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Bezeichnung der Erfindung: A process for conveying a particulate solid fuel
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : C10J 3/50

ENTSCHEIDUNG / DECISION

vom / of / du 18 September 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet : Shell Internationale Research Maatschappij BV

Einsprechender / Opponent / Opposant : Krupps Koppers GmbH

Stichwort / Headword / Référence : Conveying fuel/Shell

EPÜ / EPC / CBE Articles 56, 83, 91, 111 and 114, Rule 55(c)

Schlagwort / Keyword / Mot clé : "Inventive step (denied)"
"Late filed ground of insufficiency disregarded as an abuse of procedure"

Leitsatz / Headnote / Sommaire

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Case Number : T 109/89 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 18 September 1990

Appellant : (Opponent)
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Representative :

Respondent : (Proprietor of the patent)
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Decision under appeal :
Decision of the Opposition Division of the European Patent Office of 25 October 1988, posted on 9 January 1989, rejecting the opposition filed against European patent No. 0 101 098 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : K.J.A. Jahn
Members : R.W. Andrews
J. Stephens-Ofner

Summary of Facts and Submissions

I. European patent No. 0 101 098 in respect of European patent application No. 83 200 783.5, which was filed on 1 June 1983, was granted with seven claims on 28 January 1987 (cf. Bulletin 87/06). The only independent claim reads as follows:

"A process for conveying particulate solid fuel from an atmospheric container by means of a lock system to a reactor in which the fuel is partially combusted at elevated pressure to synthesis gas with an oxygen-containing gas, in which process the fuel is passed from the container to a lock hopper that is pressurized by pressing an inert gas into the lock hopper, the fuel is subsequently passed from the lock hopper to a pressure vessel at at least the same pressure as that in the reactor and from the pressure vessel to the reactor, and the fuel is passed from the pressure vessel to the reactor by means of a carbon monoxide- and hydrogen-containing carrier gas, characterized in that the fuel is kept in the fluidized state in the container and lock hopper by means of an inert fluidizing gas and in the pressure vessel by means of a carbon monoxide- and hydrogen-containing fluidizing gas."

II. On 21 October 1987 a notice of opposition was filed requesting the revocation of the patent on the ground that its subject-matter was not patentable within the terms of Articles 54 and 56 EPC. The opposition was supported by, inter alia, the following documents:

(1) DE-A-2 831 208
(2) GB-A-1 003 358 and
(4) DE-C-2 654 662.

III. By a decision delivered orally on 25 October 1988, with written reasons posted on 9 January 1989, the Opposition Division rejected the opposition. The Opposition Division held that the skilled person, starting from the closest prior art as represented by document (1), would not be led to the process of the patent in suit in view of the statement that with this prior art process the maintenance of a fluidised layer can be largely dispensed with and the disclosure that the portion of the fuel situated above the lower part of the dosage container, which is equivalent to the pressure vessel of the present process, is maintained in a static state. In the light of this, the skilled person would be unlikely to combine the teaching of document (1) with that of document (2). In the Opposition Division's opinion, document (1) constitutes a technical prejudice which justified the finding that the subject-matter of the disputed patent involved an inventive step.

IV. An appeal was lodged against this decision on 10 February 1989 and the prescribed fee was duly paid. In his Statement of Grounds of Appeal, filed on 3 May 1989 and during the oral proceedings held on 18 September 1990, the Appellant contended that, for the assessment of inventive step, the present Claim 1 should be notionally redrafted so that its characterising feature is the use of an inert gas to maintain the fuel in the atmospheric container and the lock hopper in the fluidised state.

The Appellant also argued that, if the problem underlying the disputed patent lies in avoiding the agglomeration of the fuel, the use of fluidisation is obvious from the definition of the term "fluidisation". Furthermore, in the light of the disclosure in document (2) of a fuel distribution system with three containers positioned one above the other, in which the flowability of the fuel was improved by maintaining it in a fluidised state in all

three containers, it was obvious to extend the fluidisation of the fuel in the pressure vessel as described in document (1) to the other two containers.

With respect to the use of inert gas as the fluidising means in the two upper containers, the Appellant considered this was obvious since the inert gas, after removal of any entrained solid particles, may be released into the atmosphere. Similarly, the use of product gas or a gas containing carbon monoxide and hydrogen only as the fluidising gas in the pressure vessel was obvious because this measure reduces losses of product gas and avoids contamination of the products of the gasification reaction.

In the Statement of Grounds of Appeal, the Appellant alleged, for the first time, that the disclosure of the disputed patent was insufficient in the absence of any reference to a number of process parameters.

V. In his reply to the grounds of appeal and during the oral proceedings, the Respondent contended that the Appellant's approach of subtracting a feature from the characterising part of the main claim was unallowable and that incorrect delimitation of a claim is not a ground for opposition. The Respondent further argued that the main problems solved by the present invention were the unimpeded flow of fuel to a reactor operating under pressure and the avoidance of contamination of the synthesis gas produced in the reactor. According to the Respondent, these problems were solved in an non-obvious way by the specific choice of features.

The Appellant also maintained that the disclosure of document (1) led away from the invention and that the skilled person would not combine the disclosure of the document with that of document (2), which is, in any case,

not in the same technical field. This latter document disclosed the use of air as the fluidising means in all three vessels and the skilled person in the field of synthesis gas production would not be interested in the use of air.

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

VII. At the conclusion of the oral proceedings, the Board's decision to allow the appeal was announced.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. It was only in his Statement of Grounds of Appeal that the Appellant alleged that the description of the patent in suit was insufficient in the absence of information in respect of certain specified process parameters. However, Articles 99(1) and 111 EPC, as well as Article 114(2) EPC in conjunction with Rule 55(c) EPC, clearly require that an Opponent's case and his evidence in support of it should be fully set out at the earliest possible stage in the opposition, namely, in the statement of grounds of opposition, and not developed piecemeal fashion (cf. T 117/86, OJ EPO 1989, 401 and T 182/89, of 14 December 1989; Headnote published, OJ EPO 8/1990). In the present case, the allegation of insufficiency had neither been expressly pleaded nor foreshadowed until the appeal stage. The submission of this formerly unpleaded ground at this late stage of the proceedings is, therefore, a procedural abuse and has been disregarded by the Board.

3. The patent in suit is concerned with a process for conveying a particulate solid fuel from an atmospheric container by means of a lock system comprising a lock hopper and pressure vessel to a reactor in which the fuel is converted at elevated pressures by an oxygen-containing gas to synthesis gas. Document (1), which may be considered to represent the closest prior art, describes a process of this type.

It was found, however, that even though the particulate fuel is dried before being conveyed to the atmospheric container, the transfer of the fuel particles is sometimes impeded by their tendency to agglomerate, which may lead to bridging across the discharge outlets of the respective containers.

Therefore, in the light of this prior art, the technical problem underlying the patent in suit may be seen in providing a process in which this difficulty in supplying particulate fuel to the synthesis gas reactor is overcome.

3.1 According to the disputed patent, this technical problem is essentially solved by maintaining the particulate fuel in a fluidised state in the atmospheric container and lock hopper by means of an inert fluidising gas and in the pressure vessel by means of a carbon monoxide-hydrogen containing fluidising gas.

3.2 In the absence of any evidence to the contrary, the Board has no reason to doubt that the proposed means successfully solve the above-defined technical problem.

3.3 The other technical problem referred to by the Respondent, i.e. the prevention of contamination of the product synthesis gas, cannot be taken into consideration in establishing the objective technical problem addressed and

successfully solved by the invention, since this technical problem has already been solved in document (1). According to this document, part of the product from the gasification reactor may be used to form the partially fluidised layer in the lower part of the vessel corresponding to the present pressure vessel (cf. Figure 1 in combination with page 13, lines 7 to 20).

3.4 It is true that normally a distinction is made between the expressions "carrier gas" and "fluidising gas". However, in document (1) it is clear that the gas which enters the base of the dosage container and which is described as a carrier gas is distributed through a porous material in such a manner to cause partial fluidisation of the fuel particles before conveying them to the burners of the gasification reactor (cf. page 9, lines 7 to 13 and page 13, lines 16 to 25).

4. After examination of the cited prior art, the Board is satisfied that the claimed subject-matter is novel. Since novelty is not in dispute it is not necessary to consider this matter in detail.

5. It still remains to be examined whether the requirement of inventive step is met by the subject-matter of the patent in suit.

5.1 Document (1) discloses a process for conveying a pulverulent fuel from an atmospheric container by means of a lock system to a reactor operating at elevated pressure (cf. Figures 1 and 2 and the corresponding description on pages 12 to 14). As mentioned above, the embodiment illustrated in Figure 1 solves the problem of avoiding the contamination of the product gas. In contrast to the present process, the fuel particles in the two upper vessels, i.e. the atmospheric container and the lock hopper, are not maintained in a fluidised state. In fact,

it is indicated in this document that processes involving the maintenance of fluidised beds are uneconomic on an industrial scale and the advantage of the process described in this document is the fact that the circulation of gas for maintaining the fuel particles in a fluidised bed may be dispensed with to a large extent (cf. page 4, lines 6 to 31 and page 5, lines 2 to 13).

In the Board's judgement, these economic considerations would not have led the skilled person away from the solution proposed in the patent in suit since if, in certain circumstances, it is found that agglomeration of the fuel particles or bridge formation is a problem, the skilled person has to ensure the unimpeded flow of fuel particles to the reactor and accept that the solution to this problem may be disadvantageous economically.

5.2 The skilled person would be encouraged to ignore these adverse comments by the fact that document (4), which relates to the partial combustion of coal powder, discloses that fluidisation would solve the problem of the coal particles sticking together since it states that fluidisation renders coal powder free-flowing (cf. paragraph bridging columns 2 and 3). Although document (4) is only concerned with the transfer of the fluidised coal particles from the fluidisation vessel to the reactor, nevertheless the cited passage represents a signpost directing the skilled person towards the proposed solution to the problem underlying the disputed patent.

5.3 The skilled person would be encouraged to follow the direction indicated by document (4) by the disclosure of document (2) which describes a process for injecting powdered material into blast furnaces. According to this document, the powdered material in each of the three

containers, which correspond to the atmospheric container, lock hopper and pressure vessel of the present process, is maintained in a fluidised state using air as the fluidising gas (cf. Figure 2 and the corresponding description on page 3, lines 24 to 81). However, it would be clear to the skilled person that, for maintaining the powdered material in the fluidised state, the type of fluidising gas is of no consequence. The skilled person would realise that, although air is an appropriate choice in this prior art process, other fluidising gases may be selected in the light of the nature of the powdered material and its intended use. In view of the possibility of forming explosive mixtures of coal dust and the oxygen in the air (cf. document (1), 2nd complete paragraph on page 10), the skilled person, for reasons of safety, would choose to use an inert gas as the fluidising means in the upper two vessels. Having regard to the disclosure of document (1), the skilled person would select a carbon monoxide-hydrogen mixture to maintain the fuel particles in the fluidised state in the pressure vessel in order to avoid contaminating the synthesis gas product.

Although the powdered material in the process disclosed in document (2) is conveyed to a blast furnace rather than to a reactor for the production of synthesis gas, nevertheless, in the Board's judgement, the skilled person would not only have been aware of this document but would have also recognised its relevance, since both the disputed patent and this prior art document are concerned with the conveying of particulate solids.

6. Therefore, the proposed solution to the problem of providing a process in which the supply of solid particulate fuel to a reactor operating at elevated pressure from an atmospheric container via a lock system is not impeded by agglomeration of the fuel particles or

bridging is obvious in the light of the combined teaching of documents (1), (2) and (4). Thus, the subject-matter of Claim 1 does not involve an inventive step.

6.1 Dependent Claims 2 to 7 relate to preferred embodiments of the process in accordance with Claim 1. It was not argued that these claims contained any independent inventive features and, therefore, in the absence of such features, they are unallowable in the absence of an allowable main claim.

Order

For these reasons, it is decided that:

1. The appeal is allowed.

2. The decision under appeal is set aside.

3. The patent is revoked.

The Registrar: The Chairman:

M. Beer K.J.A. Jahn