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**D E C I S I O N**  
**of 3 June 2003**

**Case Number:** T 0887/00 - 3.3.5

**Application Number:** 95904546.9

**Publication Number:** 0735913

**IPC:** B01D 19/00

**Language of the proceedings:** EN

**Title of invention:**

Apparatus and process for pumping and separating a mixture of gas and liquid

**Patentee:**

POM TECHNOLOGY OY AB

**Opponent:**

Andritz Oy

**Headword:**

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**Relevant legal provisions:**

EPC Art. 54, 111(1)

**Keyword:**

"Novelty (yes) - proper construction of the claim"  
"Remittal to department of first instance for further prosecution"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0887/00 - 3.3.5

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.5  
of 3 June 2003

**Appellant:** POM TECHNOLOGY OY AB  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 31 July 2000  
revoking European patent No. 0735913 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** R. K. Spangenberg  
**Members:** A. T. Liu  
J. H. Van Moer

## Summary of Facts and Submissions

I. European patent No. 0 735 913 was granted with a set of 19 claims, of which claim 1 was directed to an apparatus for pumping a fluid mixture with claims 2 to 9 depending thereon, claim 10 directed to a process for pumping a fluid mixture with claims 11 to 17 depending thereon, and claims 18 and 19 directed to the use of the claimed apparatus in a process for producing paper or board, and in a flotation process, respectively.

II. Claim 1 read as follows:

"An apparatus for pumping a fluid mixture of a gas and a liquid or a liquid suspension and for separating said gas and said liquid or suspension from each other, said apparatus having a stationary fluid inlet (14) at one end (18) and at the opposite end (22) a stationary pump housing (16) with a liquid outlet (28) and, between said inlet (14) and said pump housing (16), a hollow elongated gas separation part (30) of an essentially circular cross-section with a generally central outlet (26,27) for separated gas, said apparatus including at said inlet end (18) means for causing said mixture to rotate, while said opposite end (22) of said apparatus widens into a pumping zone (17) having a diameter larger than the diameter of the gas separation part (30) immediately upstream thereof, said apparatus being characterized in that said gas separation part (30) is provided by a hollow rotor (12) between said inlet (14) and said pump housing (16), the inner wall of said rotor (12) providing a large rotatable gas separation surface (32)."

III. A notice of opposition was filed against the patent on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC) and supported, *inter alia*, by the following document:

D3: WO 90/13344

IV. The present appeal was lodged against the decision of the opposition division to revoke the patent on the ground that the subject-matter of the independent claim 1 was not novel with respect to the disclosure of D3.

V. By letter of 9 May 2003, after the parties had been summoned to attend oral proceedings on 3 June 2003, the respondent for the first time made reference to the following new document:

D11: US-A-4 886 530

VI. By a fax dated 26 May 2003, the parties were notified that they should be prepared to discuss the disclosure of D11.

VII. At the oral proceedings, the appellant filed new amended claims as basis for subsidiary requests 1, 1B, 2, 2A, 2B and 2C.

VIII. The appellant's arguments may be summarised as follows:

- The finding of the opposition division was based on an erroneous interpretation of document D3, in particular Figure 5.

IX. The respondent's arguments were briefly as follows:

- The patentee's interpretation of claim 1 was very specific and not usual in the art.
- The subject-matter of claim 1 as granted lacked novelty over D11, in particular with reference to Figure 4.

X. At the end of the oral proceedings, the requests were as follows:

The appellant requested that the decision under appeal be set aside and that the case be remitted to the first instance for further prosecution on the basis of the claims as granted (main request) or on basis of any of the subsidiary requests submitted during the oral proceedings.

The respondent requested that the appeal be dismissed.

## **Reasons for the Decision**

### *Main request*

#### 1. *Interpretation of claim 1*

As clearly arises from the exchange of arguments, there is a discrepancy as to the meaning attributed by either party (and by the opposition division) to certain technical features stipulated in claim 1. Before the novelty of the claimed subject-matter can be assessed,

the Board therefore has to decide as to how the claim is to be construed. In substance, the divergence concerns the following technical features in claim 1:

- (i) pump housing
- (ii) gas separation part
- (iii) elongated gas separation part
- (iv) upstream of pumping zone
- (v) hollow rotor between the stationary inlet and the stationary pump housing.

1.1 Re: feature (i)  
Pump housing

The respondent has argued that according to one embodiment of the patent in suit, the exterior of the inlet and the pump housing are connected together by a shell (15) which is concentric with the hollow rotor (12). The pump housing is therefore not restricted to the part which is designated with reference numeral (16) in the drawings but must be regarded as including that shell (15) (see column 10, lines 31 to 34 and Figure 4). In the Board's judgment, however, this definition of the pump housing is not consistent with the wording of claim 1 which explicitly stipulates the inlet be at one end of the apparatus and the pump housing at the opposite end, with the hollow rotor (12) in-between. The subject-matter of claim 1 thus stipulated cannot be construed to encompass a

configuration wherein a pump housing connects both end parts and envelopes the rotor.

According to the appellant, the pump housing is only the part of the apparatus that contains liquid being pumped and has an outlet for discharging that liquid (see also claim 1: "an apparatus ... having a stationary pump housing (16) with a liquid outlet (28)"). A priori, it is noted that difference is indeed made in the patent in suit between the terms "pump housing" and "shell" concerning the embodiment of Figure 4. With reference to Figure 3, it is stated in the description that the pump housing is sealed off with a seal (23) to minimize leakage from the liquid ring (40) to the outside space (see Figure 3 and column 10, lines 1 to 10). Although the description does not make further reference to that seal with respect to the embodiment of Figure 4, the same seal is also depicted in Figure 4, between the pump housing (16) and the shell (15). The Board therefore concurs with the appellant in that, in the embodiment according to Figure 4, the pump housing is sealed off from the chamber formed by the shell surrounding the rotor. As a consequence, the Board accepts the appellant's submission that the pump housing is restricted to the part that is meant to receive liquid being pumped, designated with reference number (16), thus, not including the shell (15).

1.2 Re: feature (ii)  
Gas separation part

The respondent has submitted that, according to the claim, the gas separation part has a central outlet (26,27) for separated gas. The drawings, on the other hand, show that the outlet with the reference signs in question is located at the end of the pump housing. This would correspond to the description stating that the central gas outlet (26) is at the pump housing and that the gas outlet (27) extends decentrally from the wall of that pump housing (see column 8, lines 50 to 52 and column 10, lines 38 to 39). For this reason, the gas separation part must be understood as extending into the pumping zone (17) and comprising the pump housing (16).

The above definition is strongly contested by the appellant who has submitted that, first of all, the wording of claim 1 only implies that the gas outlet must communicate with the gas separation part ("a hollow elongated gas separation part (30) of an essentially circular cross-section with a generally central outlet (26,27) for separated gas"). Secondly, since the separated gas has to be removed from the apparatus, clearly the end of the gas outlet must lead away from the casement of the apparatus. As is indicated in the patent in suit, this gas outlet is preferably located in the pump housing where the liquid has essentially totally been separated from the gas. The gas removal may alternatively be through a tubular shaft of the rotor or through the inlet (column 8, line 50 to column 9, line 1). The conclusion that, in such cases, the gas separation part could be regarded



as including the pump housing, the rotor shaft or the inlet is therefore erroneous and supported neither by the wording of the claim, nor by the description.

In the Board's view, the definition of the gas separation part is given in the characterising portion of claim 1 which stipulates that "gas separation part (30) is provided by a hollow rotor between said inlet (14) and said pump housing (16)". If this part is between the inlet and the pump housing, it, therefore, cannot at the same time include the pump housing. Furthermore, as is observed by the appellant, when the liquid reaches the pump housing, it has essentially totally been separated from the gas (see preceding paragraph). The purpose of the pump at this point is to discharge the liquid and not to achieve a further gas separation from that liquid. The Board therefore accepts the appellant's submission as technically sound and finds that the gas separation part and the pump housing are different entities with clearly different functions. This interpretation is also consistent with the description of Figure 1 which states that the gas separation part smoothly transforms into a larger diameter pumping zone (see patent in suit, column 7, line 49 to column 8, line 5).

- 1.3 Re: feature (iii)  
Elongated gas separation part

The respondent has put forward the argument that the direction of the elongation of the gas separation part is not indicated in the claim. Thus, an elongated part can only mean that the part in question has one dimension which exceeds another, not necessarily in the

axial direction but also possibly in the radial direction.

The Board notes that the respondent's view does not correspond to that expressed by the opposition division in the decision under appeal (page 3, last three sentences of the first paragraph). Furthermore, the gas separation part is stipulated as being of an essentially circular cross-section. Thus, to the knowledge of the Board, such part can only have one length which is in the axial direction, perpendicular to that cross-section. In the common usage of the term, if the part is to be regarded as elongated, then the axial length must exceed the cross section. There is no question that this is the usage of the term in the patent in suit, as can be derived from the description (see column 6, lines 49 to 56) and all the drawings.

1.4 Re: feature (iv)

Gas separation part upstream of pumping zone

The respondent has raised the objection that it is unusual to interpret the term "upstream" only in the axial direction as it is construed by the appellant for the purpose of claim 1. In reality, the term must be interpreted strictly in relation to the fluid flow.

According to the wording of claim 1, the apparatus comprises "a stationary fluid inlet (14) at one end (18) and at the opposite end (22) a stationary pump housing (16) with a liquid outlet (28) and, between said inlet (14) and said pump housing (16), a hollow elongated gas separation part (30) of an essentially circular cross-section". Surely, a technically sound

deduction from that phrasing must be that, when the apparatus is put in use, the fluid mixture will flow from the inlet through the gas separation part to the outlet. Since the gas separation part is elongated, the flow direction will be essentially axial. In the Board's view, the interpretations given by the parties are therefore not mutually exclusive in the present case.

1.5 Re: feature (v)

Hollow rotor between the stationary inlet and the stationary pump housing.

The respondent has also observed that dependent claim 2 clearly indicates that the "rotor (12) has a generally tubular configuration and comprises at its outlet end (22) said pumping zone (17)". He therefore has gone on to argue that, when this preferred embodiment is taken into consideration, it is clear that the rotor encompasses the gas separation part and the pump. Thus, the term "between" should not be construed as relating to the axial direction but also may relate to the radial direction with respect to the axis of the gas separation part.

In the Board's judgment, the stipulation that the rotor (which provides the gas separation part) comprises at its outlet end the pumping zone does not mean that the pumping zone is an integral part of the rotor. On the contrary, the Board understands this feature as another way of expressing the configuration that at its end, the rotor (or the gas separation part) transforms into a pumping zone (compare patent in suit, Figure 1 and column 7, lines 49 to 51). Thus, the preferred

embodiment of dependent claim 2 merely confirms the above finding that the gas separation part and the pumping zone or the pump housing are separate entities (see item 1.2 above). Furthermore, the Board can only reiterate the fact that claim 1 stipulates the apparatus to comprise an inlet at one end, a pump housing at the opposite end and an elongated gas separation part being a rotor in-between (see also item 1.4 above). Since the inlet and the pump housing are at opposite ends of the gas separation part which is provided by a rotor of tubular configuration, the Board finds it difficult to imagine how the term "between" could be interpreted other than in the axial direction of that tubular rotor.

## 2. *Novelty*

The opposition division has revoked the patent on the ground that the subject-matter of claim 1 lacks novelty with respect to D3. In addition, the respondent has cited D11 as a novelty-destroying document.

### 2.1 Novelty with respect to D3

2.1.1 The opposition division has stated that, according to the general disclosure of D3, the gas separation stage extends along the entire length of the rotor. In the preferred embodiment of Figure 5, the length of the rotor would be the length between inlet (52) and plate (20). In this case, the hollow gas separation part must be regarded as "elongated" since the rotor length exceeds its largest diameter at plate (20) (see decision under appeal: II. Reasons for the decision, item 2.4). This view was confirmed by the respondent at

the oral proceedings. Furthermore, the opposition division has observed that the functions fulfilled by the rotor are inter alia to effect the gas and liquid separation and to raise the liquid outlet pressure (see decision under appeal, page 3, lines 3 to 6). The Board understands this statement as indicating that the rotor also acts as a pump in the sense of claim 1. In that case, since the gas separation part extends along the entire length of the rotor, the Board fails to recognise that the apparatus according to Figure 5 of D3 includes a gas separation part immediately upstream of the pumping zone (compare claim 1 and point 1.4 above).

- 2.1.2 The respondent has additionally asserted that "a pump housing is clearly the part of the device where the pumping vanes or blades are situated. Accordingly, it is questionable whether the entire housing 50 is to be referred to as a "pump housing". In contrast, the "pump housing" of D3 is the portion of the housing 50 in Figure 5 having an enlarged diameter encircling the spiral chamber 56 in which the pressure is raised." (see letter of 26 June 2001, page 5, paragraph 3). The respondent has gone on to conclude that D3 therefore discloses an apparatus having an elongated gas separation part between a stationary inlet and a stationary pump housing. Although the opposition division has not discussed this technical feature in detail, it is clear that the decision is also based on the presumption that the pumping zone is restricted to the spiral chamber (see decision under appeal, item 2.6, in particular page 4, lines 1 to 2).

According to the description of D3, the embodiment of Figure 5 is a structure involving a straight or slightly conical tubular shell 110 with openings in the upper part via which the pulp could flow due to the centrifugal force to the outlet of the spiral chamber 56. When the pressure in the spiral chamber 56 is higher than the pressure in the inlet duct, "the pulp would tend to flow via the slot between the rotor of the separator, in this case the tubular shell 110 and the wall 60 of the casing, back to the pulp space.... This can of course be avoided by providing the outer surface of the tubular shell 110 of the rotor with, for example, a spiral thread 116 which tends to pump the pulp collected in the clearance back to the spiral chamber of the casing 50" (D3, page 11, line 34 to page 12, line 22). The prior art according to D3 thus neither discloses nor even suggests that the pumping zone be restricted to the spiral chamber 56. In fact, the wall 60 of the casing envelopes the entire rotor, thus the spiral chamber in the upper part and the clearance with the lower part of the rotor. There is no doubt that flow communications exist between these two parts with a pumping function also being strived for in the lower part in order to avoid the problem of clogging ("to pump the pulp collected in the clearance back to the spiral chamber of the casing"). The respondent's and the opposition division's definition of the pump housing therefore cannot be aligned with the disclosure of D3. Furthermore, since the casing 50 directly communicates with the fluid inlet 52, the apparatus cannot be said at the same time to accommodate a gas separation part between this inlet and the pump housing (represented by the casing 50), regardless of the direction given to the term "in-

between", be it axial or radial (compare claim 1 and point 1.5 above).

2.1.3 As a consequence of the above, the Board holds that the apparatus of claim 1 is at least distinguished from that of D3 in the stipulation of:

(i) "a stationary fluid inlet (14) at one end (18) and at the opposite end (22) a stationary pump housing (16) with a liquid outlet (28) and, between said inlet (14) and said pump housing (16), a hollow elongated gas separation part (30)" and that

(ii) the "opposite end (22) of said apparatus widens into a pumping zone (17) having a diameter larger than the diameter of the gas separation part (30) immediately upstream thereof".

2.2 Novelty with respect to D11

The respondent has submitted that D11 is generally directed to an apparatus with a stationary fluid inlet (22) at one end, a stationary pump housing (10) with a liquid outlet at the opposite end and a hollow elongated gas separation part (30) of an essentially circular cross-section in-between. With particular reference to Fig.4 of D11, the respondent has gone on to assert that the known gas separation part is provided by a hollow rotor (30,80) located between the inlet (22) and the pump housing (10), with the inner wall of the rotor providing a large rotatable gas separation surface (see also letter of 9 May 2003, item 2.1).

2.2.1 The Board notes that D11 discloses as exemplary embodiment an elongated pump housing (10) having a suction inlet at one end, a first outlet primarily for gas at the other end and a liquid outlet intermediate the ends but in close adjacency to the other end. An elongated rotor (30), provided with a plurality of radially extending vanes (62), is disposed within the pump housing and also extends between the ends, with the function to generate a high and strong centrifugal field so as to centrifuge the liquid phase outwardly (column 2, lines 1 to 12; column 2, line 66 to column 3, line 29; column 3, lines 49 to 51; Figures 1 and 2). According to this configuration, the known apparatus thus does not comprise the following features as stipulated in claim 1:

(i) an inlet and a pump housing at opposite ends of a hollow elongated gas separation part and

(ii) a rotor with an inner wall providing a rotatable gas separation surface.

2.2.2 According to the particular embodiment of Figure 4, a frustoconical shroud (80) is provided at the radially outer edges of the vanes (62). In the respondent's view, this shroud corresponds to the rotor as stipulated in the characterising portion of claim 1.

As is submitted by the appellant and not refuted by the respondent, there is no mention in the entire disclosure that the shroud has an elongated form. In fact, the schematic illustration of the shroud in Figure 4 does not particularly lend to this presumption. Furthermore, the shroud is mounted at the



outer edges and is entirely enclosed by the pump housing. Thus, the shroud cannot be seen as featuring an inlet and a pump housing at its opposite ends (see feature (i) in point 2.2.1 above).

Moreover, the Board does not have any reason to assume that the shroud (80) acts as a gas separation surface. On the contrary, the gas separation is still provided by the rotor (30) with the vanes (62). The respondent has not advanced any plausible argument to the contrary. Indeed, the function of the shroud is explicitly described as to maintain the incoming fluid mixture in a generally axial flow while allowing the strong centrifugal forces to effectively separate without subjecting the liquid to shear at the interface of the pump housing (10) and the rotor (30) (column 2, lines 39 to 46; column 4, lines 38 to 52 and Figure 4). The shroud therefore cannot be regarded as a rotor with an inner wall providing a rotatable gas separation surface within the meaning of claim 1 (see feature (ii) in point 2.2.1 above).

- 2.2.3 As a corollary to the above, the Board finds that D11 cannot be regarded as novelty-destroying to the subject-matter of claim 1.
  
3. Neither the opposition division, nor the respondent has cited any other document to question the novelty of the apparatus of claim 1. The other issues raised by the opponent, in particular the question of lack of inventive step of the subject-matter of claim 1 and the novelty and inventive step involved with the remaining claims, have not been addressed by the opposition division. The Board therefore exercises its power under

Article 111(1) EPC to remit the case to the first instance for further prosecution in respect of the matters still requiring attention.

**Order**

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

The decision under appeal is set aside. The case is remitted to the first instance for further prosecution.

The Registrar:

The Chairman:

U. Bultmann

R. Spangenberg