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**Datasheet for the decision  
of 16 November 2017**

**Case Number:** T 0421/16 - 3.3.05

**Application Number:** 99900207.4

**Publication Number:** 1044044

**IPC:** B01D1/00, F26B3/10, F26B17/10,  
F26B21/02

**Language of the proceedings:** EN

**Title of invention:**

METHOD AND APPARATUS FOR THE REMOVAL OF LIQUID FROM  
PARTICULATE MATERIAL

**Patent Proprietor:**

ASJ Holding ApS

**Opponent:**

BMA Braunschweigische Maschinenbauanstalt AG

**Headword:**

Drying apparatus/ASJ HOLDING APS

**Relevant legal provisions:**

EPC Art. 83

**Keyword:**

Sufficiency of disclosure - main request (no) - auxiliary  
request (no)

**Decisions cited:**

G 0004/95

**Catchword:**



**Beschwerdekammern**  
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Case Number: T 0421/16 - 3.3.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.05**  
**of 16 November 2017**

**Appellant:** BMA Braunschweigische Maschinenbauanstalt AG  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
22 December 2015 concerning maintenance of the  
European Patent No. 1044044 in amended form.**

**Composition of the Board:**

**Chairman** E. Bendl  
**Members:** H. Engl  
O. Loizou

## Summary of Facts and Submissions

- I. European patent EP-B-1 044 044 is concerned with a method and an apparatus for the removal of liquid from particulate material.
- II. An opposition based on the grounds of Article 100(a) EPC (lack of novelty and lack of inventive step) and Article 100(b) EPC (lack of sufficiency of disclosure) was lodged against the granted patent.
- III. The documents cited in the opposition procedure included the following:
- E1: US 5 289 643 A  
E2: WO 92/01200 A
- IV. The opposition division decided at the oral proceedings on 17 November 2015 *inter alia* that the invention was disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The opposed patent was maintained in amended form.
- V. Claim 1 in the version as maintained by the opposition division reads as follows:
- "1. Apparatus for the execution of a method for the removal of liquid from particulate material by evaporation through the supply of heat transferred mainly by superheated vapours or steam of the liquids existing in the particulate material, said method taking place in a substantially closed system, wherein the particulate material is supplied continuously to a process chamber which is in the form of an annular or partly annular chamber (1) lying in a substantially horizontal manner, that the superheated steam is led

from below up through openings (11) in a bottom (10) in the annular chamber, so that the particulate material is brought into movement by the superheated steam, and such that a transport of the particulate material occurs through the annular chamber (1), said apparatus consisting of a substantially closed container which has means for the introduction of particulate material from which liquid is to be removed, means for the removal of dried particulate material, means for the circulation in the container of superheated vapours, means for the supply of thermal energy to these vapours and means for the separation of dust particles from these vapours, characterized in that the container contains a process chamber which lies substantially horizontal and which is configured as an annular or partly annular chamber (1), said chamber having a bottom (10) through which steam can permeate, in that openings (11) are provided in the bottom (10), and in that the bottom has a relatively greater opening area close to the outer side of the annular chamber than close to the inner side of the chamber, and a relatively greater opening area in the vicinity of a supply opening (5) for the particulate material than in the vicinity of a discharge opening (6) for the particulate material, and that the openings (11) in the bottom (10) are shaped in such a manner that an influx of steam takes place partly at right-angles to the bottom and partly at angles to the bottom (10) of between  $0^{\circ}$  and  $90^{\circ}$ , and preferably between  $0^{\circ}$  and  $80^{\circ}$  and particularly between  $0^{\circ}$  and  $30^{\circ}$  in different directions, so that a rotating movement and possibly a movement in the annular chamber's peripheral direction is promoted in the particulate product."

VI. The present appeal of the opponent (henceforth: the appellant) lies against this interlocutory decision.

The appellant's statement of grounds of appeal was filed with letter dated 19 April 2016. A further submission was received by letter dated 16 October 2017. Attached were the following documents:

Annex 1: Paper by CFX Berlin Software GmbH on "*Numerische Berechnung des Siebbodens eines Wirbelschichtverdampfungstrockners*", 24 July 2015

E10: "*Schnitzeltrocknung mit überhitztem Dampf*", XX<sup>th</sup> General Assembly of the International Commission of Sugar Technology (CITS), June 1995, containing the following publications:

Arne Sloth Jensen, "*Schnitzeltrocknung mit überhitztem Dampf unter Druck*";

N. Brons, "*Schnitzeltrocknung mittels überhitztem Dampf am Beispiel der Zuckerfabrik Könnern*";

M. Bruhns and U. Bunert, "*Betriebsmessungen an mehreren Verdampfungstrocknern und Grundlagenuntersuchungen*",

By letter dated 10 November 2017 the appellant submitted further arguments and the following document:

E11: CH-B-462 721.

VII. The respondent's (patentee's) response to the statement of grounds of appeal was received by letter dated 7 September 2016. As its main request the respondent referred to the set of claims found allowable by the opposition division. The auxiliary request consisted of the set of claims of the first auxiliary request (erroneously referred to as second auxiliary request),

filed on 13 July 2011.

VIII. Independent claim 1 of this auxiliary request differs from claim 1 of the main request (see point V.) in that the following passage is added at the end of the claim:

" , and in that the bottom (10) in the annular chamber (1) has a trough-shaped double-bent or an approximately double-bent shape, through which the superheated steam is introduced in controlled directions, and in that a greater flow of superheated steam is fed into the annular chamber in the vicinity of the chamber's outer side than at the chamber's inner side."

Independent claim 2 of the auxiliary request differs from claim 1 of the main request (see point V.) in that the following passage is added at the end of the claim:

" , and in that plates (13) are suspended in the annular chamber (1), said plates (13) extending from the inner side (2) and/or from the outer side (3) of the annular chamber (1), and being suspended in such a direction and with such a slope and/or bend that a suitable filling of the particulate material in the annular chamber is ensured."

IX. Oral proceedings before the board took place on 16 November 2017.

X. The arguments of the appellant, as far as relevant for the decision taken, were essentially as follows:

The appellant pointed at six major gaps of information in the patent which the skilled person would not be able to fill on the basis of its general technical knowledge and which led to a lack of sufficiency of

disclosure.

Firstly, claim 1 of the patent in suit defined, as an effect to be achieved by the claimed apparatus features, that "a rotating movement and possibly a movement in the annular chamber's peripheral direction is promoted in the particulate product" (henceforth identified as claim feature 1.9.2). However, the structural apparatus details and essential parameters leading to this effect were not disclosed. The patent failed to define the necessary parameters governing the steam influx (in a certain angle with respect to the bottom) and the shape of the orifices. Furthermore, the ratio of the respective amounts of steam entering in an oblique angle and perpendicular to the bottom plate was not defined.

Secondly, the shape of the openings causing the steam to enter the process chambers in an angle of between  $0^\circ$  and  $90^\circ$  was not defined in the claim or disclosed elsewhere in the description. It was also not disclosed how angled or oblique openings having the above mentioned effect on the steam can be provided in a relatively thin bottom plate (e.g. of 1 mm thickness), as would be used in a compact drying apparatus for pharmaceutical products.

Thirdly, vague and unclear expressions in the claims, such as "relatively greater", "close to the inner (or outer) side", "vicinity of an opening", "partly at right angles" and "partly at angles to the bottom of  $0^\circ$  and  $90^\circ$ ", would lead to a very general and broad claim. It was not plausible that all embodiments falling under such a broad claim could give rise to the desired effect as defined in claim feature 1.9.2. Determining the effective combinations placed an undue burden on



the skilled person.

Concerning a fourth gap of information, the appellant argued that claim feature 1.9.2 did not follow from an apparatus having claim features 1.9 and 1.9.1 (see Reasons, point 2, below). The appellant also raised the question of how the angles of the oblique openings in the bottom plate were defined and how angles between 0° and 90° could be distinguished from angles between 90° and 180°. The claim encompassed embodiments wherein the steam entered at small angles even approaching zero degrees. Such embodiments could however not be put into practice.

Furthermore, claim feature 1.9.1 required the steam to enter in various directions with respect to the bottom plate. However, the patent failed to teach how the irregular distribution of openings in the bottom plate could give rise to the effect recited in claim feature 1.9.2.

Finally, the effect on the particulate product as recited in claim feature 1.9.2 consisted of an obligatory part (the rotating movement) and an optional one (the movement in the chamber's peripheral direction). However, the optional movement was essential for carrying out the process of the invention (*cf.* claim feature 1.3.6). The patent failed to disclose which structural features caused such a movement.

Feature 1.8.1 of claim 1 (see Reasons, point 2, below) called for a relatively greater opening area in the vicinity of a supply opening (5) for the particulate material than in the vicinity of a discharge opening (6) for the particulate material. According to the

appellant, this claim feature was trivial and could not contribute to the effect defined in claim feature 1.9.2.

The patent did not provide sufficient guidance to be followed in case of failure. The skilled person was therefore left with a trial and error approach involving an unacceptable number of trials. The patent was not more than an invitation to conduct a research programme.

In summary, it was not plausible in view of these and still other gaps of information and the broad definition of the claimed invention that the claimed apparatus could be put into practice in the light of what was disclosed in the patent and of the general technical knowledge. Under these circumstances, the burden of proof rested with the respondent to demonstrate that the claim features were sufficient and causal for achieving the effects recited in claim feature 1.9.2.

XI. The arguments of the respondent, as far as relevant to the present decision, were essentially as follows:

The arguments of the appellant regarding sufficiency of disclosure were refuted. In the respondent's view, several questions raised by the appellant concerned clarity issues rather than issues of enablement. The prior art of E1/E2 described the general concept of steam dryer technology. Starting from this prior art, the novel features characterizing the claimed invention were fully disclosed and described in the patent.

More specifically, the distribution of the steam openings in the bottom plate and their shape was

discussed in paragraph [0018] of the patent. Two kinds of openings were defined, namely the "simple" ones, through which steam entered at a right angle with respect to the bottom plate, and others, through which the influx of steam took place at an angle of between 0° and 90°. The latter ones promoted the rotating movement of the material in the process chamber. For relatively thick bottom plates (of e.g. 8 to 9 mm), such as would be used in large apparatuses designed for drying beet pulp, the angled openings could be formed by making oblique holes. In thinner plates, openings were usually punched, an operation which resulted in a protruding metal collar at the plate's inner side. This collar served as an additional guide for the steam. These and other options for forming and shaping the openings were implicitly disclosed and available to the skilled person.

As regards the relatively greater opening area in the vicinity of a supply opening (5) for the particulate material than in the vicinity of a discharge opening (6) for the particulate material, the respondent argued that the last cell (the outlet cell) was not a process cell and hence should not be taken into account for the definition of the relative number of openings.

## XII. Requests

The appellant (opponent) requests that the decision under appeal be set aside and the patent be revoked.

The respondent (patentee) requests that the appeal be dismissed, or in the alternative, that the patent be maintained in amended form based on the claims according to the first auxiliary request, filed before

the opposition division with letter dated 13 July 2011.

## **Reasons for the Decision**

### 1. Admissibility of late-filed documents

Annex 1 (the CFX paper) and E10 were filed by the appellant after the expiry of the period defined in Article 108 EPC. The public availability of E10 was under dispute. E11 was filed three days before the date of oral proceedings. In addition to admitting these late-filed documents into the appeal procedure, the questioning of Mr Jensen as a witness as to the content of E10 was also requested in the oral proceedings by the appellant.

The board decided neither to admit the documents into the procedure, nor to allow the questioning of Mr Jensen as a witness. A detailed reasoning is in either case not required, since the patent in suit cannot be maintained even in the absence of the documents at issue (see the reasoning below).

### 2. Respondent's request to hear the accompanying person, Mr Jensen, as a technical expert

After the discussion on Article 83 EPC and before the deliberation of the board the chairman explicitly asked the parties whether they had any further arguments or comments to make. Both parties declared that there were none. However, immediately before the announcement of the decision by the board, the respondent requested that the accompanying person, Mr Jensen, be given the floor. This was strongly objected to by the appellant.

As this request was neither announced well in advance to give the other party, i.e. the appellant, sufficient time to prepare properly, nor agreed to by the appellant, the request had to be refused in accordance with the decision of the Enlarged Board of Appeal G 4/95 (see the headnote II b), items ii) and iii)).

3. To facilitate argumentation, the following breakdown of features will be used in this decision:

Claim 1, main request:

"1.1.1 Apparatus for the execution of a method for the removal of liquid from particulate material  
1.1.2 by evaporation through the supply of heat  
1.1.3 transferred mainly by superheated vapours or steam of the liquids  
1.1.4 existing in the particulate material,  
1.2 said method taking place in a substantially closed system,  
1.3 wherein the particulate material is supplied continuously to a process chamber  
1.3.1 which is in the form of an annular or partly annular chamber (1)  
1.3.2 lying in a substantially horizontal manner,  
1.3.3 so that the superheated steam is led from below up  
1.3.4 through openings (11) in a bottom (10) in the annular chamber,  
1.3.5 so that the particulate material is brought into movement by the superheated steam, and  
1.3.6 such that a transport of the particulate material occurs through the annular chamber (1),  
1.4 said apparatus consisting of  
1.4.1 a substantially closed container  
1.4.2 which has means for the introduction of

particulate material from which liquid is to be removed,

1.4.3 means for the removal of dried particulate material,

1.4.4 means for the circulation in the container of superheated vapours,

1.4.5 means for the supply of thermal energy to these vapours and

1.4.5 means for the supply of thermal energy to these vapours and

1.4.6 means for the separation of dust particles from these vapours,

characterized in that

1.5 the container contains a process chamber which

1.5.1 lies substantially horizontal and

1.5.2 which is configured as an annular or partly annular chamber (1),

1.6 said chamber having a bottom (10)

1.6.1 through which steam can permeate,

1.7 openings (11) are provided in the bottom (10),

1.8 the bottom has a relatively greater opening area close to the outer side of the annular chamber than close to the inner side of the chamber, and

1.8.1 a relatively greater opening area in the vicinity of a supply opening (5) for the particulate material than in the vicinity of a discharge opening (6) for the particulate material, and

1.9 the openings (11) in the bottom (10) are shaped in such a manner that an influx of steam takes place partly at right-angles to the bottom and

1.9.1 partly at angles to the bottom (10) of between  $0^\circ$  and  $90^\circ$ , and preferably between  $0^\circ$  and  $80^\circ$  and particularly between  $0^\circ$  and  $30^\circ$  in different directions, so that

1.9.2 a rotating movement and possibly a movement in the annular chamber's peripheral direction is promoted

in the particulate product."

Claim 1, auxiliary request:

Said claim contains the following additional features:

"1.10.1 the bottom (10) in the annular chamber (1) has a trough-shaped double-bent or an approximately double-bent shape, through which the superheated steam is introduced in controlled directions, and

1.10.2 a greater flow of superheated steam is fed into the annular chamber in the vicinity of the chamber's outer side than at the chamber's inner side."

4. Objections under Article 100(b) EPC

4.1 To support an argumentation with regard to lack of sufficient disclosure, gaps of information of the attacked invention have to be identified. The question then has to be answered whether the skilled person with its common general knowledge can remedy these defects, or whether the consequences of the information gaps result in an undue number of experiments necessary ("research programme").

4.2 *Concerning claim features 1.9, 1.9.1 and 1.9.2 ("angled" openings (11) in the bottom (10))*

The appellant raised the question of how the angles of the oblique openings were defined or determined and how angles between 0° and 90° could be distinguished from angles between 90° and 180°.

In this regard, at the oral proceedings before the opposition division, after having decided that the requirements of Article 83 EPC were met, the opposition

division entered the following statement in the Minutes (item 2.4):

*"the angle of the patent specification refers to the angle formed by the influx direction through the opening and the tangential plane to the plate and that angles of 90° and different of 90° had to be present".*

The board notes that there is no literal basis in the application documents as originally filed for such a claim construction. According to paragraph [0018] of the granted patent (page 6 of the PCT application), the angle is defined in relation to the bottom plate. Such a bottom plate may or may not be curved (cf. claim 2 and Figure 1). A tangential plane of reference for a curved bottom plate is not mentioned in the description. The board considers that a hypothetical horizontal average plane at the level of the (curved) bottom plate may also be considered as a possible reference plane. Clearly, the respective angles would then be quite different from those defined with respect to a tangential reference plane. The board is of the opinion that this feature is critical for the claimed invention, because the angled openings in the plate are supposed to give rise to the rotating movement of the particulate product (cf. paragraph [0018] of the description). It is therefore essential for the understanding of the claimed invention. The failure to properly define said angles in the patent, as caused by the lack of reference of the openings, therefore constitutes a lack of disclosure of the invention.

- 4.3 Another objection concerned the question of how "angled" or "oblique" openings having the above mentioned effect of guiding the steam were to be made in case of a relatively thin bottom plate (e.g. in the



order of 1 mm thickness). The appellant pointed out that such thin plates would be used in relatively compact drying apparatus for pharmaceutical products, which were also encompassed within the scope of the claims.

The respondent refuted this objection arguing that openings in thin plates were commonly made by punching. This operation resulted in a protruding metal collar at the plate's inner side which served as an additional guide for the steam. These and other options for forming and shaping the openings were implicitly disclosed and available to the skilled person.

- 4.4 The board does not accept the respondent's arguments, for the following reasons. Firstly there is no explicit or implicit disclosure in the patent of how the opening should be made, be it by punching or any other metal working technique. Secondly, even if punching was an obvious choice, the patent fails to suggest that the protruding metal collars at the plate's inner side should remain in place because they served as a steam guide. In the board's view, absent an explicit or implicit teaching in this direction, the skilled person would normally remove any such irregularities stemming from the punching operation. But even if they remained in place, no further details are given on how they would have to be formed to guide the steam in the desired directions. Other obvious drilling techniques, such as laser drilling, would in any way not produce such "steam guiding" protrusions. In addition no teaching is given in the patent under appeal how to arrange the openings with such protruding collars so as to create a rotating movement and possibly a movement in the annular chamber's peripheral direction.

The board is also not aware of any evidence supporting the respondent's argument that the above mentioned gaps of information could be filled by common general technical knowledge. No proof in this respect has been submitted.

Also, as regards the respondent's argument that suitably drilled plates were available on the market, no evidence therefore was put forward nor is there any disclosure in the patent itself in this direction.

- 4.5 In conclusion, the board is convinced that at least those embodiments of the claimed apparatus having angled or "oblique" openings in a relatively thin bottom plate are not disclosed in a manner sufficiently clear and complete to be carried out by the skilled person.

The respondent's main request is therefore not allowable (Article 83 EPC).

- 4.6 As regards the auxiliary request, the respondent did not submit additional arguments. The board considers that the above objections also apply *mutatis mutandis* to the claims of the auxiliary request.

The respondent's auxiliary request is therefore also not allowable (Article 83 EPC).

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated