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D E C I S I O N
of 20 October 1998

Case Number: T 0079/96 - 3.3.5

Application Number: 91904361.2

Publication Number: 0515478

IPC: B01J 2/04

Language of the proceedings: EN

Title of invention:
Process and apparatus for producing a granulate by spray drying

Patentee:
APV Anhydro A/S

Opponent:
Niro A/S

Headword:
Granulation by spray drying/APV ANHYDRO

Relevant legal provisions:
EPC Art. 54(1), 56

Keyword:
"Main request: novelty - no"
"First and second auxiliary request: inventive step - no, obvious improvement"

Decisions cited:
-

Catchword:
-

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Case Number: T 0079/96 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 20 October 1998

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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 11 December 1995 rejecting the opposition filed against European patent No. 0 515 478 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: R. K. Spangenberg
Members: G. J. Wassenaar

Summary of Facts and Submissions

I. The appeal is from the decision of the Opposition Division to reject the opposition and maintaining European patent No. 0 515 478 with claims 1 to 16 as granted. Claim 1 of the patent in suit reads as follows:

"A process for producing a substantially dust-free granulate with a desired mean particle size and a narrow particle size distribution by spray drying a solution or suspension of the material to be granulated comprising the steps of atomizing the solution or suspension to droplets in an atomizing zone in the upper part of a spray drying and granulation zone in a drying chamber; contacting said atomized solution or suspension with a central downward stream of drying gas and a stream of solid feed particles introduced or blown directly into the upper part of the spray drying and granulation zone to obtain a granulate by enlargement of the size of said particles by collision between droplets and feed particles and between moist feed particles; adjusting the amount of introduced solution or suspension to the amount and drying capacity of introduced drying gas to ensure a desired moisture content of the particles or granulates leaving the spray drying and granulation zone and evaporation of non colliding droplets to formation of fine particles; withdrawing a stream of spent drying gas from the spray drying and granulation zone; withdrawing the particles or granulates leaving the spray drying and granulation zone from the drying chamber; and subjecting said withdrawn particles or granulates to a

size classification into two fractions in a countercurrent gas/gravity classifier, preferably multistage, wherein the particles or granulates are introduced in a rising gas stream in a separation zone and separated into a coarse fraction of the predetermined particle size which is withdrawn as product and an undersize fraction, which is withdrawn from the separation zone as an entrained suspension in the exit gas from the classifier and returned to the spray drying and granulation zone as solid feed particles.

II. In the decision, inter alia, the following prior art documents were considered:

D1: K. Masters, Spray Drying Handbook, 4th.ed. (1985), pages 580 to 583;

D1a: K. Masters, Spray Drying Handbook, 3rd.ed. (1979), pages 575 to 577;

D3: Ullmann's Encyclopedia of Industrial Chemistry, 5th.ed. (1988), B2, 17-6 and 17-7;

D5: EP-A-163 836.

III. In the statement of the grounds of appeal and during oral proceedings the appellant maintained that the process of claim 1 lacked novelty over D1. It was further argued that claim 1 lacked an inventive step over D1 in combination with D3 or D5.

IV. In reply, the respondent maintained that the

subject-matter of the granted claims was new and involved an inventive step over the available prior art. Two new sets of claims were submitted as auxiliary requests and a declaration of Mr Wimmerstedt, concerning the meaning of the expression "countercurrent gas/gravity classifier". Respondent's counterarguments put forward in the written and oral proceedings with respect to the novelty and inventive step objections mentioned above can be summarized as follows:
The vibrated fluidized bed referred to in D1 had the primary function of cooling and transporting the particles leaving the spray dryer. Although at the same time fines were removed from the larger product particles, a person skilled in the art would not regard such a fluidized bed as a countercurrent gas/gravity classifier since it is a rather inefficient classifier. With reference to D5 it was stressed that fluidized beds are not suitable to obtain granules with a narrow particle size distribution.

The closest prior art for the evaluation of inventive step was not D1 but D1a, also disclosing a spray dryer followed by a vibrated fluidized bed. D1a further disclosed an agglomeration in two stages with two consecutive fluidized beds in order to improve the product quality. There was no suggestion that the fluidized bed could be replaced with a countercurrent gas/gravity classifier in the meaning of the patent in suit in order to obtain a granulate with a narrow particle size distribution free of dust. The solution of the technical problem of obtaining such a granulate as now claimed went against the trend in the art and

was therefore not obvious.

V. The appellant requested that the decision under appeal be set aside and that the European patent No. 0 515 478 be revoked.

As main request the respondent requested that the appeal be dismissed and that the patent be maintained. As first and second auxiliary request, the respondent requested that the patent be maintained on the basis of the first and second set of claims filed with his letter dated 21 September 1998.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request*

2.1 Novelty

2.1.1 D1, an extract from a handbook concerning spray drying, discloses a process for producing granulate by spray drying in a drying chamber, withdrawing agglomerated particles from the drying chamber and subjecting the withdrawn particles to a rising gas stream in a vibrating fluidized bed for cooling, transport and classification, whereby small particles are removed from the granules and returned to the drying chamber via an inlet in the upper part thereof (page 581, section (b) and Figure 15.4b). It was undisputed that apart from the use of a "countercurrent gas/gravity

classifier", D1 disclosed all the features of present claim 1. Thus with respect to novelty it only has to be decided whether a vibrating fluidized bed with an upwards gas flow through the bed of particles should be regarded as a countercurrent gas/gravity classifier.

2.1.2 According to D3, an extract from a standard handbook on chemical technology, the direction of mass force in a *countercurrent classifier* is counter to the main gas flow. Under the heading **4.2.1. Countercurrent Gravity Classifiers** several types of classifiers of very different construction are discussed. The larger particles may be withdrawn from below (Figure 6) or sidewards (Figure 5) but they all have in common that the smaller particles are removed by an upward gas flow. During oral proceedings it was undisputed that in the vibrating fluidized bed of D1, the dominant mass force was the gravity and that the vibrating fluidized bed of D1 falls under the definition of a counter current gas/gravity classifier as given in D3.

2.1.3 The respondent's argument, supported by the declaration of Mr. Wimmerstedt, that the definition given in D3 is too broad and that the person skilled in the art would not consider a fluidized bed, being a rather inefficient classifier, as a countercurrent gas/gravity classifier, cannot be accepted.

The Board agrees with the statement of Mr. Wimmerstedt that a fluidized bed is a rather inefficient classifier and the statement in D5 (page 3, lines 34 to 36) that a fluidized bed is not suitable for obtaining a granulate with a particle size distribution which is as narrow as

that obtainable with other conventional, more effective countercurrent gas/gravity classifiers, but holds that a fluidized bed is a suitable tool for separating fines from the agglomerated granules, for which purpose it is used in the process according to D1. Although claim 1 as granted relates to the production of a granulate with a "narrow" particle size distribution, it is in no way limited to a certain cut size (classification efficiency). The Board takes the view that when assessing novelty of the claimed subject-matter an expression in a claim should be given its broadest technically sensible meaning. In the present case, there is in the Board's judgment no reason to assume that this term means anything else than the separation of the desired coarse granules from the "fines" mentioned in D1. More particularly, there is no reason to give this term in the present case the same meaning as that intended in D5, page 3, lines 31 to 36, where it is expressly stated that a particle size distribution obtainable with a fluidized bed is not considered to be "narrow". On that basis, the Board holds that any gas/gravity classifier, separating smaller particles from coarser particles by an upward gas stream, including a fluidized bed, satisfies the classification requirements of present claim 1. The subject-matter of claim 1 of the main request, therefore, lacks novelty over D1 so that the main request cannot be allowed (Article 54 EPC).

3. *First auxiliary request*

3.1 Novelty

Claim 1 of the first auxiliary request differs from claim 1 of the main request by limiting the countercurrent gas/gravity classifier to a multistage countercurrent gas/gravity classifier. D1 does not disclose the use of a multistage countercurrent gas/gravity classifier so that D1 does not anticipate the process of claim 1 of the first auxiliary request. Since no other document on file discloses in combination all the features of claim 1 of the first auxiliary request, the process according to said claim 1 is novel.

3.2 Inventive step

3.2.1 D1 belongs to the same art and has more features in common with the process of claim 1 than any other document on file. The Board is, therefore, of the opinion that D1 represents the closest prior art. The Respondent's point of view that D1a is a more suitable starting document for the evaluation of inventive step cannot be shared for the following reasons:

D1a also discloses a process for producing a substantially dust free granulate by spray drying and classification in a vibrating fluidized bed but fails to disclose the recycle of the fines in the **upper part** of the drying chamber (see Figure 15.4b). Moreover D1a, having a publication date of 1979, is older than D1, published in 1985. If there are several prior art documents disclosing subject-matter coming about equally close to the subject-matter of a patent in suit, the most recent document should be regarded as the closest prior art and chosen as the starting point

for the evaluation of inventive step. The person skilled in the art, referred to in Article 56 EPC, is supposed to take into account the latest developments in the art. The Board, therefore, holds that D1 is a more appropriate starting point for the evaluation of inventive step than D1a.

3.2.2 According to the patent in suit one of the characteristic features of the invention resides in the fact that the use of a countercurrent gas/gravity classifier allows a very "sharp cut"; ie granules with a narrow particle size distribution can be obtained (page 4, lines 13 to 32 and the examples).

Starting from D1, the technical problem underlying the invention is thus seen in providing a process for producing a substantially dust-free granulate with a narrower particle size distribution.

According to claim 1 this problem is solved by using as classifier a multistage countercurrent gas/gravity classifier instead of a fluidized bed. The respondent confirmed during oral proceedings that this was the only difference with respect to the process disclosed in D1. The respondent also confirmed that a zigzag classifier with several zigzag sections as disclosed in Figure 6 of D3 is a multistage countercurrent gas/gravity classifier in the meaning of present claim 1. Since according to D3 (page 17-7) the sharpness of cut increases exponentially with the number of sections, the Board is satisfied that the process according to present claim 1 actually solves the above-mentioned technical problem. It is therefore

to be decided whether the use of a multistage countercurrent gas/gravity classifier in a spray drying process according to D1 was obvious to a person skilled in the art in order to solve the above-mentioned problem.

3.2.3 The particle size distribution of a granulate obtained by classifying agglomerated particles is essentially dependent upon the working of the classifier. If a skilled person tries to reduce the particle size distribution, he will take into consideration the use of a classifier having an improved sharpness of cut. It belongs to his general technical knowledge, as testified by the handbook extract D3 (text under Figure 6), that multistage countercurrent gas/gravity classifiers have a much higher sharpness of cut than single stage countercurrent gas/gravity classifier. In order to solve the above-mentioned problem it was thus obvious to replace the vibrated fluidized bed classifier in D1 by a more efficient conventional multistage countercurrent gas/gravity classifier.

3.2.4 The respondent's argument that D1a teaches away from the invention, so that the solution of the problem as presented by present claim 1 went against the trend in the art and should therefore be considered as non-obvious, cannot be accepted, firstly, because - as already mentioned - D1a was published earlier than D1, and, secondly, since D1a, disclosing the use of two consecutive fluidized beds for further agglomeration in order to obtain granules of coarse size, being free of fines and possessing a high degree of flowability, wettability and dispersibility (page 576 under (c)),

does not disclose that in this way the particle size distribution can be narrowed. Therefore, it cannot be deduced from D1a that for solving the above-mentioned problem of reducing the particle size distribution the use of multistage classifiers, specifically designed for reducing the particle size distribution, is against the trend in the art. Moreover, the spray drying processes of D1a relate to dairy products, whereas present claim 1 is not limited to any particular substance. A possible trend for improving the quality of a very specific product such as milk powder may not be generalized for the whole art of producing granules by spray drying.

The Board therefore holds that the process of claim 1 of the first auxiliary request lacks an inventive step within the meaning of Article 56 EPC.

4. *Second auxiliary request*

Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary request in the additional requirement that the solid feed particles are introduced **via an inlet arranged in the upper part of the drying chamber.** The process of D1, however, also fulfils this requirement; see Figure 15.4b. The reasons against inventive step given above under point 3.2 with respect to claim 1 of the first auxiliary request are therefore equally valid for claim 1 of the second auxiliary request. Thus the subject-matter of claim 1 of the second auxiliary request also lacks an inventive step.

5. In the absence of a set of claims fulfilling all the requirements of the EPC, the patent in suit cannot be maintained.

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:

S. Hue R. Spangenberg