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D E C I S I O N
of 21 May 2001

Case Number: T 0097/98 - 3.3.5

Application Number: 92910588.0

Publication Number: 0579749

IPC: B01D 39/16

Language of the proceedings: EN

Title of invention:
Fiber spinning process and product thereof

Patentee:
MINNTECH CORPORATION

Opponent:
Fresenius Medical Care Deutschland GmbH

Headword:
Spinning process/MINNTECH

Relevant legal provisions:
EPC Art. 107, 100(b), 54, 56
EPC R. 64(a), 65(2), 26(2)(c)

Keyword:
"Admissibility of the appeal (yes)"
"Sufficiency of disclosure (yes)"
"Novelty and inventive step (yes)"

Decisions cited:
T 0867/91, T 0340/92, G 0010/91, T 0001/97, T 0920/97

Headnote:
Correction of the name of the appellant to substitute a natural or legal person other than the one indicated in the appeal is allowable under Rule 65(2) EPC in conjunction with Rule 64(a) EPC, if it was the true intention to file the appeal in the name of said person and if it could be derived from the information in the appeal, if necessary with the help of other information on file, with a sufficient degree of probability that the appeal should have been filed in the name of that person (point 1 of the reasons).

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Case Number: T 0097/98 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 21 May 2001

Appellant: (Opponent)
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Representative:
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Respondent: (Proprietor of the patent)
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Representative:
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 22 December 1997 concerning maintenance of European patent No. 0 579 749 in amended form.**

Composition of the Board:

Chairman: R. K. Spangenberg
Members: M. M. Eberhard
M. B. Günzel

Summary of Facts and Submissions

I. European patent No. 0 579 749 based on application No. 92 910 588.0 was granted on the basis of 21 claims. Claim 1 reads as follows:

"1. An improved process for the manufacture of asymmetrical, microporous, hollow fibers, the process comprising:

(a) passing, through an outer annular orifice of a tube-in-orifice spinneret, a polymeric solution comprising about 11 to 25 wt% of a hydrophobic polysulfone polymer and about 0.1 to 5 wt% of a polyvinylpyrrolidone polymer dissolved in an aprotic solvent and having a viscosity of about 700 to 3500cP to form an annular liquid wherein the tube-in-orifice spinneret has an inner tube, said inner tube and said outer annular orifice each having a cross-sectional area such that the ratio of the respective cross-sectional areas of the outer annular orifice to the inner tube is about 5:1 or greater;

(b) simultaneously passing in laminar fluid flow, through the inner tube of the tube-in-orifice spinneret, into the center of the annular liquid a precipitating solution comprising:

(i) about 30 to 90 wt% of an alcohol having from one to five carbon atoms;

(ii) about 10 to 35 wt% of water; and

(iii) about 0 to 50 wt% of an aprotic solvent;

(c) passing in laminar flow the annular liquid and the precipitating solution in the center of the annular liquid through a vertical drop from 0.1 to 10 meters in an atmosphere or an augmented atmosphere comprising a mixture of air and a gas, an inert gas, and mixtures thereof, wherein the precipitating solution interacts with the polymeric solution within the annular liquid to form an annular polymer precipitate;

(d) quenching the polymer precipitate in a bath to form a hollow fiber, wherein the spinneret and the quenching bath are separated by a vertical distance of from 0.1 to 10 meters; and

(e) taking up the fiber at a rate of about 90 to 150% of the rate at which it is formed, the fiber being produced at a rate of at least 30 m/min."

II. The appellant (opponent) filed a notice of opposition requesting revocation of the patent on the grounds of lack of novelty and inventive step and insufficiency of disclosure. During the opposition proceedings inter alia the following documents were relied on:

D1: EP-A-0 168 783

D4: US-A-4 051 300

D5: US-A-4 342 711

III. The opposition division decided to maintain the patent in an amended form, on the basis of the amended set of claims filed on 17 October 1997. The said set of claims differs from the granted claims only by the deletion of

the product claim 21. Concerning sufficiency of disclosure, the opposition division took the view that the process of the patent in suit was not restricted to the production of haemodialysis membranes but related generally to the production of asymmetrical, microporous, hollow fibres usable in various separation processes. The patent contained detailed teaching and examples providing adequate information to perform the claimed process. The fact that some membranes presented in the Tables were not suitable for haemodialysis did not prove that haemodialysis membranes could not be produced by the claimed process. The process of claim 1 was new over the disclosure of D1. It differed therefrom by features f1, f2 and f3, namely the ratio of the cross-sectional areas of the outer annular orifice to the inner tube orifice, the composition of the precipitating solution and the production rate of the fibres respectively. The problem to be solved with respect to the closest prior art D1 was to provide a process for manufacturing asymmetric, hollow fibres at an increased production speed. Features f1 and f2 in combination with the other known features of claim 1 were not obvious to the skilled person seeking an increased production rate.

IV. An appeal was lodged against this decision by the representative having represented the opponent before the opposition division. At the appeal stage five additional documents were referred to, in particular "Journal of Applied Polymer Science, vol. 20, 1976, pages 2377 to 2394, Cabasso et al. (hereinafter D6); DE-C-29 17 357 (D8); EP-B-0 037 185 (D9); DE-A-33 42 824 (D10). In a communication issued shortly before the oral proceedings the board raised the question of the admissibility of the appeal in view of a different name

stated in the notice of appeal for the opponent as well as in further written submissions. Oral proceedings were held on 21 May 2001. The appellant's arguments can be summarised as follows:

The appeal was admissible. It was not filed in the name of "Fresenius AG". This firm name was erroneously indicated in the notice of appeal as being the name of the opponent. The true intention was to file the appeal in the name of the opponent "Fresenius Medical Care Deutschland GmbH". Correction of the appellant's name was requested. The present situation corresponded to that in case T 340/92. The appellant provided a copy of the commercial register of Bad Homburg v.d. Höhe, a copy of a letter to the representative dated 16 January 1998 and a copy of an authorisation to Dr. Ludt dated 2 September 1996.

Regarding sufficiency of disclosure, the appellant argued that the patent in suit did not disclose how to produce more rapidly membranes having performance data **comparable to** those of the membranes of D1. It contained no teaching about the influence of the orifice geometry (feature f1) on the performance data of the membranes. The effect of a variation of the components of the precipitating medium on the performance data of the membrane was disclosed inadequately as shown by Tables IV, VI and VIII of the patent in suit which reported contradictory results. Furthermore, the calculation of the nozzle lag as presented in Table III of the appellant's letter dated 20 April 2001 showed that the calculated nozzle lag would be higher than the limit of 150% indicated in claim 1 for all the examples of the patent in suit. As none of the examples of the patent in suit was carried

out by a process according to claim 1, the skilled person had no information as to how to perform the claimed process.

Features f1 to f3 did not establish novelty over the process of D1. Feature f1 was directly derivable from D1. With a membrane having an outer diameter of 300 µm and a thickness of 100 µm as given in D1, the ratio of the areas of the annular orifice to the tubular orifice would be 8:1 for a tube thickness of 0 and this ratio would increase with a higher tube thickness. Regarding feature f2, the skilled person would have understood at the priority date that non-solvents of polysulfone polymers included not only water but also alcohols such as methanol, ethanol, isopropanol as shown by D6 and confirmed by D8 to D10. As D1 used the same viscosity of the polymeric solution and the same distance to the quenching bath as the claimed process, it was also possible to obtain production rates higher than 30m/min in D1.

The problem underlying the patent in suit, namely the production of comparable fibres more rapidly, had not been solved by the claimed process. D1 did not disclose the production rate so that it was not clear whether or not the claimed process was faster. The alleged higher production rates stated in the examples of the patent were achieved with a process not fulfilling feature (e) of claim 1 and the properties of the obtained membranes did not bear comparison with the membranes according to D1. The choice of water and alcohol as the precipitating solution was obvious in view of the teaching of D6 which was confirmed by D8 to D10. The use of water in the precipitating solution was expressly disclosed in examples 6 and 9 of D5 where

high production rates were reported. There was in fact no direct relation between the production rate and the composition of the precipitating solution. Likewise the nozzle geometry had no influence on the production rate. Production rates exceeding 30m/min were already known for polysulfone fibres as shown in D6. The appellant further raised two new grounds of opposition, namely (i) that the replacement of "lower alcohol" by "alcohols having 1 to 5 carbon atoms" contravened Article 123(2) and (ii) that the invention did not meet the requirements of Article 53(a).

V. The respondent indicated at the oral proceedings that he did not consent to the two new grounds of opposition being introduced into the proceedings. Concerning the other issues he put forward inter alia the following arguments:

The appeal was filed in the name of the firm "Fresenius AG". No reliable evidence was provided that the intention of the representative was to file the appeal in the name of "Fresenius Medical Care Deutschland GmbH". The additional papers submitted at the oral proceedings made the situation more confused since it was not the same firm which gave the authorisation to Dr Ludt. Therefore, the appeal was inadmissible.

The appellant's calculations in Table 3 of their letter dated 20 April 2001 were fallacious. The mathematically correct calculation could not be applied to the fabrication of a microporous fibre since the material extruded at the orifice of the spinneret was different from the formed fibre, ie an asymmetric non-homogenous microporous fibre. The rate of 90 to 150% indicated in claim 1 was defined with respect to the rate at which

the fibre was being formed in a very short time between the orifice of the spinneret and the quenching bath. The speed at the spinning orifice could be measured by extruding the polymeric solution and letting it drop into the quenching bath instead of winding it on the take-up reel.

D1 neither anticipated the ratio of orifice cross-sectional areas stated in claim 1 nor the particular composition of the precipitating solution and production rates of at least 30m/min. The patent in suit solved the problem of providing a method for producing multiple kinds of membranes having different properties faster. The combination of all parameters stated in claim 1 was important to achieve this result. D6 disclosed that many variables were involved in the spinning process and that the interaction of all the parameters was very complex. There was no teaching in D6 towards the combination of parameters defined in claim 1 which allowed production of asymmetrical microporous hollow fibres at a rate of at least 30m/min.

VI. The appellant requested that the decision under appeal be set aside and that the patent be revoked. The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. Concerning the admissibility of the appeal the question has arisen whether or not the appeal was filed by a person entitled to appeal.

1.1 According to Article 107 EPC only a party to

proceedings may appeal the decision. The opposition against the patent-in-suit was filed by "Fresenius Medical Care Deutschland GmbH" and the decision of the opposition division was given to the said company as opponent. In the notice of appeal filed by the representative who had represented the opponent before the opposition division there was no name explicitly indicated as being the name of the appellant, but a "Fresenius AG", i.e. a different legal person from the opponent, was indicated as "opponent". Such way of designating the appellant is, as a matter of fact, not unusual in notices of appeal, where the opponent becomes appellant. Such an indication is normally intended to be and also accepted as constituting the indication of the name of the appellant as required by Rule 64(a) EPC, in situations where the same representative who represented the opponent before the opposition division filed the appeal (for the corresponding situation where the appellant was only designated as "patentee", see T 867/91 dated 12 October 1993, point 1.1 of the Reasons).

1.2 In response to a communication by the board drawing attention to the fact that the appeal appeared at first sight to have been filed in the name of a legal person other than the opponent and outlining what the legal situation might be depending on the circumstances of the case, which were at that time not known to the board, the representative submitted that "Fresenius Medical Care Deutschland GmbH" and "Fresenius AG" were indeed separate legal persons both existing within the "Fresenius" group of companies. There was no question of any transfer of the opposition. The indication "Fresenius AG" in the notice of appeal simply constituted an error. Although he was authorised

generally to act for both companies, it was quite clear from the circumstances of the case that nothing else could have been his true intention than to file the appeal in the name of the opponent who was actually the party to the proceedings before the opposition division, i.e. Fresenius Medical Care Deutschland GmbH, which he had represented in these proceedings. It was thus clear that the name "Fresenius AG" had erroneously been indicated in the notice of appeal as being the name of the "opponent". The representative requested correction of the name of the appellant in accordance with Rule 65(2) EPC to read "Fresenius Medical Care Deutschland GmbH". He referred in this respect to decision T 340/92 dated 5 October 1994, which had been cited by the board in its communication.

1.3 In order to secure correct identification of the appellant and to allow establishment of whether or not the appeal was filed by a party to the proceedings within the meaning of Article 107 EPC as well as for other, more administrative purposes, Rule 64(a) EPC prescribes that the appeal shall contain the name and address of the appellant in accordance with the provisions of Rule 26 (2)(c) EPC. If the appeal does not comply with Rule 64(a) EPC, according to Rule 65(2) EPC such a deficiency can be remedied within the period specified in the invitation inviting the appellant to remedy the deficiency, even after expiry of the time limit for filing the appeal.

It is the position of the board that there is a deficiency in the indication of the name and address of the appellant within the meaning of Rule 65(2) EPC not only when no such express indications at all have been made in the notice of appeal but also when incorrect

indications have been made. Such an understanding corresponds to the normal meaning of the term "deficiency" and to the construction of Rule 65(2) EPC. By referring to Rule 64(a) EPC, which rule again refers back to Rule 26(2)(c) EPC, Rule 65(2) EPC defines when a deficiency exists by reference to all the details of the required indications of name and address laid down in Rule 26(2)(c) EPC. When so many details are required, it is clear that errors may occur which should be corrected. This interpretation of the term "deficiency" underlies the decisions of the boards of appeal which have allowed corrections of wrong indications of the name of the appellant according to Rule 64(a) EPC in conjunction with Rule 65(2) EPC, see e.g. T 340/92 dated 5 October 1994, point 1 of the reasons, and T 1/97 dated 30 March 1999, in particular point 1.4 of the Reasons.

Correction of errors in the name or address of the appellant may be of varying nature. As is the case here, their correction may lead to a different natural or legal person to the one indicated within the time limit for filing the appeal having, after correction, to be regarded as the appellant.

The cited rules of the EPC refer to deficiencies in the indication of the name or address, generally. No distinction is made as to their nature. In the board's view there is nothing in said rules which would allow them to be applied only to certain kinds of deficiencies and as a matter of principle not when the correction of a wrong indication of the name or address of the appellant leads to a different person to the one originally expressly named in the appeal having to be regarded as the appellant. As has been rightly stated

in decision T 1/97, point 1.3 of the Reasons, and as is also the reasoning underlying decision T 340/92, point 1 of the Reasons, it would indeed be inappropriate, if not contradictory, if on the one hand according to Rule 64(a) EPC in conjunction with Rule 65(2) EPC the name of the appellant could expressly be given for the first time after expiry of the time limit for filing the appeal, where no express indication at all was made within the time limit, but on the other hand no correction of the name of appellant were allowable to substitute the name of the person for whom the appeal was actually intended to be filed when the original indications made in this respect were incorrect. In both cases the situation is that on expiry of the time limit for filing the appeal the appeal does not expressly indicate the true name of the person in whose name the appeal was intended to be filed.

What is required under Rules 64(a) and 65(2) EPC is that there was indeed a deficiency, i.e. that the indication was wrong, so that its correction does not reflect a later change of mind as to whom the appellant should be, but on the contrary only expresses what was intended when filing the appeal. It must be shown that it was the true intention to file the appeal in the name of the person, who is, according to the request, to be substituted.

Furthermore, Rules 64(a) and 65(2) EPC cannot be construed as forming an exception to the basic principle that - the requirements for an admissible appeal having to be met on expiry of the time limit for filing the appeal - the appellant must be identifiable at that point in time. It must then be possible to

determine whether or not the appeal was filed by a person entitled to appeal in accordance with Article 107 EPC. However, in the Board's judgement, and in accordance with the jurisprudence of the boards of appeal it is sufficient therefor that it is possible to derive from the information in the appeal with a sufficient degree of probability, where necessary with the help of other information on file, e.g. as they appear in the impugned decision, by whom the appeal should be considered to have been filed, see e.g. T 1/97, point 1.1 of the Reasons and the further decisions cited therein.

1.4 Accordingly, correction of the name of the appellant to substitute a natural or legal person other than the one indicated in the appeal is allowable under Rule 65(2) EPC in conjunction with Rule 64(a) EPC, if it was the true intention to file the appeal in the name of said person and if it could be derived from the information in the appeal, if necessary with the help of other information on file, with a sufficient degree of probability that the appeal should have been filed in the name of that person.

In the present case the appellant's attention was drawn for the first time to the presence of a deficiency by the board's communication dated 17 May 2001. The appellant has therefore by its faxed letter on 18 May 2001 and its submissions and evidence presented during the oral proceedings on 21 May 2001 asked for correction of the appellant's name in time.

1.5 As regards the question of the true intention of the representative who filed the present appeal, the following circumstances can be derived from the

evidence submitted:

From the submissions of the representative of the appellant, which were not contested, and from a copy of a commercial register submitted during the oral proceedings it can be concluded that at the time of filing the present appeal several companies existed within the "Fresenius" group of companies. As far as they play a role in the present case these were a "Fresenius AG", a "Fresenius Medical Care AG" and the opponent "Fresenius Medical Care Deutschland GmbH". "Fresenius AG" being the parent company, "Fresenius Medical Care AG" was a subsidiary company and the opponent was in turn a subsidiary company of "Fresenius Medical Care AG".

In a letter dated 16 January 1998 addressed to the representative, the company "Fresenius Medical Care AG" had asked the representative to file an appeal against the decision of the opposition division in the opposition case Fresenius/Minntech Corp. having the reference FR 3033. As can be seen from the notice of opposition the reference FR 3033 is the representative's opposition reference. The letter is signed by a Dr. Ludt and a Dr. Mathieu. During the oral proceedings the representative also submitted a "Vollmacht" (authorisation) dated 2 September 1996 given by the opponent to Dr. Ludt. It appears from the text of the "Vollmacht" that within the "Fresenius" group of companies the patent department of "Fresenius Medical Care AG" was internally entrusted with the task of looking after the patent affairs of the opponent and was authorised to act for the opponent in all patent matters. Therefore, the fact that the instruction to appeal was given to the representative by a person from

the patent department of Fresenius Medical Care AG, cannot be understood as meaning that the appeal should be filed in the name of a person other than the opponent, but rather that by giving the instruction to appeal the decision of the opposition division the patent department carried out its internal function of looking after the patent matters of the opponent. There is also no indication that the representative had understood the instruction received differently and intended to act in the name of a person other than the opponent. In the absence of any indication to the contrary it can be presumed that it is clear to a representative that, unless a transfer of rights has been established, an appeal can only be filed by the legal person who was the party to the opposition proceedings and not by another legal person even if belonging to the same group of companies. It can also be presumed that it is the intention of the representative to act in such a way as to ensure that the appeal is admissible in order for it to be dealt with in substance; see in this respect e.g. decision T 920/97 dated 19 December 2000, point 1 of the reasons, where it was stated that in the absence of any clear indication to the contrary a professional representative who was authorised to act for a party adversely affected by a decision and then filed an appeal against this decision must be presumed to be acting on behalf of the same party that he acted for in the first instance proceedings and not on behalf of someone else not entitled to appeal. Similar considerations underlie decision T 340/92 already cited. During the oral proceedings before the board the representative also submitted, which was again not contested as such, that at the time of filing the appeal the parent company "Fresenius AG", named in the

notice of appeal, was no longer active in the field of dialysis and membranes, this having been taken over by the opponent. There is therefore no apparent reason why the representative would have wanted to file the appeal in the name of a company other than the company which was party to the first instance proceedings.

In summary, the overall factual picture of all these elements sufficiently supports the conclusion that the indication "Fresenius AG" in the appeal constituted a genuine error and did not reflect the wish to file the appeal in the name of "Fresenius AG" but that it was the intention of the representative to appeal in the name of the opponent.

1.6 As regards the question of what could be derived from the appeal the Board is satisfied that a person not knowing all the details considered here, presented later to the Board, could have derived from reading the appeal with the help of the indications in the impugned decision that the party on behalf of which the appeal was intended to be filed was the opponent, i.e. Fresenius Medical Care Deutschland GmbH, since this was the sole opponent, represented before the opposition division by the representative who had filed the appeal. Furthermore, there were no indications on file that a transfer of rights might have taken place in the meantime. Thus, in the present case it could be inferred by a third person from the circumstances of the appeal with a sufficient degree of probability that the opponent should be the appellant.

1.7 The requested correction for the appellant's name to be that of the opponent must therefore be allowed and the appeal is to be regarded as having been filed in the

name of the opponent.

The appeal is accordingly admissible.

2. According to decision G 10/91 (OJ EPO, 1993, 420), fresh grounds of opposition may be considered in appeal proceedings only with the approval of the patentee. In the present case, the appellant's objections raised at the appeal stage that (i) the subject-matter of claim 1 as granted extends beyond the content of the application as filed and (ii) the invention would contravene Article 53(a), were neither submitted nor substantiated in the statement under Rule 55(c) EPC. These grounds of opposition had also not been raised later in the course of the opposition proceedings and they were not investigated by the opposition division. Therefore, these two grounds are considered to be fresh grounds of opposition raised for the first time at the appeal stage. At the oral proceedings the respondent did not give his approval for introducing these fresh grounds into the proceedings. No reason was given by the appellant for not applying decision G 10/91 to the present case. In these circumstances the board holds that it does not have the power to investigate these two fresh grounds of opposition.

3. Turning to the issue of sufficiency of disclosure, it was not contested that the examples of the patent in suit were reproducible by the skilled person. The appellant argued that according to the patent in suit the problem underlying the invention was to produce membranes having performance data comparable to those of the membranes of D1 more rapidly. Therefore, according to the appellant, it would have been necessary to disclose how to produce membranes having

performance data in haemodialysis comparable to those of D1 and/or to show the influence of the orifice geometry and of the composition of the precipitating solution on the performance data of the membranes. Otherwise, the patent in suit would not fulfil the requirement of sufficiency of disclosure. The board is not convinced by these arguments for the following reasons:

Firstly, the problem underlying the patent in suit indicated on page 2, lines 50 to 53, is not restricted to a process for producing hollow fibres having performance in haemodialysis comparable to those of the haemodialysis membranes of D1. On page 2, lines 12 to 49, of the patent in suit not only membranes for haemodialysis according to D1 but also membranes suitable for other uses are discussed. Furthermore, process parameters for membranes suitable for haemodialysis, haemofiltration and blood filtration are given on page 5. According to page 6, lines 54 to 56, the membranes prepared by the claimed process can be used in haemodialyzer, haemofilters, blood filters water filters, etc, having performance levels at least equivalent to currently available hollow fibre membranes. Neither claim 1 nor the description of the patent in suit are limited to a process for manufacturing microporous hollow fibres having performance data in haemodialysis comparable to those of the membranes of D1. In these circumstances, it is irrelevant for the issue of sufficiency of disclosure whether or not the process as defined in claim 1 and in the patent in suit leads to membranes whose performance data in haemodialysis are comparable to those of the membranes of D1. Although the burden of proof rests on the appellant, he has provided no evidence that the

reproduction of the claimed process as illustrated in the examples of the patent in suit would give microporous hollow fibres of such a poor quality that they are not suitable for at least one of the different uses stated in the patent in suit when the production rate is at least 30m/min. It is thus also irrelevant whether or not the patent in suit indicates how to vary the composition of the precipitating solution and the ratio of the orifice cross-sectional areas within the claimed ranges in order to obtain a membrane having performance data in haemodialysis comparable to those of the membranes of D1. As pointed out by the appellant, in some of the examples where the effect of some process parameters are investigated (see Tables V, VII and VIII), the BSA retention is such that the membrane would be unsuitable for the purposes of haemofiltration or haemodialysis. However, it cannot be derived therefrom that the skilled person would not be able to produce membranes suitable for haemodialysis or haemofiltration on the basis of other examples of the patent in suit which are said to lead to membranes exhibiting a good solute clearance and flux. Concerning the alleged contradiction between Table IV and Table VIII or between examples 14 and 16, the board observes that examples 6, 11 and 12 of Table IV do not only differ by their water/isopropanol proportions but by several other parameters. In these circumstances it is doubtful that any valid conclusion regarding the influence of the water concentration on the fibre performance can be drawn from the results of Table IV. Regarding examples 14 and 16, it is observed that the compositions of the precipitating solution reported in Table VI all fall outside the claimed range except for the third example which was not tested. Therefore, if there were a contradiction, it would not be between

examples relating to the invention. The appellant's allegation that membranes for use in haemodialysis cannot be prepared without the presence of an aprotic solvent in the precipitating solution was not supported by any evidence. Furthermore it is in contradiction with the teaching on page 5 of the patent in suit and was contested by the respondent. This unsupported affirmation cannot therefore be accepted by the board.

Regarding the appellant's arguments that in all the examples of the patent in suit the calculated nozzle lag was far greater than the upper limit of 150% stated in claim 1 (see point IV above), the board observes the following. To arrive at this conclusion the appellant calculated the rate at which the fibre is produced using the rate of introduction of the polymeric solution into the spinneret given in the examples and the dimension of the annular orifice stated in example 1. The respondent contested however the validity of this calculation and emphasised that the range 90-150% indicated in claim 1 was based on the measured rate at which the fibre was formed. According to the patent in suit (see page 6, lines 50 to 53) "the fibre is wound at about 90-150 % of the rate at which it is formed at the spinneret; more preferably, the fibre is being wound at a rate substantially equal to that at which it is produced, ie there is no draft". No further information is given concerning the determination of the production rate (or formation rate) of the fibres. However, as indicated at the oral proceedings by the respondent and not contested by the appellant it was well-known to the skilled person that this rate can be measured by extruding the fibre and letting it drop into the bath. It cannot be inferred from the patent in suit whether the production rate

referred to in the said passage on page 6 is a theoretical rate of production obtained by a calculation as made by the appellant or the actual rate of production, ie the measured one. However, in view of the fact that the rates of formation calculated by the appellant would lead to all the examples of the patent in suit falling outside the range of 90-150% stated both in the patent in suit and in claim 1, and, thus, would give results being in contradiction with the teaching of the patent in suit, the board considers it very unlikely that a theoretical rate of formation as calculated by the appellant was considered. Furthermore, although the burden of proof lies on the appellant, he has provided no evidence that the measured rate of formation would have led to all the examples of the patent lying outside the range of 90-150% stated in claim 1. In these circumstances the board cannot conclude on the basis of these arguments that a lack of sufficiency of disclosure exists.

4. The appellant has contested the novelty of the claimed process with respect to D1. Concerning the precipitating solution, D1 discloses the use of a mixture of a non-solvent with an aprotic solvent such as dimethylformamide (DMF), dimethylsulfoxide (DMSO), dimethyl acetamide (DMA), N-methylpyrrolidone and their mixtures. The preferred non-solvent is water. The amount of non-solvent in the mixture has to be at least 25 wt% in order to obtain the precipitation. The precipitating solution contains preferably about 35 wt% of non-solvent (see claim 14; page 12, lines 34 to 38; page 13, lines 4 to 30). In example 1 a mixture of 40 wt% water and 60 wt% 1:1 DMA/DMSO is used as the precipitating solution. D1 discloses no non-solvent other than water. A precipitating solution containing

30-90 wt% of an alcohol having from 1 to 5 carbon atoms, 10-35 wt% water and 0- 50 wt% of an aprotic solvent cannot be directly and unambiguously derived from this teaching. Even if it were assumed in favour of the appellant that lower alcohols were well-known to the skilled person as non-solvent for the polysulfone polymer, the amounts of water and lower alcohol as defined in claim 1 would still be new over the disclosure of D1. The other documents referred to by the appellant, ie D6, D8, D9 or D10 cannot be combined with the teaching of D1 to conclude the lack of novelty of this feature. Furthermore, D1 does not disclose any production rate, let alone the production rate of at least 30 m/min indicated in claim 1 of the patent in suit. The appellant has provided no evidence showing that by using the precipitating medium disclosed in D1, ie a precipitating medium having a composition different from the claimed one, it was possible to produce the hollow fibres at rates of at least 30m/min. The fact that the same viscosity of the polymeric solution and the same distance between the spinneret orifice and the quenching bath are used in the process of D1 is not sufficient to prove that a production rate of at least 30m/min was achieved in D1, taking into account the complex interaction of all the parameters involved in the process and their influence on the properties of the fibres.

Regarding the ratio of the cross-sectional area of the annular orifice to the cross-sectional area of the inner tube orifice, D1 teaches that the outer diameter of the hollow fibres is from 0.1 to 0.3 mm, whereas the thickness of the membrane is about 10 to 100, preferably 15-50 µm (see page 14 lines 20 to 23). D1 further discloses an annular nozzle having an outer

diameter and an inner diameter of respectively 0.3 mm and 0.2 mm corresponding to the dimensions of the hollow fibre (see example 1). In other words, example 1 discloses an outer diameter of 0.3 mm and a membrane thickness of 0.1 mm (100 µm). The appellant calculated that, assuming a wall thickness of zero for the inner tube, the corresponding ratio of cross-sectional areas would be of 8:1 and this ratio would increase with a higher tube thickness. This seems to be correct; however, the dimensions stated in example 1 are used for the extrusion of a polymer solution containing 9 wt% of PVP, ie a polymer composition lying outside the claimed one, with a precipitating solution also differing from the claimed one. Taking into account that according to the disclosure on page 14, lines 20 to 23, of D1 the outer diameter of the hollow fibre and the membrane thickness may vary within the ranges of 0.1-0.3 mm and 10-100 µm respectively, it is not directly and unambiguously derivable from D1 that an annular orifice having the dimensions stated in example 1 would also be used with different compositions of both the polymer solution and the precipitating solution and in particular with the claimed compositions. Assuming a wall thickness of zero for the inner tube as done by the appellant, the two ranges of values given on page 14 of D1 could also lead to a ratio of the orifice cross-sectional areas which is far lower than 5:1. In these circumstances, the board considers that a ratio of the orifice cross-sectional areas of about 5:1 or greater is not disclosed in D1 in combination with a polymer composition and a composition of the precipitating solution as indicated in claim 1. It follows from the above that the process according to claim 1 is new over the disclosure of D1. The claimed process is also new

over the remaining documents cited by the appellant. This was not contested at the oral proceedings so that further considerations in this respect are not necessary.

5. Turning to the issue of inventive step, the board considers in agreement with the parties and the opposition division that D1 represents the closest prior art. Although D1 does not disclose the rate of production of the hollow fibres, it can be inferred from the patent in suit that the process of D1 can only be run at about 15-20m/min (see page 2, lines 47 to 49).

5.1 Starting from D1 as the closest prior art, the problem underlying the claimed process can be seen in the provision of a process for manufacturing asymmetrical microporous hollow fibres suitable for use inter alia in haemodialysis, haemofiltration, blood filtration, or water filtration, which makes it possible to reduce the manufacturing time, or in other words to increase the production rate.

The patent proposes to solve this problem by the process as defined in claim 1. As indicated above, this process differs from D1 in particular by the composition of the precipitating solution and the ratio of the orifice cross-sectional areas in combination with the compositions of the polymeric solution and precipitating solution stated in claim 1. In view of the take-up rate stated in the examples of the patent in suit and considering that these take-up rates are about 90 to 150% of the rate at which the fibre is produced, it is credible that the process as defined in claim 1 of the patent in suit leads to higher

production rates than the process of D1. It is also credible in view of the information given in the patent in suit and in the absence of evidence to the contrary that the obtained fibres are suitable for use in haemodialysis, haemofiltration, blood filtration or water filtration. The question whether or not the membranes produced by the claimed process have performance data in haemodialysis at least equivalent or comparable to those of the haemodialysis membranes of D1 may remain open since the problem to be solved is not to produce haemodialysis membranes with performance data equivalent to those of D1. The appellant's arguments that it was also possible to produce the hollow fibres at a rate of at least 30m/min with the process of D1, suggesting thereby that no improvement in production rates is achieved by the claimed process, cannot be accepted by the board. This allegation is not in agreement with the statement on page 2, lines 40 to 49, of the patent in suit, and the appellant has failed to produce any concrete credible evidence to show that rates approaching 30m/min were possible with the combination of process parameters disclosed in D1. The appellant's arguments that the higher production rates were achieved in the examples of the patent in suit with a process not fulfilling the feature 90-150% stated in step (e) of claim 1 are based on assumptions and calculations which were strongly contested by the respondent and have no support in the description. The appellant has provided no evidence showing that by considering the measured production rates instead of the calculated ones, the take-up rates stated in the examples would not lie within the range 90-150% indicated in claim 1 (see point 3 above). Therefore, the board considers it plausible, in the absence of convincing evidence to the contrary, that the problem

stated above has actually been solved by the process of claim 1.

5.2 As indicated above in point 4, D1 discloses using a mixture of a non-solvent and an aprotic solvent as the precipitating solution, the amount of non-solvent being at least 25 wt% and the preferred non-solvent being water. D1 itself contains no information suggesting that by using a precipitating solution comprising 30-90wt% of an alcohol with 1-5 carbon atoms, 10-35 wt% of water and 0-50 wt% of an aprotic solvent in combination with the other process parameters indicated in claim 1, the production rate of the hollow fibres might be increased while still obtaining membranes which are suitable for haemodialysis or for the other uses stated above.

5.3 D4 discloses coaxially extruding a polymer solution containing 18% polysulfone, 10% PVP and 72% DMA with a water-isopropanol mixture as the precipitating medium and then collecting the hollow fibres after passage through cold water (see example 4). The composition of the polymer differs from the claimed composition by the amount of PVP, and the relative proportions of water and isopropanol are not indicated. In example 11 the precipitating solution is a mixture of 50% isopropanol and 50 % water. The amount of water lies thus outside the claimed range and the polymer is not a polysulfone. Furthermore, the problem of increasing the production rate of the hollow fibres is not addressed in D4 and it cannot be inferred from D4 that the methods used in examples 4 and 11 might lead to an improvement of the production rate over the remaining examples in which a different precipitating medium is used. Therefore D4 contains no information pointing towards the

combination of features as claimed in claim 1 in order to solve the problem stated above.

5.4 Contrary to D4, D5 addresses the problem of manufacturing hollow fibres at high speeds, ie at speeds well above 30m/min. The fibres can be used for various purposes such as dialysis or ultrafiltration. High speeds are achieved by using a core liquid which is substantially incapable of coagulating or gelling the polymer. The core liquid is a solvent or a swelling agent for the polymer. Coagulation of the extruded spinning solution takes place in a coagulating bath containing water. D5 teaches that the presence of water in the core liquid is detrimental to achieving high production rates (see column 2, lines 49 to 61; column 3, lines 15 to 24 and lines 47 to 65; column 4, lines 36 to 52; column 7, lines 15 to 25; claims 1 and 4). The teaching of D5 is focused on the manufacture of hollow fibres from cuprammonium cellulose, cellulose ester, polymethyl methacrylate and polyvinyl chloride. Polysulfone is only mentioned as a possible polymer (see column 5, line 20) but the preparation of polysulfone hollow fibres is neither disclosed nor claimed in D5. The appellant referred to examples 6 and 9 and pointed out that high production speeds of 130m/min and 136m/min were achieved although water was present in the core liquid. In these examples the spinning solutions consist of polyvinyl chloride dissolved in DMF and cellulose acetate dissolved in acetone and the core liquids are respectively a mixture of tetrahydrofuran/water 90/10 and DMSO/water 80/20. Therefore the said core liquids contain a very high amount of solvent for the polymer, ie 90% and 80%, and no lower alcohol contrary to the claimed precipitating solution in which the aprotic solvent is either absent

or, if present, its amount is at most 50 wt%. In examples 5 and 1 of D5, which are performed under the same experimental conditions as in examples 6 and 9 except that water is used as the core liquid, the spinning speed is only 9m/min and 12m/min. The appellant has given no reason as to why this teaching, which does not relate to polysulfone fibres, might point towards the claimed combination of features. In the board's judgment, D5 contains no information suggesting that the use of a precipitating solution containing 30-90 wt% of an alcohol with 1-5 carbon atoms, 10-35 wt% of water and 0-50 wt% of an aprotic solvent in combination with the orifice geometry and the other process parameters stated in claim 1 might improve the production rate in a process of manufacture of polysulfone fibres according to D1.

5.5 D6 discloses the influence of the composition of the precipitating solution on the fibre properties. DMA/water mixtures with different proportions, 1/1 DMA/isopropanol, isopropanol, and air were used as the internal quench fluid (see pages 2386 and 2387). Tables III and IV on page 2387 illustrate the influence of these precipitating fluids on the hydraulic permeability of the fibres when simultaneously varying the composition of the polymeric solution and its viscosity. According to page 2390, last paragraph, a sharp increase in the quench rate, caused by infusion of a strong non-solvent such as isopropanol, produces a highly brittle fibre. The possibility of using a precipitating solution containing a mixture of water and isopropanol or another alcohol having 1-5 carbon atoms in the relative amounts stated in claim 1 is not taught in D6, let alone the advantages resulting from such a precipitating solution. D6 contains no

information from which the skilled person could have inferred that the use of a precipitating solution having the claimed composition in combination with the other process parameters and the orifice cross-sectional ratio stated in claim 1 might have permitted to produce the hollow fibres at a higher rate.

5.6 D8, D9 and D10 were cited by the appellant only to prove that it was known to use a mixture of water and a lower alcohol such as methanol, ethanol or isopropanol as the precipitating solution in the manufacture of polysulfone hollow fibres. These documents concern the manufacture of semi-permeable membranes from a polysulfone polymer; however PVP is not used as the second polymer and none of these documents exemplifies the preparation of the membranes using a mixture of water and one of these alcohols as the precipitating solution. Only the possibility of using said mixture is mentioned in D8 to D10 without suggesting that such a mixture might be advantageous compared to the exemplified precipitating liquids. Furthermore, D8 and D9 do not mention the relative proportions of alcohol and water and D10 discloses on page 10 amounts of alcohol which appear to fall outside the claimed range. D10 contains no examples illustrating the manufacture of hollow fibres. These documents would therefore be of no assistance to the skilled person faced with the problem stated above and cannot suggest to the skilled person which direction to follow. The remaining documents cited by the appellant also contain no additional teaching which in combination with the preceding documents would hint at the claimed combination of features.

6. It follows from the above that the subject-matter of

claim 1 involves an inventive step over the disclosure of the cited prior art. Thus, claim 1 meets the requirement of patentability set out in Articles 52(1), 54 and 56 EPC. Claim 1 being allowable, the same applies to dependent claims 2 to 20 whose patentability is supported by that of claim 1.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Rauh R. Spangenberg