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Datasheet for the decision of 15 October 2010

Case Number: T 0907/07 - 3.3.05

Application Number: 02751150.0

Publication Number: 1414556

IPC: B01F 3/08

Language of the proceedings: EN

Title of invention:
Process for the preparation of an emulsion or dispersion with controlled shape of the dispersed phase

Patentee:
Unilever N.V. et al

Opponent:
Friesland Brands B.V.

Headword:
Controlled shape/UNILEVER

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step (all requests): no - identification of the most suitable starting point for assessing inventive step - reformulation of the problem to be solved - technical solution derivable from the prior art"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0907/07 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 15 October 2010

Respondent: (Opponent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 28 March 2007 concerning maintenance of European patent No. 1414556 in amended form.

Composition of the Board:

Chairman: G. Raths
Members: J.-M. Schwaller
S. Hoffmann

Summary of Facts and Submissions

I. The present appeal was lodged by the patentee (hereinafter the "appellant") against the interlocutory decision of the opposition division maintaining the patent in amended form on the basis of the set of claims filed as second auxiliary request during the oral proceedings of 30 January 2007, with claim 1 - the sole independent claim of this request - reading as follows:

"1. Process for the preparation of a composition comprising at least two phases, a first phase which is a continuous phase based on oil and a second phase which is a dispersed aqueous phase containing a gelling agent, said process comprising the steps of
a) providing the continuous phase material in a fluid form,
b) providing material for the phase to be dispersed,
c) adding material for the phase to be dispersed to the continuous phase material resulting in a composition comprising at least two phases,
d) subjecting the dispersed phase to a deformation treatment by flow,
e) subjecting the dispersed phase to a fixation treatment, said fixation treatment comprising temperature treatment of a gelling agent whose setting is dependent on temperature or chemical fixation of a chemically setting gelling agent,
wherein step (e) is carried out during or after step (d) characterised in that the deformation treatment is selected from elongational flow or a combination of shear flow and elongational flow."

II. The documents cited during the opposition proceedings included the following:

D3: English translation of JP 6-039259

D5: Stone et al., J. Fluid Mech., vol. 173 (1986), pages 131 to 158.

III. With the statement of grounds of appeal dated 18 July 2007, the appellant requested as a main request that the decision be set aside and that the patent be maintained in its version as granted. Alternatively, it requested that the patent be maintained on the basis of one of the sets of claims filed on the same date as auxiliary requests 1, 2 and 3, respectively.

Independent claims 1, 10, 11 and 12 as granted read as follows:

"*1. Process for the preparation of a composition comprising at least two phases, a first phase which is a continuous phase and a second phase which is a dispersed phase, said process comprising the steps of:*
a) providing the continuous phase material in a fluid form,
b) providing material for the phase to be dispersed,
c) adding material for the phase to be dispersed to the continuous phase material resulting in a composition comprising at least two phases,
d) subjecting the dispersed phase to a deformation treatment by flow,
e) subjecting the dispersed phase to a fixation treatment,

wherein step (e) is carried out during or after step (d), characterised in that the deformation treatment is selected from elongational flow or a combination of shear flow and elongational flow.

10. Composition obtained by a process according to anyone of the preceding claims.

11. Food product comprising a composition obtained by a process according to anyone of claims 1-9.

12. Apparatus comprising a flow chamber, wherein elongational flow or a combination of shear flow and elongational flow is exerted on the contents, said flow chamber comprising a means for supply of the continuous phase, means for addition of a material for the phase to be dispersed, means for controlling the flow speed and type, means for outlet of the continuous phase, means for reducing the flow strength, and means for obtaining fixation."

IV. With a letter dated 1 February 2008, the opponent (hereinafter the "respondent") objected to the above claims on the grounds of lack of novelty and/or inventive step.

V. On 14 October 2010, the board faxed to the parties the following document found during preparation of the case:

D7: Food Hydrocolloids, vol. 15, Issue 2, 1 January 2001, pages 139 to 151.

VI. Oral proceedings took place on 15 October 2010. After discussion of the novelty of the claims of the

different requests on file, the appellant withdrew the three auxiliary requests and submitted two new sets of amended claims as auxiliary requests 1A and 1B, respectively.

Claim 1 of auxiliary request 1A reads as follows (differences to claim 1 as granted underlined):

"*1. Process for the preparation of a composition comprising at least two phases, a first phase which is a continuous phase and a second phase which is a dispersed phase, said process comprising the steps of:*
a) providing the continuous phase material in a fluid form
b) providing material for the phase to be dispersed
c) adding material for the phase to be dispersed to the continuous phase material resulting in a composition comprising at least two phases
d) subjecting the dispersed phase to a deformation treatment by flow
e) subjecting the dispersed phase to a fixation treatment
wherein step (e) is carried out during or after step (d), characterised in that the deformation treatment is selected from elongational flow or a combination of shear flow and elongational flow <u>wherein shear flow is defined as planar flow and elongational flow is defined as hyperbolic, biaxial flow</u>."

Claim 1 of auxiliary request 1B differs from claim 1 of auxiliary request 1A by the additional feature "*<u>the dispersed phase is characterised by a roundness of from 1.1 to 5.</u>*"

VII. The appellant requested that the decision under appeal be set aside and that the patent be maintained as granted. Alternatively, it requested that the patent be maintained on the basis of one of the sets of claims according to auxiliary request 1A or 1B filed during the oral proceedings before the board.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. *Main request - inventive step*

1.1 The contested patent (see paragraphs [0001] and [0007]) relates to a process for the preparation of an emulsion or dispersion with controlled shape of the dispersed phase.

1.2 As to the starting point for assessing inventive step, the appellant argued that document D3 was to be considered as the closest state of the art, as D3 disclosed a process for the preparation of an emulsion wherein the dispersed phase was deformed by a uniaxial elongation flow generated by the flow of the emulsion through a membrane.

The appellant argued that document D7 could not represent the starting point for assessing inventive step, because the object of D7 was not the preparation of dispersed particles having a controlled shape, but a study of aggregation under shear of latex particles coated with whey protein in a continuous phase.

1.3 The board cannot accept these arguments, because although document D7 concentrates on aggregates, it clearly and unambiguously discloses - as explained hereinafter - a process wherein a dispersion is prepared using the **same apparatus** (a four-roll mill), and so generating the **same type of elongational flow** (a hyperbolic, biaxial flow), as the process put into practice in the examples of the contested patent.

Furthermore, the aggregates prepared in D7 clearly and unambiguously consist of dispersed particles having an **oval** form (see paragraph 3.3 "Direct observations under dynamic conditions", second sentence), and so a "controlled" shape of the dispersed particles is obtained in D7 too.

1.4 For the above reasons and owing to the similarities between the apparatus and process conditions used in both D7 and the contested patent, the board considers that this document has the most relevant technical features in common with the subject-matter claimed, and is therefore to be considered as representing the closest state of the art and the starting point for assessing inventive step.

1.4.1 Document D7 (see D7, paragraph 2.2 "Dispersion preparation") discloses the preparation of a dispersion of whey-coated polystyrene latex particles by dissolving the particles in a small volume of a water/ethanol mixture. To reduce the amount of ethanol, the dispersion is stirred and heated to 90°C. After cooling, sodium chloride, rhodamin (used as contrast agent for the microscope micrographs) is dissolved in water, and whey protein concentrate are dissolved in

the dispersion. The pH is adjusted to 5.4 with HCl. A solution containing 10% gelatine, 10% sucrose, sodium chloride and water is prepared and heated to 60°C to dissolve the gelatine and reduce the amount of dissolved gases in the solution. After 15 mn, the temperature is reduced to around 30°C. As a final step, the particle dispersion is mixed with the same amount of gelatine solution. The dispersion is then regulated and kept at 30°C for 10 mn during stirring to avoid gelation of the gelatine.

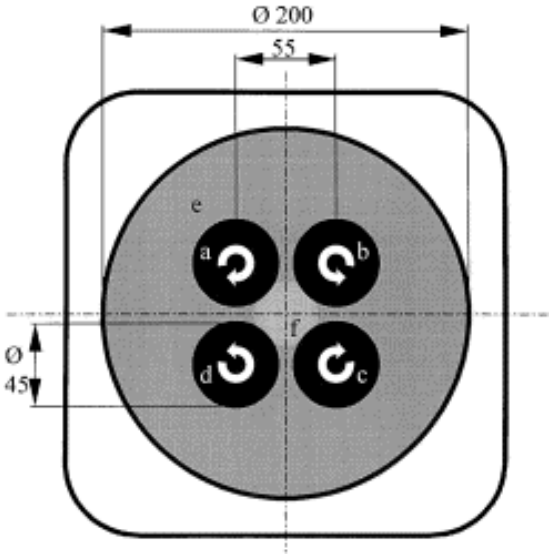
The board notes that the dispersion thus obtained comprises in particular water as the continuous phase and whey-coated polystyrene latex particles as the dispersed phase. So, it can be concluded that D7, under the heading "Dispersion preparation", discloses a process comprising the steps a), b) and c) according to claim 1 of the main request.

The question arises whether D7 also discloses steps d) (deformation treatment by flow) and e) (fixation treatment).

1.4.2 D7, paragraph 2.6, discloses that the above dispersion was studied under dynamic conditions under a microscope. The study was conducted in a four-roll mill (4-RM) with a confocal laser scanning microscope (CLSM).

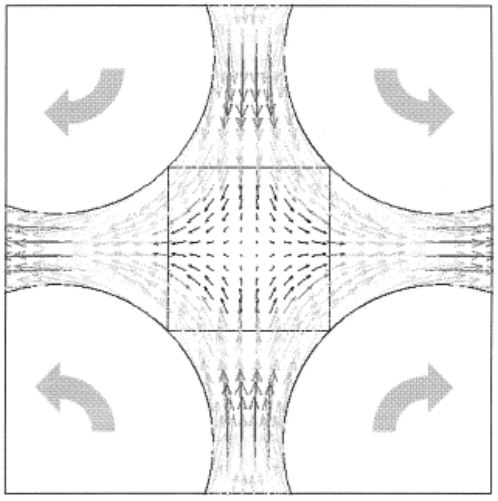
The board observes that the 4-RM - schematically represented in Fig. 1 of D7 and reproduced hereinafter - works under the same principle as the four-roll mill illustrated in Figure 3 of the contested patent, namely with two motors controlling the speeds of the four

rolls, with each motor controlling a diagonally opposite pair of rolls.



D7, Fig. 1: (a)–(d) rolls, (e) sample chamber, (f) optic window.

By letting one pair of rolls rotate in one direction and the other pair in the other direction, a typical hyperbolic flow-field - as illustrated in Fig. 2 of D7 and reproduced hereinafter - can be generated in the centre of the chamber.



The investigations were made in D7 at a roll speed of 4 rpm, with the dispersion described in point 1.3 above and with a sample chamber filled with 300g of the dispersion, the surface of which was covered with a thin layer of silicone oil. The 4-RM was placed under the CLSM so that the laser could scan near the stagnation point through the optic window at the bottom of the dish.

As explained in D7 (paragraph 3.3; page 148, right column, first seven lines), the direct observations under dynamic conditions reveal that the particles are slightly **oval** because of motion disturbance due to the continuous flow and also because the aggregates move during the scanning procedure.

Thus, the above passage clearly and unambiguously discloses that the particles of the dispersed phase are deformed (from spherical to oval) by a flow which is - as illustrated above - the same as in the contested patent, i.e. an elongated and hyperbolic biaxial flow.

1.4.3 So, as explained in points 1.4.1 and 1.4.2 above, a process according to steps a) to d) of claim 1 of the main request is disclosed in D7.

Although the dispersion according to D7 (page 141, left column, last sentence of the paragraph 2.2 "Dispersion preparation") is fixed by gelation of the gelatine when the temperature is lowered below 30°C, this operation is not carried out while studying the dispersion under dynamic conditions, but when studying it under static conditions under light microscopy (see paragraph 2.5 in D7).

So, step e) of claim 1 of the main request is not disclosed in combination with the other features of claim 1 of the main request.

1.5 As to the problem to be solved in the light of the closest prior art document D7, the appellant referred in particular to paragraphs [0005] and [0006] of the patent and stated that the problem was to be seen in the provision of a process wherein the shape of the dispersed phase, and so the properties of the composition, could be carefully controlled.

The board cannot accept this formulation of the problem because there is no evidence that any kind of shape might be obtained with the process claimed, nor is there any evidence that "the properties" of a composition might be "carefully controlled" by modification of the shape of the dispersed particles. In fact, the sole properties tackled in the contested patent are "rheological properties", however under the condition that use is made of "a monodisperse droplet size distribution of the dispersed phase" (see paragraph [0022]), but this specific feature being not defined in claim 1 at issue, the control of these properties cannot further be taken into the definition of the problem.

In this context the problem has to be reformulated in less ambitious terms. The respondent defined the problem as the provision of a process wherein the dispersed particles can be kept in a certain state for a certain time. The board can accept this definition.

1.6 As a solution to this problem, the patent in suit proposes the process according to claim 1 characterised in that the dispersed phase is subjected to a fixation treatment (i.e. step e) in claim 1).

1.7 The board is satisfied that this problem is credibly solved by the claimed process (see in particular the examples).

1.8 As to the question whether or not the proposed solution is obvious in view of the state of the art, the board observes the following:

1.8.1 As indicated in point 1.4.3 above, document D7 discloses that the dispersion prepared in accordance with its paragraph 2.2 can be fixed by gelling the gelatine by lowering the temperature below 30°C. The purpose of this fixation treatment is to allow the study of the system under a microscope and so, implicitly, to keep the system in a certain state for a certain time.

1.8.2 In any case, there is no doubt that it is common general knowledge for a skilled person that a fluid system can be kept in a certain state for a certain time for instance by freezing or by chemical setting, e.g. with gelatine. It is in particular commonly known to any ordinary person that an ice cream - which is an emulsion - is in a frozen state in order to keep the emulsion in a certain state for a certain time.

1.8.3 In this context, as the technical field of the contested patent encompasses in particular food processing (see paragraph [0002] of the contested

patent), it is trivial for the skilled person faced with the problem of keeping a system in a deformed state to fix it, for instance by freezing, or alternatively to use a chemical setting agent - such as gelatine - for the same purpose.

1.8.4 Therefore, it is concluded that the skilled person would easily arrive at the subject-matter of claim 1 of the main request in view of the disclosure of document D7 alone. Therefore, the subject-matter of claim 1 of this request does not meet the requirements of Article 56 EPC.

2. *Auxiliary request 1A - Inventive step*

The subject-matter of claim 1 of this request is distinguished from the subject-matter of claim 1 of the main request in that the shear flow is defined as a planar flow and in that the elongational flow is defined as a hyperbolic, biaxial flow.

As explained in point 1.4.2 and as can be seen from the figure reproduced in it, the flow in the four-roll mill used in D7 is hyperbolic and biaxial.

This distinguishing feature being directly and unambiguously disclosed in combination with the other features of steps a) to d) in D7, paragraphs 2.5 and 2.6, the reasoning set out under points 1.1 to 1.8 above applies *mutatis mutandis* to the subject-matter of claim 1 of this request, which therefore does also not meet the requirements of Article 56 EPC.

3. *Auxiliary request 1B - Inventive step*

3.1 The subject-matter of claim 1 of this request is distinguished from the subject-matter of claim 1 of the preceding request in that the dispersed phase is characterised by "*a roundness of from 1.1 to 5*".

3.2 The roundness values for several shapes can be seen in Figure 5 of the contested patent, reproduced below.

Figure 5

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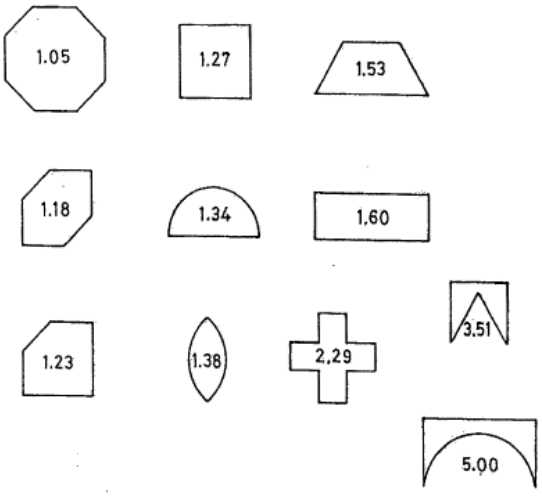
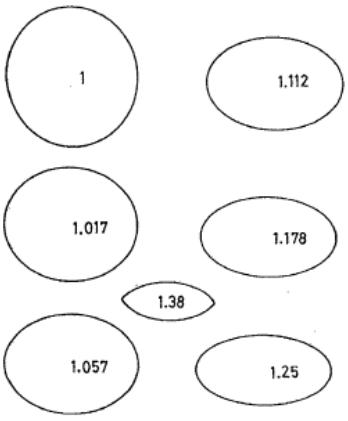


Circularity shape factors for various outlines



Circularity shape factors for ellipses

It can in particular be assessed from this figure that spheres and some ovals are now excluded from the scope of protection of claim 1 of this request, but that ovals with a more elongated form - for instance those

with a roundness of 1.112, 1.178 or 1.25 - still fall under claim 1 of this request.

3.3 So starting from D7 the problem to be solved can be seen in the provision of a process wherein different shapes of dispersed particles can be produced and wherein the particles can be kept in a certain state for a certain time.

3.4 As a solution to this problem, the patent in suit proposes the process according to claim 1 of this request characterised in that the dispersed phase is subjected to a fixation treatment and in that the dispersed phase is characterised by a roundness of from 1.1 to 5.

3.5 As to the question whether or not the proposed solution is obvious in view of the state of the art, the board observes the following:

3.5.1 Concerning the feature that the dispersed phase is subjected to a fixation step, the reasons as to why this feature is obvious from the state of the art are set out under points 1.1 to 1.8 above; they apply *mutatis mutandis* to the subject-matter of claim 1 of auxiliary request 1B.

3.5.2 As to the feature concerning the roundness of the dispersed phase, D7 discloses - as indicated in point 1.4.2 above - that particles with a slightly oval form were prepared.

It is however not directly and unambiguously derivable from D7 that the roundness of said oval particles would

fall within the roundness range defined in claim 1 at issue.

3.5.3 The skilled person is nevertheless taught by document D5 (paragraphs 3.2 and 4.1) that a drop of a silicone oil suspended in a different fluid (here: an oxidised castor oil) can be elongated in a four-roll mill to an ellipse similar to those illustrated in Figure 5 of the contested patent and having a roundness factor above 1.1. For instance, it can be seen that the shape of the second drop (identified as "i = 27.8") in the left part (a) of Figure 6 at page 140 in D5 is close to that of an ellipse having a roundness of either 1.178 or 1.25 in Figure 5 of the contested patent.

3.5.4 Bearing in mind this teaching, the skilled person starting from the process disclosed in D7 and faced with the problem defined in point 3.3 above would so arrive in an obvious manner at the subject-matter of claim 1 of auxiliary request 1B simply by associating, on the one hand, the common general knowledge that a fluid system can be kept in a certain state for a certain time by freezing or by chemical setting and, on the other hand, the teaching by document D5 that different shapes of dispersed particles can be produced with the four-roll mill known from D7.

Therefore, the subject-matter of claim 1 is derivable in an obvious manner from the state of the art, and therefore lacks inventive step within the meaning of Article 56 EPC.

4. In conclusion, none of the sets of claims at issue meets the requirements of Article 56 EPC 1973, so none of the appellant's requests is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz G. Raths