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**Datasheet for the decision
of 29 April 2008**

Case Number: T 1030/04 - 3.3.05

Application Number: 98917614.4

Publication Number: 1016451

IPC: B01F 7/04

Language of the proceedings: EN

Title of invention:
MIXER

Patentee:
KAO CORPORATION

Opponent:
Gebrüder Lödige Maschinenbau GmbH

Headword:
Mixer/KAO

Relevant legal provisions:
EPC Art. 84, 52(1), 54(1)(2), 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Main request: novelty (no)"
"Auxiliary request 1: clarity (no)"
"Auxiliary request 2: inventive step (no) - obvious further mixer"
"Auxiliary request 3: inventive step (yes) - improved pulverising efficiency"

Decisions cited:
-

Catchword:

-



Case Number: T 1030/04 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 29 April 2008

Appellant:
(Opponent)

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Decision under appeal:

Decision of the Opposition Division of the
European Patent Office posted 13 July 2004
rejecting the opposition filed against European
patent No. 1016451 pursuant to Article 102(2)
EPC 1973.

Composition of the Board:

Chairman: G. Raths
Members: B. Czech
S. Hoffmann

Summary of Facts and Submissions

- I. This appeal is from the decision of the opposition division to reject the opposition against European patent No. 1 016 451.

Claim 1 of the patent as granted reads as follows:

*"1. A mixing apparatus, comprising:
a vessel for containing a material to be mixed;
a rotating shaft provided to be drivable in a rotating manner around an axis inside the vessel;
a stirring member provided so as to rotate together with the rotating shaft;
a pulverizing member provided on the inner circumference of the vessel facing the outer circumference of the rotating shaft to be drivable in a rotating manner; and
a flow direction-changing member provided so as to rotate together with the rotating shaft,
wherein the stirring member is arranged by leaving a space relative to the outer circumference of the rotating shaft in the radial direction of rotation, and has a stirring surface, which causes the material being mixed to flow toward the outer circumference of the rotating shaft; and
the flow direction-changing member is arranged by leaving a space relative to the inner circumference of the vessel in the radial direction of rotation, and has a changing surface, which changes the direction of flow of the material being mixed from a direction toward the outer circumference of the rotating shaft to a direction toward the inner circumference of the vessel."*

II. In the contested decision, the claimed subject-matter was found to be novel and inventive over the disclosures of the nine prior art documents cited in the notice of opposition, which include

D1: DE 1 101 113 A

D5: R. Lücke et al., "Aufbereitung von Preßmassen mit hohen Faseranteilen"; Sonderdruck aus Aufbereitungs-Technik, Jahrgang 15 (1974), Heft 6, Seiten 291-296; and

D6: H. Mollenkopf, "Mischaufgaben in der Lebensmittelindustrie: Problemlösungen durch den Einsatz von Pflugscharmischern"; Sonderdruck aus lebensmittel technik, Heft 2, Seite 66-74, 5. Jahrgang (1973).

The opposition division disregarded two further documents, namely

D10: J. Raasch et al., "Vergleich der Mischgüte eines Durchlaufmischers mit der eines Chargenmischers"; Schüttgut, 1 (1995), Nr.3, pages 497 to 503 and

D11: Leaflet "m-tec Mischer MR" from m-tec mathis technik gmbh,

on the grounds that they had been filed after the expiry of the opposition period and that they were not prima facie relevant.

III. In its statement of grounds of appeal, the appellant (opponent) requested the revocation of the patent in

suit inter alia on the grounds that the subject-matter of claim 1 lacked novelty over an "m-tec mixer" which was "commercially available" before the priority date of the patent in suit. In this connection, the appellant referred to D10 and to D11, which in its view both disclosed all the features of claim 1 of the patent in suit. The appellant took the view that the opposition division should have considered both D10 and D11. Together with the statement of grounds of appeal, the appellant also filed the further prior art document

D12: US 2 802 650 A.

It argued that the claimed apparatus was not inventive in view of a combination of the newly cited document D12, which was closer to the claimed subject-matter than D1, in combination with common general knowledge as illustrated by D6.

- IV. In its reply, the respondent held that lack of novelty was a new ground that should not be considered and that the opposition division had correctly disregarded the two late-filed documents D10 and D11. However, even if they were considered, D10 and D11 were not novelty destroying. The respondent also objected to the late filing of D12 and argued that this document should not be considered either. However, discussing also D6, it argued that even if D12 were to be considered, the claimed subject-matter was inventive considering that D12 related to a pug mill for kneading clay and not to a mixer in the sense of claim 1 of the patent in suit.
- V. Under cover of a further letter of 16 March 2005, the appellant submitted a first technical opinion of

Professor Pahl and argued that in the eyes of a skilled person D11 disclosed all the features of claim 1 of the patent in suit. It also invoked lack of novelty over the "corresponding" public prior use of an "m-tec mixer". Additionally, it argued that the claimed apparatus lacked an inventive step over D11 and over the alleged prior use of the "m-tec mixer".

VI. In the annex to the summons to oral proceedings, the board inter alia expressed its provisional opinion that there was no legal basis for not considering novelty objections in the present appeal proceedings. Moreover, the board commented on the contents of D10, D11 and the opinion of Professor Pahl, and indicated that in the event these documents were to be considered at the oral proceedings, the question may arise what information the skilled person could directly and unambiguously derive from D10 and D11 taken by themselves, possibly in combination with the common general knowledge. Concerning the prior use alleged by the appellant, the board has inter alia questioned whether the prior use had actually been sufficiently substantiated and to which extent the evidence submitted corroborated the appellant's statements.

VII. Under cover of its reply of 6 March 2008 to the summons to oral proceedings, the respondent filed two sets of amended claims as first and second auxiliary requests.

The wording of claim 1 according to the first auxiliary request differs from the wording of claim 1 according to the main request in that the following features are appended to the latter:

", for concentrating the material toward the pulverizing member."

The wording of claim 1 according to the second auxiliary request differs from the wording of claim 1 according to the main request

- in that the word "and" is deleted from the wording "*... of the rotating shaft; and the flow direction-changing member ...*", and

- in that the following features are appended to the claim:

"; and the changing surface has a portion which faces the pulverizing member in the radial direction of rotation partway through a rotation."

The respondent submitted that the prior art on file did not disclose the subject-matter of these amended claims.

VIII. In a further letter dated 28 March 2008, the appellant argued that even taking into account the first opinion of Professor Pahl, the disclosure of D11 was not clear enough to allow an unambiguous evaluation of its relevance. Even if D11 were to be taken into consideration, it did not disclose pulverising members and a flow direction-changing member as required by claim 1, i.e. directing the material to be mixed toward the pulverising members.

IX. Under cover of its last reply also dated 28 March 2008, the appellant filed printouts of several internet pages,

a second technical opinion of Professor Pahl (dated 27 March 2008) and

D18: three lists labelled "Referenzliste - Mischer für Mischzement", "Referenzliste - Mischer MS" and "Referenzliste - Mischer MR".

The respondent argued that D18 showed that mixers as claimed had been supplied to various companies. Also for this reason, the special "m-tec" mixing tools as shown in D11 and their mode of action belonged to the common general knowledge.

- X. In the course of the oral proceedings which were held on 29 April 2008, the respondent filed as third auxiliary request an amended set of claims and a description adapted thereto.

The wording of claim 1 according to the third auxiliary request differs from the wording of claim 1 according to the main request in that the following features are appended to the latter:

"; wherein the changing surface has a portion which faces the pulverizing member in the radial direction of rotation partway through a rotation, and wherein the inner circumference of the vessel and the changing surface constitute curved surfaces, which parallel a rotating body which is coaxial with the rotating shaft."

- XI. The arguments of the parties as presented during the oral proceedings may be summarised as follows.

The appellant held that D11 and D10 should both be considered in view of their relevance. Both documents disclosed a mixer with all the features of claim 1 as granted. In particular, the element described as "Wirbler" in D11 could be considered as a pulveriser, and the plate-like extensions of the mixing arms visible in the figures of D11 would inevitably act as flow direction-changing members in the sense of claim 1. The subject-matter was also not based on an inventive step in view of a combination of D12 with D5, the latter disclosing a pulverising means at the interior wall of a mixer.

The appellant submitted that the features additionally comprised in claim 1 according to the first auxiliary request were not disclosed in isolation, but only in connection with other features which were not incorporated into claim 1. Moreover, claim 1 according to the first auxiliary request had no clear boundaries. It was not clear from the description and the drawings of the patent in suit how a concentration of the material to be mixed could actually be achieved under operating conditions involving no hurling of the material. The kind of concentration of the material referred to in the patent in suit would also occur upon operation of the mixer disclosed in D10, Figure 9. The mixer comprised elements that the skilled person would identify as pulverising member and a member suitable for changing the flow of the material being mixed from a direction toward the axial shaft to a direction toward the inner circumference of the vessel. Claim 1 according to the first auxiliary request thus also lacked novelty over D10.

In the appellant's view, claim 1 according to the second auxiliary request expressed in constructional features what was claimed in a functional manner in claim 1 according to the first auxiliary request. Figure 9 showed a member with a flow direction-changing surface facing a pulveriser. In case the two elements shown at the bottom of the mixer in Figure 9 were not pulverisers, then it was at least obvious to use pulverising elements at this location to improve the comminution of the material being mixed.

The appellant raised no objections against the claims according to the third auxiliary request. It conceded that a curved flow direction-changing surface parallel to the curved inner wall of the mixer vessel was not disclosed in the prior art.

The respondent argued that D11 did not directly and unambiguously disclose a pulverising member. The "Wirbler" element mentioned in D11 was foreseen for admixing further components, and was not necessarily suitable for comminuting the material. Such a comminution was moreover expressly avoided according to D11. Moreover, D11 did not disclose members having a surface for changing the direction of the flow provided by the stirring members back to the wall. Which directions were meant was readily apparent from the patent in suit. The patent in suit disclosed no other directions than the ones shown by arrow 300 in Figure 1 thereof. In D11, the function of the plate-shaped extensions shown in the figures was not indicated. Since they were apparently not angled in the radial direction, they would not direct the flow of material back to the vessel wall but rather in the axial

direction of the mixer vessel. D12 was not relevant since it related to pug mill knives and not to mixers for particular or granular material like the claimed mixer.

Claim 1 as amended according to the first auxiliary request found a basis in the application as filed and more clearly expressed the change in flow direction imparted to the material. The material was "concentrated" in the sense that the number of contacts between the particles and the pulverising member was increased, thereby improving the pulverising efficiency. Concentrating the material in this manner was not disclosed in D10. D10 neither mentioned the function of the plate-shaped extensions nor the function of the two elements provided on the wall of the vessel. Hence, it was not directly and unambiguously derivable from D10 whether these elements were actually rotating and suitable for pulverising the material. The flow directions of the particles in the mixer were also not derivable from D10.

By the same token, the subject-matter of claim 1 according to the second auxiliary request was also novel over D10. Moreover, due to the perspective distortion of the photograph shown in Figure 9 of D10, it was not even possible to establish whether or not a portion of a plate-shaped extension of one of the mixer arms was actually facing - in the sense of claim 1 - one of the two elements arranged on the wall of the mixer vessel.

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

The respondent requested that the appeal be dismissed, or, in the alternative, that the appealed decision be set aside and the patent be maintained on the basis of the claims according to one of the first or second auxiliary requests filed with letter of 6 March 2008, or on the basis of claims 1 to 5 and the description columns 1, 2 to 6, 15 and 16 according to the third auxiliary request filed during the oral proceedings and the description columns 7 to 14 as granted, and the figures according to pages 13 to 22 of the patent as granted.

Reasons for the Decision

Main request

1. Novelty

The issue of novelty of the subject-matter of claim 1 as granted was addressed and decided in the contested decision (point 4 of the reasons). Hence the novelty objections of the appellant cannot be considered to be based on a "fresh ground of opposition" in the sense of opinion G 10/91 (OJ EPO, 1993, 420), point 3.

Therefore, in the present case the examination of novelty does not require the consent of the respondent.

- 1.1 For the board, D11 is a document which is prima facie highly relevant in the sense that it is highly likely to prejudice the maintenance of the patent in suit. The board does not share the opposition division's view that the information contained in D11 was limited to a "purely diagrammatical description of a configuration

of mixing elements within a mixing chamber" and that the figure of D11 entitled "m-tec Entleersystem" was "ambiguous". On the contrary, for the board, the total information disclosed to the skilled person by the text parts and the several figures of D11 is such that the novelty of the subject-matter of claim 1 appears to be prima facie questionable. Moreover, the board notes that D11 had been filed only about four weeks after the end of the opposition division period and that the patent proprietor, also in its capacity as respondent, was given ample opportunity to deal with and to comment on D11. Under these circumstances, the board, in this case, considers it appropriate to take D11 into consideration despite its filing after the expiry of the opposition period.

1.2 D11 is a leaflet of commercial, technical and advertising nature, offering further consulting ("Wir beraten Sie gerne") with respect to mixers of the type "m-tec Mischer MR" described therein. D11 bears contact information including the supplier's address, which still comprises a 4-digit German postcode. Germany has switched to 5-digit postcodes in 1993. The board thus accepts, and it has not been disputed, that D11 was made available to the public before the priority date of the patent in suit and therefore belongs to the prior art pursuant to Article 54(2) EPC.

1.3 As to its contents, D11 discloses a mixing apparatus ("Mischer") comprising a vessel for containing the material to be mixed ("Mischergehäuse") with an essentially cylindrical inner surface. The mixing tools ("Mischwerkzeuge") arranged within the vessel comprise a rotating axial shaft ("Mischerwelle") with radially

extending mixing arms ("Mischarme") carrying members for hurling the material to be mixed ("Spezialschleuderschaukeln"), i.e. stirring members in the sense of present claim 1. These stirring members rotate, together with the axial shaft, close to the inner wall of the mixing vessel and at a certain radial distance from the outer circumference of the axial shaft. At an intermediate position between the axial shaft and the stirring members, i.e. at a certain radial distance from the inner circumferential surface of the vessel, the mixing arms carry plate-like extensions. Concerning the above features, reference is made in particular to D11, the title, the schematic drawing and the picture 1 of 5 on the front side; the left-hand column and the upper half of the middle column, and pictures 2 to 4 on the reverse side of D11. A further mechanical element with several edges, provided on the inner circumferential wall of the vessel and facing the axial shaft, is visible in the colour picture 2 of 5 (upper right picture on the reverse side of D11).

- 1.3.1 Considering their intended mixing and hurling function, the skilled person understands that the direction of rotation of the shaft (which is implicitly counter-clockwise in the schematic drawing and clockwise in colour picture 3 of 5) is such that the surfaces of the stirring members facing the axial shaft will cause the material to be mixed to flow in a direction away from the inner wall of the vessel, the directional vector of the particle flow thus necessarily having a component oriented in the direction of the outer circumference of the axial shaft. According to the patent in suit, those surfaces of the stirring members which move the

material to be mixed (see e.g. reference numbers 4a, 4a', 4b, 4b', 4c and 4c' in figures 3, 4, 5 and 9(1)(2)) may be arranged in a manner leading to a flow of material in a direction which is not strictly the direction of the axial shaft, but which may have vector components oriented in other directions, e.g. in the axial direction of the mixer vessel. Therefore, in a mixer according to D11, the material will inevitably also flow to some extent in a direction "*toward the outer circumference of the rotating shaft*", as required by present claim 1.

- 1.3.2 The purpose of the plate-shaped extensions is not explained in D11. However, the skilled person immediately realises that these extensions inevitably have an impact on the movement of the material to be mixed inside the mixer, at least under operating conditions wherein said material is hurled by the rotating curved blades. When hit by the rotating plate-shaped extensions, the direction of the movement of particles hurled away from the wall and towards the axial shaft will inevitably be changed to some extent. As pointed out by the board at the oral proceedings, said extensions can therefore be considered to constitute "*flow direction changing members*" having a "*flow direction changing surface*" in the sense of present claim 1. Considering that the rotating plate-shaped extensions are not arranged perpendicularly to axial shaft (see colour pictures 2 and 3 of 5), and their rotation around the axis of the shaft, the changed direction of the particle flow will inevitably have a vector component oriented towards some part of the inner circumference of the vessel, e.g. in a direction tangential to the circle defined by the

rotating extension. According to present claim 1, the changed direction need neither be a strictly radial outward direction (shortest possible path) nor the direction illustrated in Figure 1 of the patent in suit (arrow with reference number 300). Therefore, the board considers that in a mixer according to D11 the flow direction of the material being mixed will also inevitably be changed to "*a direction toward the inner circumference of the vessel*", as required by present claim 1.

- 1.3.3 Furthermore, the skilled person reading D11 immediately understands that the further mechanical element shown in colour picture 2 of 5 can only be one of the whirling elements ("Wirbler") mentioned in the text on the reverse side of D11 (left-hand column, second paragraph and middle column, second bullet), which elements are foreseen for inputting additional mixing energy and for admixing small amounts of mixture components. In the context of D11, an element described as whirling element having a mixing function must implicitly rotate upon operation. Moreover, the reference to the avoidance of the fragmentation of granular mixture components (reverse side of D11, top left paragraph: "Kornzertrümmerung ... vermieden") is an indication that the mixer described is suitable for preparing mixtures comprising solid components. Although D11 does not refer to a pulverisation of the material to be mixed, and despite the general reference to gentle mixing (top left paragraph: "produktschonende Mischung"), the board takes the view that an element comprising edges and rotating at speeds imparting a whirling motion to such solid components is also inherently suitable for breaking agglomerates of the

material to be mixed. Such agglomerates may, depending on the mixing conditions, e.g. form when a small amount of liquid component is added to a solid granular material. For this reason, the board takes the view that the whirling element of the mixer shown in the colour image 2 of 5 of D11 can also be considered as a "*pulverizing member*" in the sense of present claim 1.

1.4 The board thus comes to the conclusion that D11 discloses mixers with all the features of present claim 1. Hence, the subject-matter of claim 1 lacks novelty (Articles 52(1) and 54(1)(2) EPC) over the disclosure of D11.

2. The appellant's main request is thus not allowable.

First auxiliary request

3. Amendments

3.1 Claim 1 according to this request comprises the additional functional feature "*for concentrating the material toward the pulverizing member*".

3.2 The respondent relied on the wording appearing on page 6, lines 4 to 8 of the application as filed as a basis supporting the amendment to claim 1. The wording, which also appears once in the patent in suit (column 3, lines 22 to 23), indicates that the material being mixed is "*concentrated toward the pulverizing member*". The appellant argued that by virtue of the added features it was implicit that the flow direction change referred to in claim 1 was the one illustrated in Figure 1 (arrow 300), which made it possible "to

increase opportunities for contact between the material being mixed and the pulverising member, and to enhance mixture pulverizing efficiency" (patent in suit, column 3, lines 23 to 26).

- 3.3 The board however notes that the wording added to claim 1 is part of a longer sentence starting with the expression "*In accordance therewith ...*" (see column 3, line 19) which immediately follows a description of the mixer "*of the present invention*" reciting exactly the same features as claim 1 as granted (see section [0012]), and of the operation of this mixer (see section [0013], lines 7 to 19). The description of the patent in suit thus conveys the information that the material to be mixed will inevitably be "*concentrated toward the pulverizing member*" by virtue of the features that were already present in claim 1 before the amendment.

If only for this reason, the further limitations in terms of constructional apparatus features of the subject-matter of claim 1, if any, that might be implied by the amendment in question, are not clear.

- 3.4 Moreover, upon being questioned by the board at the oral proceedings, the appellant confirmed that Figure 1 (dotted/dashed line 200) showed a mixer in an operating mode wherein the material to be mixed was merely made to move ("*Schubmischen*") without being hurled, as opposed to a hurling mode ("*Schleudermischen*"). The board notes that in the former mode, the concentration (in terms of particles per unit volume of the mixer vessel) of the material being mixed is essentially the same throughout the bulk volume of the material being

mixed (delimited by dotted/dashed line 200 in Figure 1 of the patent in suit). Hence, Figure 1 referred to by the respondent is not suitable for clarifying the meaning of the feature "*for concentrating the material toward the pulverizing member*".

- 3.5 Due to the amendment in question, claim 1 thus lacks clarity within the meaning of Article 84 EPC.
- 3.6 In this connection the board also acknowledges that no other specific flow directions than the ones shown in Figure 1 (arrow 300) are illustrated or mentioned in the patent in suit and that in the description (column 3, lines 19 to 26) the concentration of the material toward the pulverising member and the "*increased opportunities for contact*" are presented in connection with each other. However, for the board, this is not a sufficient reason for reading into claim 1 as amended any further, allegedly implicit, limitations which are to be derived from the description or the drawings only, instead of being expressed in the amended claim in the form of further functional or constructional features.
- 3.7 For the sake of completeness the board notes that if amended claim 1 was to be understood along the lines proposed by the respondent, then it would be objectionable under Article 123(2) EPC for the following reason. According to the description of the patent in suit (and of the application as filed), some further features are also required for achieving the concentration of the material toward the pulverising member now referred to in amended claim 1, namely the features "*the material being mixed is prevented from*

flowing in a direction away from the pulverizing member provided on the inner circumference of the vessel" (see patent in suit, column 3, lines 19 to 22). Figure 1 and the other figures show that the latter effect may be achieved (Figure 1, arrow 300) using very specific geometric configurations of the mechanical mixer elements. However, since neither said further features nor a reference to the specific means shown in the figures were incorporated into the present amended claim 1, the latter is inter alia directed at mixers achieving the intended concentration of the material to be mixed toward the pulverizing member without necessarily comprising said further features and/or means. However, such mixers are not disclosed in the application as filed and would therefore constitute added subject-matter.

4. The appellant's first auxiliary request is thus not allowable either.

Second auxiliary request

5. Amendments

- 5.1 Claim 1 according to this request results from the incorporation of the features of dependent claim 3 as granted (identical to claim 3 as originally filed) into claim 1 as granted, and is thus more limited in scope than claim 1 as granted.

- 5.2 The board is therefore satisfied that the amendment meets the requirements of Article 123(2) and (3) EPC.

6. Novelty

6.1 Document D11 does not disclose a mixer wherein a portion of the flow direction-changing surface, i.e. of the plate shaped extension referred to in point 1.3.2 faces the pulverising member in the sense of present claim 1. This was also acknowledged by the appellant at the oral proceedings.

6.2 Concerning document D10, the board observes that it is immediately apparent that it does not directly and unambiguously disclose a flow direction-changing surface facing a pulverising member as required by present claim 1.

6.2.1 Figure 9 of D10 shows the interior of an "m-tec" mixer for continuous mixing, which is described and assessed in sections "4. Untersuchungen am Durchlaufmischer" and "5. Zusammenfassung" of D10. In Figure 9, two elements arranged on the mixer wall are visible, as well as some plate-shaped elements extending from the radial mixing arms ("Arme") carrying the stirring members ("Schaufeln"). However, the caption of Figure 9 and the corresponding text of D10 (section 4) is silent about the purpose of the elements on the mixer wall, and in particular does not mention whether the elements are rotatable, let alone at speeds that may result in a pulverising effect. Document D9 is also silent about the purpose of the plate-shaped extensions, and in particular does not mention a specific flow direction-changing effect thereof. Moreover, due to the viewing angle of Figure 9, and the ensuing perspective distortions, the board considers that it cannot be directly and unambiguously gathered therefrom that a

portion of one of these extensions necessarily "*faces*" (in the sense of claim 1, i.e. "*partway through a rotation*" of the axial mixer shaft) one of said elements arranged on the mixer wall. Furthermore, as is apparent from e.g. D11, a facing arrangement of the plate-shaped extension(s) and - if present at all - of the rotating element(s) arranged on the mixer wall is not mandatory in an "m-tec" mixer. Hence, this feature is also not implicit to the mixer shown in Figure 9 of D10 in the eyes of the skilled person.

6.2.2 Therefore, even if document D10 were to be taken into consideration by the board at all, despite having been disregarded by the opposition division, it could not call into question the novelty of the claimed subject-matter.

6.3 Document D12 was only filed with the statement of grounds of appeal without an indication of the reason for which it was filed at such a late stage. D12 is a document of three pages which relates to special knives for pug mills for treating clay, and not to a mixer for mixing and pulverising materials like the mixer according to claim 1 which comprises a pulverising member. Consequently, it is immediately apparent that D12 (see the figures and the corresponding description), does not describe a pulverising element as required by claim 1. Even if D12 were to be considered by the board despite its late filing, it could not call into question the novelty of claim 1.

6.4 Alleged prior use

6.4.1 In its written submissions, the respondent repeatedly referred to the prior use of "m-tec" mixers and their well-known "mixer geometry". These mixers showed all the features of the mixer according to claim 1 as granted of the patent in suit and were commercially available before the priority date of the patent in suit. Concerning the features of the allegedly commercially available "m-tec" mixer, the respondent specifically referred to the contents of D10 and D11 only.

6.4.2 Document D18 consists of three lists which appear to refer to sales of "m-tec" mixers to various clients. Most of these sales appear to have occurred before the priority date of the patent in suit. However, these lists refer to different mixer types (e.g. "MS", "MR", "MD"), all of which were apparently available in several variants; see the various model numbers in the left-hand column labelled "Produkt".

6.4.3 The board notes that D10 refers to several different "m-tec" mixers, of which some do not (see figures 5 and 8) comprise elements that could respectively be regarded as pulverising member and flow-direction-changing member in the sense of claim 1 of the patent in suit. Therefore, even accepting purely for the sake of argument that the evidence on file proves that some particular "m-tec" mixers have been made available to the public by sales before the priority date of the patent in suit, it has not been established what has actually been made available to the public in terms of the mixing tool configuration.

6.4.4 The board concludes that the prior use alleged by the respondent has not been proved. Therefore, the alleged prior use is not taken into account as state of the art pursuant to Article 54(2) EPC.

6.5 The board is also satisfied, and it was not in dispute, that none of the other prior art documents cited by the opponent and appellant discloses a mixer with all the features of present claim 1.

6.6 The subject-matter of present claim 1 is thus novel within the meaning of Article 52(1) and 54(1)(2) EPC.

7. Inventive step

7.1 The patent in suit (see section [0001]) relates to a mixing apparatus, which mixes a material to be mixed having fluidity, such as fine particles and a granular material, by stirring with a stirring member provided on a rotating shaft, which is driven in a rotating manner inside a vessel.

7.2 As is apparent from the above points 1.3 to 1.3.3, the mixer described in D11 is suitable for the same purpose. Amongst the mixers described in the cited prior art, the mixer according to D11 has the most features in common with the subject-matter of present claim 1. In view of its constructional similarity to the mixer of present claim 1, the mixer according to D11 is a reasonable starting point for the assessment of inventive step.

7.3 In order to define the technical problem to be solved in the light of the closest prior art as disclosed in

D11, the board takes into account the following considerations. The appellant was of the opinion that the requirement additionally incorporated into claim 1 led to the desired concentration of the particulate material being mixed toward the pulverising member and hence to increased opportunities for contact between the particles and the pulverising member (see patent in suit, sections [0016] and [0017]). However, the board takes the view that arranging a portion of a flow direction-changing surface such that it "faces" the pulverizing member in the manner recited in claim 1 is not sufficient to lead to the desired increased opportunities for contact. More particularly, in the absence of corresponding indications in claim 1, the added features do not imply that the changed flow direction is necessarily oriented towards the pulverising member. Whilst facing the pulverising member in the sense of present claim 1, the flow direction-changing member may also be configured such that the changed flow direction will be oriented toward some other location on the inner wall surface of the mixer, which may be radially and or axially offset from the location of the pulverising member. Consequently, present claim 1 also encompasses mixer embodiments which do not, even when operated in the hurling mode, lead to the desired concentration of the material to be mixed towards the pulveriser.

For the board, the technical problem to be solved in the light of D11 can thus merely be seen in the provision of a further mixer.

- 7.4 According to present claim 1, the solution to this technical problem is a mixer which is inter alia

characterised in that the "*flow direction changing member*" is configured such that its "*changing surface has a portion which faces the pulverizing member in the radial direction of rotation partway through a rotation*".

7.5 The mixer according to claim 1 solves the less ambitious technical problem retained by the board (point 7.3 above). This has not been challenged by the appellant.

7.6 It remains to be decided whether this claimed solution to the technical problem is obvious in view of the cited prior art.

7.6.1 Neither D11, nor D10 and D12 if they were to be considered at all, nor any of the prior art documents considered by the opposition division in the appeal proceedings, directly and unambiguously discloses or suggests a flow direction changing member having a surface portion facing the pulverising member in the sense of present claim 1.

7.6.2 However, as indicated above, this claimed configuration does not necessarily imply that the flow direction is advantageously changed toward the pulverising member. Modifying the mixer of D11 such that the plate-shaped extension and the pulverising member are in a facing configuration is thus just one out of many equally obvious arbitrary possibilities at the hand of the skilled person for modifying the mixer according to D11 in order to provide a further, but not necessarily better mixer.

7.7 Hence, the board concludes that the subject-matter of present claim 1 does not involve an inventive step as required by Article 52(1) and 56 EPC.

7.8 The appellant's second auxiliary request is thus not allowable either.

Third auxiliary request 3

8. Amendments

8.1 Claim 1 according to this request results from the incorporation of the features of dependent claims 3 and 4 (identical to claims 3 and 4 as originally filed) into claim 1 as granted, and is thus more limited in scope than claim 1 as granted.

8.2 The board is therefore satisfied that the amendments to claim 1 meet the requirements of Article 123(2) and (3) EPC

9. Novelty

9.1 Since present claim 1 is even more restricted than claim 1 according to the second auxiliary request, the findings of the board with respect to the novelty of the subject-matter of the latter (see point 6 hereinabove) also apply in the case of claim 1 according to the present request.

9.2 The subject-matter of independent claim 1 and, consequently, of the claims dependent thereon is thus novel within the meaning of Articles 52(1) and 54(1)(2) EPC.

10. Inventive step

10.1 Having regard to the more restricted claims according to the present request, D11 remains the closest prior art for the same reasons as indicated under point 7.2 above.

10.2 In the light of D11, and in view of the indications in the patent in suit concerning the disadvantages of the prior art (sections [0002] to [0011]) and the effects achieved by the features additionally incorporated into claim 1 (see sections [0016] to [0019]) the technical problem to be solved by the claimed invention can be seen in the provision of a mixer which can be operated with a higher mixture pulverising efficiency.

10.3 According to present claim 1, the solution to this technical problem is a mixer which is inter alia characterised in that the "*flow direction changing member*" is configured such that its (flow direction) "*changing surface has a portion which faces the pulverizing member in the radial direction of rotation partway through a rotation, and wherein the inner circumference of the vessel and the changing surface constitute curved surfaces, which parallel a rotating body which is coaxial with the rotating shaft*".

10.4 In view of the indications in the patent in suit, the board is satisfied that the technical problem is credibly solved by this claimed solution. In particular, it is plausible that the particular configuration of the "*flow direction changing surface*" is suitable for leading to the "*increased opportunities for contact between the material being mixed and the pulverizing*

member" mentioned in the patent in suit, and hence to an improved pulverising efficiency of the claimed mixer, when the mixer is operated under conditions adapted to the material to be mixed in terms of the usual parameters such as the rotational speed and the amount of material in the mixer). This has not been challenged by the appellant.

10.5 It remains to be decided whether this claimed solution to the technical problem is obvious in view of the cited prior art.

10.5.1 Neither D11, nor D10 and D12 if they were to be considered at all, nor any of the prior art documents considered by the opposition division addresses the issue of pulverising efficiency. These documents also do not disclose or suggest the provision of a flow direction-changing member having the specific configuration mentioned under point 10.3 above for some other purpose.

10.5.2 The board thus concludes that the skilled person was not induced by the prior art to provide a modified or additional flow direction-changing surface as defined in present claim 1 in a mixer described in D11 in order to solve the stated technical problem.

10.6 The subject-matter of claim 1 and, consequently, of the claims dependent thereon is thus also based on an inventive step as required by Articles 52(1) and 56 EPC.

10.7 The board notes that the numbering of the remaining dependent claims in the documents filed as third auxiliary request during the oral proceedings contains

an obvious error since there are two claims depending on claim 1 having the number 2. Thus, the set of claims according to the third auxiliary request contains independent claim 1 and five dependent claims.

11. The appellant has not objected to the adapted description belonging to the present request. The board is also satisfied that the description has been adequately adapted to the amended claims.
12. The appellant's third auxiliary request is thus allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent as amended in the following version:
 - (a) claims 1 to 5 according to the third auxiliary request filed during the oral proceedings,
 - (b) description: columns 1 to 6, 15 and 16, filed during the oral proceedings; columns 7 to 14 as granted,
 - (c) figures: pages 13 to 22 of the patent as granted.

The registrar

The chairman

C. Vodz

G. Rath