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D E C I S I O N
of 16 December 1998

Case Number: T 0645/96 - 3.3.3

Application Number: 86117950.5

Publication Number: 0228072

IPC: B01D 61/14

Language of the proceedings: EN

Title of invention:
Filtration membrane and method of making the same

Patentee:
Gelman Sciences, Inc.

Opponent:
01: Akzo Nobel Faser AG
02: Hoechst Aktiengesellschaft Werk Kalle-Albert
03: Sartorius AG
04: Fresenius AG

Headword:
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Relevant legal provisions:
EPC Art. 123(2), 84, 123(3)

Keyword:
"Amendments (main request) - added subject-matter (yes)"
"Amendments (first and second auxiliary requests) - not clearly allowable"

Decisions cited:
T 0153/85, T 0227/88, T 0301/87, T 0472/88

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0645/96 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 16 December 1998

Appellant:
(Proprietor of the patent)
Gelman Sciences, Inc.
600 South Wagner Road
Ann Arbor, Michigan 48106 (US)

Representative:
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70182 Stuttgart (DE)

Respondent:
(Opponent 02)
Hoechst Aktiengesellschaft
Werk Kalle-Albert
Zentrale Patentabteilung
65174 Wiesbaden (DE)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 15 May 1996 revoking European patent No. 0 228 072 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: C. Gérardin
Members: B. ter Laan
A. Lindqvist

Summary of Facts and Submissions

I. Mention of the grant of European patent No. 0 228 072 in respect of European patent application No. 86 117 950.5, filed on 23 December 1986, claiming priority from three earlier applications in the USA (812 260 and 812 343, both of 23 December 1985, and 897 045 of 15 August 1986), was announced on 28 August 1991, on the basis of twenty claims, claim 1 reading:

"A hydrophilic microfiltration membrane made from a polymer which in bulk form is hydrophobic and has an equilibrium water absorption ranging from 2 to 4% and which is blended with a polymer additive in an amount effective to make the membrane when formed and dried inherently water-wettable, with a pore size range such that the membrane does not retain or reject dissolved proteins or salts from aqueous feed solutions."

II. Four Notices of Opposition against the granted patent were filed, in which the revocation of the patent in its entirety was requested on the grounds set out in Article 100(a) EPC. The ground of Article 100(b) EPC against a number of claims was raised by one opponent. By decision of 14 July 1993 the Opposition Division revoked the patent for insufficient disclosure pursuant to Article 83 EPC and also expressed some doubt as to whether the wording of the claims met the requirements of Article 123(2) EPC. After an appeal had been filed against that decision (case T 817/93), the Board, taking the view that the issue of insufficient disclosure had not been properly substantiated until the oral proceedings before the Opposition Division, on 30 November 1994 decided to set aside the decision under appeal and to remit the case to the Opposition Division for further prosecution.

In the course of the further opposition proceedings three Opponents withdrew their opposition, so that Hoechst AG (Opponent 02) remained as the sole Opponent.

III. By a decision issued in writing on 15 May 1996, the Opposition Division revoked the patent on the ground that the expression "does not retain or reject dissolved proteins or salts from aqueous feed solutions" was so unclear that a person skilled in the art would not be able to carry out the invention. Therefore, the claimed subject-matter did not comply with the requirements of Article 83 EPC.

IV. On 11 July 1996 the Appellant (Proprietor) lodged an appeal against the above decision and paid the prescribed fee simultaneously. The Statement of Grounds of Appeal was filed on 9 September 1996. That Statement was followed by numerous supplementary letters some of which contained new claims:

- a letter of 2 April 1997 containing two sets of new claims the status of which was not indicated,

- a letter of 6 May 1997 indicating that the original requests were maintained so that one main and three auxiliary requests were now on file,

- a letter of 12 October 1998 containing three sets of new claims as the main and two auxiliary requests,

- a letter of 16 November 1998 containing a new set of claims as the new first auxiliary request and

- a letter of 20 November 1998 containing a new set of claims as the main request.

Claim 1 of the latest request read:

"A hydrophilic microfiltration membrane comprising a polyethersulfone polymer, which polymer in bulk form is hydrophobic and has an equilibrium water absorption ranging from 2 to 4% and which is blended with a polymer additive in an amount effective to make the membrane when formed and dried inherently water wettable, the membrane having a pore size rating of 0.1 µm to 20 µm, with a pore size range being such that the membrane does not retain or reject dissolved proteins or salts from aqueous feed solutions."

V. During the oral proceedings before the Board held on 16 December 1998, after the Board had raised objections under Article 123(2) EPC and also stated that any new claims to be filed should be clearly allowable in accordance with decision T 153/85 (OJ EPO 1988, 001), two new sets of claims were filed as first and second auxiliary requests, respectively.

The first auxiliary request differs from the main request in that the membrane should now have "a pore size rating of 0.02 µm to 20 µm, not including pore size ratings up to 0.05 µm".

The second auxiliary request differs from the main request by the following characterisation of the membrane: "... said membrane being precipitated by humidifying a casted solution of the polymer and polymer additive and having a pore size...".

VI. The Appellant no longer objected to the admission of the ground of insufficient disclosure and did not maintain its initial request for reimbursement of the appeal fee. However, it expressed its surprise that objections under Article 123(2) EPC were raised.

Regarding Article 123(2) EPC, the Appellant argued essentially as follows:

(a) Main request: The lower limit of 0.1 µm for the pore size rating was supported by Example 3, in which a polyethersulfone membrane having a pore size of 0.1 µm was disclosed as the lowest pore size of all the examples. The value of 0.02 given in the description had not been mentioned in connection with any example and also it might give an overlap with the pore size ranges used in ultrafiltration. It should be borne in mind that the pore size **rating** reflected the effective pore size of a membrane, determined by the standard method of the water bubble point test which measured the largest pore size present in the membrane, as described in the patent specification. Therefore, smaller pores could still be present. Since the largest pore controlled the size of the particles still able to pass through the membrane, that was a practical, widely used method.

(b) First auxiliary request: The disclaimer excluding a pore size of up to 0.05 µm was based upon D3 (EP-A-0 082 433), in which membranes having layers with pore sizes of up to 0.05 µm were disclosed. Although it was not indicated how those membranes were prepared nor how the pore size was measured, the standard water bubble point method used in the patent in suit would immediately come to the mind of the skilled person reading D3, as the method of choice to determine the pore size of the membranes described in that document, which were designed for separation purposes.

(c) Second auxiliary request: the precipitation of the membranes from a cast solution was based upon process Claims 13, 15, 18 and 20 as granted. The process steps(c) and (d) in those claims, although disclosed in the framework of different methods, were common to all of them and could hence be generalized.

VII. The Respondent (Opponent)'s arguments can be summarized as follows:

(a) Main request: First, the lower limit of 0.1 µm, as disclosed in Example 3 of the patent in suit, was only mentioned in connection with a number of specific process features so that the generalization of that limit was not allowed. Secondly, there was no indication of how the 0.1 µm was measured. In view of the general remark about the water bubble point test in the description, which determined the largest pore size, one would assume the 0.1 µm to be the largest pore size present. The water bubble point test was a rough method, unsuitable for measuring the average pore size.

(b) First auxiliary request: The disclaimer found no basis in the patent in suit. Although D3 disclosed a pore size limit of 0.05 µm, there was no indication of the measurement method for that size, so that it was not clear whether it indicated the largest pore size or the average pore size, for which another standard method (ASTM) was available. Therefore, D3 could also not be a basis for the disclaimer.

(b) Second auxiliary request: Claims 13, 15, 18 and 20 as granted mentioned a precipitation step in connection with a number of specific other process features so that the generalization of that single feature was not allowed. Claim 20 did not even refer to polyethersulfone. Therefore, there was no proper basis for the amendments in the second auxiliary request.

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

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

Admissibility of the appeal

1. The appeal is admissible.

Late filed requests

2. The main request, although late filed, did not differ to a great extent from the main request filed on 16 November 1998, so that the Board accepted to consider it fully. The first and second auxiliary requests, both filed during the oral proceedings and containing features which had not been present in the claims at any stage of the proceedings before, are however regarded as late filed and are therefore judged in the light of decision T 153/85 (supra), that is, according to the criterion of clear allowability.

Article 123(2)

3. According to standard jurisprudence of the Boards of Appeal, both the first instance and the second instance have the power and indeed the obligation to examine whether amendments to a patent satisfy the requirements of the EPC (see e.g. T 227/88, OJ EPO 1990, 292; T 301/87, OJ EPO 1990, 335; T 472/88 of 10 October 1990, not published in OJ EPO). Therefore, the Appellant need not have been surprised by the objections of the Board under Article 123(2) EPC, which, in view of the continuously changing claims, the latest being filed less than a month before the oral proceedings, the Board was not even in a position to raise earlier.

Main request

4. Claim 1 of the main request differs from Claim 1 as granted in that the polymer is defined as being a polyethersulfone and a specification of the pore size rating as 0.1 to 20 µm is given.

4.1 The application as originally filed discloses a pore size rating of 0.02 to 20 µm for microporous membranes in general (page 8, lines 10 to 11). The description refers not only to polyethersulfones as the polymer to be used, but also to other polymers that fulfil the requirements of hydrophobicity and water wettability as defined in original Claim 1. Specific examples of suitable polymers are polyethersulfone (Table I in conjunction with page 8, lines 19 to 23), polyamide-imide and thermoplastic polyimide (page 10, lines 29 to 33). According to page 9, lines 20 to 26, "Polymers according to this invention include, but are not limited to, aromatic polyethers, preformed polyimides, and polyamide-imides derived from fully aromatic polyacids.

One preferred polymer of the present invention is polyethersulfone (sold under the tradename Victrex)." The molecular structure of the latter is then given by a formula.

Therefore, in line with the broad wording of original Claim 1, the original description refers to more than one polymer, of which a polyethersulfone of a specific formula is indicated as particularly preferable.

The examples illustrate the use of three specific polymers, one of them being a specific polyethersulfone. In Example 3 a membrane is described which is made out of a mixture of that particular polyethersulfone ("Victrex 5200") with dimethylformamide, polyethylene glycol and glycerine in a ratio of 15/18/66.5/0.5 and which is indicated as "polyethersulfone membrane 0.1u". Examples 1 and 2 refer to "polyethersulfone membrane 0.2u" and "polyethersulfone membrane 0.45u", respectively and are prepared using the same polyethersulfone under different conditions in casting solutions of different compositions.

The information given in the examples needs some interpretation. First, in the light of the patent specification (e.g. page 4, lines 30 to 31; page 8, lines 26 to 27), it is assumed that the indicated ratio relates to weight percentages. Secondly, in view of the explanation of the water bubble point test on page 8, lines 56 to 58, which is the only test in the patent in suit used for measuring the pore size, it is assumed that "0.1u" means that the largest pore size of the membrane, as determined by the water bubble point test, is 0.1 µm. Likewise, Examples 1 and 2 would refer to membranes with largest pore sizes of 0.2 µm and 0.45 µm, respectively.

The membranes of the examples are prepared in specific conditions using specific compounds in specific ratios, each example being different. Introducing one feature resulting from the specific conditions used in a particular example (Example 3), that is, a minimal largest pore size of 0.1 µm, into Claim 1 without any indication of the other specific features mentioned in that example amounts to picking out one feature at random and using it as the lower limit for a range relating to a much broader technical field than the context of the example would allow. Due to the different conditions, the other examples do not give rise to a generalisation of any one feature either. Therefore, the requirements of Article 123(2) EPC are not met.

First auxiliary request.

5. The first auxiliary request differs from the main request in that the membrane should now have a pore size rating of 0.02 µm to 20 µm, not including pore size ratings up to 0.05 µm.

The parties agreed that the original disclosure of the patent in suit does not contain any basis for the disclaimer and the Board concurs with that view. The question is, therefore, whether sufficient support for the disclaimer can be found in the state of the art, in particular in D3, which was cited by the Appellant.

5.1 D3 describes macroporous, asymmetrical, hydrophilic membranes of 5 to 70 weight % polyvinyl pyrrolidone with a molecular weight of at least 100,000 Dalton and 95 to 30 weight % polysulfone, polyethersulfone or aromatic or araliphatic polyamide. The membranes consist of an outer layer which has a relatively small pore size and thus functions as the effective separation layer, whereas the inner part of the

membrane possesses a larger pore size and serves as a support for the outer one. The pore sizes are indicated as 0.001 to 0.05 µm for the outer layer and 0.05 to 10 µm for the support layer (page 8, lines 1 to page 9, line 2). Such asymmetrical membranes have a density gradient from the inside to the outside.

Although D3 specifies the pore size of the separating layer, no indication is given as to how that size is measured. No mention is made either of the water bubble point test or of the ASTM method mentioned by the Respondent as a possible other standard method, which was also known to the Appellant. The Respondent's remark that those two methods gave a different outcome and in fact did not measure the same property, was not contradicted by the Appellant. Therefore, it is not clear to which kind of pore size D3 actually refers. In view of the general way in which the pore sizes are referred to in that document, it is not even certain whether a particular method was meant to be used. Since both the water bubble point test and the ASTM method are standard measuring methods for determining the pore size of separation membranes, the fact that the passage in D3 referring to the pore sizes also mentions the separation effect of the outer membrane layer, does not help to clarify which method, if any, was in fact meant. For those reasons, the value of 0.05 µm mentioned in D3 is not directly comparable, hence not compatible with the values of 0.02 and 20 µm mentioned in the patent in suit. However, the formulation of Claim 1 of the first auxiliary request would imply that the value of 0.05 µm refers to the same feature and is measured in the same way as in the patent in suit. Therefore, the allowability of the introduction of the disclaimer is at least questionable in view of Article 123(2) EPC.

5.2 In addition, the uncertainty regarding the kind of pore size mentioned in D3 appears to render the scope of the claim unclear as well, so that it is doubtful whether the requirements of Article 84 EPC are met.

5.3 In view of the above considerations, Claim 1 of the first auxiliary request is not clearly allowable and hence cannot be accepted.

Second auxiliary request

6. The second auxiliary request differs from the main request in that the pore size rating of the membrane is deleted and instead a process feature is introduced indicating that the membrane should be precipitated by humidifying a cast solution of the polymer and polymer additive.

6.1 In the application as originally filed only Claims 17, 20, 24 and 26 (corresponding to Claims 13, 15, 18 and 20 as granted) refer to the preparation of the claimed membranes. From these claims the method of producing a microporous membrane can be defined in general terms as a four step process, namely

(a) dissolution of the hydrophobic polymer, optionally together with the polymer additive, in a polar aprotic solvent,

(b) addition of a pore forming agent, in particular polyethylene glycol, to the solution,

(c) casting the solution in a thin layer; and

(d) humidification of the solution.

It is evident that the specific features in steps (a) and (b) must be regarded as essential in this sequence of operations and that, consequently, the combination of steps (c) and (d) alone, as it appears in the present product-by-process formulation, cannot be an adequate definition of the process actually required. Moreover, Claim 24 is limited to the use of a specific polyethersulfone and Claim 26 refers to a specific polyamide-imide. Therefore, it is evident from the application as originally filed (Article 123(2) EPC) and from the patent as granted (Article 123(3) EPC) that the numerous requirements in the process claims have been disclosed in the specific context of a four step process carried out with and on specific compounds and that there is no basis for characterizing the whole process by only the feature of humidifying a cast solution of polyethersulfone in general.

The passages in the original description that refer to the preparation of the membranes can be found on page 13, lines 1 to page 16, line 5. There, "humidifying" is described as subjecting the cast polymer solution to conditions of controlled air velocity, temperature and relative humidity (page 13, lines 25 to 27). Precipitation takes place in two steps: first, initial precipitation by contact with humid air and then final precipitation by immersion in a quench bath (page 13, lines 27 to 32; page 15, lines 1 to 9). In the examples the manufacturing conditions are even more specific. However, nothing of all those details can be found in the wording of present Claim 1, so that it must be concluded that the original description, too, does not justify such generalization.

6.2 For those reasons, the claimed subject-matter of the second auxiliary request appears to contain subject-matter extending beyond the original disclosure as well as extending the protection and, as a consequence, is not clearly allowable.

Conclusion

7. In the light of the above the Board cannot but conclude that the subject-matter of Claim 1 of the main request is not derivable directly and unambiguously from the original disclosure and hence extends beyond it. That request therefore does not satisfy the requirements of Article 123(2) EPC. The amendments in the first and second auxiliary requests are not clearly allowable so that the claims are not admitted to consideration.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin