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**D E C I S I O N**  
**of 28 May 1998**

**Case Number:** T 0149/95 - 3.3.4

**Application Number:** 86112535.9

**Publication Number:** 0235352

**IPC:** C12H 1/04

**Language of the proceedings:** EN

**Title of invention:**

Hydrated silica gel for stabilization treatment of beer

**Patentee:**

FUJI-DAVISON CHEMICAL LTD., et al

**Opponent:**

Akzo Nobel N.V.

**Headword:**

Silica gel/FUJI

**Relevant legal provisions:**

EPC Art. 54, 56

**Keyword:**

"Novelty (yes) - after amendments"

"Inventive step (yes)"

**Decisions cited:**

G 0004/92

**Catchword:**



Case Number: T 0149/95 - 3.3.4

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.4  
of 28 May 1998

**Appellant:** FUJI-DAVISON CHEMICAL LTD.  
(Proprietor of the patent) 1846, Kozoji-cho 2-chome  
Kasugai-shi  
Aichi-ken (JP)

**Representative:** Vetter, Hans, Dipl.-Phys. Dr.  
Patentanwälte  
Dipl.-Ing. Rudolf Magenbauer  
Dipl.-Phys. Dr. Otto Reimold  
Dipl.-Phys. Dr. Hans Vetter  
Hölderlinweg 58  
D-73728 Esslingen (DE)

**Respondent:** Akzo Nobel N.V.  
(Opponent) Velperweg 76  
NL-6824 BM Arnhem (NL)

**Representative:** Schalkwijk, Pieter Cornelis  
AKZO NOBEL N.V.  
Patent Department (Dept. C0)  
P.O. Box 9300  
NL-6800 SB Arnhem (NL)

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 18 November 1994  
revoking European patent No. 0 235 352 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** U. M. Kinkeldey  
**Members:** L. Galligani  
S. C. Perryman

## Summary of Facts and Submissions

I. The appellants (patentees) lodged an appeal against the decision of the opposition division issued on 18 November 1994 whereby the European patent No. 0 235 352, which had been opposed by the respondents under Article 100(a) EPC, was revoked pursuant to Article 102(1) EPC.

II. Claims 1 to 6 as granted read as follows:

"1. A method of treating beer, comprising:  
adding a hydrated silica gel which has a specific surface area of 530 - 720 m<sup>2</sup>/g, a pore volume of 0.9 - 1.5 ml/g, a mean pore diameter of 5 - 12 nm (50 - 120 Å), a water content of 7 - 25% by weight and a PH, which as a 5% aqueous suspension, is 6.0 - 8.0 to beer so that the silica absorbs and removes colloidal components which causes haze in beer; and separating silica gel from the beer.

2. A method of claim 1, wherein the silica gel is body fed to beer in a filtering step, thereby absorbing and removing colloidal components which causes haze in the beer, and then the silica is filtered from the beer.

3. A hydrated silica gel for a stabilizing treatment of beer, the silica gel having a specific surface area of 530 - 720 m<sup>2</sup>/g, a pore volume of 0.9 - 1.5 ml/g, a mean pore diameter of 5 - 12 nm (50 - 120 Å), a water content of 7 - 25% by weight and a PH, which as a 5% aqueous suspension, is 6.0 - 8.0.

4. A hydrated silica gel according to claim 3, wherein the silica gel, in a hydrated state of colloidal particles, has a three-dimensional network structure.

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5. The hydrated silica gel according to claim 4, wherein the silica gel has a water activity value less than 0.62.

6. The hydrated silica gel according to claim 3 wherein the silica gel is prepared by drying silica hydrogel while the water content of the silica is controlled within the range of 7 - 25% by weight."

III. The decision of the opposition division was based on amended claims 1 to 5 as a main request and claims 1 to 2 as an auxiliary request, the latter being identical to claims 1 and 2 of the main request. Claims 1 to 2 and 4 to 5 of the latter were identical to the corresponding granted claims. Amended claim 3, which resulted from the incorporation into claim 3 as granted of the features of granted claim 6, contained the additional feature "measured by means of a nitrogen adsorption method at a nitrogen relative pressure of 0.931" in relation to the pore volume.

The opposition division considered that the claimed hydrated silica gel as well as its use in treating beer lacked novelty under Article 54 EPC having regard to the following document:

(1) GB-A-981 715

which, by way of reference, incorporated also the contents of the following document:

(6) GB-A-938 153.

IV. The respondents (opponents) replied to the statement of grounds of appeal. Further submissions from the appellants were received.

- V. The board issued a communication pursuant to Article 11(2) of the rules of procedure of the boards of appeal with an outline of the issues to be discussed at the oral proceedings.
- VI. The respondents informed the board that they would not be represented at the oral proceedings. However, they maintained their request that the appeal be dismissed.
- VII. In reply to the board's communication, the appellants filed a new set of claims (claims 1 to 5) together with the affidavit of Dr Ito.
- VIII. Oral proceedings took place on 28 May 1998. As a sole claim request during oral proceedings claims 1 to 3 as follows were submitted:

1. A method of treating beer, comprising:  
adding a hydrated silica gel which has a specific surface area of 530 - 720 m<sup>2</sup>/g, a pore volume of 0.9 - 1.5 ml/g measured by means of a nitrogen adsorption method at a nitrogen relative pressure of 0.931, a mean pore diameter of 5 - 12 nm (50 - 120 Å), a water content being controlled to 7 - 25% by weight in the course of dehydration of the silica hydrogel, a pH, which as a 5% aqueous suspension, is 6.0 to 8.0, and in a hydrated state of colloidal particles a three-dimensional network structure and a water activity value less than 0.62 to beer so that the silica adsorbs and removes colloidal components which causes haze in beer; and separating silica gel from the beer.

2. A method of claim 1, wherein the silica gel is body fed to beer in a filtering step, thereby adsorbing and removing colloidal components which causes haze in beer, and then the silica is filtered from the beer.

3. A hydrated silica gel for a stabilizing treatment of beer, the silica gel having a specific surface area of 530 - 720 m<sup>2</sup>/g, a pore volume of 0.9 - 1.5 ml/g measured by means of a nitrogen adsorption method at a nitrogen relative pressure of 0.931, a mean pore diameter of 5 - 12 nm (50 - 120 Å), a water content being controlled to 7 - 25% by weight in the course of dehydration of the silica hydrogel, a pH, which as a 5% aqueous suspension, is 6.0 to 8.0, and in a hydrated state of colloidal particles a three-dimensional network structure and a water activity value less than 0.62."

IX. The appellants essentially maintained that the subject-matter of the amended claims was novel having regard in particular to documents (1) and (6). Moreover, in their view, it involved an inventive step having regard to prior art cited during the opposition-appeal proceedings.

X. In their written submissions, the respondents had maintained that a person skilled in the art, when following the disclosure of document (1) and, for specific details, that of document (6), inevitably arrived at a silica gel having the same characterizing technical parameters as that of the patent in suit (reference being made in their submissions to the claims of the main request before the opposition division; cf, Section III supra) . Moreover, document (1) disclosed also a method of treating beer based on the use of the said silica gel. Thus, in their view, the subject-matter of all claims was not novel. In the course of the opposition proceedings, the respondents had also argued against the inventive step of all claims as granted on the basis of the combination of document (1) with the following document:

(3) Typed text of an article by H. Miedaner with title "Stabilisierungsmittel für Durchlaufkontaktverfahren", said to correspond to the oral presentation at the EBC Symposium "Filtration" in Weihenstephan (Germany) on 26-27 November 1973 (see Brauwelt, Jg. 114 (1974) Nr 51, 17 July, document (9));

or, alternatively, on the basis of the combination of the said document (3) with the following document:

(2) FR-A-2 021 756.

XI. The appellants requested that the decision under appeal be set aside and the patent be maintained on the basis of claims 1 to 3 submitted at the oral proceedings on 28 May 1998.

The respondents requested that the appeal be dismissed.

### Reasons for the decision

#### *The formal requirements (Articles 123(2)(3) and 84 EPC)*

1. The extent of protection conferred by the claims 1 to 3 at issue is narrower than that conferred by the independent claims 1 and 3 as granted as both the method and product claims now contain further limiting features taken from the dependent claims 4 to 6 as granted. The change in the wording "**absorbs**" (granted claims) to "**adsorbs**" (present claims) does not affect the extent of protection conferred by the claims because, in spite of the obviously erroneous formulation in the claims as granted, the function meant for the silica gel is unambiguously understood as being that of "adsorbing", ie the concentrating haze-

causing colloidal particles on its surface (cf application as filed which referred exclusively to adsorption). Thus, there is no objection under Article 123(3) EPC.

2. The hydrated silica gel of claim 3 characterised on the whole by the features recited therein and its use in a method for treating beer according to claims 1 and 2 find a fair basis in the application as filed. The latter, apart from stating the specific ranges of the surface area, pore volume, mean pore diameter and pH (cf page 4, seventh paragraph, and original claim 1, taking into account the obvious error in relation to the pH range), explicitly refers to the step of controlling the water content to 7 - 25% by weight in the course of dehydration of the silica hydrogel (cf passage bridging pages 9 and 10), to the hydrated state of colloidal particles, to the three-dimensional network structure (cf original claim 2) and to a water activity value less than 0.62 (cf original claim 4). Moreover, the application as filed refers on page 18 to the fact that the pore volume is measured by means of a nitrogen adsorption method at a nitrogen relative pressure of 0.931. Thus, the subject-matter of the claims at issue does not extend beyond the content of the application as filed. Consequently, no objection under Article 123(2) EPC is seen by the board.
3. The claims at issue satisfy also the clarity requirements of Article 84 EPC.

*Novelty (Article 54 EPC)*

4. The opposition division decided that the subject-matter of the patent in suit is not novel, in agreement with the opponents-respondents, on the basis of the teaching of document (1), account being taken also of the



technical details of document (6) which are incorporated by way of reference. Although independent claims 1 and 3 before the opposition division were different from the independent claims 1 and 3 presently at issue, it is observed that the novelty objection was held valid for the subject-matter of all claims, ie also for the dependent claims from which the further features now characterising the present subject-matter have been derived.

5. Document (1) concerns a method for treating beer in order to reduce haze characterised by the addition of a finely powdered silica gel which has inter alia the following features:

- a) surface area of 200 to 600 m<sup>2</sup>/g;
- b) pore volume of 0.5 to 1.5 ml/g;
- c) a pore diameter of 40 to 180 Å;
- d) a pH, in a 5% suspension, of 4.0 to 8.0.

As confirmed on page 2, line 34 of the patent in suit, the silica gel of document (1) is a xerogel, ie a dehydrated gel. In respect of this gel, document (1), makes explicit reference to document (6) (cf page 1, lines 28 to 39) and, thus, the technical teaching of the latter is considered to be an integral part of the disclosure of document (1). Document (6) indicates that the gel should preferably be considerably dehydrated (cf page 2, lines 17-20) and exemplifies drying at 200°C. Neither document (1) nor document (6) provide specific data in respect of the water content by weight of the gel.

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6. It is observed that the parameters a) to d) overlap with the ranges given for the same parameters in claim 3 at issue.

Apart from the indication in present claim 3 of the nitrogen relative pressure at which the pore volume was measured, which is considered to be of little or no relevance, the silica gel as presently claimed is further characterised by:

- e) the fact that its water content is controlled to 7 to 25% by weight in the course of dehydration;
- f) a water activity value less than 0.62;
- g) a three dimensional network structure in a hydrated state of colloidal particles.

None of the above features e) to g) are explicitly indicated in documents (1) or (6). The question arises whether these features can be considered as being inherently disclosed in the said documents.

7. The water content (e) is a particularly controversial issue in this case. This is because:

- On the one hand, the opponents-respondents maintain that drying at 200°C as taught in documents (1) or (6) reduces the water content to a value falling within the range recited by feature e). In support of their contention, during the opposition proceedings they submitted a declaration by Mr Leliveld who stated that he obtained a silica gel with a water content of 7% (cf item 7) or 9% (cf item 6) by working according to document (1), with the drying details of document (6).

- On the other hand, the appellants maintain that a xerogel is characterised by a water content below 7%, and argue that by carrying out the teaching of document (1), as done by Mr Leliveld, one would **not** arrive at a silica gel with a structure identical to that of the gel according to the patent in suit. In support of this contention, during the appeal proceedings, they submitted the affidavit by Mr Matsuhiko Ito, who stated that, by repeating the experiments of Mr Leliveld, he obtained a silica xerogel with a structure different from the silica hydrogel of the patent in suit as shown by the NMR analysis.

8. Limiting for the time being the discussion to the question whether feature e) can inherently be derived from the teaching of document (1), account being taken of the technical information of document (6), the board notes that the only detail given therein in respect of the drying step is the temperature (200°C), nothing being said in either document about the drying time or the moisture content. Document (6) indicates only that the gel should preferably be "considerably dehydrated".

Mr Leliveld in his declaration states that he "dried at 200°C to a moisture content of 9% by weight" (see item 6) or "dried at 200°C to a moisture content of 7% by weight" (see item 7), no indication being given about the drying time. It is not clear whether drying took place under controlled conditions in order to obtain the stated moisture content (ie by working with a view to the result to be achieved) or whether the said moisture content was automatically achieved by drying at 200°C for an unspecified time period. Under these circumstances, the board is bound to conclude that the said declaration cannot constitute a definite proof that the xerogel of documents (1) or (6) had

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inherently a water content falling within the range recited by feature e). In this respect, the opponents-respondents have not succeeded in discharging their onus of proof.

9. In any case, the hydrated silica gel of claim 3 is now further characterised by features f) and g) which are equally not indicated in documents (1) or (6). In particular, in respect of feature f) no proof is available to the board that, as stated by the opponents-respondents during the opposition proceedings, "all silica gels with a water content below 20% by weight will satisfy this parameter" (cf annex to the notice of opposition, page 3) and, consequently, it was also inherent in the teaching of documents (1) or (6).
  
10. As already stated above, the claimed silica gel is presently characterised by a combination of features which all have to be satisfied in order for it to achieve the desired function of effectively adsorbing haze-causing components from beer. According to the patent specification, any departure from the recited ranges results in an ineffective gel (cf page 3, lines 38-47 as well as page 5, lines 7 to 9). Moreover, the patent specification attaches great importance to the **control** of the water content in the course of dehydration as this critically influences the structure of the claimed silica gel, which is defined as a "hydrated silica gel". In this respect, the specification states (cf specification page 5, lines 2 to 9): "The "hydrated silica gel" ... means a silica gel from a state where no more reduction in the pore volume occurs in the course of dehydration of the "silica hydrogel", ie a strong colloidal particle three-dimensional structure (silica xerogel structure) has been formed and also still hydrated to a state

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immediately before becoming the "silica xerogel". In short, the hydrated silica in accordance with this invention is a silica gel having a silica xerogel structure in a hydrated state."

11. In the board's judgement, this specific teaching is not inherent or "hidden" in documents (1) or (6), nor in any other document cited during the opposition proceedings. For these reasons, novelty of the subject-matter of product claim 3 is acknowledged. This of course implies that also method claims 1 and 2, being based on the use of the new silica gel for treating beer, are novel.

*Inventive step (Article 56 EPC)*

12. In the board's view, the closest prior art is represented by document (1) (cf point 5 supra).
13. In the light of document (1), the problem to be solved was the preparation of an alternative silica gel particularly suitable for treating beer.
14. As a solution thereto, the hydrated silica gel of claim 3 is proposed. This is characterised by a combination of physical parameters which reflect its particular structure which is said to be that of a xerogel in a hydrated state. The exemplified use of this silica gel in a method for treating beer according to claims 1 and 2 shows that it is particularly effective in improving haze stability of beer (cf Tables 1 and 2), especially when comparison is made with commercially available hydrogels or xerogels (cf Table 3).

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15. The relevant question is whether the skilled person, starting from the teaching of document (1), would have readily derived from this document or any other prior art document(s) a hint or suggestion in the direction of preparing a silica gel characterised by the combination of physical parameters recited in claim 3. It should in particular be decided whether the skilled person would have readily derived from the prior art or common general knowledge the suggestion of **controlling** the moisture content of the gel in the course of the dehydration so as to achieve a value within the range 7 - 25% by weight.

16. In the board's view, such a suggestion would not have been derivable from documents (1) or (6) because the actual suggestion therein is to prepare preferably "considerably dehydrated" gels. This goes against a **controlled** drying step.

As for document (2), this refers generally to xerogels obtained by drying either by pulverisation at 175 - 200°C or in an oven at 200°C, nothing being said about the moisture content of the dried gel. In the board's view, this would direct the skilled person to the preparation of "considerably dehydrated" gels, as in the case of documents (1) and (6).

17. The respondents in arguing against inventive step in their written submissions relied also on document (3) which in their view corresponds to an oral presentation at a symposium in 1973 as allegedly shown by the publication in the journal Brauwelt in 1974 (document (9)). Document (3) is merely a typed text bearing no date and unaccompanied by any declaration or affidavit by the author. The board sees no possible ways to link the contents of this document to document (9). Under these circumstances, document (3) has to be disregarded

as there is no evidence that it represents information available to the public. However, the contents of document (9) can be taken into account because there is evidence that it was published. This document refers generally to the use of silica gels in the stabilisation of beer. It reports the use of twelve silica gels, subdivided into hydrogels with a water content above 45% and xerogels with a water content below 6%, one of them being a gel with an intermediate water content of 12.4% but no information being available whether it satisfies the other parameters of claim 3. For the 12.4% water content gel, no physical parameters of any kind are mentioned in the article. Moreover, the use of this gel is not emphasised in any way. Thus, in the board's judgement, the skilled person, faced with the stated technical problem, starting from the teaching of document (1), had no reasons to focus his or her attention on any particular gel described in general terms in document (9), including the gel with an intermediate water content. Thus, even when considering document (9), the skilled person would **not** have arrived at a silica gel of claim 3. This of course implies that the skilled person would not have arrived at the claimed method using it in treating beer.

18. For these reasons, in the board's judgement the subject-matter of the claims presently at issue involves an inventive step.

*Basis of the decision*

19. Although duly summoned, the respondents did not attend oral proceedings (cf Section VI supra). According to the decision G 4/92 (OJ EPO 1994, 149), a decision against a party who has been duly summoned but who does not appear at oral proceedings may not be based on

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facts put forward for the first time during those oral proceedings.

20. In the present case, the board decided in substance on the maintenance of the patent on the basis of a claim request filed at oral proceedings in the absence of the respondents. In the board's judgement, this is not in conflict with the quoted decision of the Enlarged Board of Appeal because the submission of a new request in which the new independent claims incorporate the features of dependent claims which have always been part of the application and the patent granted thereon involves no new facts. This is a request that the respondents could have expected. A respondent who chooses not to be present at oral proceedings must be considered to have accepted the risk that the claims will be narrowed by reference to what has been specifically described, and that the patent may be upheld on this basis.

*Other matters*

21. As the patent is to be maintained on the basis of a more limited claim request, the first instance to which the case is remitted will have to reconsider whether the description requires amendments in order to be adapted to the present request.

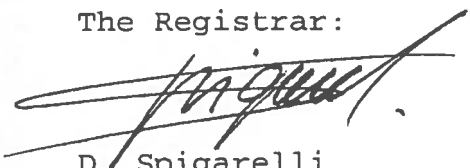


**Order**

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

1. The decision under appeal is set aside.
  
2. The matter is remitted to the first instance with the order to maintain the patent on the basis of claims 1 to 3 submitted at the oral proceedings on 28 May 1998 and a description to be adapted.

The Registrar:



D. Spigarelli

The Chairperson:



U. M. Kinkeldey

a.  
P.P.

