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D E C I S I O N
of 7 February 1995

Case Number: T 0337/93 - 3.2.3

Application Number: 86870085.7

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Title of invention:
Process for the incineration of combustible materials

Patentee:
THE ALPHA FOUNDATION

Opponent:
Linde Aktiengesellschaft, Wiesbaden

Headword:
-

Relevant legal provisions:
EPC Art. 56, 111(1)

Keyword:
"Inventive step (denied)"
"Decision re-appeals - remittal (no)"

Decisions cited:
T 0273/84, T 0669/90

Catchword:
-

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Case Number: T 0337/93 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 7 February 1995

Appellant: (Proprietor of the patent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office dated 26 February 1993 revoking European patent No. 0 207 924 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: C. T. Wilson
Members: H. Andrae
L. C. Mancini

Summary of Facts and Submissions

I. European patent No. 0 207 924 was granted on 27 February 1991 on the basis of European patent application No. 86 870 085.7 filed on 16 June 1986.

II. With Notice of Opposition filed on 26 November 1991 the Respondent (Opponent) requested revocation of the patent for the reason of non-compliance with the provisions of Article 100(a) EPC.

In support of the opposition, inter alia the following documents were cited:

(D1) US-A-4 490 347

(D2) "Chem. Ing. Tech." 50 (1978), No. 11, pp. 823 to 831

(D3) US-A-4 485 745

(D5) "Incineration of polychlorinated biphenyls with oxygen burner" in "Environmental Science & Technology", Vol. 12, No. 10, October 1978, pp. 1295 to 1298

III. By decision dated 26 February 1993 the Opposition Division revoked the patent. According to the decision, the subject-matters of Claim 1 and Claim 11 were novel but did not involve an inventive step in the light of the documents (D2) and (D1) and the documents (D3) and (D1), respectively.

IV. The Appellant (Patentee) lodged an appeal against this decision on 9 April 1993 and paid the appeal fee on the same day.

In his Statement of Grounds of Appeal, filed on 22 June 1993, the Appellant filed sets of claims according to a first, second and third subsidiary request.

According to the main request, the Appellant submitted that the case be remitted to the first instance for further prosecution and that the appeal fee be reimbursed on the basis of good faith and the unexpected procedure.

V. In the communication of 16 August 1994 in preparation for oral proceedings, the Board set out why it was not considered, according to their provisional opinion, that the procedure before the first instance suffered from an infringement of the principle of good faith so that the main request would probably have to be rejected.

Furthermore, the Board pointed out that the single claim according to the first subsidiary request would appear to be obvious with regard to the prior art disclosed in (D1) and (D2). Further according to the Board's communication, the independent claims according to the second and third subsidiary request would not appear to be arrived at in an obvious manner since the document "TA (Technische Anleitung)-Luft '86" submitted by the Respondent with the observation that it anticipates the requirement of a minimum oxygen volume portion of 6% in the flue gas of the combustion of polychlorinated compounds, could not be regarded as forming part of the state of the art.

In reply thereto, the Respondent filed a new document, (D10) Kalmbach, Schmölling: "Technische Anleitung zur Reinhaltung der Luft und Verordnung über Großfeuerungsanlagen" Erich Schmidt Verlag, 1983.

VI. Oral proceedings before the Board took place on 7 February 1995.

According to the main request, the Appellant submits that the decision under appeal be set aside and that the patent be maintained with the Claims 1 to 9 filed on 22 June 1993.

According to the first auxiliary request, Claims 1 and 2 of the main request are to be restricted from "combustible materials" to "solid combustible materials".

According to the second auxiliary request, the case is to be remitted to the first instance for further prosecution with reimbursement of the appeal fee.

The independent Claims 1 and 2 according to the main request read as follows:

"1. A process for incinerating combustible materials containing precursors of dioxines and furans, in which the combustible material is pyrolysed and the gases produced in the pyrolysing step are incinerated by means of air enriched with oxygen, said enrichment being sufficient to reach an incineration temperature of 1200°C, while the amount of oxygen contained in the air used for the incineration is sufficient so that a demand for 6% of oxygen in the flue gases exists, so as to cut down noxious nitrogenous gases as well as dioxines, furans and other poisonous products.

2. A process for incinerating combustible materials containing precursors of dioxines and furans, in which the combustible material is pyrolysed and the gases produced in the pyrolysing step are incinerated by means of air enriched with oxygen, said enrichment being

sufficient to reach an incineration temperature of 1200°C, while the amount of oxygen contained in the air used for the incineration is sufficient to allow an availability of oxygen in the flue gases of 6-8%, so as to cut down noxious nitrogenous gases as well as dioxines, furans and other poisonous products."

VII. In support of his requests, the Appellant argues in the written and oral proceedings essentially as follows:

- A notification dated 27 November 1992 with a copy of the letter of the Opponent dated 24 November 1992 attached was delivered to him in which only the "Take note" box was crossed. He was preparing a reply with a note of comments and proposed amendments, but due to the unexpected decision of the Opposition Division to revoke the patent, i.e. less than three months from the signification of the said notification, it was no longer possible for him to file the reply he was preparing. Since this unexpected procedure constituted an infringement of the principle of good faith, in particular with regard to the principles indicated in the decision T 669/90 (OJ EPO 1992, 739), he requests that the case be reexamined by the Opposition Division and that the appeal fee be reimbursed.

  Remittal of the case to the first instance for further prosecution is justified for the reason that the citation "TA Luft" has been cited by the Respondent only recently so that the first instance has not had an opportunity to assess the relevance of this citation in view of the issue of patentability.

- (D3) concerns a solid waste processing method in which the solid waste is pyrolysed and the gases of the pyrolysing process are incinerated at a temperature of 1200°C by means of an auxiliary burner. No reference is made to the use of oxygen enriched air, nor to the use of said process for cutting down dioxines and furans, nor to a demand for 6% of oxygen in the flue gases.

- (D1) relates to a process for sulphuric acid regeneration. In this process, oxygen enriched air is used so as to reduce both the heat load and, as nitrogen forms, nitrogen oxides in the hot oxidizing environment of the furnace. The furnace temperature of 1000°C is not sufficient for reducing dioxines and furans to their harmless precursors. The oxygen content in the furnace exit gas of at most 2% is also not sufficient for ensuring a cutting down of dioxines and furans.

- The plant according to section 3.2.1.2.1 of (D10) needs a post-combustion chamber where by means of a minimum oxygen content in the flue gases of 6% a minimum temperature of 1200°C for the incineration of PCB is reached. After the post-combustion chamber, the oxygen content in the flue gases could be less than 6%, i.e. the atmosphere of the post-combustion chamber will not be sufficient for reducing efficiently the dioxines and furans.

  (D10) teaches neither that the flue gases must have a sufficient oxygen content whereby it can be ensured that the dioxines and furans have been cut down, nor that oxygen enriched air has to be used.

(D10) only teaches that in order to have a maximum Cl or F content in the flue gases, a sufficient amount of air has to be used so that a sufficient dilution of Cl or F can be obtained in the flue gases.

VIII. In support of his request for revocation of the patent, the Respondent submitted essentially the following arguments:

- (D3) discloses already a process for incinerating combustible materials in which the combustible material is pyrolysed and the gases produced in the pyrolysing step are incinerated, the incineration temperature being 1200°C and the combustible material being solid waste. The skilled person is aware that waste, in particular industrial waste, frequently contains dioxine and furan precursors.

- Any combustion process has to comply with the regulations provided for in the citation "Technische Anleitung zur Reinhaltung der Luft - TA Luft". The document "TA Luft" valid in 1983 (D10) specifies that in processing polychlorinated biphenyl compounds the exhaust gases of the waste processing plant have to be incinerated such that an incineration temperature of at least 1200°C and an oxygen content of at least 6% in the flue gas is maintained.

  In order to maintain an oxygen content of 6% in the flue gas, the combustion air also has to contain a high content of oxygen. Hence, the skilled person will try to reach the required oxygen content of 6% in the flue gas by enriching the combustion air with oxygen, without exercising any inventive activity.

Besides, (D1) recommends the enrichment of the combustion air with oxygen for the purpose of increasing the incineration temperature. In order to reach the incineration temperature of 1200°C provided for in (D2), (D3) and (D10), the skilled person will adopt the suggestion of (D1) and make use of combustion air enriched with oxygen. Furthermore, also (D5) teaches the incineration of PCB compounds by means of an oxygen burner.

- The subject-matter of Claim 1 and Claim 2, respectively, according to the main request is arrived at immediately from (D3) taking account of the regulations of "TA-Luft" valid before the priority date of the patent in suit. When taking additionally account of (D1), the subject-matter of these claims is all the more obvious.

The feature "solid combustible materials" distinguishing Claims 1 and 2 of the first auxiliary request from the corresponding claims of the main request is also known from (D3). The arguments forwarded in respect of the main request are thus also valid in respect of the first auxiliary request.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments (Article 123 EPC)*

The claims according to the main request and the first auxiliary request comply with the requirements of Article 123(2) and (3) EPC. Moreover, no objection under

Articles 100(c) and 123(2) and (3) EPC, respectively, was raised in the proceedings so that this issue requires no further consideration.

Main request:

3. *Novelty*

None of the prior art citations discussed by the parties to the proceedings discloses all the features of Claim 1 and Claim 2, respectively, so that the subject-matter of these claims is novel in the sense of Article 54 EPC.

The question of novelty was also not in dispute in the appeal proceedings. This issue requires, therefore, no further consideration.

4. *Inventive step*

4.1 It is undisputed that (D3) discloses a process for incinerating combustible materials in which these materials are pyrolysed and in which the gases produced in the pyrolysing step are incinerated and reach an incineration temperature of 1200°C. This citation, lying in the technical field of waste combustion under very high temperatures constitutes, therefore, a relevant piece of prior art and will be considered by the expert in this field.

4.2 Claim 1 differs from (D3) in that the gases produced in the pyrolysing step are incinerated by means of air enriched with oxygen, said enrichment being sufficient to reach the incineration temperature of 1200°C while the amount of oxygen contained in the air used for the incineration is sufficient so that a demand for 6% of oxygen in the flue gases exists, so as to cut down noxious nitrogenous gases as well as dioxines, furans

and other poisonous products. Furthermore, there is no explicit indication in (D3) that the combustible materials contain precursors of dioxines and furans.

4.3 In accordance with page 2, lines 48 to 52 of the patent in suit, the object of the invention is to provide a process for incinerating combustible materials containing precursors of dioxines and furans, the process ensuring a reduction of the amount of noxious gases (nitrogen oxides, NO_x), and at the same time a reduction of the amounts of fresh air necessary for this incineration while still ensuring that there is enough oxygen to reduce all the hydrocarbons as well as dioxines and furans to their more harmless precursors.

The use in the combustion process of air having an increased content of oxygen per unit volume has the effect that less nitrogen as compared to a combustion with normal air is introduced into the combustion chamber which reduces the amount of nitrogen oxides produced per unit oxygen used in the combustion. At the same time, an effective cutting down of the polychlorinated compounds may be arrived at as illustrated for example by the prior art process described in (D2), see section 1.3.2, operating in a range of the combustion temperature above 1200°C.

The problem as indicated in the description of the patent in suit is manifestly solved by the subject-matter of Claim 1. This applies also in respect of Claim 2 which differs from Claim 1 only in that the feature concerning the availability of oxygen in the flue gases of 6 to 8% has been substituted for the feature concerning a demand for 6% of oxygen in the flue gases. As set out by the Respondent with reference to (D10), an availability of oxygen in the flue gases of at

least 6% safeguards a complete combustion of the PCB compounds and thus achieves the decomposition of the dioxines and furans.

4.4 The process known from (D3) relates to solid waste in general without dealing with a particular kind of waste. The skilled person in the field of waste processing is aware that precursors of dioxines and furans are nearly always present in the waste, in particular, waste of industrial origin.

Therefore, the skilled person carrying out the process for incinerating waste according to (D3) will have to take account of the recommendations (constituting even regulations for one of the EPC Contracting States) provided for by "TA Luft 1983" (D10). He will make provisions in processing the waste such that an incineration temperature of at least 1200°C and an oxygen content in the flue gases of at least 6% is maintained.

It derives immediately from the requirement of having a 6% oxygen content in the flue gases that the combustion air must contain a correspondingly high proportion of oxygen so as to comply with this requirement. It is clear to the skilled person already from his basic knowledge of the combustion technology that a high proportion of oxygen in the combustion air can be obtained by an enrichment of the air with oxygen. Thus, the application of the recommendations according to (D10) in view of the processing of waste containing precursors of dioxines and furans to the process known from (D3) in a consistent manner leads the skilled person to the subject-matter of Claim 1 and Claim 2, respectively, without any difficulties having to be overcome or inventive measures being required.

It may be added that, without regard to the above considerations in view of the general knowledge of the skilled person, also (D1) would be taken into account when the production of noxious gases in processing spent materials is to be decreased. (D1) teaches that in order to reduce the pollution load of pollutants, such as SO_2 and NO_x, in the stack gas, air enriched with oxygen is fed into the furnace. Since the ratio of oxygen to inert gases in oxygen-enriched air is higher, less inerts are introduced into the process per mole of oxygen consumed which results in a substantial reduction of pollutants released to the atmosphere. It is further emphasised in (D1) that the burner temperature increases as the concentration of oxygen is increased (see in particular column 2, "Summary of the invention"). Thus, also (D1) would suggest to the skilled person to make use of air enriched with oxygen in the incineration process both for the purpose of reducing the noxious nitrogenous gases and for the purpose of reaching a sufficiently high incineration temperature for cutting down dioxines and furans.

4.5 The Appellant argues that the plant according to (D10) needs a post-combustion chamber and that the oxygen content in the flue gases could be less than 6% and thus insufficient for reducing efficiently the dioxines and furans.

(D10) discloses in fact that an additional burner is to be provided in the post-combustion chamber which is switched on automatically when the temperature falls below the indicated minimum value. However, a post-combustion chamber is not required in plants operating according to the fluidized bed process or in plants achieving an equivalent degree of burn-out (see page 47, section 3.2.1.2.1 (d) of (D10)). Thus, a post-combustion chamber is only required in the case where the main

combustion chamber does not allow to obtain the minimum temperature of 1200°C, in all other cases it may be dispensed with. In the opinion of the Board, the reference in (D10) can only be interpreted such that the content of oxygen in the flue gas of at least 6% is maintained at a position in the combustion chamber where the predetermined temperature of 1200°C has been reached, i.e. downstream of the area of combustion or post-combustion if any.

Besides, the Board would point out that Claim 1 and Claim 2, respectively, do not exclude the possibility that the incineration temperature of 1200°C is reached in a process comprising a main and a post-combustion.

The Appellant argues further that (D10) only teaches that in order to have a maximum Cl or F content in the flue gases, a sufficient amount of air has to be used so that a sufficient dilution of Cl or F can be obtained in the flue gases.

This argument is based on the passage on page 47, section 3.2.1.2.1 (k) of (D10) according to which gaseous emissions of inorganic chlorine and fluorine compounds must not be in excess of a given mass per cubic metre of flue gas.

The conclusion from this instruction is not to increase the amount of air for diluting the pollutants, there being no teaching in (D10) in this direction. In the view of the Board, the instruction advises the skilled person rather to limit the amount of pollutants present in a unit of flue gas volume by appropriate measures. By no means is the instruction to be interpreted in the sense of increasing the amount of the combustion air since this measure would lead inevitably to an increased amount of pollutants, in particular NO_x, in the flue gas

which would be contrary to the general aim of reducing the noxious gases underlying the regulations pursuant to (D10).

The above arguments of the Appellant cannot, therefore, be accepted by the Board.

4.6 For the above reasons the Board comes to the conclusion that the subject-matter of Claim 1 and Claim 2 respectively, according to the main request is the result of routine activities of the skilled person and does not involve an inventive step within the meaning of Article 56 EPC. These claims cannot, therefore, be allowed.

First auxiliary request:

Claims 1 and 2 according to the first auxiliary request differ from the corresponding claims according to the main request only in that the term "solid combustible materials" has been substituted for the term "combustible materials". Since the method for thermal processing of waste known from (D3) relates to solid combustible waste, the above considerations apply analogously also to the independent Claims 1 and 2 of the first auxiliary request. These claims can therefore, likewise, not be maintained.

5. Claims 3 to 9 are dependent on the non-allowed Claims 1 and 2 respectively, according to the main and first auxiliary requests and cannot, therefore, be maintained.

Second auxiliary request:

As already illustrated in the Board's communication dated 16 August 1994, the decision under appeal is based upon the disclosure of the prior art documents (D1),

(D2) and (D3). These documents have been cited by the Respondent in the Notice of Opposition which was communicated to the Appellant by the letter dated 6 December 1991. In the view of the Board, all the relevant facts upon which the decision under appeal is based were known to the Appellant from the Notice of Opposition so that no infringement of Article 113(1) EPC occurred in view of the issuing of the said decision. This present case is distinguished in this respect from the case referred to in decision T 669/90, "principle of good faith".

Besides, in the present case reimbursement of the appeal fee may not be ordered since the Board deemed the appeal not to be allowable (Rule 67 EPC).

The Appellant supports his request for remittal of the case to the first instance on the observation that the citation "TA Luft" was cited by the Respondent only recently so that the first instance had no opportunity to consider this citation. In this context, the Respondent referred to the circumstance that reference was made by him to the version of "TA Luft" valid on the priority date of the patent, that is in respect of Claims 3 and 4 of the patent as granted, already in the Notice of Opposition dated 25 November 1991, on page 6, paragraphs 3 and 4. The relevant substantial content of the citation "TA Luft" could therefore be taken into consideration already in the proceedings before the first instance.

The Board accepts this argument of the Respondent. Pursuant to Singer EPC Article 111 cipher 3 (see also decision T 273/84, OJ EPO 1986, 346) remittal to the first instance is considered inter alia in the case where new facts and evidence not taken account of in the preceding procedure have been revealed. As illustrated

above, this situation does not apply in the present case so that the reason for remittal of the case put forward by the Appellant is, in fact, not convincing.

The requests for reimbursement of the appeal fee and for remittal of the case to the first instance for further prosecution are, therefore, rejected.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Maslin C. T. Wilson