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Datasheet for the decision of 17 September 2019

Case Number: T 2163/16 - 3.3.05

Application Number: 06405227.7

Publication Number: 1736218

IPC: F04D9/00, B01D19/00

Language of the proceedings: EN

Title of invention:
A gas separation apparatus, a front wall and a separation rotor thereof

Patent Proprietor:
Sulzer Management AG

Opponent:
KSB Aktiengesellschaft

Headword:
Apparatus comprising a centrifugal pump and a gas separation apparatus/Sulzer Management

Relevant legal provisions:
EPC Art. 56, 123(2)
RPBA Art. 12(4)

Keyword:
Late-filed evidence - admitted (no)
Amendments - intermediate generalisation - extension beyond the content of the application as filed (no)
Inventive step - reformulation of the technical problem - common general knowledge - non-obvious modification - (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 2163/16 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 17 September 2019

Appellant: (Opponent)	KSB Aktiengesellschaft Johann-Klein-Strasse 9 67227 Frankenthal (DE)
Representative:	von Tietzen und Hennig, Nikolaus Lorenz Seidler Gossel Rechtsanwälte Patentanwälte Partnerschaft mbB Widenmayerstraße 23 80538 München (DE)
Respondent: (Patent Proprietor)	Sulzer Management AG Neuwiesenstrasse 15 8401 Winterthur (CH)
Representative:	Intellectual Property Services GmbH Langfeldstrasse 88 8500 Frauenfeld (CH)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 15 July 2016 concerning maintenance of the European Patent No. 1736218 in amended form.**

Composition of the Board:

Chairman	E. Bendl
Members:	T. Burkhardt
	R. Winkelhofer

Summary of Facts and Submissions

I. The appeal lies from the opposition division's interlocutory decision to maintain the European patent EP 1 736 218 in amended form on the basis of the then first auxiliary request.

II. The following documents were among those discussed at the opposition stage.

D1 KSB Aktiengesellschaft, "Betriebsanleitung CPK.D, Chemie-Normpumpe", May 2002, 1-20

D1a Seybold,"CPK.D/KWP.D P03-315, Laufrad Impeller, 230, 0W231066-00", technical drawing

D1b Seybold, "CPK.D/KWP.D P03-250, Deckel Cover, 160, 0W229186-00", technical drawing

D1c Seybold,"CPK.D/KWP.D P03-250, Laufrad Impeller, 230, 0W231165-00", technical drawing

D3 WO 90/13344 A1

D4 US 6,071,331 A

III. The opposition division held that the then main request (patent as granted) did not fulfil the requirements of Article 123(2) EPC and that the then first auxiliary request fulfilled the requirements of the EPC, in particular those of Articles 123(2) and 56 EPC.

IV. Claim 1 of the then first auxiliary request, which is the present main (sole) request, reads as follows:

"1. Apparatus comprising a centrifugal pump and a gas separation apparatus, the centrifugal pump having a rotatable shaft (42), an impeller (40) attached to the shaft, a back wall, and a gas discharge to the gas separation apparatus, wherein

the shaft (42) acts simultaneously as shaft of the gas separation apparatus, and wherein the back wall of said centrifugal pump acts as front wall (50) of the gas separation apparatus; the gas separation apparatus having a separation chamber (62), and a disc (60) located in said separation chamber (62) and attached on the shaft (42); the disc dividing the separation chamber (62) to a so called front chamber (64) with the front wall (50) and a so called rear chamber (66) with a gas discharge near the shaft; the disc further allowing flow connection between front and rear chambers around its outer rim and having vanes on a surface facing the rear chamber (66) characterized in at least one opening (70) in the disk for allowing liquid or gas flow to be treated to traverse the disk and enter the rear chamber (66), and in that the disc (60) is provided with a smooth surface facing the front chamber and that the surface of the front wall (50) facing the front chamber (64) is at least partially provided with ribs (74), by means of which the rotation of the liquid in the separation chamber (62) is prevented in the front chamber (64)."

Claims 2 to 7 describe preferred embodiments of the apparatus according to claim 1.

V. With its grounds of appeal, the opponent (appellant) submitted the following documents:

D5 GB 1 307 170 A1

D6 G M Wood *et al.*, "Centrifugal Dynamic Shaft Seals", Mechanical Engineering, 1964, 48-55

VI. The arguments of the appellant may be summarised as follows:

The claims as upheld went beyond the original disclosure since the feature "gas discharge to the separation device" was disclosed in paragraph [0018] of the application as originally filed only in combination with further features, such as the "[gas discharge] openings 48".

The subject-matter of claim 1 as upheld did not involve an inventive step over D4 (or the similar D3), in combination with:
- common general knowledge,
- the prior use according to D1-D1c, possibly additionally accounting for D6, or
- D5.

VII. The arguments of the respondent (patent proprietor) may be summarised as follows :

Documents D5 and D6 should be disregarded, because they had been filed late and were not *prima facie* relevant.

Claim 1 as upheld did not go beyond the original disclosure and the subject-matter of the claims as upheld involved an inventive step.

VIII. The appellant requests that the decision under appeal be set aside and that the patent be revoked.

The respondent requests that the appeal be dismissed.

Reasons for the Decision

1. Consideration (admissibility) of documents

1.1 According to the appellant, the submission of D5 was a response to the reasoning of the contested decision that dynamic seals related to a different technical field from that of gas separation apparatuses.

However, in its reply to the notice of opposition, the respondent had already argued that the function of a dynamic seal was different from that of a gas separation apparatus (page 6, paragraphs 3-4). This point of view was moreover reflected in the summons to the oral proceedings at the opposition stage (point 3, third paragraph). Consequently, there was no reason not to already submit D5 at the opposition stage.

Moreover, D5 is not *prima facie* relevant, since it fails to disclose the feature "opening (70) in the disk for allowing liquid or gas flow to be treated to traverse the disk" (see disc 26 in the figure of D5).

For these reasons, in exercising the board's discretion according to Article 12(4) RPBA, D5 is not considered (admitted) into the proceedings.

1.2 D6 represents the common general knowledge of the skilled person with regard to dynamic fluid seals. Therefore, it is admitted into the proceedings (Article 12(4) RPBA).

2. Amendments

For the following reasons, the main request fulfils the requirements of Article 123(2) EPC.

2.1 The appellant was of the opinion that the feature "gas discharge to the gas separation apparatus" in claim 1 was an intermediate generalisation from paragraph [0018] of the application as originally filed.

This argument is not convincing. The combination of a gas separation apparatus with a centrifugal pump is disclosed in dependent claim 8 as originally filed, which relates to the centrifugal pump, the common shaft and the common wall and which refers back to claim 1 as originally filed, the latter relating to the details of the gas separation device.

Moreover, paragraph [0001] as originally filed, which belongs to the general part of the description, states: "It is especially advantageous to use a gas separation apparatus in accordance with the invention for separating, from the process flow, gas accumulated in the centre part or some other cavity prevailing at a reduced pressure in rotary apparatuses. An advantageous rotary apparatus worth mentioning is a centrifugal pump or a specific gas separator".

This passage implies that there has to be a gas passage from the pump to the gas separation apparatus. Otherwise it would not be possible to separate in the gas separation device the "gas accumulated" in the centrifugal pump as indicated in the end of paragraph [0001].

It is thus not necessary to resort to paragraph [0018], which belongs to the description of the preferred embodiment of Figure 2, with two specific alternatives for the gas passages, namely "gas discharge openings" or a flow "around the outer rim of the back plate of the impeller".

2.2 The appellant disputes whether paragraph [0001] of the application as originally filed could form a basis, at least not in this general form, since paragraph [0001] did not exclude an *indirect* passage of the gas extracted from the centrifugal pump to the gas separation apparatus.

This argument is not convincing either. The passage of paragraph [0001] cited above clearly indicates that it is the "gas accumulated in the centre part or some other cavity prevailing at a reduced pressure in rotary apparatuses" that is separated in the "gas separation apparatus". Thus, no indication can be found that the gas extracted from the pump was meant to be treated or conditioned in a further piece of equipment between the pump and the gas separation.

3. Inventive step

For the following reasons, the subject-matter of the claims of the main request is inventive within the meaning of Article 56 EPC.

3.1 Invention

The invention relates to a system comprising a centrifugal pump and a gas separation apparatus.

3.2 Closest prior art

It is common ground between the parties that D4 is to be considered closest prior art.

D4 discloses in Figure 3 a centrifugal pump having a rotatable shaft (shaft 12) and an impeller (rotor 10) connected to a gas separation device having a disc (disc 32), that divides the separation chamber into a front chamber (40) and a rear chamber (38) and a flow connection between the front and rear chambers around the disc's outer rim (column 5, lines 55-62). The centrifugal pump and the gas separation device are separated by a wall (annular disc 80). Vanes (blades 30) are located on the surface of the disc facing the rear chamber. Moreover, there is an opening in the disc that allows liquid or gas flow to traverse the disc and enter the rear chamber (column 5, lines 47-55).

On the other hand, it is also common ground between the parties at least that the smooth nature of the surface of the disc that faces the front chamber and the presence of ribs on the surface of the wall facing the front chamber are distinguishing features of claim 1.

As a matter of fact, in D4 there are "blades" (34) on the front side of the "disc" 32, which "prevent the pulp in the subchamber 40 from densifying and forming lumps in the subchamber 40 by generating sufficient turbulence in the pulp in the subchamber 40 (column 5, line 66 - column 6, line 2). Moreover, there are no ribs on the surface of the wall 80 facing the disc 32.

3.3 Problem to be solved

According to the patent in suit, the main problem to be solved is the provision of an apparatus that is also suitable for less fibrous suspensions and that has an improved return of the liquid from the gas separation device back to the pump (paragraphs [0008, 0009]).

3.4 Proposed solution

Claim 1 proposes solving this problem by the features of claim 1 involving, in particular, a smooth surface of the front surface of the disc and ribs on the front wall facing the disc.

3.5 Success of the solution

However, claim 1 does not specify the precise path taken by the separated liquid and consequently the liquid path cannot necessarily be considered to show an improved return. In particular, it is not specified that it flows back to the pump around the rim of the disc.

Consequently, the problem as indicated in the patent in suit is not plausibly solved.

3.6 Reformulation of the problem

In the appellant's view, the problem to be solved is in fact the provision of an apparatus that reduces the degree of turbulence in the gas separation device, making it easier to establish the liquid ring around the disc, especially during start-up of the device.

This definition of the problem to be solved is based on the distinguishing features. Moreover it relates to the drawbacks of prior art apparatuses as mentioned in paragraphs [0008] and [0009] of the patent in suit, which the patent in suit seeks to overcome.

Consequently, this reformulated problem will be used for the assessment of inventive step.

3.7 Success of the solution to the reformulated problem

Even the appellant acknowledged that the ribs and the smooth front surface result in a calming of the fluid and in a reduced degree of turbulence (see the statement setting out the grounds of appeal, page 7, paragraph 3, and page 8, paragraph 2).

The board agrees that the reformulated problem is successfully solved.

3.8 Obviousness

Moreover, the proposed solution to this problem is not obvious, as will be shown below.

3.8.1 In the appellant's view, the skilled person starting from D4 would remove the blades 34 on the front side of the disc 32 when handling less fibrous suspensions, since there was no longer the risk of clogging described in the passage bridging columns 5 and 6.

Additionally, the skilled person would, on the basis of their common knowledge, add ribs on the front wall 80 facing the front chamber 40 in order to further reduce the degree of turbulence in the front chamber.

This argument is not convincing. Firstly, in D4, column 6, lines 30 ff., a situation with a less fibrous suspension is *already* described (see in particular lines 41-45). Nothing in D4 hints at modifying the gas separation device, let alone removing the blades 34 or adding ribs on the wall 80.

Secondly, the appellant has not provided any evidence for the alleged common general knowledge that would lead the skilled person to a removal of blades on the disc and the addition of ribs on the wall facing the disc in order to reduce the degree of turbulence.

Consequently, the skilled person would not arrive at the claimed subject-matter in the light of D4 alone.

3.8.2 With regard to combining D4 with the subject of alleged public prior use as illustrated by D1-D1c, and irrespective of whether this was made available to the public and whether the ribs on the wall were present, the following is noted:

D1-D1c relate to a centrifugal pump combined with a dynamic seal. According to the appellant, the respective structures of the dynamic seal of D1 and of the gas separation device of the contested patent are similar, to the extent that the dynamic seal can be construed as the gas separation device.

D1 discloses, on pages 18-19 ("9 Gesamtzeichung mit Einzelteilverzeichnis"), a pump comprising an impeller (Laufrad 230.01), the pump being separated by a wall (Zwischendeckel 160.09) from a dynamic seal comprising a disc (Entlastungslaufrad 230.02) having vanes on the rear side and a smooth front side. Moreover, the structures on the wall 160.09, as illustrated in D1b,

can be construed as "ribs" within the meaning of claim 1. On the other hand, there is no opening in the disc for allowing liquid or gas flow to traverse the disk.

More importantly, there is no motivation of lowering the degree of turbulence in the dynamic seal section, let alone of achieving this by means of the smooth surface on the front side of the disc and by the ribs on the front wall.

Consequently, there is no reason for the skilled person to *selectively* isolate the smooth surface of the front side of the disc and the ribs on the front side of the wall of D1 and to apply them to the device of D4.

3.8.3 D6 also describes a dynamic seal. However, there is no hint towards a reduction of turbulence. Thus, even when considering this document this would lead to the same conclusions as described above.

3.8.4 The subject-matter of claim 1 therefore involves an inventive step within the meaning of Article 56 EPC.

3.8.5 This reasoning applies *mutatis mutandis* to the dependent claims as well.

3.8.6 For analogous reasons, the subject-matter of the claims also involves an inventive step over D3, since the content of D3 is very similar to that of D4 (see in particular Figure 4 of D3).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated