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**D E C I S I O N**  
of 27 September 1996

**Case Number:** T 0825/95 - 3.4.2

**Application Number:** 90420162.1

**Publication Number:** 0448897

**IPC:** B01D 25/28

**Language of the proceedings:** EN

**Title of invention:**

Homogeneous substitution method and apparatus for cake using filter press

**Applicant:**

Tsukishima Kikai Co. Ltd.

**Opponent:**

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**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56, 84

**Keyword:**

"Unallowable extension of the subject-matter: no"

"Clarity of the claims: yes"

"Inventive step (after amendments): yes"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 0825/95 - 3.4.2

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.2  
of 27 September 1996

**Appellant:** Tsukishima Kikai Co. Ltd.  
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**Representative:** Laurent, Michel  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 2 May 1995 refusing  
European patent application No. 90 420 162.1  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** E. Turrini  
**Members:** M. Chomentowski  
B. J. Schachenmann

## Summary of Facts and Submissions

- I. European patent application No. 90 420 162.1 (publication No. 0 448 897) was refused on the grounds that the subject-matter of the submitted claims 1 and 2 lacked an inventive step having regard to the document *Aufbereitungs-Technik*, vol.5, May 1971, pages 285 to 288, E. Borgmann: "Leistungssteigerung und Rationalisierung in der Druckfiltration durch Membranfilterpresse und Pressfilterautomat".

The Examining Division took the following view:

A homogeneously substitution washing method for a cake using a filter press which comprises a plurality of opposed squeezed and squeezing filter plate units and further filter and pressing elements was known from *Aufbereitungs-Technik*. It was already suggested in said document that, for reducing the consumption of the washing liquid used for washing the cake obtained by filtration and for reducing the washing time, careful pressing of the cake for blocking the channels formed in the cake during filtration was necessary. Thus, the skilled person was aware that some balancing of the pressure of the entering washing water against the pressure applied through the diaphragms pressing the filtering elements was needed to return said diaphragms to their initial position and this was only a matter of routine optimization.

- II. The appellant (applicant) lodged an appeal against this decision and requested oral proceedings auxiliarily.
- III. In a communication dated 13 June 1996, the Board of appeal expressed the opinion that the claims filed with the statement of grounds of appeal appeared to contain subject-matter extending beyond the content of the

application as filed and to lack clarity, but that annexed, amended new claims 1 and 2 could meet said objections and, taking into account the appellant's arguments, could be patentable having regard to Aufbereitungs-Technik.

IV. With letter dated 5 September 1995 (sic!) and received on 9 September 1996, the appellant expressed its agreement with the text of the claims annexed to the communication of the Board and requested that the decision under appeal be set aside and that a patent be granted on the basis of the only two claims filed with the same letter, which read as follows:

"1. A homogeneously substitution washing method for a cake using a filter press (1) which comprises a plurality of opposed squeezed and squeezing filtering plate units (2, 3), a plurality of pairs of opposed squeezed and squeezing filtering cloths (24, 25), each pair of said pairs of squeezed and squeezing filtering cloths (24, 25) being arranged between a corresponding pair of said pairs of squeezed and squeezing filtering plate units (2,3), and a plurality of diaphragms (14), each of said diaphragms (14) being arranged on each side opposed to said squeezed filtering plate unit (2) of said squeezing filtering plate unit (3) of a corresponding pair of said pairs of squeezed and squeezing filtering plate units (2,3), each diaphragm (14) having a plurality of filtering-cloth supports adapted to press said squeezing filtering cloth (25), said homogeneous substitution washing method comprising the steps of: supplying stock solution into a space between said pair of squeezed and squeezing filtering cloths (24, 25), pressurizing and dehydrating said stock solution using said diaphragms (14) to form said cake, and washing-processing said cake to obtain a clean raw material; said homogeneous substitution washing method

characterized (read "being characterized") in that: said washing-processing step further comprises the step of: in parallel with said pressurizing and dehydrating step, pouring a washing liquid into a space between a respective diaphragm (14) and a respective squeezing filtering cloth (25) abutted against said diaphragm at a pressure which slightly exceeds the pressurizing and dehydrating pressure applied to said stock solution through said diaphragm (14) and, simultaneously, gradually releasing said pressurizing and dehydrating pressure, to return said diaphragm toward the squeezing filtering plate unit (3) so that the filtering-cloth supports move away from the squeezing filtering cloth to ensure a uniform flow of the washing liquid over the entire surface of the cake."

"2. A homogeneously substitution washing apparatus for a cake using a filter press (1) which comprises a plurality of opposed squeezed and squeezing filtering plate units (2, 3), a plurality of pairs of opposed squeezed and squeezing filtering cloths (24, 25), each pair of said pairs of squeezed and squeezing filtering cloths (24, 25) being arranged between a corresponding pair of said pairs of squeezed and squeezing filtering plate units (2,3), and a plurality of diaphragms (14), each of said diaphragms (14) being arranged on each side opposed to said squeezed filtering plate unit (2) of said squeezing filtering plate unit (3) of a corresponding pair of said pairs of squeezed and squeezing filtering plate units (2,3), each diaphragm (14) having a plurality of filtering-cloth supports adapted to press said squeezing filtering cloth (25), wherein stock solution is supplied into a space between said pair of squeezed and squeezing filtering cloths (24, 25), and is pressurized and dehydrating by said diaphragms (14) to form said cake, said cake being processed in washing to obtain a clean raw material, said filter press (1) further comprising:

a filtered-liquid chamber (A) defined between said squeezed filtering unit (2) and said squeezing filtering cloth (24);

a washed-article chamber (B) defined between said squeezed filtering cloth (24) and said squeezing filtering cloth (25);

a washing-liquid chamber (C) defined between said squeezing filtering cloth (25) and said diaphragm (14);

and

a pressurizing-water chamber (D) defined between said diaphragm (14) and said squeezing filtering plate unit (3);

said homogeneous substitution washing apparatus characterized (read "being characterized") in comprising:

pump means (37) for supplying said stock solution to said

washing-article chamber (B) and for supplying washing liquid to said washing-liquid chamber (C);

flow rate control means (41) associated with said pump means (37) for controlling flow rates of said respective stock solution and washing liquid;

supply-pressure control means (45) associated with said pump means (37) for controlling pressure of said respective stock solution and washing liquid; and

supply-pressure control means (62, 64) associated with said pressurizing-water chamber (D) for controlling a supply pressure of pressurizing water;

said flow rate control means (41) controlling said flow rate of said washing liquid so that said washing liquid is supplied to said washing-liquid chamber (C) in parallel with pressurizing and dehydrating of said stock solution;

said supply-pressure control means (62, 64) associated with said pressurizing-water chamber (D) controlling said supply pressure of pressurizing water under such a condition that a pressurizing and dehydrating pressure applied to said stock solution through said diaphragm

(14) is maintained at a predetermined pressure and is relieve (read "relieved") when said pressure is exceeded; and  
said supply-pressure control means (45) associated with said pump means (37), regulating said supply pressure of said washing liquid at a pressure which slightly exceeds said pressurizing and dehydrating pressure so that the filtering-cloth supports of a respective diaphragm are moved away from said aqueezing (read "squeezing") filtering cloth toward the squeezing filtering plate unit (3) to ensure a uniform flow of the washing liquid over the entire surface of the cake."

- V. The appellant submitted the following arguments in support of its requests:

The homogeneously substitution washing method for a cake using a filter press known from Aufbereitungs-Technik does not comprise the features mentioned in the second part of present claim 1; in particular, it is derivable inter alia from Figures 3 and 4 of this document, that the step of washing is not effected simultaneously with the step of pressing, but after pressing. Indeed, it was already suggested in Aufbereitungs-Technik, for reducing the consumption of the washing liquid used for washing the cake obtained by filtration and for reducing the washing time, to carefully press the cake for blocking the channels formed in the cake during filtration. However, the several specific features recited and combined in the second part of present claim 1, in particular the newly introduced ones, are neither derivable nor rendered obvious without "ex-post facto" reasoning from Aufbereitungs-Technik and from the vague indications therein about careful intermediate pressing ("vorsichtiges Zwischenpressen"). Therefore, the method

of present claim 1 and, for the same reasons, the apparatus of present claim 2, involve an inventive step.

### Reasons for the Decision

1. The appeal is admissible.
2. *Allowability of the amendments*

The amendments resulting in the present application are based on the application as originally filed. In particular, the features of the present washing method and, in apparatus terms, of the present apparatus, that the washing liquid has its pressure slightly higher than the pressure of the pressurizing water moving the diaphragm, that said washing liquid is supplied to the washing-liquid chamber and, simultaneously, the pressure of the pressurizing water is gradually released, thereby resulting in the diaphragm being returned toward the squeezing filtering plate unit (3) and providing a homogeneous washing, i.e. ensuring a uniform flow of the washing liquid over the entire surface of the cake, without abrupt change in the conditions of washing, are disclosed originally (see page 5, line 9 to page 6, line 28; page 7, lines 2 to 14; page 13, line 20 to page 14, line 5). Therefore, the Board is satisfied that the European patent application has not been amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Article 123(2) EPC).

3. *Clarity*

Present claims 1 and 2 unambiguously define the method and apparatus to be protected. In particular, the claims include, in method and apparatus terms, respectively, the features mentioned in the preceding paragraph which, according also to the present description (see in particular page 5 bis, line 28 to page 6, line 28; page 7, lines 2 to 14; page 13, line 20 to page 14, line 5) are derivable as being essential to the performance of the invention; indeed, these features are presented as resulting in homogeneous washing of the cake without abrupt change in the conditions of washing, and thus in the cited advantages that, in particular, cracks in the cake (resulting from washing in the same apparatus) are avoided. Therefore, the Board is satisfied that the present claims are clear in the sense of Article 84 EPC.

4. *Novelty*

There can be seen no reason not to accept the conclusion in the decision under appeal, that Aufbereitungs-Technik represents the nearest prior art. Since, as will be seen hereunder in relation with the question of inventive step, this document does not show the second part of present claims 1 and 2, respectively, the subject-matter of said claims is novel in the sense of Article 54 EPC.

5. *Inventive step*

- 5.1 A homogeneously substitution washing method for a cake using a filter press and comprising substantially the features of the first part of present claim 1 is known from Aufbereitungs-Technik (see page 286, paragraph "2.

Hoesch - Membran - Kammerfilterpressen"; Figures 3 and 4; see also page 288, right-hand column, antepenultimate paragraph).

However, contrary to the method of present claim 1, in the homogeneous substitution washing method of Aufbereitungs-Technik, said washing-processing step does not further comprise the step of: in parallel with said pressurizing and dehydrating step, pouring a washing liquid into a space between a respective diaphragm and a respective squeezing filtering cloth abutted against said diaphragm at a pressure which slightly exceeds the pressurizing and dehydrating pressure applied to said stock solution through said diaphragm and, simultaneously, gradually releasing said pressurizing and dehydrating pressure, to return said diaphragm toward the squeezing filtering plate unit so that the filtering-cloth supports move away from the squeezing filtering cloth to ensure a uniform flow of the washing liquid over the entire surface of the cake.

5.2 According to the present application (see page 1, line 16 to page 3, line 18), in a homogeneously substitution washing method for a cake using a filter press, cracks in the cake resulting from the filtration can occur if the washing liquid is not homogeneously dispersed during said operation of washing. The present invention (see page 5 bis, line 28 to page 7, line 14) has as its aim the solution of this problem, and uses in particular balancing of the different fluids (washing water, liquid for moving the diaphragms, or pressurizing liquid); this is achieved by regulating simultaneously the washing water pressure and the pressure of the pressurizing liquid.

5.3 Indeed, it was already suggested in Aufbereitungs-Technik (see page 286, right-hand column, seventh paragraph), for reducing the consumption of the

washing liquid used for washing the cake obtained by filtration and for reducing the washing time, to carefully press the cake for blocking the channels formed in the cake during filtration.

However, as convincingly argued by the appellant, the several specific features recited and combined in the second part of present claim 1, in particular the new ones introduced after the decision under appeal, stressing the simultaneous, balanced pressing and washing and the intended uniform flow of the washing liquid over the entire surface of the cake, are neither derivable nor rendered obvious without "ex-post facto" reasoning from Aufbereitungs-Technik and from the vague indications therein about careful intermediate pressing ("vorsichtiges Zwischenpressen"). The further documents of the prior art do not provide either any further indication about the balancing of the pressurizing and washing liquids in the way specified in the second part of claim 1 to ensure a uniform flow of the washing liquid over the entire surface of the cake.

Therefore, the subject-matter of present claim 1 is considered as involving an inventive step in the sense of Article 56 EPC.

- 5.4 The subject-matter of present claim 2 consists in an apparatus of the type known from Aufbereitungs-Technik which moreover comprises the apparatus means adapted to carry out the technique of present claim 1 and is thus also considered as involving an inventive step for the same reasons.
6. Since a patent can be granted on the basis of the present application, the oral proceedings requested auxiliarily by the appellant are not necessary.

**Order**

**for these reasons it it decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division with the order to grant a patent on the basis of the documents presently on file, i.e.:

**Description:**

Pages 1, 2, 6, 7, 9, 10, 12 and 14 to 17 as originally filed; Pages 3 filed with applicant's letter of 21 September 1993; Pages 4, 5, 5 bis, 5 ter, 8, 11 and 13 filed with appellant's letter received on 9 September 1996;

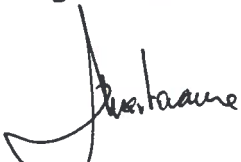
**Claims:**

Nos. 1 and 2 filed with appellant's letter received on 9 September 1996;

**Drawings:**

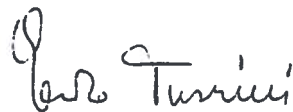
Sheets 1/2 and 2/2 as originally filed.

The Registrar:



P. Martorana

The Chairman:



E. Turrini

MCH

B. Sch.