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D E C I S I O N
of 3 December 1997

Case Number: T 0367/96 - 3.4.2

Application Number: 87402408.6

Publication Number: 0266271

IPC: B01D 53/22

Language of the proceedings: EN

Title of invention:

Process for membrane separation of gas mixtures

Patentee:

L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION
DES PROCEDES GEORGES CLAUDE

Opponent:

THE DOW CHEMICAL COMPANY

Headword:

-

Relevant legal provisions:

EPC Art. 112(a), 54, 56, 114(2), 84, 102(3)

Keyword:

"Main request: referring to the Enlarged Board of Appeal (no)"
"1st auxiliary request: novelty (yes); inventive step (no)"
"2nd and 3rd auxiliary request: disregarded"
"4th auxiliary request: support by description (accepted)"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:

T 1027/93, T 0939/92, T 0222/89, T 0798/93, T 0301/87

Catchword:

1. An interest to oppose is not required for the admissibility of an opposition and, as long as said opposition has been correctly based in the notice of opposition on lack of novelty and/or lack of inventive step as grounds of opposition, this "prima facie" also applies to a case wherein the opponent argues that the invention in the impugned patent is "futile" and has no useful result (see point 2 of the reasons; decision T 0798/93, OJ EPO 1997, 363, followed).

2. Article 102(3) EPC does not allow objections of lack of support by the description of an amended main claim if said claim results in substance from the combination of claims of the patent as granted in accordance with the cross references therein and thus concerns a specific object which as such was already claimed in the patent as granted (see point 6.2 of the reasons; decision T 301/87, OJ EPO 1990, 335, followed).



Case Number: T 0367/96 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 3 December 1997

Appellant:
(Proprietor of the patent)

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Respondent:
(Opponent)

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Decision under appeal:

Decision of the Opposition Division of the
European Patent Office posted 26 February 1996
revoking European patent No. 0 266 271 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: M. Chomentowski
Members: R. Zottmann
M. Lewenton

Summary of Facts and Submissions

I. The appellant is proprietor of European patent No. 0 266 271, which was granted on the basis of European patent application No. 87 402 408.6. The patent indicated on its front page EP-A-0 142 005, a document of the European Search Report corresponding to D1: US-A-4 591 365. In the patent, claim 1 and dependent claims 2 to 6 concerned a method and claim 7 an apparatus for carrying out the method of claim 6, and claims 1, 2, 6 and 7 read as follows:

"1. Method for continuous substantial separation of at least one gas component from a gas mixture to generate a residue gas substantially depleted of said gas components comprising the steps of,

providing a semipermeable membrane having a feed gas side and a sweep gas side,

contacting said feed gas side of said semipermeable membrane with a feed gas mixture containing at least one gas to be retained and at least one gas to be separated therefrom,

simultaneously contacting said sweep side of said semipermeable membrane with a sweep gas having a pressure lower than that of said feed gas,

withdrawing a residue gas after contact with said feed side of said membrane which is substantially depleted of said gases to be separated,

withdrawing a permeate gas after contact with said sweep side of said membrane which is substantially enriched with said gases to be separated,

characterized by further comprising:

balancing the partial pressure of one of the gas components to be retained on said feed gas side which is present on both sides of the membrane so that the partial pressure differential on both sides of the membrane is substantially zero."

"2. A method as claimed in claim 1 wherein said feed gas mixture contains two gases to be retained, which gases are present on said sweep gas side said method further comprising,

balancing said partial pressure of a first gas to be retained to provide as close as possible substantially equal partial pressures on both sides of the membrane while at the same time providing a partial pressure differential across the membrane for a second gas to be retained, which partial pressure differential is less than the partial pressure differential of said gas to be separated to maximize diffusion across the membrane of said gas to be separated while minimizing diffusion across the membrane of said gases to be retained."

"6. A method according to anyone of claims 1 to 4, wherein it is used in a fermentation process."

"7. An apparatus for carrying out the method of claim 6, comprising:

a source of compressed air;

a source of oxygen;

a fermentation vat comprising a substantially closed vessel having an inlet and an outlet;

means within said vat in communication with said inlet for the introduction of gases;

first conduit means in communication with said source of compressed air and said source of oxygen and with said means within said vat for the introduction of gases;

second conduit means in communication with said outlet of said vat;

a carbon dioxide and oxygen analyser in communication with said second conduit means;

a compressor in communication with said second conduit means for pressurizing gas passing therethrough;

an enclosure;

a semipermeable membrane disposed within said enclosure which divides said enclosure into a first and second separate compartments each having an inlet and an outlet which compartments communicate only by passage across said membrane;

third conduit means in communication with said compressor and with said inlet of said first compartment;

fourth conduit means in communication with said source of compressed air and said inlet of said second compartment of said enclosure;

fifth conduit means in communication with said outlet of said first compartment of said enclosure and with said first conduit means for conducting residue gas from said first enclosure back to said vat for recycling."

II. The respondent filed an opposition against the patent on the grounds of lack of novelty having regard inter alia to D1 or of lack of inventive step either in the light of common general knowledge of the skilled person or having regard inter alia to D1.

III. The patent was revoked.

The Opposition Division took the view that the method of claim 1 as granted was novel in that, by taking into account the description, an interpretation of the term "balancing" led to a distinguishing feature having regard to D1, but that, however, this method of claim 1 lacked an inventive step because, for a feed mixture consisting only of two gas components, it produced a disadvantage, i.e. the loss of a pure gas component used as a sweep gas to block said same gas component from passing the membrane.

The decision contained a remark that a combination of claims 1 and 2 as granted, i.e. with two gases to be retained, and restricted to a fermentation process, could involve an inventive step.

IV. The patent proprietor lodged an appeal against this decision.

The opponent also lodged an appeal against the findings in the decision concerning the issue of novelty, but decided not to pay the appeal fee and continued the appeal proceedings only as a party as of right.

VI. The decision in said appeal case (T 1027/93 of 11 November 1994), the first one concerning the present European patent, was to remit the case to the Opposition Division for further prosecution.

In particular, it was considered that the question of novelty with respect to D1 required further investigation because of a questionable interpretation of the term "balancing" in claim 1; moreover, lack of inventive step could not be based convincingly only on the finding that the solution of a problem to be solved was apparently "futile"; therefore, the substantive issues required further examination and, in this respect, the parties should not be deprived of two levels of jurisdiction.

VII. The patent was again revoked.

In said second decision, the Opposition Division argued in substance as follows:

Having regard to the findings in the decisions T 939/92, OJ 1996, 309 and T 222/89 of 1 July 1992, unpublished, and since in particular the method of claim 1 as granted was futile because it did not solve a technical problem and provided no technical contribution to the art, it was not an invention in the sense of Article 52(1) EPC. Therefore, the questions of novelty and inventive step needed not be considered.

Moreover, the first auxiliary request, for maintaining the patent in amended form, was not allowable because the amendments it contained were only of clarifying nature and did not correspond to a ground of opposition. For the second auxiliary request, which corresponded to a combination of claims 1 and 2 as granted, there was lack of disclosure.

VIII. The patent proprietor lodged an appeal against this second decision.

IX. The Board of Appeal summoned the parties for oral proceedings which had been requested auxiliarily by the respondent (opponent). In the annex to the summons, it was expressed that, in view of the above-mentioned decisions T 939/92 and T 222/89, it appeared that novelty and inventive step should in any case be examined, that the method of claim 1 as granted appeared to be novel, but to lack an inventive step having regard to D1, and that the main claim of an auxiliary request for maintaining the patent in amended form on the basis of a combination of claims 1 and 2 as granted seemed to lack clarity.

X. With fax of 27 November 1997, the appellant filed in particular a first request, which is now the **Main request**, which consisted in referring the following question to the Enlarged Board of Appeal:

"Can a commercial company, which should have an interest to make opposition, argue that an invention is futile (having no useful result) to request the nullity of a patent right which is a "right to preclude others from doing what is claimed?". If an invention has no useful result, then a patent covering this invention would not preclude a third party, because such third party should have no reason to carry out the same?"

This fax mentioned various further requests for maintaining the patent, for instance substantially as granted, or with a combination of claims 1 and 2 as granted, with or without the restriction to a fermentation process.

This fax was followed by a further fax of 1 December 1997 with indicated requests and the corresponding texts of the respective sets of claims.

In particular, a request, mentioned as "Auxiliary Request", which is now the **Second auxiliary request**, comprised a new claim 1 wherein the following substitutions had been effected in claim 1 as granted:

- "feed gas mixture" in place of "gas mixture" in the beginning of claim 1 as granted;
- most of the first part of claim 2 as granted "wherein said feed gas mixture contains two gases ... said method further comprising" in place of "comprising the steps of" in the beginning of claim 1 as granted; and
- the last part of claim 2 as granted "balancing said partial pressure...of said gases to be retained " in place of the last part of claim 1 as granted "balancing...is substantially zero".

A further request, which was mentioned as "Fourth request", which is now the **Third auxiliary request**, comprised a new claim 1 wherein,

- at the beginning of claim 1 as granted, "Fermentation process wherein the off-gases is comprised of a gas mixture, said process" had been substituted for most of the first part of the claim " Method for continuous substantial separation of at least one gas component from a gas mixture to generate a residue gas substantially depleted of said gas components"; and
- at the end of claim 1 as granted, "across" had been substituted for "on both sides of"; and, moreover, in claim 1 as granted,

- the words "comprising said off-gases, said feed gas mixture" had been inserted between "feed gas mixture" and "containing at least one gas to be retained and at least one gas to be separated therefrom,".

XI. During the oral proceedings of 3 December 1997, the appellant stated that its **First auxiliary request** consisted in maintaining the patent as granted and filed a new request, designated as "Patentee's Fifth Request", which is now the **Fourth auxiliary request**, which was presented as being a combination of claims 1, 2 and 6 as granted, with further adaptation, and wherein claim 1 reads as follows:

"1. A fermentation process wherein the off-gases is comprised of a gas mixture, comprising the steps of

providing a semipermeable membrane having a feed gas side and a sweep gas side,

contacting said feed gas side of said semipermeable membrane with a feed gas mixture comprising said off-gases, said feed gas mixture containing two gases to be retained which gases are present on said sweep gas side, and at least one gas to be separated therefrom,

simultaneously contacting said sweep side of said semipermeable membrane with a sweep gas having a pressure lower than that of said feed gas,

withdrawing a residue gas after contact with said feed side of said membrane which is substantially depleted of said gases to be separated. (read ",")

withdrawing a permeate gas after contact with said sweep side of said membrane which is substantially enriched with said gases to be separated,

characterized by further comprising:

balancing said partial pressure of a first gas to be retained to provide as close as possible substantially equal partial pressures on both sides of the membrane while at the same (read "same") time providing a partial pressure differential across the membrane for a second gas to be retained, which partial pressure differential is less than the partial pressure differential of said gas to be separated to maximize diffusion across the membrane of said gas to be separated while minimizing diffusion across the membrane of said gases to be retained."

In this Fourth auxiliary request, the numbering and dependence of claims 2 to 4 are modified accordingly, and the last claim, claim 5, concerns an apparatus for carrying out the method of one of claims 1 to 4.

XII. The appellant submitted the following arguments in support of its requests:

It is important in particular to the patent proprietor to know if and, if yes, on which basis an invention which is found to be "futile" and thus scarcely useful can be opposed. This is the meaning of the referral to the Enlarged Board of Appeal in the main request.

The first auxiliary request consists in the maintenance of the patent as granted. Starting from D1, which shows a process of separation of gases wherein there is no balancing of the gas component to be retained, i.e. there is no partial differential pressure of said gas component substantially equal to zero across the membrane, the skilled person will find in said document or in the further prior art no indication to reduce the differential partial pressure of the gas to be retained to substantially zero.

Claim 1 of the second auxiliary request concerns a process with two gases to be retained, it is understandable by the skilled person and is thus clear. Claim 1 of the third auxiliary request specifies that the method of claim 1 as granted is to be implemented with off-gases of a fermentation process; starting from D1, which is not concerned with fermentation, and without incitation from the further prior art, the skilled person would not be incited to use, with fermentation off-gases, balancing of a gas component to be retained on both sides of the membrane.

Concerning the fourth auxiliary request, which results from the combination of claims 1, 2 and 6 of the granted patent, i.e with a fermentation process and two gas components to be retained, it is clear and not suggested by the prior art, in particular by D1, wherein in the relevant example only one gas is retained.

XIII. The respondent requested that the appellant's requests which had been filed less than one month before the date of oral proceedings be disregarded as not being provided in due time, and requested that in any case the appeal be dismissed on the basis of following arguments:

The question to be referred to the Enlarged Board of Appeal is irrelevant because an opponent confronted with a patent comprising an invention which is "futile" can nevertheless consider that it is safe to oppose the patent in order to avoid any future possible infringement suit.

The interpretation of the process in suit in the patent as granted, with terms such as "balancing", "minimizing", "substantially zero", does not allow the skilled person to distinguish said process in suit from

the process known from D1, or at least renders the former obvious in view of the small differential pressure for nitrogen on both sides of the membrane in the latter process. Therefore, claim 1 of the first auxiliary request, i.e. as granted, is not patentable.

Claim 1 of the second auxiliary request is already unclear in view of the ambiguities and deficiencies in its text. Claim 1 of the third auxiliary request is not patentable for the same reasons as the patent as granted because the additional feature that the feed gas comprises the off-gases of a fermentation process does not change the issue.

Concerning the fourth auxiliary request, it is to be noted that, in addition to the clarity deficiencies already mentioned with respect to other requests, the claims are not supported by the description in that there is no numerical example in the description corresponding to the features and parameters mentioned in claim 1. Because of these ambiguities in the patent in suit, the invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. In any case, membranes for separating gases are generally known, so that people skilled in the art of fermentation could obviously use them.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request*

The appellant requests that the question mentioned in paragraph X here above be referred to the Enlarged Board of Appeal.

This question has two main aspects, i.e. a first aspect about the "interest to make opposition", and a second aspect relating to "futility" of an invention, that is, the lack of any useful result by implementing said invention.

Concerning the first aspect, it is to be noted that, as mentioned by the Board during the oral proceedings, there is no indication derivable from the European Patent Convention that an "interest to make opposition" is required and, moreover, this finding has been stressed in decisions of Boards of appeal. This is for instance clearly mentioned in the decision T 798/93, OJ EPO, 1997, 363 (cf. point 3.2.1 of the reasons).

Concerning the second aspect, i.e. the "futility" of an invention, it is first to be noted that, whatever the arguments the opponent used in the present case in the course of the opposition and following appeal procedures, the grounds of opposition contained in the notice of opposition were however lack of novelty (Article 54 EPC) and lack of inventive step (Article 56 EPC), i.e. grounds according to Article 100(a) EPC, so that, in this respect, the opposition was admissible (Rule 55(c) EPC).

It is also to be noted that in the first decision T 1027/93 (cf. point 4 of the reasons) of a Board of appeal on the basis of the present European patent, it was stated that, for a construed case comprising a feed gas with two gases A and B, "whether the aim is partial or complete removal of B, the apparent futility of achieving this by carrying out the claimed process cannot be said to be obvious; in fact in view of the futility, it could be said to be completely non-obvious". In said first decision, the Board considered in particular that the question of novelty with respect to D1 required further prosecution because of a questionable interpretation of a term of the claim and that lack of inventive step could not be convincingly based only on the finding that the solution of a problem to be solved was "futile". Moreover, the present Board had expressed in the annex to the summons to oral proceedings that, taking into account the above-mentioned decisions T 939/92, (cf. point 2.4.2 and also point 2.7 of the reasons) and T 222/89 (cf. points 2 and 4.8, and also points 3, 5 and 6 of the reasons), even in case that a contribution to the technique was not apparent or that no problem seemed to be solved, examination of novelty and inventive step appeared in any case to be necessary. Accordingly, it was mentioned that, in the present case, the method of claim 1 as granted seemed to lack an inventive step.

The reasons given by the appellant (proprietor) for this late submission, one week before the oral proceedings, concerned more a general interest for this question, which in its opinion should be settled, than a need concerning the present case, and they were thus not convincing for the finding of the present decision. Moreover, concerning the combination of both aspects, i.e. the futility and the interest to act, the respondent has argued that the present invention was indeed "futile", but has stressed convincingly that, in

any case, an opponent could nevertheless have an interest to oppose for avoiding possible future infringement suits on the basis of a granted patent covering a large field.

Therefore, since this submission has been filed less than one month before the date of the oral proceedings and thus has not been submitted in due time and since "prima facie" it is relevant neither for the present decision nor in general because in any case, whatever the nature of the arguments, the opposition must be based on the grounds of opposition listed in the Convention, the question needs not be referred to the Enlarged Board of Appeal and, thus, said submission is disregarded in accordance with respondent's request (Articles 112(1)(a) and 114(2) EPC).

3. *First auxiliary request (patent as granted)*

3.1 It has not been disputed that D1 represents the nearest prior art. The method known from D1 (see column 1, line 5 to column 2, line 32; column 3, lines 9 to 60; Figure 1) is for continuous substantial separation of at least one gas component (H_2) from a gas mixture (H_2 , 62%; N_2 , 21%; Ar, 6%; CH_4 , 11%; pressure of the gas mixture 125 bar) fed by the conduit (6) to generate in conduit (10) a residue gas substantially depleted of said gas component (15% H_2); this method comprises the steps of:

providing a semipermeable membrane (9) having a feed gas side in communication with the incoming conduit (6) and the outgoing conduit (10) and a sweep gas side in communication with the conduits (11) and (12);

contacting said feed gas side of said semipermeable membrane (9) with a feed gas mixture in conduit (6) containing at least one gas (N_2 , 21%; Ar, 6%; CH_4) to be retained and at least one gas (H_2) to be separated therefrom;

simultaneously contacting said sweep side of said semipermeable membrane with a sweep gas (N_2) provided by conduit (11) having a pressure (about 25 bar) lower than that of said feed gas (125 bar);

withdrawing by conduit (10) a residue gas after contact with said feed side of said membrane (9) which is substantially depleted of said gases (H_2) to be separated;

withdrawing a permeate gas (H_2) after contact with said sweep side of said membrane which is substantially enriched with said gases (H_2) to be separated.

Taking into consideration the partial pressures of one of the gas components (N_2) to be retained on said feed gas side which is present on both sides of the membrane (9), and using the same calculation principle as in the patent in suit (see for instance column 7, lines 4 to 26), the partial pressures in D1 are the following:

feed side: with a pressure of the gas mixture about 125 bar, the partial pressure of a gas component to be retained, N_2 , i.e. of 21% of said gas mixture, is "about 125" x 0.21 = about 26.25 bar.

Thus, since for N_2 the difference "about 26.25 bar" - "about 25 bar" = "about 1.25 bar", it cannot be concluded directly and unambiguously that the method of D1 further comprises

"balancing the partial pressure of one of the gas components to be retained on said feed gas side which is present on both sides of the membrane so that the partial pressure differential on both sides of the membrane is substantially zero."

The further documents of the cited prior art are less relevant.

Therefore, the subject-matter of claim 1 as granted is new in the sense of Article 54 EPC.

3.2 According to the patent in suit (see column 2, lines 30 to 42), balancing of the partial pressures of a component of the gas mixture on both sides of the semipermeable membrane causes the minimal passage of the gases to be retained, in particular of the gas with balanced partial pressures, in either direction across the membrane and maximizes the passage of the gas to be separated from the feed gas side to the sweep gas side.

However, starting from the above - mentioned example of the method known from D1 wherein the difference of partial pressures of the gas component N_2 of the feed mixture to be retained is "about 1.25 bar" as compared with partial pressures of said same gas component on both sides of the semipermeable membrane to be retained of "about 26.25 bar" and "about 25 bar", i.e. a ratio of about 0.05, the person skilled in the relevant art intending to carry out said example and making simple trials for adjusting the process parameters (about "125 bar", "about 26.25 bar" and "about 25 bar") will arrive inevitably to values of the differential partial pressures of said gas components which are very near to "substantially zero".

It is to be noted in this respect that the process of this example of D1 is for separating and recovering H₂ from a feed gas comprising also i.a. N₂. **The amount of N₂ is controlled so that** the thus formed mixture withdrawn via conduit (12) from the feed side of the membrane device has a H₂ proportion of about 75% molar; with such a composition, the gaseous mixture can be directly returned after some compressing into an ammonia synthesis system, from which the off-gases had been treated and directed to the feed gas side of the membrane.

Thus, the person skilled in the art of D1 receives from this document the teaching that, in order to adjust the separation capability of a semipermeable membrane for a specific component (H₂) of a feed mixture having at least two components (H₂ and N₂), it is necessary to provide directly a gas of the component (N₂) to be retained on the other, sweep side of the membrane with an amount, i.e. with a partial pressure, resulting in the desired amount or proportion of H₂. Since D1 (see column 1, lines 52 to 54) is not restricted to the implementation of the separation system with an ammonia synthesis system, the person skilled in the art will control the amounts of gas components and arrive, if this is necessary for another implementation of the separation system, in an obvious way at a differential pressure which does not differ from substantially zero, so that the subject-matter of claim 1 as granted lacks an inventive step in the sense of Article 56 EPC.

4. *Second auxiliary request*

The method of the second auxiliary request is for continuous substantial separation of at least one gas component from a feed gas mixture to generate a residue gas substantially depleted of said gas components. From

one of the amendments resulting in this request, said gas mixture is mentioned as containing **two gases to be retained**, which gases are present on said sweep gas side of the membrane. The claim goes further saying that there is a step of contacting said feed gas side of said semipermeable membrane with a feed gas mixture containing **at least one gas to be retained** and at least one gas to be separated therefrom. Then, the claim goes farther stating, according to a provided amendment, that there is a step of balancing said partial pressure of a first gas to be retained to provide as close as possible substantially equal partial pressures on both sides of the membrane while at the same time providing a partial pressure differential across the membrane for a second gas to be retained, which partial pressure differential is less than the partial pressure differential of said gas to be separated to maximize diffusion across the membrane of said gas to be separated while **minimizing diffusion across the membrane of said gases to be retained**.

Leaving aside deficiencies of the text of the claim, whereby for instance the "sweep gas side" is mentioned before being defined, there is thus a first ambiguity relating to the number of gases to be retained which is introduced by the amendments. There is also a second ambiguity relating to which of said gases to be retained is submitted to a balancing with a partial pressures which are substantially equal across the membrane, and to which other of said gases to be retained is submitted to the second partial pressure differential, which is only less than the partial pressure differential of the gas to be separated and such that the desired effect, in particular the "**minimizing**" of the diffusion of said gas component to be retained, is obtained.

Therefore, because of these ambiguities introduced by the amendments, claim 1 of the second auxiliary request "prima facie" lacks clarity in the sense of Article 84 EPC and cannot serve as a basis for maintaining the patent in amended form since said patent does not satisfy the requirements of the Convention (Article 102(3) EPC). For this reason, the second auxiliary request, which has not been submitted in due time, is disregarded in accordance with respondent's request (Article 114(2) EPC).

5. *Third auxiliary request*

Claim 1 of the third auxiliary request results in substance from the combination of claim 1 and dependent claim 6, both as granted, and concerns thus a fermentation process wherein the off-gases is comprised of a gas mixture which is utilized as a feed gas mixture in the separation process. However, this means that the method of claim 1 of the third auxiliary request differs in substance from the method of claim 1 of the first auxiliary request, i.e. as granted, only in that the former specifies that the method is applied to off-gases of a fermentation process, all other features remaining the same. Thus, the method is for retaining only "at least one gas". Since the method of D1 can be applied to any method wherein it may be desirable to separate at least one gas component and thus to the treatment of fermentation off-gases, the method of the third auxiliary request "prima facie" lacks an inventive step for the same reasons as those put forward here above in relation with the first auxiliary request, so that this request, which has not been submitted in due time, is disregarded in accordance with respondent's request (Article 114(2) EPC).

6. *Fourth auxiliary request*

6.1 Claim 1 of the fourth auxiliary request results in substance from the combination of claim 1 and dependent claims 2 and 6, all as granted, and concerns thus a fermentation process wherein the off-gases is comprised of a gas mixture comprising at least one gas to be separated and two gases to be retained. It is first to be noted that already in the first decision of the Opposition Division a combination of this type had been mentioned as possibly involving an inventive step so that, although this request has not been filed in due time, the Board nevertheless decides to admit it in the procedure (Article 114(2) EPC).

There has been no objection of the respondent concerning the amendments having led to this request, and the Board can see no objection either in this respect (Article 123(3) and (2) EPC). The wording of claim 1 of this request makes it clear to the skilled person, if necessary with his general expertise and if further needed by taking into account the content of the description of the patent in suit (see column 2, lines 20 to 47), what process is meant; in particular, the process can comprise passing air enriched with oxygen through a fermentation vat for speeding up the fermentation reaction, this air/oxygen enrichment producing off-gases from the fermentation vat consisting for example of 30% by volume of oxygen, 55% by volume of nitrogen, and 15% by volume of carbon dioxide, which are returned to the separation system to maximize the passage of carbon dioxide from the feed gas side of the membrane to the sweep gas side thereof and thus recycling of a mixture comprising mainly nitrogen and oxygen.

6.2 The respondent has objected that in the description and drawings of the patent in suit there was no example, and in particular no numerical example, of carrying out the invention in accordance with the features of claim 1 of the fourth auxiliary request, so that there was lack of support by the description in the sense of Article 84 EPC. This argument could not convince for the following reasons:

Without going into numerical calculation for checking whether actually there is a discrepancy between claim 1 of this request and the description, it is to be noted first that said claim 1 results in substance from a combination of claims 1, 2 and 6 as granted in accordance with the cross references stated therein and that, thus, this combination concerns a specific process which as such was already claimed in the patent as granted. If there is lack of support in the sense of Article 84 EPC in the patent maintained in amended form on the basis of the fourth auxiliary request, said lack of support was already there in the patent as granted and has not been introduced after grant of the patent, so that, following for instance decision T 301/87, OJ 1990, 335 (cf. points 3.7 and 3.8 of the reasons), it is concluded that Article 102(3) EPC does not allow objections to be based upon Article 84 EPC if such objections do not arise out of the amendments made.

The terms such as "balancing", "maximizing" or "minimizing" which are objected by the respondent with respect to their ambiguity were also there in the claims of the patent as granted, so that, for the same reason, respondent's objection of lack of clarity is not relevant either.

6.3 Concerning the sufficiency of disclosure, it is to be noted that, although for the reasons mentioned here above contradictions between the claims and the description concerning the values of the parameters may result in difficulties for the skilled person, however, there is in the opinion of the Board sufficient information in the patent in suit for him to be able to control the partial pressures of each of the three gases of the feed mixture which comprises the off-gases of a fermentation process and which thus are enough defined, so that he will be able to carry out the process to arrive at the intended result, i.e. the intended separation.

6.4 The process of claim 1 of the fourth auxiliary request is neither known from nor obvious having regard to D1 (see in particular Figure 1 and the corresponding text), which does not show a fermentation process or a process wherein the two same gases are flown on the feed side and the sweep side of the membrane for separating a third gas initially in the feed stream. The further prior art documents showing membranes are less relevant and, starting from D1, do not render obvious the subject-matter of the fourth auxiliary request. Therefore, the subject-matter of claim 1 of the fourth auxiliary request is novel in the sense of Article 54 EPC and involves an inventive step in the sense of Article 56 EPC. The same conclusion applies to Claim 5, which is concerned with an apparatus for carrying out methods of this type, so that the claims are allowable in the sense of Article 52(1) EPC and the patent can be maintained on this basis (Article 102(3) EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in amended form on the basis of the fourth auxiliary request (filed as "Patentee's Fifth Request, with 5 claims, during the oral proceedings of 3 December 1997), with the description and drawings, if necessary, to be adapted.

The Registrar:


P. Martorana

The Chairman:


M. Chomentowski

