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**D E C I S I O N**  
**of 14 September 1993**

**Case Number:** T 0246/91 - 3.3.1

**Application Number:** 85900903.7

**Publication Number:** 0186663

**IPC:** C09K 7/02

**Language of the proceedings:** EN

**Title of invention:**

Gel and process for retarding fluid flow

**Applicant:**

Oxy USA Inc.

**Opponent:**

-

**Headword:**

Gel-forming composition/OXY

**Relevant legal norms:**

EPC Art. 56, 82, 84

EPC R. 29(5)

**Keyword:**

"Inventive step (acknowledged, after amendment)"

"Definition of the technical problem"

"Reasonable number of claims; undue burden on public if number is large"

**Decisions cited:**

T 0495/91

**Catchword:**

What is a reasonable number of claims (Rule 29(5) EPC) depends on the facts and circumstances of each particular case. In the present application, to construe 157 claims imposes a severe and undue burden on the public (No. 7.2).



**Case Number:** T 0246/91 - 3.3.31

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.1**  
**of 14 September 1993**

**Appellant:** Oxy USA Inc.  
PO BOX 300  
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**Representative:** Jack, Bruce James  
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**Decision under appeal:** Decision of the Examining Division 022 of the European Patent Office dated 2 August 1990 refusing European patent application No. 85 900 903.7 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** K.J.A. Jahn  
**Members:** P.K.H. Krasa  
J.A. Stephens-Ofner



## Summary of Facts and Submissions

I. On 2 October 1990, the Appellant (Applicant) lodged an appeal against the Examining Division's decision dated 2 August 1990, refusing the application No. 85 900 903.7, which then comprised 191 claims.

The Examining Division held that the application did not meet the requirements of Article 56 EPC, having regard to the following documents:

- (5) GB-A-2 125 860 and
- (6) US-A-4 349 443.

Other documents were also mentioned in the decision under appeal, *inter alia*

- (2) US-A-3 926 918.

Furthermore, it was decided that the application did not meet the requirements of Article 82 EPC as the claims defined a plurality of inventions which were not linked together by a common inventive concept.

II. In his Grounds for Appeal, filed 10 December 1990, the Appellant essentially argued that no gels and no gel forming compositions were disclosed either in citation (5) or in citation (6) and that the compositions prepared according to document (6), which were used in document (5), were either viscous liquids or solids. This was supported by submitting the copy of a declaration, which had been filed in the US-patent office.

III. By a communication of 9 July 1993, pursuant to Article 11(2) of the Rules of Procedure of the Boards of Appeal, the Board indicated that the set of 191 claims was not in compliance with the requirements of Article 84 EPC and of Rule 29 EPC, in particular of Rule 29(5) EPC. In response the Appellant restricted the number of claims to 157.

IV. During oral proceedings, which took place on 14 September 1993, the Appellant, countering a novelty objection raised by the Board, filed a new Claim 1, which reads:

"A gel-forming composition for forming a gel comprising:

i. a first substance selected from the group consisting of polyvinyl alcohols, polyvinyl alcohol copolymers, and mixtures thereof, wherein the amount of said first substance is from about 0.1 to about 5% of the weight of the gel-forming composition,

ii. a second substance selected from the group consisting of dialdehydes, polyaldehydes, substances that will generate dialdehydes and mixtures thereof, capable of cross-linking with said first substance through the formation of acetal cross-linkages, wherein total aldehyde content of said gel-forming composition is from about 0.005 to about 4% of the weight of the gel-forming composition, and

iii. water or brine, and wherein H<sub>2</sub>O of said water or brine provides at least about 64% of the weight of said gel-forming composition, and wherein said gel-forming composition has a pH less than 7."

Furthermore, the Appellant indicated his readiness to further drastically reduce the number of claims.

In the course of the said oral proceedings, the Board of its own motion placed reliance on

(8) US-A-4 098 337,

which document was already cited on page 1 of the application in suit as describing the relevant state of the art.

- V. The Appellant requested that the decision under appeal be set aside, and the case be referred back to the Examining Division for further prosecution on the basis of Claim 1, submitted in the course of oral proceedings.

At the end of the oral proceedings the Chairman announced the Board's decision to allow the appeal.

### **Reasons for the Decision**

1. The Appeal is admissible.
2. *Amendments*
  - 2.1 New Claim 1 is supported by the originally filed application documents, page 11, lines 12 to 14 (polyvinyl alcohol, polyvinyl alcohol copolymers, or mixtures thereof comprising compositions, from which a gel may be formed); in combination with page 9,

lines 38 to 39 (specifying the amount of the first substance); and page 5, lines 18 to 19, 22 to 25, and 33 to 37, and page 39, lines 26 to 28 (specifying the second substance and their cross-linking abilities); and page 9, lines 24 to 25 (specifying the amount of the second substance); and page 9, lines 1 to 3 (defining the further component water or brine and its amount); and page 8, lines 38 to 39 (requiring the presence of an acidic catalyst, which implies a pH of less than 7).

- 2.2 It follows that new Claim 1 does not contain subject-matter extending beyond the content of the application as filed and, therefore, complies with the requirements of Article 123(2) EPC.

3. *Novelty*

The subject-matter of the new Claim 1 is not disclosed in any of the citations on file, and is now properly delimited in particular over the compositions disclosed in document (2) (see Claim 12 in combination with Claim 8, and column 3, lines 24 to 28), which document was cited in the decision under appeal, without drawing any conclusions therefrom. Thus, the subject-matter of the new Claim 1 is novel.

4. *Problem and Solution*

- 4.1 The application relates to gels which can be used for reducing the permeability of soils and subterranean formations to the flow of various fluids (page 1, lines 6 to 9), compositions and methods for producing

such gels and to the use of the latter ones. Such gels are known, e.g. from document (8), which was used as starting point for defining the technical problem underlying the present application (page 1, line 31 to page 2, line 17). The gels disclosed in document (8) are formed *in situ* by injecting aqueous solutions of polyacrylamide and of formaldehyde into the subterranean formation to be treated (see the abstract).

4.2 According to the present application, such gels cannot be successfully applied to formations having a higher temperature and hardness (page 2, lines 5 to 17). Consequently, the technical problem to be solved was said to be the development of a gel capable of retarding or blocking the water flow in subterranean formations having a temperature of 65°C or higher and a water hardness of 1000 ppm or higher (page 2, lines 29 to 32).

4.3 The present application suggests, as the solution of this problem, a gel having the features of new Claim 1. It follows from Figure 1 of the application that, by the aid of a gel described and claimed in the application, the permeability of a sand stone core can be reduced to about 10%, or less, of its original value for a period of 100 days (or more) at 82°C, and to 20 to 30% of its original value for a period of about 40 days at 127°C. According to page 39, lines 18 to 21, the hardness of the water used for gel formation is at least about 1000 ppm and may be up to 6000 ppm, or higher. The Board has no reason to doubt these results and is, therefore, satisfied that the said technical

problem was adequately defined and was in fact solved by the gel-forming composition of the application in suit.

- 4.4 This Board held already that an objective definition of the technical problem to be solved should normally start from the technical problem that is described in the patent in suit. Only if it turns out that an incorrect state of the art was used to define the technical problem or that the technical problem disclosed has in fact not been solved, can an inquiry be made as to which other technical problem objectively existed (see T 0495/91 of 20 July 1993, No. 4.2 of the Reasons of the Decision, not published in the OJ EPO).

As the proper document was used in the present application for defining the technical problem and as there is nothing available to the Board which could call in question the success of the suggested solution, there is no need to deviate from the technical problem set out in the application in suit. Therefore, it has to be accepted for the purpose of evaluating inventive step.

5. *Inventive Step*

- 5.1 It remains to be decided, if the suggested solution is inventive.
- 5.2 For the following reasons, the Board cannot uphold the Examining Division's finding that the subject-matter of the present application was obvious over documents (5) and (6).

Both citations are concerned with a technical problem, unrelated to the one underlying to the present invention and, thus, neither can they serve as a valid starting point for examining inventive step, nor can they render obvious the subject-matter of Claim 1 when read in combination with document (8).

5.2.1 Document (5) relates to additives for drilling fluids which prevent formation clays and shales from swelling and dispersing when contacted with aqueous drilling fluids (see the abstract). This is accomplished by the addition of a combination of  $AlO(OH)$  and aldehyde-cross-linked polyvinyl alcohol (PVA), which is a solid product (abstract in combination with page 3, lines 15 to 17). Thus, neither the cross-linked PVA nor the drilling fluid containing it is a gel according to the present application (see the sentence bridging pages 7 and 8); the latter is rather an aqueous suspension comprising the  $AlO(OH)$  and the cross-linked PVA (see Claim 1). Therefore, document (5) contains no hint for the solution of the existing technical problem.

5.2.2 Document (6) also relates to a composition which is capable of imparting both pseudoplastic and water loss controlling properties to aqueous drilling fluids. These compositions are formed from a combination of a hydroxyl groups containing aluminium agent and a PVA/aldehyde reaction product (see column 3, paragraph 3 and column 4, lines 4 to 15). There is no indication in this citation that such drilling fluids, which by their very nature have to have low viscosity under shear stress conditions, which means that they are thixotropic, could be modified to serve as

permanent plugging agents under such conditions and in particular at an increased temperature and an increased water hardness. Therefore, there is little merit in the Examining Division's argument (page 3, last paragraph) that the pseudoplastic preparations known from citation (6) have to be thixotropic and, thus, are in the form of gels. As explained above, thixotropic gels would not solve the existing technical problem which, on the contrary, required non-thixotropic gels for its solution.

5.2.3 Thus, in the Board's judgment, the skilled person would not have considered citations (5) and (6) when looking for solutions of the above defined technical problem.

5.3 The Examining Division also relied on the following statement (see page 4, lines 5 to 9):

"It should also be stressed, that according to doc 2/ (col.3 line 27) the tendency of cross-linked PVA to gelation in aqueous media is well known, thus it was quite obvious to use cross-linked PVA alone as gel forming agent."

However, Document (2) is concerned with a process for preparing a precipitated PVA-aldehyde condensation product in the form of fine particles which has superior solubility, transparency, and mouldability, and is to be used in paints, as an interlayer of safety glass, an adhesive or a resin foam (abstract and column 1, lines 4 to 10, in combination with column 5, lines 23 to 32).

The passage referred to by the Examining Division reads "... the possible gelation of the reaction system can be avoided.", which, in the Board's judgment, only indicates a possibility of (undesired) gel formation but does not amount to a technical teaching how to produce such a gel, let alone what properties it would have, if formed at all. Hence, there is no sign-post in document (2) that gels possibly formed from the compositions of Claim 1 could solve the existing technical problem.

Therefore, the Board concludes that the subject-matter of Claim 1 is inventive.

6. *Unity of Invention*

In view of such finding the lack of unity of invention objection raised by the Examining Division in respect to the then pending claims, and based on the alleged lack of inventive step, is void.

7. *Reasonable Number of Claims*

7.1 Finally the Board wishes to draw attention to the extremely large number of claims contained in this application (157 filed on 8 September 1993 by way of amendment). Under Rule 29(5) EPC the number of claims has to be reasonable in consideration of the nature of the invention claimed. Obviously no hard and fast definition can be accorded to the term reasonable, but this does not mean that the requirement is wholly devoid of meaning and legal effect.

7.2 Although the first instance never dealt with this point, so that in this case the Board cannot base its decision upon it by way of appeal (cf. G 9/91 and G 10/91 dealing with the nature and function of appeal proceedings under the EPC), the Board wishes to emphasise the following. What is or what is not reasonable depends on the facts and circumstances of each particular case. In deciding the matter, regard has to be had to the interest of the relevant public since patents should not be allowed to erect a legal maze or smoke screen in front of potential users of the inventions to which they lay claim. Patent claims, taken singly as well as in totality, must be clear and concise (Article 84 EPC) in order to enable such potential users to ascertain, without undue burden, let alone recourse to litigation, whether their planned commercial use is likely to infringe the patent monopoly. Having to construe the 157 claims (let alone 191 claims), and to form a valid and commercially useful opinion on whether or not any one of them could prevent or hinder the commercial activities must in the nature of things impose a severe and totally undue burden on the public. It follows that the present application as it stands before the Board falls foul of the clear provisions not only of Rule 29(5) but also of Article 84 EPC. No doubt this serious legal deficiency can and will be eliminated in the course of further prosecution.

**Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division for further prosecution on the basis of Claim 1 submitted in the course of oral proceedings.

The Registrar:

The Chairman:

E. Görgmaier

K. Jahn