

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

**Datasheet for the decision
of 26 May 2010**

Case Number: T 1115/07 - 3.3.09

Application Number: 00932634.9

Publication Number: 1189977

IPC: C08J 3/03

Language of the proceedings: EN

Title of invention:

A continuous process of extruding and mechanically dispersing a polymeric resin in an aqueous or non-aqueous medium

Patentee:

DOW GLOBAL TECHNOLOGIES INC.

Opponent:

Hexion Specialty Chemicals Research Belgium S.A.

Headword:

-

Relevant legal provisions:

EPC Art. 54, 123(2)(3)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Amendments - allowable"
"Inventive step - yes"

Decisions cited:

G 0009/92, G 0004/93

Catchword:

-



Case Number: T 1115/07 - 3.3.09

DECISION
of the Technical Board of Appeal 3.3.09
of 26 May 2010

Respondent: Hexion Specialty Chemicals Research Belgium S.A.
(Opponent) Intellectual Property Section
Avenue Jean Monnet 1
B-1348 Ottignies-Louvain-la-Neuve (BE)

Representative: van der Straaten, Jan Anthony
Hexion Specialty Chemicals Research Belgium S.A.
Avenue Jean Monnet 1
B-1348 Ottignies-Louvain-la-Neuve (BE)

Appellant: DOW GLOBAL TECHNOLOGIES INC.
(Patent Proprietor) Washington Street - 1790 Building
Midland MI 48674 (US)

Representative: Raynor, John
Beck Greener
Fulwood House
12 Fulwood Place
London WC1V 6HR (GB)

Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
9 May 2007 concerning maintenance of European
patent No. 1189977 in amended form.

Composition of the Board:

Chairman: W. Sieber
Members: N. Perakis
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. Mention of the grant of European patent No 1 189 977 in respect of European patent application No 00932634.9 in the name of Dow Global Technologies, Inc., which had been filed as International application No PCT/US00/13844 on 19 May 2000, was announced on 23 March 2005 (Bulletin 2005/12). The patent was granted with seventeen claims, whereby the (sole) independent Claim 1 and dependent Claim 2 read as follows:

"1. A continuous method for preparing a stable dispersion or emulsion comprising the step of merging into a mechanical disperser a stream of a molten or liquid disperse phase containing a polymer with a stream of a molten or liquid continuous phase to form a dispersion or an emulsion, wherein

- a) the continuous phase is substantially immiscible with the disperse phase; and
- b) the polymer is self-dispersable and
- c) the polymer is continuously extruded in an extruder that is coupled to the mechanical disperser."

"2. The method of Claim 1 wherein **the continuous phase is water or polyether polyol.**" [*emphasis added by the board*]

II. A notice of opposition was filed by Resolution Research Belgium S.A. (now Hexion Specialty Chemicals Research Belgium S.A.) on 16 December 2005 requesting revocation of the patent in its entirety on the grounds of Article 100(a) EPC, namely that the claimed subject-

matter lacked novelty and did not involve an inventive step.

During the opposition proceedings the following documents *inter alia* were cited:

D5: WO-A- 97/45476; and

D6: DE-A- 2 104 044.

At the oral proceedings held before the opposition division on 14 March 2007, the opposition division decided to maintain the patent in amended form on the basis of claims 1 to 7 according to the second auxiliary request filed on that day.

Claim 1 of that request read as follows:

"1. A continuous method for preparing a stable dispersion or emulsion comprising the step of merging into a mechanical disperser a stream of a molten or liquid disperse phase containing a polymer with a stream of a molten or liquid continuous phase to form a dispersion or an emulsion, wherein

- a) **the continuous phase is polyether polyol** and is substantially immiscible with the disperse phase; and
- b) the polymer is self-dispersable and
- c) the polymer is continuously extruded in an extruder that is coupled to the mechanical disperser."

[emphasis added by the board]

According to the decision announced at the oral proceedings and issued in writing on 9 May 2007 the subject-matter of the main request corresponding to the granted claims was obvious from D5, considered to

represent the closest state of the art, in combination with D6.

III. The appellant (patent proprietor) appealed the decision of the opposition division on 6 July 2007 and paid the appeal fee on the same day. The statement setting out the grounds of appeal was filed on 20 August 2007. It was accompanied by arguments and two auxiliary sets of claims. For the arguments of the appellant reference is made to section VII below.

IV. With a letter of 18 May 2010 the appellant filed in reaction to a communication from the board two new auxiliary requests replacing the previous auxiliary requests.

Claim 1 of the second auxiliary request read as follows:

"1. A continuous method for preparing a stable dispersion or emulsion comprising the step of merging into a mechanical disperser a stream of a molten or liquid disperse phase containing a polymer with a stream of **a molten or liquid continuous phase which is water or a polyether polyol** to form a dispersion or an emulsion, wherein

- a) the continuous phase is substantially immiscible with the disperse phase; and
- b) the polymer is self-dispersable and
- c) the polymer is continuously extruded in an extruder that is coupled to the mechanical disperser."

[emphasis added by the board]

V. With a letter dated 20 December 2007 the opponent/respondent submitted observations regarding

the lack of inventive step of the subject-matter of the granted claims. For the arguments of the respondent reference is made to section VIII below.

VI. On 26 May 2010, oral proceedings were held before the board, at which the respondent, as announced by letter dated 18 March 2010, was not represented. In the course of the discussion, the appellant withdrew its previous main request (claims as granted) and its first auxiliary request. Thus, the second auxiliary request filed with the letter dated 18 May 2010 became the appellant's sole request.

VII. The arguments put forward by the appellant in its written submissions and at the oral proceedings can be summarized as follows:

- The subject-matter of Claim 1 resulted from the introduction of the subject-matter of granted Claim 2 into that of granted Claim 1, limiting the continuous phase to water or polyether polyol, and was thus formally allowable.
- The claimed subject-matter contained an alternative according to which the continuous phase was a polyether polyol. This alternative was not open for consideration because it corresponded to the subject-matter of Claim 1 maintained by the opposition division, against which no appeal had been lodged by the opponent.
- The appeal thus concerned the alternative according to which the continuous phase in the subject-matter of Claim 1 was water. This subject-matter was novel over D5, which did not disclose an extruder coupled to a mechanical disperser.

- This subject-matter also involved an inventive step over the alleged combination of D5 with D6.
- D5, which was considered to represent the closest state of the art, disclosed only an extruder. On the basis of this fundamental structural difference, the technical problems dealt with in D5 did not relate to the technical problem of the claimed invention (steam pressure build-up), which involved an extruder coupled to a disperser. Nor could this problem be derived from D5 without using hindsight.
- The claimed subject-matter was also not obvious from D5 in combination with D6. D6 was a rather old document which belonged to a different technical field and dealt with a different technical problem, namely the provision of an apparatus for the continuous dispersion of a dispersible (solid) medium in a plastic mass. Therefore the skilled person would not have taken it into consideration at all.
- Finally the skilled person starting from D5 and aiming at improving the continuous process by avoiding the steam pressure build-up in the extruder would not find it obvious to modify the known process in such a manner that the extrusion would be carried out in a separate disperser coupled to the extruder. On the one hand the state of the art did not provide any motivation in that direction and on the other hand the skilled person based on his general technical knowledge would not have expected that the coupling of a disperser to an extruder would provide a final, stable emulsion/dispersion.

VIII. The arguments put forward by the respondent in its written submissions with respect to the subject-matter

of granted Claim 1, which apply also to the subject-matter of Claim 1 as amended during the appeal proceedings, can be summarized as follows:

- D5 should be considered as the closest state of the art. This document discloses a dispersing step occurring after an extrusion step in an extruder, ie "sequentially". This term implies the concept of having the extrusion step separated from the dispersion step. This document also discloses that the extrusion and the dispersion are carried out in a continuous way.
- D6 should be considered as the second-most relevant document. The skilled person would have taken it into consideration since this document had been cited in the international phase in which the EPO acted as IPEA and since in the proceedings before the opposition division it had been considered to disclose the combination of an extruder with a disperser.

IX. The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of Claims 1 to 16 submitted as the second auxiliary request with the letter of 18 May 2010.

The respondent requested in its written submissions that the appeal be dismissed.

Reasons for the Decision

1. *Admissibility of the appeal*

The appeal is admissible.

2. *Scope of the appeal*

The subject-matter of amended Claim 1 of the sole request of the appellant relates to a continuous method for preparing a stable dispersion or emulsion according to which the stream of the molten or liquid continuous phase is (i) water or (ii) a polyether polyol.

As far as alternative (ii) is concerned the board remarks that it corresponds to the subject-matter which the opposition division in its interlocutory decision (see points 5 and 6) has considered to be patentable.

Since the opponent did not challenge the interlocutory decision of the opposition division, the scope of the appeal proceedings is restricted to the examination of the decision which adversely affects the appellant given the binding effect of the statement in the notice of appeal on the other party's requests or on *ex officio* examination (see G 9/92 paragraphs 1, 7 and 9 and G 4/93, both OJ EPO 1994, 875).

Accordingly, questioning *ex officio* the patentability of the subject matter found patentable by the opposition division would amount to a decision *ultra petita*.

Therefore the outcome on the issue of the patentability of the claimed subject-matter will depend on the

patentability of alternative (i) of the claimed subject-matter.

3. *Amendments under Article 123(2) and 123(3) EPC*

Claims 1-16 of the appellant's sole request correspond to the granted claims with the following amendments:

- the subject-matter of Claim 1 has been limited by the insertion of the preferred embodiment of granted Claim 2, and
- the remaining claims have been renumbered.

The board considers that these amendments fulfil the requirements of articles 123(2) and (3) EPC. Nor did the opponent raise any objection in this context.

4. *Inventive step*

4.1 The closest state of the art

The board considers D5 to represent the closest state of the art since it belongs to the same technical field as the claimed invention, namely the continuous preparation of stable dispersions of polymer particles by extrusion and dispersion. Furthermore, D5 has also the most technical features in common with the claimed invention.

In particular, D5 discloses a continuous process for preparing a polymer particulate dispersion in a liquid carrier which comprises forming a molten mixture of a polymeric resin and a crosslinker under extrusion conditions (whereby substantial crosslinking potential is retained) and thereafter dispersing the still-molten

polymer composition into the liquid carrier and allowing the molten, dispersed mixture to solidify to form particles (Claim 1). The apparatus of D5 is simply a conventional extruder (Claim 8), which has an intermediate liquid injection port between the main intake and the exit port. Resin and crosslinker are introduced into the extruder through the main intake, and are heated and mixed together as they pass through the extruder so as to form a molten mixture before they reach the liquid injection port. A liquid carrier is introduced into the extruder through the injection port, and the molten material becomes dispersed in the liquid medium. The liquid carrier is immiscible with the molten polymer (page 6, lines 3-5). Control of the process in accordance with D5 can be achieved by variation of the flow rates of the molten material entering at the main intake, and of the continuous phase introduced through the intermediate liquid injection port.

In Example 2 a polymer resin based on hydroxyl acrylic resin is dispersed in water/aqueous ammonium hydroxide solution, and in Example 3, Composition 1, Uralac P2127, a carboxy functional polyester (page 9, lines 17-18), is dispersed in water. Due to the presence of ionic groups or potentially ionic groups such as carboxylic acids the polymers used in Examples 2 and 3 are self-dispersing, as defined in the patent in suit (see patent specification, paragraph [0013]).

However, D5 does not suggest at all the concept of a separate disperser coupled to the extruder. As explained above, the extrusion and the dispersion in

the process of D5 take place sequentially, but in the same apparatus, namely an extruder.

4.2 The technical problem

The opposed patent aims at the provision of a continuous process for the preparation of stable aqueous dispersions of a resinous material directly from an extruder without first having to solidify, then grind, then sieve, the resin (paragraph [0005]). However, this problem is already solved by the process of D5 (page 2, lines 6-7 in combination with page 2, line 27 to page 3, line 2).

The opposed patent, paragraph [0010], further discloses that the claimed process eliminates steam pressure build-up in the extruder, because water is not added to the extruder but rather to a stream containing the resin melt after the melt has exited from the extruder. As convincingly explained by the appellant, this problem inevitably occurs in the process of D5. Thus, the objective technical problem over D5 has to be seen in the provision of a continuous method for preparing a stable dispersion avoiding the disadvantage of the method of the closest prior art, namely the steam pressure build up in the extruder.

The board has no doubt that the differentiating feature of the claimed process, namely the use of an extruder coupled to a mechanical disperser, provides the solution of this technical problem, because water is not introduced into the extruder.

4.3 Obviousness

The question which remains to be answered is whether the skilled person starting from the disclosure of D5 and aiming at a continuous method for preparing a stable dispersion or emulsion which avoids the steam pressure build-up in the extruder would consider the following modifications obvious: to use two distinct apparatuses for mixing (extruder) and dispersing (mechanical disperser), whereby the continuous phase, ie water, is added to the stream containing the resin melt after the melt has exited from the extruder.

The board concurs with the appellant that the available state of the art does not provide any hint to the skilled person to modify the closest prior art in the way set out in Claim 1.

D5 itself does not contain any hint to carry out the mixing and the dispersing step in two separate apparatuses. In fact, D5 does not even mention the problem of steam pressure build-up.

Furthermore, the board does not consider, in disagreement with the respondent, that the skilled person would find the hint for those modifications in D6 (figure; page 3, second paragraph; page 5, third and fourth paragraphs). Although D6 discloses the technical principle of coupling an extruder to a disperser in order to independently control and optimize the operation of the extrusion and the dispersion steps, it does not disclose, explicitly or implicitly, that the continuous phase is water (or any other low viscosity liquid phase). D6 is concerned, as a matter of

practical technical reality, with a completely different field of endeavour from the field with which the claimed process concerns itself. Thus the word "dispersing" used in D6 has the meaning of "dispersing" solid pigments or the like in a solid or semi-solid mass of a substance such as a molten plastic, paint resin or the like (page 1, third paragraph). Consequently D6 is not concerned at all with steam pressure build-up. Hence, in the board's understanding, the skilled person would not consider combining the teaching of D6 with the closest state of the art, since there is no motivation in D6 to use an extruder coupled to a disperser in order to solve the objective technical problem arising from D5. In fact, the combination of D5 and D6 appears to be based on an *ex post facto* analysis of the claimed invention.

In summary, the modifications which lead to the solution of the technical problem would not have been obvious to the skilled person in the light of the available state of the art.

- 4.4 On the basis of the above considerations the board comes to the conclusion that the subject-matter of Claim 1 involves an inventive step.
- 4.5 The subject-matter of dependent Claims 2 to 16, which correspond to preferred embodiments of the subject-matter of Claim 1, involves *mutatis mutandis* an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of Claims 1-16 submitted as second auxiliary request with letter of 18 May 2010, after any necessary consequential amendment of the description and the figure.

The Registrar:

The Chairman:

G. Röhn

W. Sieber