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Bezeichnung der Erfindung: Process for removing and recovering organic substances from industrial waste gases
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : B01D 53/04

ENTSCHEIDUNG / DECISION

vom / of / du 4 December 1987

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent / Titulaire du brevet : Sacchetti, Massimo et al.

Einsprechender / Opponent / Opposant : Rekuperator KG Dr.-Ing. Schack & Co.

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56

Kennwort / Keyword / Mot clé : "Inventive step (no) - obvious alternative"

Leitsatz / Headnote / Sommaire

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Case Number : T 174/85

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 4 December 1987

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Decision under appeal : **Decision of the Opposition Division of the European Patent Office dated 31 May 1985 revoking the European patent No.0 046 141 pursuant to Article 102(1) EPC.**

Composition of the Board :

Chairman : K. Lederer
Members : J. Roscoe
R. Schulte

Summary of Facts and Submissions

I. European patent No. 0 046 141, incorporating nine claims, was granted on the basis of European patent application 81 830 113.7.

II. The firm Omniatex S.r.t. and the Respondent both filed notices of opposition to the European patent and requested revocation of the patent in its entirety on the ground of non-patentability because of lack of inventive step (Articles 52 and 56 EPC). Later the firm Omniatex withdrew its opposition.

III. The Appellant (Proprietor of the patent) requested that the patent be maintained in amended form, the sole remaining claim reading:

"A process for removing and recovering volatile organic substances from industrial waste gas by adsorption on solid adsorbent in fixed bed adsorber, and subsequently desorption with hot inert gas, wherein the volatile organic substances are recovered from the inert desorption gas circulating in a closed cycle and characterised in that the closed cycle of the desorption gas comprises the following steps:

(a) heating of the desorption gas,

(b) flowing of the hot desorption gas through the solid adsorbent to be regenerated,

(c) cooling of the desorption gas enriched of volatile organic substances at temperature suitable for condensation of most of said organic substances and then separation of the condensate,

(d) purification of the desorption gas from the residual volatile organic substances by passage through the same solid adsorbent which has passed the industrial waste gas in the adsorption step, the adsorption step of volatile organic substances from waste gas being carried out in such a way to have at the end a residual adsorption capacity of the solid adsorbent".

IV. The Opposition Division revoked the patent on the ground that the subject-matter of the claim lacked inventive step having regard to the disclosure of the documents CEER - Chemical Economy and Engineering Review (Japan) - December 1976; Volume 8, No. 12; pages 36 to 43, hereafter document D1 and GB-A-1 261 750, both of which had been cited by the Opponent Omniatex.

The reasons for the revocation of the patent were inter alia that document D1 disclosed a process over which the claimed one distinguished only by the use of fixed bed adsorbers in lieu of the known fluidized bed adsorbers and that these different types of bed adsorbers were obviously interchangeable.

V. An appeal against the decision was lodged by the Proprietor of the patent.

VI. The Appellant simply asks that his claims be reconsidered. In a response to a communication from the Rapporteur it was confirmed that the claim(s) in question was the single claim, numbered 1, filed 12 December 1984 on which the impugned decision is based. The Board therefore takes the Appellant to be requesting that the impugned decision be set aside and the patent maintained on the basis of the aforementioned single claim.

With respect to document D1, he submits that the use of fixed bed adsorbers instead of the known fluidized bed adsorbers led to important differences in the working conditions, and that the skilled person could not apply simply and immediately the teaching of this document to a process using fixed bed adsorbers.

VII. The Respondent requests that the appeal be dismissed.

He submits inter alia that the transfer of the teachings of document D1 from a fluidized bed adsorption device as there described to a stationary bed adsorption device would be obvious for the skilled man.

Reasons for the Decision

1. The appeal is admissible.

2. Novelty.

2.1 Document D1 discloses a process for removing and recovering volatile organic substances (toluene) from industrial waste gas by adsorption on solid adsorbent (BAC i.e. Beads Activated Carbon) and subsequent desorption with hot inert gas (nitrogen) wherein the volatile organic substances are recovered from the inert desorption gas circulating in a closed cycle which comprises the following steps:

(a) (indirect) heating of the desorption gas,

(b) flowing of the hot desorption gas through the solid adsorbent to be regenerated (in the adsorption section),

(c) cooling (in the chilling unit) of the desorption gas enriched of volatile organic substances at temperature suitable for condensation of most of said organic substances and then separation of the condensate (in the solvent tank),

(d) purification of the desorption gas from the residual volatile organic substances by passage (in the secondary adsorption section) through the same solid adsorbent which has passed the industrial waste gas in the adsorption step, the adsorption step of volatile organic substances from waste gas (necessarily) being carried out in such a way to have at the end a residual adsorption capacity of the solid adsorbent (otherwise the residual volatile organic substances in the desorption gas could not be extracted in the purification step) (see Figure 8 and corresponding portion of the description).

In this known process, adsorption of the volatile organic substances from industrial waste gas is performed in a fluidized bed adsorber. The subject-matter of the present claim distinguishes thereover in that said adsorption is performed in a fixed bed adsorber in lieu of the fluidized bed adsorber.

2.2 The remaining documents cited by the Opponents or mentioned in the European search report are more remote from the subject-matter of the present claim.

2.3 Consequently, the subject-matter of the claim is novel in the sense of Article 54 EPC.

3. Inventive step.

3.1 No convincing evidence has been produced to show that replacing the fluidized bed adsorption of document D1 by fixed bed adsorption produces any technical effects beyond those inherent in the fixed bed process.

In this respect, the Appellant's assertion in the Statement of Grounds that the result achieved in the described embodiment of his process is substantially superior to that achieved by the process of document D1, fails to establish that this superiority is attributable to the mere substitution of fixed beds for a fluidized bed, which is the sole feature distinguishing the claimed invention from the known process. In fact the quoted superior result is achieved with a particular choice of working conditions, including the condensation and desorption temperatures, the type of solid adsorbents, the nature and original concentration of the organic substances removed, and the flow of industrial waste gases treated. In the process of document D1 the corresponding working conditions are all either different from these or are not specified. It is thus entirely uncertain which feature or features lead to the superior result.

The objectively assessed technical problem underlying the subject-matter of the patent is, therefore, to be seen as to provide an alternative to the process of document D1.

In the mere recognition of a need for alternatives to the known process no contribution to inventive step is to be seen since it is the constant endeavour of the skilled man to provide alternatives from which a choice can be made to meet the particular circumstances in any application.

It remains therefore to be examined whether the claimed solution to the above stated problem involves an inventive step.

3.2 Document D1 includes a detailed comparison of the currently used bed systems for removing and recovering volatile organic substances from industrial waste gas by adsorption on a solid adsorbent and subsequent desorption with hot inert gas (see page 36, introduction, second and third paragraphs).

In the second paragraph it is stated that when a large volume of gas is to be treated in a fixed bed system, adsorbing efficiency drops because the gas cannot be passed homogeneously over the cross-section of the activated carbon column and that in treating highly concentrated solvent gas, heat generated during the adsorbing reaction cannot easily be removed.

On the other hand, the third paragraph says that "breaking and wearing of activated carbon, ..., has been said to prevent the fluidized bed method from being used as extensively as the fixed bed process, adding to themselves some difficulties in equipment design". One such difficulty would appear to be to accurately control the gas flows in such a way as to maintain the adsorbent in the fluidized condition while at the same time permitting the organic substances to be properly adsorbed on and desorbed from the adsorbent in respective sections of the device.

Thus, document D1 not only shows that fixed bed adsorption and fluidized bed adsorption are alternative methods for removing and recovering volatile organic substances from industrial waste gases, but also teaches that the fixed bed technique is quite appropriate for treating gas containing low concentrations of solvent, (as is the subject-matter of the present patent, see description, page 2, lines 31 to 33,) provided the volume of gas to be treated is not too great.

Therefore, the claimed process is no more than an obvious alternative, for particular circumstances, to the process specifically disclosed in document D1.

3.3 The Appellant's argument in support of inventive step that the teaching of document D1 could not readily be applied to a process using fixed bed adsorbers is not convincing.

The present description lacks any indication that the skilled man would expect, or did in fact encounter, any problems which he could not solve using his routine skills in seeking to make use of fixed bed adsorbers in a process incorporating the steps (a), (b), (c) and (d) as defined in the claim. Nor has the Board been able to find any such indications in D1. Moreover, the Appellant has neither pointed out what these problems were nor indicated how the inventors have solved them. In any event, Claim 1 makes no reference to any measures for overcoming such problems.

The remaining arguments put forward by the Appellant in the appeal or opposition proceedings do not need to be considered, since they are based on features, e.g. that the nitrogen to be purified flows through the whole adsorbing section, the flow rate is low, i.e. the contact time is high, and the heated desorption gas is heated directly, which do not appear in the claim.

3.4 The subject-matter of the sole claim presently on file therefore lacks an inventive step within the meaning of Article 56 EPC and the patent accordingly cannot be maintained under Article 102(3) EPC with this claim.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: F. Klein

The Chairman: K. Lederer