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**Datasheet for the decision  
of 11 June 2019**

**Case Number:** T 1262/16 - 3.3.06

**Application Number:** 09723152.6

**Publication Number:** 2268862

**IPC:** D21C7/06, D21C3/24

**Language of the proceedings:** EN

**Title of invention:**

FEEDING SYSTEM COMPRISING PUMPS IN PARALLEL FOR A CONTINUOUS  
DIGESTER

**Patent Proprietor:**

Valmet Aktiebolag

**Opponent:**

Andritz Oy

**Headword:**

Cavitation/Valmet

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - main request (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 1262/16 - 3.3.06

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.06**  
**of 11 June 2019**

**Appellant:** Andritz Oy  
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**Representative:** Becker Kurig Straus  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 6 April 2016  
rejecting the opposition filed against European  
patent No. 2268862 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** J.-M. Schwaller  
**Members:** S. Arrojo  
C. Brandt

## Summary of Facts and Submissions

- I. In its statement of grounds of appeal the patentee (from now on "the appellant") requested to set aside the decision to reject the opposition against European patent Nr. 2 268 862 and to revoke the patent in its entirety.
- II. Claim 1 as granted (main request) reads:
- "Feed system for a continuous digester (6) where wood chips are continuously fed into the top of the digester and fed out from the bottom of the digester, characterized in that the wood chips that are to be fed into the top of the digester are suspended in a vessel (3) to create a chips suspension, in which vessel is arranged at least one supply line (40/41) for the addition of fluid controlled by a level transmitter (20) that establishes a liquid level (LIQ<sub>LEV</sub>) of at least 10 meters and preferably at least 15 meters and even more preferably at least 20 meters in the vessel and that, to the bottom of the vessel, are connected at least two pumps (12a, 12b) in parallel, where each pump transfers the chips suspension in a transfer line (13a-d/13ab) to the top of the digester."*
- III. In its reply the opponent (from now on "the respondent") requested to reject the appeal and to maintain the patent as granted or, alternatively, in amended form on the basis of auxiliary requests 1 and 2 filed with letter dated 14 October 2014.
- IV. The Board issued a communication to inform the parties of its preliminary opinion that the main request was not rendered obvious by document D1 (US 5 753 075) taken alone or in combination with documents D5

("Perry's Chemical Engineers' Handbook", Sixth edition, 1984), P6 ("Improving Pumping System Performance: A Sourcebook for Industry", Second edition, US Department of Energy, 2006) or D8 (WO 03/106765 A1).

V. At the oral proceedings the discussion focused on compliance of the patent as granted with Article 56 EPC starting from document D1 as closest prior art and combining it with the teachings of documents D5 and P6.

VI. After closure of the debate, the requests were as follows:

The appellant requested to set aside the decision of the opposition division and to revoke the patent in its entirety.

The respondent requested that the appeal be dismissed and the patent be maintained as granted (main request) or, auxiliarily, on the basis of one of auxiliary requests 1 and 2 filed with letter dated 14 October 2014.

### **Reasons for the Decision**

1. Main request - Article 100(a)/56 EPC

1.1 The Board has arrived to the conclusion that the ground pursuant to Article 100(a) EPC in combination with Article 56 EPC does not prejudice the maintenance of the patent as granted.

1.2 Closest prior art

1.2.1 In agreement with both parties, the Board regards document D1 as the closest prior art, as it discloses

(see column 10, lines 8-10 and figure 3) a wood chips feed system for a continuous digester (11) comprising a chute or conduit (226), the bottom of which is connected to one, two, three or more pumps in-series or in parallel. Similarly to the patent in suit, D1 intends to provide solutions for continuously transferring impregnated wood chips from a low pressure vessel to a high pressure digester. Since in D1 the pumps (251, 251') are connected to the bottom of the chute (226), this element is considered to correspond to the vessel as defined in claim 1.

1.2.2 The appellant argued that the reference in document D1 (see column 8, lines 49-52) to a "detectable level" of suspension in the chute anticipated the feature "a level transmitter (20) that establishes a liquid level (LIQLEV) (...)" in claim 1. Consequently, the subject-matter of claim 1 would only differ from D1 in that the liquid level is "at least 10 meters".

1.2.3 The Board cannot follow this argumentation. It is apparent from the cited passage in column 8 of D1, which reads: "*Cooking liquor, as described above, is added to chute 226 (see line 226' in FIGURE 3) so that a suspension of chips and liquor is produced in chute 226 having a detectable level (not shown)*", that it refers to the specific action of adding liquor to the chute (e.g. to prevent the pumps from running dry) rather than to a particular physical configuration of the system. Read within this context, the concept "detectable level [of the suspension]" appears to refer to "at least some [suspension]" (i.e. to prevent the chute from becoming empty) rather than implying that detection means should be provided, let alone detection means to control the supply of fluids. Furthermore, even if this passage were associated to a desire to

maintain a minimum level of fluid in the chute, this could be provided by allowing visual inspection of the chute and/or by safety means such as a switch-off for the pumps to prevent them from running dry. There is in any case no explicit or implicit disclosure of a level transmitter which controls the liquid level via the supply line such that a minimum level in the chute is maintained.

1.2.4 The Board therefore concludes that claim 1 differs from document D1 in the provision of "a level transmitter (20) that establishes a liquid level (LIQLEV) of at least 10 meters".

1.3 Problem underlying the invention

According to the patent in suit (see paragraph [0024]) the problem to be solved is to provide a system to pressurise and transfer the chips suspension to the top of the digester without cavitation in the pumps.

1.4 Solution and success thereof

1.4.1 To solve this problem claim 1 proposes a system comprising a suspension vessel having a supply line characterised in that the addition of fluid is controlled by a level transmitter (20) that establishes a liquid level (LIQLEV ) of at least 10 meters in the vessel.

1.4.2 The appellant argued that the reference in D1 (column 9, lines 48-52) to a "detectable level" of suspension in the chute (226) implied a certain head pressure upstream of the pumps, and so at least to a certain extent, this head pressure should be considered as reducing or eliminating cavitation in the pumps. The

solution proposed in claim 1 would thus solve the problem of providing alternative means for preventing/counteracting cavitation in the pumps.

1.4.3 The Board agrees with the appellant in that document D1 discloses means for reducing cavitation but nonetheless disagrees that this means is related to the reference to a "detectable level" of suspension. In particular, the Board notes that the passage from column 10, line 66 to column 11, line 4 of D1 explicitly refers to the use of an eductor to increase the pressure at the inlet of the pump, a configuration which would clearly provide the effect of reducing or eliminating cavitation in the pumps. On the other hand, in view of the above interpretation of the concept "detectable level" as implying "at least some", this feature cannot be regarded as providing the effect of reducing cavitation. In fact, it is noted that cavitation can only take place when there is at least some suspension in the chute, as this phenomenon could not occur if the pumps were to run dry.

1.4.4 The Board therefore concludes that the problem solved by the subject-matter according to claim 1 should be reformulated to that of providing alternative means for reducing/eliminating cavitation in the pumps.

1.5 Obviousness

1.5.1 As pointed out by the appellant, in document D1 the chute (226) can be connected to the top vessel via a pressure isolation device (224) or else be open to the atmosphere (column 9, lines 38-46). The appellant took the view that the atmospheric configuration would represent the most promising starting point. In particular, when using this configuration the liquor in



the high pressure return line (235) had to be depressurized to atmospheric pressure (column 10, lines 39-44), a teaching which would imply that the return line (235) could not be used to reduce cavitation in the pumps (i.e. a depressurised flow would not be suitable to increase the pressure at the inlet of the pumps). Furthermore, the use of an eductor as proposed in D1 would concern the drawing of suspension from the chute and not the prevention of cavitation in the pumps, and would, in any case, be regarded by the skilled person as a complicated and inherently unstable solution for the underlying technical problem.

From this starting point the appellant argued that, when looking for solutions to the problem of preventing cavitation, the skilled reader would consider the teachings of general handbooks such as D5 or P6. These books taught that a common way to prevent cavitation in pumps would be to generate a static pressure head upstream of the pump (see in particular page 6-5 of D5 and pages 20-21 of P6).

While other alternatives would be available for increasing the pressure at the inlet of the pump, as indicated above, document D1 would teach away from using the high pressure return line (235) and the eductor (70) for this purpose. Thus, the teachings in document D1 would only leave one alternative open, namely that of providing a static head pressure upstream of the pump as proposed in D5 and P6. Furthermore, since there would be no technical effect associated to the specific level defined in claim 1 (i. e. "a liquid level (LIQ<sub>LEV</sub>) of at least 10 meters"), reaching this value would be a matter of obvious trial-and-error, in particular involving well-known

calculations of the minimum head pressure as proposed in equation 6.14 at page 6-5 of D5.

For the sake of completeness, it is noted that in its statement of grounds of appeal, the appellant argued that document D8 would also suggest a solution as proposed in claim 1.

Consequently, the appellant considered that the subject-matter of claim 1 would not involve an inventive step in view of the combination of document D1 with the teachings of D5, D8 or P6 .

1.5.2 The Board cannot follow this argumentation for the following reasons:

In the system according to D1, the depressurisation of the high pressure recirculation line (235) when using an atmospheric chute arguably intends to prevent a back-flow into the chute (226). This depressurisation could however be carried out by using an eductor to draw the suspension from the chute as proposed in column 11, lines 5-8. Contrary to the arguments of the appellant, the eductor is not only arranged to draw liquid from the chute but can also be used "for increasing the pressure in the inlet or outlet of the pumps" (D1, column 11, lines 3-4), both functions not being mutually exclusive. In particular, the eductor (i.e. a Venturi orifice) can be used to decrease the pressure at the outlet of the chute (226) and to subsequently increase the pressure at the inlet of the pump, i.e. the liquid depressurises as it accelerates across the throat of the Venturi and recovers part of its pressure as the liquid decelerates downstream of the throat. It is therefore concluded that document D1 does not only not teach away from using the re-

circulation line (235) and the eductor (70) for the purpose of preventing cavitation, but in fact proposes configurations which are intended exactly for this purpose.

While the Board does not deny that a skilled reader in view of D5 or P6 could come up with other alternatives to prevent cavitation in the pumps of D1, it is noted that the solution proposed in claim 1 is not limited to the general idea of creating a pressure head upstream of the pump, but also concerns the specific control system to generate this effect. In particular, claim 1 proposes a system including a level transmitter associated to a controller and a supply line, which cooperate to establish a minimum fluid level of 10 meters in the tank used for the suspension/impregnation of the wood chips. It is not apparent for the Board which specific information in D5 or P6 would lead the skilled reader to combine the chute (226) in D1 with this specific control system.

In fact, considering that D1 precisely intends to propose solutions which reduce the size of the vessels (see column 6, lines 5-11), it is particularly not apparent for the Board why the skilled person would select a solution which entails providing a relatively large chute (226) in order to ensure that the minimum of 10 meters of head pressure is generated. In other words, since the provision of a separate chute and/or an eductor in D1 are precisely intended to prevent the need for using large vessels for the impregnation of the wood chips, it does not seem to be reasonable to argue that starting from D1 the skilled person would consider solving the underlying technical problem by substituting the eductor with an oversized chute.

The Board therefore concludes that the teachings of documents D5 and/or P6 would not prompt the skilled person to consider modifying D1 in a way which would anticipate the subject-matter of claim 1.

Finally, the Board has also concluded that the skilled person would not consider the teachings of document D8 for solving the underlying technical problem. This document discloses an impregnation vessel with inlets arranged at a distance from the bottom exit up to 31.5 meters (see figure 1). While the head pressure at the different impregnation fluid inlets is said to be at or over the saturation pressure of the liquid to avoid "the risk of steam blowing" (i. e. boiling of the liquids or cavitation) (page 11, lines 12-17), this is not intended to prevent cavitation in the pumps but within the vessel. In fact, the system in D8 only uses pumps (61, 62) at a top portion of the vessel to extract volatile gases, foam and impregnation fluid from the evacuation channel. The transfer of the suspension from the low pressure vessel to a high pressure digester is performed instead via a feeder/distributor (12) (see figure 1) arranged underneath the vessel. This distributor (12) appears to operate similarly to the high pressure feeder (27) in figure 2 of D1, implying that a pump, if present, would only be arranged at the high pressure recirculation line coming from the digester (14), in which it would be unlikely to be affected by cavitation precisely due to the high pressure in this line (analogously to the pump (32) in the recirculation line (35) of the system of figure 2 in document D1). Thus, considering that D8 does not disclose and/or require pumps arranged at the bottom of the vessel for transferring the liquid from the impregnation vessel to the digester, it is not apparent why the skilled person would consider its teachings as

a potentially relevant solution for the problem of preventing cavitation in the pumps of D1.

1.5.3 The Board is therefore of the opinion that the subject-matter of claim 1 is not rendered obvious by the combination of D1 with any one of documents D5, D8 or P6.

1.6 It is therefore concluded that the subject-matter of claim 1 as granted complies with the requirements of Article 56 EPC. Since dependent claims 2-9 as granted include all the features of claim 1, this conclusion also applies to them.

## Order

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

The appeal is dismissed.

The Registrar:

The Chairman:



D. Magliano

J.-M. Schwaller

Decision electronically authenticated