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Datasheet for the decision of 12 February 2021

Case Number: T 2161/17 - 3.3.09

Application Number: 12152803.8

Publication Number: 2620466

IPC: C08J3/00, C08J3/12, A61L15/60, B29B9/16

Language of the proceedings: EN

Title of invention:
Heat-treatment of water-absorbing polymeric particles in a fluidized bed

Patent Proprietor:
Evonik Operations GmbH

Opponent:
Nippon Shokubai Co., Ltd.

Headword:
Heat-treatment of polymeric particles/EVONIK

Relevant legal provisions:
EPC Art. 83, 100(b)

Keyword:
Sufficiency of disclosure - (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 2161/17 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 12 February 2021

Appellant: (Patent Proprietor)	Evonik Operations GmbH Rellinghauser Straße 1-11 45128 Essen (DE)
Representative:	Evonik Patent Association c/o Evonik Industries AG IP Management Bau 1042A/PB 15 Paul-Baumann-Straße 1 45772 Marl (DE)
Respondent: (Opponent)	Nippon Shokubai Co., Ltd. 1-1, Koraibashi 4-chome, Chuo-ku, Osaka-shi Osaka 541-0043 (JP)
Representative:	Ricker, Mathias Wallinger Ricker Schlotter Tostmann Patent- und Rechtsanwälte Partnerschaft mbB Zweibrückenstrasse 5-7 80331 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 20 July 2017 revoking European patent No. 2620466 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	A. Haderlein
Members:	M. Ansorge
	E. Kossonakou

Summary of Facts and Submissions

I. The appeal was filed by the proprietor (appellant) against the opposition division's decision revoking the European patent EP 2 620 466.

II. With its notice of opposition, the opponent had requested revocation of the patent, in particular on the ground for opposition under Article 100(b) EPC.

III. In the present decision, reference is made to the following document:

D9: Catalogue "CONIDUR®" by Hein, Lehmann Trenn- und Fördertechnik GmbH, dated 7 April 2000

IV. Claim 1 of auxiliary request 1 (filed on 29 June 2017 during the oral proceedings before the opposition division and the sole request on appeal) reads as follows:

"A method for heat-treating water-absorbing polymeric particles at a temperature Tp in the range of from 100 to 250°C in a fluidized bed dryer by contacting said particles with at least one hot gas stream having a temperature Tg in the range of from 100 to 320°C inside the fluidization chamber (1) of a drying compartment in a fluidized bed dryer, said drying compartment comprising at least one fluidization chamber (1), opening downwardly in at least one lower plenum chamber (2) through at least one gas distribution bottom plate (3) having openings formed there through for upward gas flow from said lower plenum chamber (2) into said fluidization chamber (1), wherein the superficial gas velocity of said hot gas stream in the

fluidized bed is in the range of from 0.1 to 0.57 m/s and wherein the pressure drop across the gas distribution bottom plate is in the range of from 100 to 900 Pa and the total pressure drop across both, the bottom plate and the fluidized bed, is in the range of from 2.500 to 5.000 Pa."

V. The opposition division decided, *inter alia*, that auxiliary request 1 did not fulfil the requirement of sufficiency of disclosure.

VI. The parties' relevant arguments are reflected in the reasoning below.

VII. Requests

The appellant requested that the decision be set aside and the case be remitted to the opposition division for further prosecution on the basis of auxiliary request 1 filed on 29 June 2017 during the oral proceedings before the opposition division.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. Sufficiency

1.1 Claim 1 relates to a method for heat-treating water-absorbing polymeric particles, characterised in particular by the feature "wherein the superficial gas velocity of said hot gas stream in the fluidized bed is in the range of from 0.1 to 0.57 m/s".

1.2 The respondent and the opposition division were of the opinion that the patent did not sufficiently specify

the calculation of the parameter "superficial gas velocity", thus leading to a lack of sufficiency. In response, the appellant argued that the skilled person could measure or determine this parameter on the basis of the guidance in the patent, particularly paragraphs [0011] and [0012], and in D9.

1.3 As can be taken from paragraph [0011] of the patent, the superficial gas velocity (v_s) is calculated according to the following formula, on the basis of the afflux gas velocity (v_a) under the bottom plate and the type of fine hole plate for a given pressure drop:

$v_s = v_a - v_{cor}$ (hereinafter "formula 1")

where v_{cor} is the "correction factor" for a given bottom plate and a given pressure drop.

1.4 Consequently, in order to determine the superficial gas velocity (v_s), it is crucial to be able to measure or determine v_a and v_{cor}. The patent does mention that the correction factor (v_{cor}) is obtained from the pressure drop curve for a given type of bottom plate provided by the bottom-plate manufacturer, but it does not explain how to do so. Aside from mentioning formula 1, the patent does not elaborate on what v_{cor} means. Since v_{cor} is expressed in the same unit as v_s and v_a, it is not dimensionless.

1.5 D9 mentions a dimensionless correction factor (f) which is used for calculating the pressure drop at operating temperature by the formula $\Delta p_1 = \Delta p * f$.

As correctly submitted by the appellant, this factor (f) cannot be equated with v_{cor}.

1.6 D9 does not contain any information about a superficial gas velocity or how this kind of velocity is to be determined. As can be taken from e.g. page 13 of D9, this document merely provides guidance on how to select the right CONIDUR® fine hole sheet and mentions that this selection is decisively determined by the gas volume at operating temperature and the corresponding specified pressure drop of the sheet.

1.7 The appellant contends that v_{cor} can be determined using a pressure drop curve, as shown for instance on page 19 of D9 (see Figure 2, for sheet type 101, annexed to the statement setting out the grounds of appeal). The board notes, however, that the x-axis in that figure is labelled "v" and not "v_{cor}". Moreover, the title of this figure ("Pressure drop as function of the approach velocity") suggests that the x-axis actually corresponds to the "approach velocity", which, as correctly argued by the respondent, corresponds to the afflux gas velocity (v_a) referred to in the patent because the formula to calculate both parameters is identical (see paragraph [0012] of the patent and page 15 of D9; see also formula 2 below). This being the case, neither the patent nor D9 explains how v_{cor} is to be measured.

1.8 Even if it were accepted that, as argued by the appellant, a skilled person would know that v_{cor} is to be calculated as proposed in the statement setting out the grounds of appeal, the invention is still not sufficiently disclosed because the patent does not sufficiently specify the method for calculating the afflux gas velocity (v_a).

1.9 The afflux gas velocity (v_a) is calculated according to the following formula (see paragraph [0012] of the patent):

$v_a = V/(A*3600)$ (hereinafter "formula 2")

where V is the gas volume flow rate (in m^3/h) at operating temperature and A is the area (in m^2) of the bottom plate. The same formula is also given on page 15 of D9.

1.10 In this context, the appellant affirmed that the area of the bottom plate (A) in formula 2 is not the total area of the bottom plate, which in the board's view is the first interpretation that would come to mind, but rather the working surface of solely the first heating zone of that plate, i.e. a significantly smaller portion of the total bottom plate.

As there is no explicit support for this interpretation and the patent is completely silent in this respect, the appellant is trying to derive this meaning of "area of the bottom plate (A)" from a reverse conclusion using comparative example 1. In this respect, the appellant alleged that the working surface of the first heating zone in the bottom plate of comparative example 1 was about 2.17 m^2; it argued that this was the value to be taken as the "area of the bottom plate (A)" in formula 2 for the CONIDUR® plate type 101 used in comparative example 1, not the plate area of 8 m^2 explicitly mentioned in that example. In the appellant's view, this interpretation is to be generalised and used when deciding on the actual area of the bottom plate (A).

1.11 For the following reasons, the board is not convinced.

Firstly, the patent is completely silent with respect to the appellant's interpretation of "area of the bottom plate (A)". Comparative example 1 only mentions a plate area of 8 m^2, which suggests that the bottom plate area (A) in fact represents the total area of the bottom plate. Accordingly, there is no guidance in the patent that the working surface of a first heating zone should be taken to be the area (A) in formula 2, contrary to the appellant's assertion.

Secondly, comparative example 1 is outside the scope of claim 1 and thus, *per se*, cannot disclose a way to carry out the invention. Even more importantly, the examples of the patent do not use the same bottom plate as comparative example 1, so the appellant's attempt to explain the "area of the bottom plate (A)" by reverse conclusion on the basis of comparative example 1 is not consistent with the patent's disclosure.

Thirdly, the appellant's interpretation is not supported by any evidence indicating that the first heating zone of the CONIDUR® plate type 101 inherently has an area of 2.17 m^2 as alleged by the appellant. In addition, there is no evidence on file supporting the assertion that that area is to be taken as the bottom plate area (A) in formula 2.

Moreover, the appellant admitted that the patent concealed the information on how the total surface of the bottom plate of 8m^2 is divided into the heating and cooling zones. According to the appellant, however, this information is irrelevant for evaluating sufficiency of disclosure.

1.12 The appellant itself thus acknowledges that the patent does not provide any teaching concerning the areal distribution of a first heating zone, a second heating zone and a cooling zone of the bottom plate. Instead, the appellant based its argument on an interpretation of the area of the bottom plate (A) which is not mentioned anywhere in the patent and which differs from that stated in paragraph [0012], i.e. that A is the area of the bottom plate.

1.13 For the appellant's own interpretation of the area (A), knowing how the two heating zones and the cooling zone are distributed over the bottom plate is by no means irrelevant for the question of sufficiency. On the contrary, it is one of the decisive parameters required in order to be able to calculate the afflux gas velocity (v_a) and, by extension, the superficial gas velocity (v_s). The superficial gas velocity (v_s) is one of the essential features characterising the claimed method. The skilled person thus needs to know how to reliably determine that parameter in order to put the invention into practice. To this end, it is necessary to know the area of the bottom plate (A) in order to reliably determine v_a and consequently also v_s. Since the patent is completely silent with respect to the appellant's understanding of the area of the bottom plate (A), the appellant's interpretation is considered to be speculative and not supported by the patent or any other evidence. D9 is also silent on this issue.

1.14 Examples 1 to 3 of the patent cannot disclose at least one way to carry out the invention. Example 1 mentions that "heat-treatment in the FBD [fluidized bed dryer] described in comparative example 1 was continued with polymer 2 for further 7 month [sic] after the design of

the fluidized bed dryer was optimized by exchanging the bottom plate to a more suitable type, e.g. the above mentioned CONIDUR® fine-hole sheets types: 1 to 8, having a hole size of 0.3 mm and providing a pressure loss of 530 Pa with hot air having a temperature of 260°C" (emphasis added).

Firstly, there is no specific information in the patent about an optimised design of the FBD.

Secondly, neither the patent nor D9 mentions a CONIDUR® fine hole sheet type 1 to 8 with a hole size of 0.3 mm. D9 does describe CONIDUR® fine hole sheet types 2, 4 and 7, but these do not have a hole size of 0.3 mm.

1.15 Moreover, the appellant provided a calculation in which the working surface of a first heating zone of a bottom plate in comparative example 1 was used as that in example 1, yet different plates having different hole sizes are used in the two examples.

Firstly, it is inappropriate to use a bottom plate having holes of 0.08 mm to simulate the plate from example 1, which has a hole size of 0.3 mm.

Secondly, it is noted that in its calculation of v_s for example 1 of the patent the appellant achieves a value of 0.4171 m/s, which is not close to the value for v_s of 0.35 m/s mentioned in the patent. The appellant's attempt to reproduce the v_s value mentioned in example 1 on the basis of the information given in that example thus fails and does not support the assertion that the patent discloses a way to carry out the invention.

1.16 The same deficiencies are found in examples 2 and 3 since they refer to the conditions described in example 1.

1.17 Without knowing which value is to be taken as the bottom-plate area (A), it is not possible to determine v_a. This is a clear lack of sufficiency of disclosure since there is no teaching in the patent with respect to the appellant's interpretation of the area of the bottom plate (A). Since v_a cannot be properly determined, v_s cannot be reliably determined either. Due to the above-discussed lack of guidance in the patent, there are serious doubts that the skilled person could carry out the invention.

1.18 On the basis of the above considerations, the parameter "superficial gas velocity (v_s)" is insufficiently defined, so the skilled person cannot carry out the invention without undue burden. The board thus concluded in its communication that the requirement of Article 83 EPC was not met.

1.19 During the oral proceedings, the appellant reiterated its arguments submitted in writing and emphasised the following points in particular.

1.19.1 Firstly, it stressed that v_{cor} was simple to deduce by applying the procedure described in D9 in reverse, i.e. by reading v from the pressure drop curve of a given bottom plate, like those shown in D9, and a given pressure drop. In the appellant's view, it is not D9 that is decisive for determining v_{cor} (since D9 does not mention v_{cor}), but the patent itself, because paragraph [0011] of the patent states that v_{cor} is the correction factor for a given bottom plate and a given pressure drop.

The board is not convinced because the patent is silent with respect to a procedure for determining v_{cor}, merely referring to "pressure drop curves for a given type of bottom sheet provided by the manufacturer" such as those shown in D9. In this context, it is particularly confusing that D9 mentions the approach velocity (v) and not v_{cor}, yet (v) corresponds to the afflux gas velocity (v_a), a different parameter in formula 1.

1.19.2 Secondly, the appellant re-emphasised that the area of the bottom plate (A) was not the total area of the bottom plate, but merely the portion through which air flows.

Since neither the patent nor D9 gives any indication in this respect, the board cannot agree with the appellant. There is simply no evidence to support the appellant's assertion that the area of the bottom plate (A) is the portion through which air flows rather than the total area of the bottom plate, as suggested in paragraph [0012] of the patent.

1.20 In sum, taking into account the appellant's arguments provided in writing and during the oral proceedings, the board concludes that the requirement of Article 83 EPC is not met. Accordingly, the appellant's sole request is not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Nielsen-Hannerup A. Haderlein

Decision electronically authenticated