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**Datasheet for the decision  
of 7 June 2011**

**Case Number:** T 0298/07 - 3.3.05

**Application Number:** 00906808.1

**Publication Number:** 1163048

**IPC:** B01J 8/40

**Language of the proceedings:** EN

**Title of invention:**

Apparatus for air treatment and transportation of a material

**Patentee:**

Larsson, Ruben

**Opponent:**

John Bean Technologies AB

**Headword:**

Conveying freezer/LARSSON

**Relevant legal provisions:**

EPC Art. 52(1), 54(1)(2), 56, 84, 123(2)  
RPBA Art. 12(4), 13(1)

**Keyword:**

"Admissibility of the appeal (yes)"  
"Admissibility of late filed prior art document (yes)"  
"Admissibility of late filed evidence for alleged prior use  
(no)"  
"Admissibility of late filed request (yes)"  
"Allowability of the amendments (yes)"  
"Admissibility of clarity objection (no) - not arising from  
amendments"  
"Novelty (main request): yes"  
"Inventive step (main request): yes - non obvious alternative"

**Decisions cited:**

T 0301/87, T 0534/89, T 0017/91, T 1002/92

**Catchword:**

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Case Number: T 0298/07 - 3.3.05

**DECISION**  
of the Technical Board of Appeal 3.3.05  
of 7 June 2011

**Appellant:** John Bean Technologies AB  
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**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
29 December 2006 concerning maintenance of the  
European patent No. 1163048 in amended form.

**Composition of the Board:**

**Chairman:** G. Rath  
**Members:** B. Czech  
S. Hoffmann

## Summary of Facts and Submissions

- I. The appeal is from the interlocutory decision of the opposition division concerning maintenance of the European Patent No. 1 163 048 in amended form.
- II. In the first instance proceedings, the opponent (now the appellant) relied inter alia on the following prior art:

D2: US 3 865 965 A,

D4: US 4 418 816 A, and

D7: A bundle of documents labelled D7a - D7k filed as evidence for the alleged prior use of a "FloFREEZE 18M" apparatus.

The proprietor (now the respondent) referred inter alia to

AK: A declaration ("affidavit") by Mr Bertil Karlsson dated 14 August 2005

- III. In the contested decision the opposition division found that amended claim 1 according to the main request then on file was not objectionable under Article 123(2) and (3) EPC. Moreover, it held that neither the invoked prior use according to the bundle of documents D7 nor the prior art disclosed in the cited references anticipated the claimed subject-matter, which was also inventive in view of the cited prior art. Document D2 represented the closest prior art. The skilled person would not have considered document D4, relating to

material transport only, in connection with D2. But even assuming he did, the claimed apparatus was not obvious.

IV. Together with its statement of grounds of appeal dated 7 May 2007, the appellant filed document

D8: US 4 951 472 A.

The appellant submitted

- that the amended claim 1 held allowable by the opposition division was objectionable under Article 123(2) and (3) EPC;
- that the amended feature "*partly fluidised*" comprised in claim 1 lacked clarity (Article 84 EPC);
- that the subject-matter of claim 1 lacked novelty in view of the prior use evidenced by documents D7; and
- that the claimed apparatus was obvious in view of certain combinations of documents, inter alia in view of the combination of documents D8 and D4 and the combination of documents D2 and D4.

V. Under cover of its reply, the respondent filed two amended claims 1 as main request and auxiliary request. It submitted that document D8 should not be admitted in view of its late filing. The feature "*partly fluidised*" could not be objected to under Article 84 EPC since it was already mentioned in claim 1 as granted. The amended claims were not objectionable under Article 123(2) and (3) EPC and their subject-matter was novel and inventive.

VI. In a further written submission dated 11 November 2008, the appellant maintained its clarity objection.

Referring also to two sets of kinematic graphs filed as documents D7k1(2) and D7k2(2), it submitted that it had realised that in the apparatus according to the bundle of documents D7 material was transported towards the inlet of the apparatus irrespective of the rotational direction of the motor of the eccentric drive motor, contrary to its own earlier statements.

Moreover, in support of another allegedly novelty-destroying prior use, it filed the evidence

D9: A bundle of documents labelled D9a to D9m, filed as evidence for the alleged prior use of a "FloFREEZE 8 MA" apparatus.

It also submitted some general considerations concerning the asymmetric acceleration patterns as disclosed in the prior art according to document D2 and the prior use D9, both of which were novelty-destroying.

- VII. In its written reply, the respondent rebutted the arguments of the appellant concerning the alleged similarity of the movement disclosed in D2.
- VIII. In response to the summons to oral proceedings, the respondent filed four amended claims 1 as new main and auxiliary requests and a statement of Mr Ruben Larsson also including calculations and setting out why the apparatuses according to D7 and D9 did "not work" in the same manner as the claimed apparatus and why said apparatuses were thus not novelty-destroying.
- IX. In a communication issued in preparation for the oral proceedings, the board inter alia questioned the

compliance of the amendments with the requirements of Article 123(2) EPC and the meaning of the terms used in claim 1. It also questioned the admissibility of the evidence D9 in view of its late filing, the lack of legibility of some documents and because it was not readily apparent or derivable from the evidence filed in which direction material transport actually occurred in the apparatus sold and at which speeds/accelerations/frequency the trough bottom was moved in operation. The board noted that lack of novelty was no longer invoked in view of documents D7 and indicated that it was inclined to consider document D8 in view of its high relevance.

- X. Under cover of its response dated 24 May 2011, the respondent submitted four complete sets of amended claims as new main and auxiliary requests. It rebutted all pending objections and filed a document that had been referred to in one of its earlier submissions, namely

D10: "Karlebo" Handbook, Issue 11, Kristiansstad 1971, pages 62 and 63.

It still considered that the late filed document D8 should be disregarded in view of its lack of relevance. Referring to case law, it also considered the late allegation of prior use D9 as abusive.

- XI. The appellant also reacted to the board's communication in a letter dated 26 May 2011 comprising further technical explanations regarding the relevance of the alleged prior use D9.

XIII. Oral proceedings were held on 7 June 2011. The debate was first focused on objections concerning the allowability of the amendments made in claim 1 according to the main request filed under cover of the letter dated 24 May 2011.

Under Article 123(2) EPC, the respondent questioned whether all the amendments to claim 1 were supported by the application as filed, inter alia the deletion of the words "at least" from the expression "at least partly fluidized" the introduction of the feature quantifying the cycle frequency. Moreover, the respondent held that claim 1 lacked clarity having regard to the features "**partly fluidized**" and "transportation ... **solely** due to ...".

The respondent reacted by presenting another amended set of claims, together with an amended page 5 of the application as filed, as new main request replacing the one previously on file.

Claim 1 according to the main request filed during the oral proceedings reads as follows:

*"1. Refrigeration or freezing apparatus for refrigeration or freezing treatment and transportation of a material (7), consisting of piece goods or granules of solid materials, which apparatus comprises a perforated trough bottom (5) for the material, and means (3) for creating an upwardly directed air or gas flow through said trough bottom (5) and said material (7) said air or gas flow being disposed to refrigerate or freeze the material, said trough bottom (5) being disposed to move backwards and forwards, characterized*



*in that said means (3) are arranged to generate a partly fluidized bed of the material (7), and in that said trough bottom (5) is disposed to move reciprocatingly backwards and forwards in a way which is asymmetrical from the acceleration viewpoint, the trough bottom, on one hand, from a starting position and in the conveying direction of the material (7), being caused to move with an acceleration which is not sufficient to overcome the static friction force between the material conveyed and the trough bottom, and, on the other hand, in the direction opposite to the conveying direction of the material, being caused to accelerate sufficiently quickly for the static friction force between the material conveyed and the trough bottom to be overcome, so that transportation of the material (7) on the trough bottom (5) is disposed to take place solely due to the movement of the trough bottom at different accelerations, which is repeated continuously at 0.1 - 60 cycles per minute, opposite to and in the conveying direction, respectively, and due to the fluidizing effect."*

XIII. The arguments of the parties concerning the admissibility of the appeal, the admissibility of document D8 and the bundle of documents D9, and their further arguments concerning the main request filed at the oral proceedings can be summarised as follows:

The **appellant** held that its appeal was admissible since in its statement of grounds of appeal, it had clearly set out why it considered the contested decision to be wrong.

Document D8 was to be admitted to the proceedings in view of its high relevance and considering that the present amended claim 1 related to an apparatus comprising means for generating a "*partly fluidized bed*".

The apparatus according to claim 1 lacked novelty over D2 which disclosed a partially fluidised bed wherein the material was conveyed towards the outlet end by virtue of an asymmetric, horizontal vibrational movement of the trough bottom generated by an eccentric drive.

Furthermore, the apparatus according to claim 1 was not inventive in view of a combination of the disclosure of document D8 or of document D2, taken as the closest prior art, with the disclosure of document D4. The disclosure of both documents D2 and D8 was not limited to the specific vibrating means exemplified therein. The skilled person looking for an alternative way of conveying the material would consider the teaching of document D4, belonging to the field of transportation of solid materials. Since the advantages of conveying particulate material on a conveying surface subjected to an asymmetric, reciprocating movement without vertical component were expressly mentioned in D4, the skilled person would consider applying the teaching of document D4 to the apparatuses disclosed in D8 or D2.

The bundle of documents D9 had to be admitted to the proceedings despite its late filing in view of the very high relevance of the alleged prior use invoked.

The **respondent** held that the appeal of the opponent was inadmissible since the statement of grounds did not address the reasoning of the opposition division concerning the relevance of documents D2 and D1 with regard to the issue of inventive step.

D8 was not sufficiently relevant to be admitted to the proceedings despite its late filing. More particularly, document D8 was not novelty-destroying since it disclosed oscillations at higher frequencies of at least 200 cycles per minute. Moreover, D8 did not disclose an asymmetric movement of the bottom for transporting the material in the conveying direction. Document D8 taught the use of a corrugated trough bottom which was not suitable for transporting material by virtue of an asymmetric, reciprocating forward and backward as described in document D4. In the apparatus according to D2, transport of the material was achieved by virtue of a directed air flow.

Document D2 neither disclosed a partly fluidised bed nor a movement of the trough bottom causing a transport effect based on overcoming static friction in the backward movement only. The movement according to D2 was symmetric since caused by an eccentric drive and the material was "thrown" forward by virtue of the vertical component of the forward and upward movement of the trough bottom. In the previously known apparatuses as disclosed in D2, D7 and D8, the bottom was vibrated in order to break up heavier agglomerates of particles and generated an oscillating airflow through the perforations which also contributed to loosen clogged portions of the bed, to achieve a more uniform fluidisation and spreading of the material

across the bed. D2 referred to "other vibrating devices" but not to other transport devices. The skilled person would not look for a different solution in document D4 since the reciprocating bottom described therein would not come into contact with the fully fluidised bed.

Referring to case law of the boards of appeal, the respondent felt that the late filing of the bundle of evidence D9 constituted an abuse. Moreover, the apparatus according to D9 was not more relevant than the one according to D7 and did not provide a transportation effect of the particles forming a partly fluidised bed as claimed.

- XIV. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent requested that the decision under appeal be set aside and that a patent be maintained on the basis of amended description page 5 and of claims 1 to 9 according to the main request filed during the oral proceedings or, alternatively, according to one of the auxiliary requests 1 to 3 filed under cover of its letter dated 24 May 2011.

## **Reasons for the Decision**

1. Admissibility of the opponent's appeal
  - 1.1 The respondent held that the appeal was not admissible since it was based on new evidence (document D8) and because the statement of grounds did not set out why

the opposition division erred in finding that the claimed subject-matter was inventive in view of documents D1 or D2, or a combination of the latter.

1.2 In its statement of grounds of appeal, the appellant set out why it considered that the positive findings of the opposition division regarding the requirements of Articles 123(2)(3) EPC, novelty and inventive step were erroneous. Moreover, with regard to inventive step, the statement of grounds contains specific arguments as to - inter alia - why a combination of documents D2 and D4 renders the claimed subject-matter obvious, contrary to the finding of the opposition division. This argumentation is based on evidence cited in the opposition proceedings. It is clear and concise and can thus immediately be understood. This finding is not affected by the fact that in its statement of grounds the appellant additionally cited new evidence and did not deal with the issue of obviousness in view of documents D1 or D2 taken alone or in combination.

1.3 The board is thus satisfied that the appellant's statement of grounds appeal sets out the legal and factual reasons for which it requested that the decision under appeal be set aside. The appeal is, therefore, admissible (Article 108 and Rule 99(2) EPC).

2. Admissibility of late filed evidence

2.1 The respondent considered that document D8 should be disregarded since it was filed a long time after the nine month opposition period and since it was not pertinent having regard to novelty.

2.2 Document D8, a US patent publication comprising only five pages of text and two figures, was filed under cover of the appellant's statement of grounds of appeal. It can be considered as a reaction to the fact that the opposition division did not accept the opponent's view that documents D1 and D2 described apparatuses wherein the material to be refrigerated or frozen was treated in form of a "*partly fluidised*" bed (see the contested decision, page 6, second paragraph, of the "Grounds for the decision (Annex)". Moreover, the *prima facie* relevance of document D8 is evident considering that it can even be regarded as representing the closest prior art in the assessment of inventive step (see point 7.2 below). The board also notes that the respondent had sufficient time to understand and react to the appellant's objection based on document D8.

2.2.1 Under these circumstances, the board decided to admit document D8 to the appeal proceedings in accordance with Rule 12(4) RPBA.

2.3 Further alleged prior use - bundle of documents D9

2.3.1 Pursuant to Article 114(2) EPC and Rule 13(1) RPBA, new evidence submitted by an appellant after the filing of its statement of grounds of appeal may be disregarded or admitted to the proceedings at the board's discretion. In deciding on the admissibility of the evidence subsumed under the designation D9, the board considered the reasons for its late filing, the complexity of the allegation of prior use and the *prima facie* relevance of the evidence.

### 2.3.2 Late filing of D9

The bundle of documents D9 was filed about eighteen months after the appellant filed its statement of grounds of appeal. The appellant submitted that upon reconsideration of the evidence with "outside experts", it had realised that the "FLoFREEZE 18M" apparatus referred to in the bundle of documents D7, irrespective of the rotational direction of the motor, conveyed the material towards the inlet of the apparatus, and not towards its outlet as alleged in its earlier submissions. In the accompanying letter, the appellant moreover alleged that the apparatus according to documents D9 was only one of numerous previously sold FLoFREEZE apparatuses comprising an eccentric drive and an asymmetrical acceleration pattern leading to transport of the particulate goods in the direction towards the outlet.

The board notes that FloFREEZE apparatuses as referred to in D7 and D9 have been commercialised by several "Frigoscandia" companies. The board thus concludes that the opponent (Frigoscandia Equipment AB) had the possibility of filing the evidence during the opposition procedure, and the appellant did not assert the contrary. The reasons for the late filing of D9 thus pertain only to the handling of the case by the opponent/appellant, in particular to an erroneous assessment of the total evidence (including D7 and D9) at its disposal.

The board does not consider the behaviour of the opponent/appellant as evidently abusive as in the cases underlying the decisions cited by the respondent

(T 0017/91 of 26 August 1992, reasons 5; and T 0534/89, reason 2.7). However, an erroneous assessment of evidence at its disposal does not discharge an opponent/appellant from filing the most relevant evidence at its disposal as early as possible.

### 2.3.3 Prima facie relevance of D9

- i) The "affidavits" of the Frigoscandia employees Mr Jonasson (D7j: point 7 - 9) and Mr Månsson (D7k: points 9 and 10) concerning the apparatus according to D7 are in contradiction with the later statement of the appellant concerning the direction of the transport allegedly achieved by the reciprocating bottom plate.

For the board, the fact that the opponent filed documents D7 and not documents D9 in the first place is a strong indication that it was not itself aware of a conveying function of the reciprocating bottom plate in any of the "FLoWFREEZE" apparatuses referred to. This view is corroborated by the "affidavit" of Mr Karlsson (see the last three paragraphs), a former Frigoscandia employee well acquainted with FLoWFREEZE apparatuses, who never heard or became aware that the movable tray bottom of these apparatuses was intended to transport the products to be chilled in a given direction (see document AK, the last three paragraphs).

- ii) In the documentation D9 there is no indication as to the goods to be treated by the allegedly sold apparatus "FLoWFREEZE 8 MA". Document D7g of 1973,



referred to by the appellant in this respect, does not even mention "FLoFREEZE 8 **MA**" apparatuses (see the column labels M, MM, S and W). Moreover, the documentation does not address the question of whether the allegedly sold apparatus comprises the cooling air fans designed to provide a "partly" or fully fluidised bed regime. The mere reference, by the appellant, to the diameters and pattern of the holes in the trough bottom is not as such sufficient to immediately establish that there will always be a substantial contact between the treated goods and the bottom plate, as alleged by the appellant.

- iii) Moreover, the appellant has not clearly set out in writing how the mechanism described in drawing D9h was supposed to lead to a bottom plate movement comparable to the one according to claim 1. It referred to the drawings D9d to D9h and, based on indications given on these drawings, provided an acceleration curve D9m calculated by external, unidentified experts. Little indications were submitted concerning the way in which the curve was calculated starting from the specific geometry and dimensions of the apparatus shown in the drawings.
- iv) According to the appellant, the motor of the eccentric drive turns at 110 rpm, the movement of the bottom plate thus having a cycle frequency of 110 per minute. This value is substantially higher than the one required by claim 1. Moreover, as can be gathered from the curves D9k and D9m provided by the appellant, very high acceleration values

(3.8 and 7.8 m/s<sup>2</sup>) are reached during both the forward and the backward movement, these values being much higher than the friction forces referred to in the patent in suit (paragraphs [0039] to [0041]). It is thus *prima facie* questionable whether the forward movement in the apparatus according to D9 is such that the static friction is not overcome, as required by claim 1.

In view of the issues addressed above regarding "what" has allegedly been sold, in particular concerning the presence or absence of some of the features of claim 1 ("*partial fluidisation*"; interaction of bed particles with moving bottom plate without the overcoming of friction in the conveying direction) in the apparatus according to D9 cannot be readily gathered from the documents filed, even taking into account the accompanying comments of the appellant. For the board the evidence D9 is thus not *prima facie* of a very high relevance, or of a higher relevance than document D8 retained as closest prior art by the board (see points 7.2 to 7.3.2 below).

#### 2.3.4 Completeness and coherence of the evidence

Due to the poor legibility of the microfilm printouts submitted, the legibility of several items referred to by the appellant is very poor. Inter alia, the last two digits of the drawing number associated with position 1 ("Agitatormotor") cannot be determined with certainty. This casts doubts on whether document D9i (drawing number 4-277**92-7**) actually refers to the motor built into the allegedly sold apparatus.

Moreover, document D9i does not mention a specific gear ratio. Only document D9j, which relates to a "spare part" that was obtainable in 2008, mentions the gear ratio of 12.76, which ratio was used as an essential element in the calculation of the acceleration curve D9m. However, for the board, the reference in D9j to the drawing number "4-27792-7" does not necessarily mean that the motor of the "FLoFREEZE MA 8" apparatus sold in 1991 (see D9a) necessarily also had a gear ratio of 12.76, like the motor available as spare part under article number "027792A".

For the board, these uncertainties in the chain of evidence further weaken its prima facie relevance.

- 2.3.5 At the oral proceedings, the appellant explained that the poor legibility of the evidence was due to the poor quality of the microfilm originals, that despite the late filing of D9 there had been sufficient time for analysing the evidence submitted and that D9 "only" differed from D7 by virtue of the mechanism for moving the bottom plate. The appellant also attempted to fill some of the above-mentioned loopholes and to provide additional technical information concerning the functioning of the apparatus allegedly sold.

These attempts were rejected since the board considers that oral proceedings are not foreseen to permit an appealing opponent to further substantiate and complement its previous submissions concerning a complex prior use only invoked at a late stage of the appeal proceedings.

2.3.6 In the exercise of the discretion conferred to the board by Article 114(2) EPC and pursuant to Rules 12(4) and 13(1) RPBA the board, considering the specific circumstances of the case including the complexity of the late filed allegation of prior use and the fact that the respondent objected to the admittance of the evidence subsumed under the designation D9, and in accordance with established case law (see e.g. decision T 1002/92, OJ 1995, 605, reasons 3.4) decided not to admit said evidence to the proceedings.

*The respondent's main request*

3. Admissibility of the main request

3.1 The filing of the amended claims and description page 5 according to the instant main request at the oral proceedings was not objected to by the appellant and can be considered as an attempt - of no particular complexity - to overcome the objections under Article 123(2) EPC raised by the board and the appellant against claim 1 according to the main request previously on file.

3.2 Therefore, the board admitted this request to the proceedings despite its late filing in accordance with Rule 13(1)(3) RPBA.

4. Allowability of the amendments

4.1 Article 123(2) EPC

4.1.1 Claim 1 according to the respondent's main request finds a basis in the following part of the application

as filed (published as WO 00/45949 A1):

- claim 1;
- claim 7 and paragraph bridging pages 4 and 5 (transportation solely due to bottom movement and fluidizing effect);
- page 9, text lines 4 and 5 (number of cycles per minute);
- claim 10 (refrigeration or freezing by air or gas flow);
- page 4, third paragraph, and page 7, text lines 10 to 13, (conveying principle and movement of bottom); and
- paragraph bridging pages 3 and 4, page 6, lines 4 and 5 of the second paragraph, lines 5 and 6 of the third paragraph (means for creating an upwardly directed air or gas flow ... arranged to generate a partly fluidised bed).

4.1.2 The appellant objected to the deletion of the expression "at least" previously referring to the "*partly fluidised bed*" mentioned in claim 1.

However, in the board's judgment, the deletion of "at least" amounts to narrowing down the ambit of claim 1. By virtue of this amendment, apparatuses having means for generating a fully fluidised bed are no longer encompassed by claim 1.

4.1.3 Moreover, the appellant held that the feature "*0.1 - 60 cycles per minute*" was only disclosed in the application as filed in close connection with either

- i) a regime comprising symmetric acceleration cycles (see claim 8) or

ii) further conditions (paragraph bridging pages 7 and 8) imposed on the relative accelerations between the material and the trough bottom (see description of figures 2A to 2C from page 7, third paragraph, to page 9, second paragraph).

However, it is expressly indicated on page 9, third paragraph, that additional cycles with symmetrical accelerations in both directions may be desirable in certain cases. The skilled person would thus understand from the description that the frequency of the asymmetric, material conveying cycles is not inextricably linked to the implementation of symmetric, non conveying cycles. Hence, in the board's judgement, the isolation of the feature "*0.1 to 60 cycles per minute*" from claim 8 of the application as filed and its incorporation into claim 1 does not generate subject-matter extending beyond the content of the application as filed.

4.1.4 The editorial amendments to the remaining depending claims do not add subject-matter either.

4.1.5 The amended claims according to the main request thus meet the requirements of Article 123(2) EPC.

4.2 Article 123(3) EPC

4.2.1 In instant claim 1, the wording previously (see claim 1 as granted) defining the movement of the trough bottom and referring to the two relative accelerations ( $a_1$ ) and ( $a_2$ ) is replaced by features relating the respective accelerations in the two directions to the static

friction force between the trough bottom and the material conveyed.

4.2.2 For the board, by virtue of the reference to the friction force between the trough bottom and the material, the amendment in question leads to a narrower ambit of claim 1 with respect to the definition of the movement of the trough bottom. Compared to claim 1 as granted, there is thus no extension of the protection conferred by claim 1. Since the appellant did not raise/uphold any objection under Article 123(3) EPC against the instant claim 1, a more detailed reasoning need not be given in this respect.

4.2.3 In the board's judgement, the amendments to the claims are not thus objectionable under Article 123(3) EPC.

5. Clarity - Article 84 EPC

5.1 Lack of clarity is not a ground for opposition pursuant to Article 100 EPC. In accordance with the established case law of the Boards of Appeal of the EPO (see e.g. decision T 301/87, OJ 1990, 335; point 3.8 of the reasons), clarity objections under Article 84 EPC may be raised against a post-grant amendment provided the lack of clarity arises from said amendment.

5.2 The appellant objected to the clarity of the feature "*partly fluidised bed*" as comprised in present claim 1, and more particularly to the clarity of the qualifying term "*partly*". In its view, the deletion of the preceding expression "*at least*" was an amendment that made the claim objectionable under Article 84 EPC.

5.2.1 In the board's judgement, the objected feature "*partly fluidized bed*" was, however, already present in claim 1 of the granted patent as the first one of two alternatives encompassed, for the skilled person, by the expression "*at least partly fluidised bed*". The second alternative encompassed by the later wording is a bed of particles which is fully or "*truly*" fluidised (see e.g. section [0003] of the patent in suit), as opposed to being only "*partly fluidised*". This second alternative was removed from claim 1 by virtue of the deletion of "*at least*". Consequently, the lack of clarity of the feature "*partly fluidised bed*" invoked by the appellant is not arising from the amendment in question.

5.2.2 Consequently, the meaning of the allegedly unclear relative expression "*partly fluidized bed*" has to be construed by the board when comparing the claimed subject-matter with the prior art in the assessment of novelty and inventive step. It is however clear from the wording of claim 1 taken by itself that the apparatus does not, upon operation, generate a fully fluidised bed, but generates a fluidised bed wherein particles still contact the surface of the trough bottom such that a significant contribution to the forward transport of the bed of particles is achieved. Moreover, this understanding of claim 1 is not in contradiction with the description of the patent, including paragraph [0013] referred to by the appellant, irrespective of the use of different terms (such as "*semi-fluidised*" in column 1, line 45, and in column 5, line 14) used to describe the same state of the particle bed.



- 5.3 At the oral proceedings, the respondent also argued that the use of the term "*solely*" in present claim 1 was in contradiction with a statement in the description (application as filed: page 5, last sentence of the second paragraph; patent as granted: last sentence of paragraph [0018]), which expressly mentioned the possibility of additionally foreseeing other means for moving the material along the trough bottom. In view of this contradiction, claim 1 was unclear having regard to the term "*solely*".
- 5.3.1 The board observes that the features inserted into present claim 1 according to which "*transportation of the material (7) on the trough bottom (5) is disposed to take place **solely** due to the movement of the trough bottom ... and due to the fluidizing effect*" (emphasis added by the board) were already almost literally present in claim 7. The incorporation of these features into claim 1 can thus not, as such, give rise to an admissible clarity objection.
- 5.3.2 Moreover, the amended description page 5 filed at the oral proceedings as part of the present main request no longer comprises the sentence mentioned under point 5.3 above. Hence, there is no contradiction objectionable under Article 84 EPC between claim 1 and the description with respect to the term "*solely*".
- 5.4 The board is thus satisfied that the claims as amended according to the present request are not objectionable under Article 84 EPC.

6. Novelty

6.1 The sole novelty objection raised by the appellant having regard to the claims of the new main request is based on document D2.

6.1.1 Document D2 (column 1, lines 6 to 9 and 20 to 24; column 2; lines 10 to 23) discloses an apparatus for rapidly cooling (i.e. refrigerating) heated food products, such as cut vegetables, preferably down to room temperature.

6.1.2 According to method claim 1 of D2, the food product is continuously fed onto one end of a perforated support. Cooling air is directed upwards through said perforated support at a velocity sufficient to "**suspend** said food **product above** said perforated **support**" as a "**fluidized bed**". The support is vibrated in a "**directional oscillational motion to** continuously **move** the **food product along** said perforated **support**" (emphasis added). According to the description of the specific cooling apparatus shown in the figures of D2, the vegetables to be treated are fed onto one end of a trough comprising an elongated perforated bottom plate 35 which is arranged horizontally in a housing 17. The cooled vegetables are withdrawn at the other end 40 of the trough over a weir 50.

6.1.3 The apparatus described in D2 comprises an air supply system (see column 3, last paragraph) provided for passing cooling air vertically through the perforated bottom plate at sufficient velocity to "**float** or **suspend** the food product in a **fluidized bed above** the

**base plate**" (emphasis added). The fluidized bed is also referred to as "**floating**" in column 4, lines 54 to 55.

Considering the wording ("float", "suspend", "above") used in both claim 1 and the description passages of D2 quoted above, the board considers that the air supply system specifically described in D2 generates what the skilled person would describe as a fully or truly fluidised bed, i.e. wherein no significant amount of food particles is in contact with the bottom plate, and not as a "*partly fluidized bed*" in the sense of present claim 1. The air supply system of D2 must thus inherently be different from and in particular more powerful than a system required for generating a less, i.e. partly fluidised bed, as in the apparatus according to present claim 1.

- 6.1.4 According to D2, the purpose or effect of the longitudinal vibration or oscillation of the housing and the perforated base plate is "to convey the food product" (column 2, lines 54 to 56), "to continuously move the food product along said perforated support" (claim 1) and "to cause the fluidized bed to evenly flow from the inlet to the outlet end of the apparatus (column 4, lines 43 to 45).

However, D2 does not specifically address physical interactions between the food particles and the bottom of the trough, let alone a net transport of a significant amount of particles resting on the perforated bottom in the direction of the outlet of the apparatus.

For the board, it is plausible that the vibrational movement of the perforated bottom may only serve the purpose of evenly distributing the mass of food particles over the width of the perforated support, to achieve a more uniform fluidisation and/or to break up heavier agglomerates of food particles which tend to sink to the perforated bottom. Thereby, the vibrational movement is said to make the product "flow" or "move" or being "conveyed" from the feed end to and over the weir 50, without, however, actively conveying the particles by virtue of frictional forces.

6.1.5 Even assuming, but purely for the sake of argument, that, in view of the wording mentioned under points 6.1.1 and 6.1.2 above, D2 described a "*partly fluidised bed*" in the sense of present claim 1, the claimed apparatus can also be distinguished from the apparatus disclosed in document D2 in terms of the means for moving the perforated bottom plate for the following reasons.

i) According to the description of the apparatus shown in the figures of D2 (see column 2, lines 35 to 53), the housing 17 comprising the perforated bottom plate is movably mounted "for reciprocating vibrational motion in the longitudinal direction" and "the housing 17 is pivotally supported on the frame 15 by pivot links 19 and 20 in a parallelogram arrangement to maintain the housing substantially horizontal during its movement". An eccentric drive 22 is connected to the housing via crank arm 29 for pivoting the housing upward and forward in a forward stroke and backward and downward in a return stroke, creating a longitudinal

directional vibrational movement of the housing at a frequency of between 60 and 400 cycles per minute. In column 2, lines 54 to 57, it is stated that "other types of oscillating or vibrating devices can be used to achieve the desired directional vibration to convey the food product" without, however, specifying any further details of these devices.

ii) Although the movement of the horizontal trough as described in D2 can be considered as a reciprocating back and forth movement, its path is not linear (x-direction in the theoretical considerations submitted by the appellant) but inherently arc-shaped, due to the pivot links 19 and 20. The movement of each point on the trough surface thus has a vertical and a horizontal component. Assuming that in the fluidised bed according to D2 a significant amount of particles were to come to rest on and thus to interact with the bottom plate, it is perfectly possible that these particles would be transported in the conveying direction by being made to "jump" forward by the upward and forward movement of the bottom, whereas they loose contact with the bottom plate during its downward and backward movement. Such a transport mechanism, wherein particles are made to lift off from the bottom plate in a direction having a vertical component is to be distinguished from the mechanism according to claim 1, according to which the particles move relatively to the bottom plate by overcoming static friction, i.e. moving along the surface of the bottom plate while staying in touch with the latter.

Moreover, the board observes that the drawings in D2 are merely schematical in nature and that the absolute

values and the degree of asymmetry of the back and forth accelerations of the bottom plate in the horizontal direction will depend on the geometry and dimensioning of the eccentric drive. No specific values for the backward and forward accelerations or their suitability for particle transport by a mechanism as claimed can be thus be derived from D2.

6.2 Therefore, in the board's judgement, there is no direct and unambiguous disclosure in D2 of an apparatus comprising means for generating a "*partly fluidised bed*" mode or of means for moving the bed in the conveying direction by virtue of a net transport of particles based granules due to the specific asymmetrical acceleration pattern applied according to present claim 1.

6.3 The board is also satisfied that none of the other prior art documents admitted to the opposition and/or appeal proceedings constitute a disclosure of an apparatus with all the features of present claim 1.

As to the prior use allegedly proven by the bundle of documents D7, the board has no reason to doubt the assertion of the appellant that the specific apparatus referred to therein transports particles contacting the bottom in a direction opposite to the conveying direction (see point VI above).

6.4 The subject-matter of claims 1 and, consequently, of claims 2 to 8 dependent thereon, is thus novel (Articles 52(1) and 54(1)(2) EPC).

7. Inventive step

7.1 The invention concerns a refrigeration or freezing apparatus.

7.2 The board concurs with the appellant in that document D8 can be considered to represent the closest prior art.

7.3 Document D8 (see claim 13, column 3, lines 11 to 22; Figure 1) discloses an apparatus for freezing particulate food granules, such as cheese, comprising "a freezing chamber having a feed inlet, an outlet and a perforated bottom plate extending from said feed inlet to said outlet, means for oscillating said perforated plate, a source of chilled gas, means for moving said chilled gas through said perforated plate, means for delivering particulate granules of said food product to said feed inlet to provide a bed of said particulate granules adjacent said perforated bottom plate, ... means for withdrawing said chilled gas from above said bed of particulate granules in said freezing chamber ..., whereby said chilled **gas levitates** and freezes said particulate granules in said bed, said **bed** of particulate granules is **moved** toward said outlet **by oscillating movement** of said perforated plate ..."  
(emphasis added by the board).

7.3.1 Moreover, it is expressly indicated in D8 that said particulate granules are only "partially" levitated or lifted (column 5, lines 24 to 28) by the force of the chilled gas flowing through the perforated bottom plate 18 and that a "fluidised bed" in the conventional sense is not developed (column 4, lines 53 to 57).

The board concludes that in the apparatus disclosed in D8, the food granules are moved from the inlet end of the bottom plate to its outlet end by means of the oscillating movement of the bottom plate in a form that has to be considered as "*a partly fluidised bed*" in the sense of present claim 1.

- 7.3.2 The oscillating movement of the bottom plate which contributes, together with the flow of chilled gas (see claim 13), to moving the particles from the inlet end to the outlet end of the housing, is not described in much detail in document D8. It is however expressly indicated in D8 that the apparatus comprises a vibrator 24 which imparts a vibratory motion to the bottom plate "that tends to **lift** and move or progress material in the desired direction" (column 4, lines 39 to 47; emphasis added by the board). Generally speaking, the preferred vibration frequency is in the range of from 450 to 800 cycles per minute (column 5, lines 61 to 64), the lowest value mentioned being 200 cycles per minutes (column 6, "Test 3").
- 7.4 Compared to the apparatus described in document D8, no particular advantage or improvement attributable to the apparatus as claimed was identified by the respondent at the oral proceedings.
- 7.5 With document D8 representing the closest prior art, the technical problem can thus be seen in providing a further apparatus for cooling or freezing and transporting piece goods or granules.
- 7.6 As a solution to said technical problem, the patent now proposes the refrigeration or freezing apparatus



according to the present amended claim 1 which is characterised in that it comprises means for moving the particles of the partly fluidised bed along the trough bottom in a specific manner, more particularly *"in that said trough bottom (5) is disposed to move reciprocatingly backwards and forwards in a way which is asymmetrical from the acceleration viewpoint, the trough bottom, on one hand, from a starting position and in the conveying direction of the material (7), being caused to move with an acceleration which is not sufficient to overcome the static friction force between the material conveyed and the trough bottom, and, on the other hand, in the direction opposite to the conveying direction of the material, being caused to accelerate sufficiently quickly for the static friction force between the material conveyed and the trough bottom to be overcome, so that transportation of the material (7) on the trough bottom (5) is disposed to take place solely due to the movement of the trough bottom at different accelerations, which is repeated continuously at 0.1 – 60 cycles per minute, opposite to and in the conveying direction, respectively, and due to the fluidizing effect."*

- 7.7 The stated technical problem is evidently and undisputedly solved by the claimed apparatus.
- 7.8 It remains to be decided whether starting from the closest prior art as disclosed in document D8, the claimed solution to the technical problem was obvious in view of the prior art.
- 7.9 Document D8 taken alone does not suggest foreseeing a vibrator imparting to the bottom plate a reciprocating

asymmetric acceleration pattern as required by present claim 1, let alone at 0.1 to 60 cycles per minute.

7.10 The appellant relied on a combination of document D8 with document D4.

7.10.1 Document D4 (see column 1, lines 4 to 13, lines 21 to 23 and lines 31 to 33) relates to an "inertial conveyor", particularly suited for use as a grate stoker in furnaces for the combustion of solid fuels, including caking coals. The transporting surface of the conveyor is reciprocatingly accelerated in the conveying direction and in the opposite direction, e.g. using a drive cam or eccentric (column 3, line 46), with a net transport of material in the conveying direction due to the loss of adhesion between the particles and the reciprocating transport surface (see e.g. column 3, lines 19 to 41).

7.10.2 The focus in document D4 is on conveying solid materials. The only specific application mentioned is the use of the conveyor as a grate stoker for solid fuel furnaces.

Hence, in the board's judgement, the skilled person tackling the stated technical problem would not even consider document D4, since the latter is not concerned with cooling or freezing apparatuses, which require particular design considerations, let alone with apparatuses wherein the cooling is achieved by virtue of an upward gas flow strong enough to levitate the particles conveyed, thereby creating a partially fluidised bed.

7.10.3 Moreover, the respective transport concepts described in documents D8 and D4 are not technically compatible for the following reason. On the one hand, considering that according to D8 the oscillatory movement imparted to the perforated bottom tends to "lift" the granules (D8: column 4, lines 46), the skilled person would assume that the vibratory movement described has a vertical component. On the other hand, D4 clearly refers to the absence of any vertical component in the movement of the conveyor surface (D4: column 3, lines 39 to 41). Moreover, the preferred embodiment disclosed in D8 (Figure 2; column 4, lines 29 to 31) comprises a corrugated bottom plate wherein the perforations are oriented such that it is the directed gas flow (column 3, line 62) that contributes to actively moving the granules in the outlet direction. D8 thus orients the skilled person towards other solutions. However, such a corrugated bottom plate is even less compatible with a conveying function in the absence of a vertical component of its movement.

7.10.4 The board concludes that in his quest for a solution to the stated technical problem, the person skilled in the art not knowing the present invention is not induced by document D4 to consider a modification of the apparatus according to D8 leading to an apparatus according to present claim 1.

7.11 According to the appellant's second line of argument, the claimed apparatus was obvious in view of a combination of document D2, taken as closest prior art, and D4.

7.11.1 However, in the board's judgement, D2 does not represent the closest prior art since it relates to an apparatus wherein a fully fluidised, and not a partially fluidised bed, is generated (see points 6.1.3 and 6.1.4 above).

7.11.2 However, even assuming for the sake of argument that D2 could be considered as the most suitable starting point, the skilled person looking for the solution to the technical problem of finding a further fluidised bed cooling/freezing conveyor for piece goods or granules would not be induced by D4 to apply the inertial transport system described therein to an apparatus according to D2. Without considerations based on hindsight, the skilled person would not envisage departing from the teaching of D2 requiring a fully fluidised cooling/freezing bed in order to accommodate a conveying system as described in D4.

7.12 The board is also satisfied that none of the other prior art admitted to the proceedings contains further relevant information which could render the claimed subject-matter obvious.

7.13 The subject-matter of claim 1 and, consequently, of dependent claims 2 to 8, thus involves an inventive step (Articles 52(1) and 56 EPC).

8. The respondent's main request being allowable, its three auxiliary requests need not be given further consideration in the present decision.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
  
2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of claims 1 to 9 according to the main request filed during the oral proceedings and a description/drawings to be adapted as far as necessary and with the order to delete the last sentence of the description paragraph [0018] of the patent in suit.

The Registrar

The Chairman

C. Vodz

G. Rath