has not been used in this context in the original application. Furthermore the latter contains neither examples nor additional information from which this feature might be directly and unambiguously derivable. This amendment therefore extends beyond the content of the application as originally filed. Claim 1 of the third auxiliary request is thus not acceptable under Article 123(2). Moreover, the preceding considerations in points 3.2 to 3.8 above concerning inventive step of the filtering device according to claim 1 of the main request, apply likewise to claim 1 of this request.

7. *Fourth auxiliary request*

According to claim 1 of the fourth auxiliary request a carrier belt, a substantive part of which is made of a non-plastic material, is excluded. In the board's understanding this new feature, which has no basis in the original disclosure, expresses in a confusing way that a substantive part of the carrier belt is made of plastic materials. The scope of claim 1 of the fourth auxiliary request therefore seems to be identical to that of claim 1 according to the second auxiliary request and is thus open to the same objections.

8. *Fifth auxiliary request*

Claim 1 according to the fifth auxiliary request differs from claim 1 according to the first auxiliary

request in that a carrier belt, a substantive part of which is made of non-thermoplastic plastic, is excluded.

This feature also has no basis in the original disclosure. Moreover, it seems to express in a complicated way that the carrier belt is substantially made of thermoplastic plastic. As already indicated under point 5 of the reasons, the terms "substantially" or "a substantive part of which" are not based on the original disclosure and would introduce an ambiguity as to the scope of the claim 1. This claim is therefore not allowable under Articles 123(2) and 84 EPC.

9. *Sixth auxiliary request*

Claim 1 of the sixth auxiliary request requires that the carrier belt is of one plastic. The term "one" has not been used in this context in the original application. The appellant's submissions that the expression "is of one plastic" is based on the original disclosure because according to the original description the plastic can be a thermoplastic plastic or a thermosetting plastic (page 1, lines 29 to 30) and that it follows from the lack of any indication of a composite or layered structure of the belt in the drawings and their description, is not convincing. In the sentence "The plastic can be a thermoplastic plastic." the word "a" is not a numeral but an article added for grammatical reasons and having no limiting character. In the drawings and the description thereof the function of the filtering device is illustrated. No special attention is given therein to the construction of the carrier belt itself. From the absence of any details in the schematic illustration of the belt it cannot be directly and unambiguously derived that it is

made of only one substance. Moreover, according to the appellant's submissions during oral proceedings, the term "one plastic" means one type of plastic and does not exclude a combination of plastics of one type, having different mechanical properties. If, however, "one plastic" is not limited to a homogeneous body of a specific plastic, its true meaning remains obscure. Also the meaning of "one type of plastic" is obscure. It could mean plastics having the same chemical composition but because of a different treatment during the production having different mechanical properties, but also plastics having different chemical compositions and mechanical properties but belonging to the same group of plastics, e.g. polyesters, which may be formed from different monomers. Thus the subject-matter according to claim 1 of the sixth auxiliary request not only extends beyond the content of the application as filed (Article 123(2) EPC) but also lacks clarity within the meaning of Article 84 EPC.

10. *Seventh auxiliary request*

10.1 The additional features of claim 1 according to the seventh auxiliary request compared with claim 1 according to the main request relate to the form of the channels in the ribbed carrier belt. The additional features have been disclosed in the application as originally filed (page 3, lines 15 to 21). The features according to claims 2 to 6 correspond to those of original claims 3, 2, 4, 6, and 7 respectively. The feature of claim 7 is based on page 3, lines 28 to 29 of the original description. The amended claims according to auxiliary request seven, therefore, fulfil the requirements of Article 123(2) EPC.

10.2 According to the patent application the form of the channels according to claim 1 has the advantage that the liquid is loaded to each of the suction boxes in a preferred direction so that the discharge characteristic of the channel can be improved (page 3, lines 21 to 27). It is credible that by the action of the force of gravity the removal of the liquid is improved. The board is therefore satisfied that the problem of improving the liquid separation is actually solved by the claimed form of the channels. This problem forms the core of every filter operation. The only document providing a solution relating to this problem and involving a modification of the channels formed by a transversely ribbed carrier belt is D6. According to D6 the channels may comprise inclined end portions in order to increase the size of the vacuum port for permitting larger quantities of liquid to be handled (column 7, lines 14 to 40 and Figure 10). Although this option stimulates the transport of the liquid at the edge portion, its main purpose was to increase the capacity of the liquid flow. The inclination being limited to the edge portions, which form part of the vacuum channels, the driving force of gravity is only acting on these edge portions. There is no suggestion to incline the channel from the middle of the belt as now claimed. None of the other prior art documents on file discloses or suggests the claimed inclination of the channels. The board, therefore, accepts that the subject-matter according to claim 1 of the seventh auxiliary request involves an inventive step within the meaning of Article 56 EPC. In fact, a claim which would have had essentially the same content as claim 1 of the seventh auxiliary request was already

considered acceptable under Article 56 EPC by the Examining Division; see communication dated 25 November 1996, point 4).

- 10.3 Claims 2 to 7 are dependent upon claim 1. The inventive step of their subject-matter follows from this dependency. The description is not yet in conformity with the amended set of claims and should be adapted.

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:

claims 1 to 7 of the seventh auxiliary request filed at the oral proceedings under any consequential modification of the description and drawings.

The Registrar

The Chairman:

U. Bultmann

M. M. Eberhard