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Aktenzeichen:
Case Number: T 14/83
N° du recours :

ENTSCHEIDUNG / DECISION
vom / of / du 7 June 1983

Anmelder:
Applicant: Sumitomo Chemical Co. Ltd.
Demandeur : Sumitomo Bakelite Co. Ltd.

Stichwort:
Headword: "vinylchloride resins"
Référence :

EPÜ / EPC / CBE Article 83, Rule 29

"Disclosure of the invention" - "occasional lack of success" - "content of the claims"

Leitsatz / Headnote / Sommaire

1. The question whether an invention has been disclosed sufficiently, clearly and completely is not to be decided solely on the basis of the content of the claims. If a chemical invention involves the task of manufacturing a product with certain measurable properties (e.g. gel content or degree of polymerisation of a copolymer), and this task is performed by means of a process involving several variables, then the means of its performance are to be regarded as sufficiently disclosed within the meaning of Article 83 EPC if, encountering occasional lack of success notwithstanding strict adherence to the prescribed limits of those variables, clear information, contained in the description, regarding the effects of individual variables on the properties of the product enables the person skilled in the art to bring about the desired properties quickly and reliably in such an event.

.../...

2. If teaching thus disclosed cannot be defined in a claim precisely enough to rule out occasional failure, such a claim is not to be objected to, provided it is possible to deduce from the description the action to be taken - and which also cannot be precisely defined - by way of fine tuning of the variables.

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Case Number: T 14 / 83

DECISION

of the Technical Board of Appeal 3.3.1

of 7 June 1983

Appellant: Sumitomo Chemical Company Limited
Osaka, Japan
Sumitomo Bakelite Company Limited
Tokyo, Japan

Representative: Senior, Janet, Abel & Imray
Northumberland House
303-306 High Holborn
London WC1V 7LH
ENGLAND

Decision under appeal: Decision of Examining Division 011 of the European Patent Office dated 18th August 1982 refusing European patent application No 79 300 604.0 pursuant to Article 97(1) EPC

Composition of the Board:

Chairman: D. Cadman
Member: K. Jahn
Member: L. Gotti Porcinari

Summary of facts and submissions

I. European patent application No. 79 300 604.0, filed on 11 April 1979 and published on 17 October 1979 under publication No. 0 004 795, claiming the priority of the Japanese prior application of 12 April 1978, was refused by decision of the Examining Division of the European Patent Office dated 18 August 1982 on the basis of the amended claim 1 filed with the letter dated 8 June 1982. This claim reads as follows:

"A method for producing a vinyl chloride resin which comprises polymerizing
either (a) vinyl chloride
or (b) a mixture of a major amount of vinyl chloride and a minor amount of at least one monomer copolymerisable therewith
in the presence of 0.01 to 10% by weight, based on the weight of the vinyl chloride monomer, of at least one polyfunctional monomer having two or more ethylenic double bonds in the molecule, characterised in that polymerization is carried out until at least 60 weight % of the total monomer in the polymerization system is polymerized, and at a temperature of 0° to 50°C, the amount and identity of the polyfunctional monomer, the percentage conversion of the total monomer and the polymerization temperature and, in the case of (b), the amount and identity of copolymerizable monomer being so selected that a vinyl chloride resin consisting of

(i) 10 to 80% by weight of tetrahydrofuraninsoluble vinyl chloride resin gel fraction and

(ii) 90 to 20% by weight of tetrahydrofuransoluble fraction having an average polymerization degree of 1,000 or more

is produced."

II. The stated ground for the refusal was insufficient disclosure according to Article 83 EPC. Neither claim 1 nor the matter of the application as a whole would enable the expert readily to select the parameters required for a consistently successful preparation of the resin. It could not be accepted (cf. the Refining decision dated 24 September 1982) that it would be a routine matter for the skilled man to select from 4 to 6 different parameters by experimentation to obtain the correct method of polymerization and then to test the product for gel content and molecular weight to establish that the end result desired had been achieved.

The question of admissibility and clarity of claim 1 was not considered and the substantive examination of the application in suit was deferred.

III. The appellants lodged an appeal against the decision on 28 October 1982, and submitted a Statement of Grounds on 22 December 1982, enclosing two amended claims in which the above two alternatives a) and b) how to carry out the invention were split into separate claims.

The appellants submit that claim 1 now specifies that the expert must select three parameters, i.e. the amount and identity of the polyfunctional monomer and the polymerization temperature such that the required product is produced. To select the polyfunctional monomer the skilled

man would merely have recourse to his experience in the art and then alter the other two parameters by using a particular amount of polyfunctional monomer and a particular temperature roughly lying in the middle of the allowed ranges or in the preferred ranges. He would then check to see whether the product produced had the required composition which involves measurements of the gel content of the tetrahydrofuraninsoluble fraction (hereinafter referred to "gel fraction") and average polymerization degree of the tetrahydrofuransoluble fraction (hereinafter simply referred to "polymerization degree" of the "soluble-fraction"). In most cases, even if the expert did not choose these values for temperature and amount of polyfunctional monomer, the product obtained would indeed have the required composition.

In the event of failing to achieve the desired composition, the expert could clearly see from tables 1 to 3 of the specification how to achieve the goal envisaged.

Claim 2 now specifies, according to the submission of the appellants, that there are additionally two parameters which affect the composition of the product, but these are conventional in the art. As could be seen in Appendix III of the Statement of Grounds of Appeal the balance between the gel content and polymerization degree is not very greatly affected by the presence of a monofunctional comonomer.

IV. On the Board's advice the appellants finally submitted on 11 April 1983 7 redrafted claims the first of which, recombining the two alternatives of the invention, has the following wording:

"A method for producing a vinyl chloride resin consisting of

(i) 10 to 80% by weight of tetrahydrofuran-insoluble vinyl chloride resin gel fraction and
(ii) 90 to 20% by weight of tetrahydrofuran-soluble fraction having an average polymerization degree of 1,000 or more

characterised by polymerizing
either (a) vinyl chloride
or (b) a mixture of a major amount of vinyl chloride and a minor amount of at least one monofunctional monomer copolymerizable therewith

in the presence of 0.01 to 10% by weight, based on the weight of the vinyl chloride monomer, of at least one copolymerizable polyfunctional monomer having two or more ethylenic double bonds in the molecule, at a temperature in the range of from 0° to 50°C and until at least 60 weight % of the total monomer in the polymerization system is polymerized."

The appellants request that the decision refusing the application be set aside and that a patent be granted on this basis.

Reasons for the decision

1. The appeal complies with Articles 106 to 108 and Rule 64

in connection with Rule 78(3) EPC and is, therefore, admissible.

2. There is no objection to the present version of the claim on formal grounds, since they are adequately supported by the specification as originally filed. Claim 1 results from the combination of the original claims 1 and 2 in connection with page 4, lines 11 to 13, lines 22 to 27 and page 7 lines 23 to 26. Claims 2 to 7 correspond to claims 3 to 6, 9 and 10 as first filed.

3. Pursuant to Article 83 EPC the invention is sufficiently clearly and completely disclosed if it can be carried out by a person skilled in the art. The source of the disclosure of the invention within the European patent application is of no importance (Article 78(1)(b), (c), (d). The question whether or not an invention is disclosed must not be judged solely on the basis of the claims, as the Examining Division did (cf. Decision III.1. first sentence). It is true that the Examining Division made the routine statement that neither the matter of claim 1 nor the matter of the specification as a whole could be successfully repeated (cf. Decision III paragraph 3, first sentence), nevertheless it neglected the relevance of the tabular results of experiments in the description of the invention.

4. The present invention is concerned with a process for the production of vinyl chloride resins consisting of 10 to 80% by weight of a "gel fraction" and the balance of a "soluble fraction" with an average polymerization degree of 1000 and more. This task is said to be achieved in the simpler of its alternative solutions (method a) of claim 1) by combination of the following simplified features

(a) copolymerization of vinyl chloride wth a polyfunctional monomer

(b) the latter being added in an amount of 0.01 to 10% by weight based on the weight of vinyl chloride

(c) using a polymerization temperature between 0 and 50°C

(d) until at least 60% by weight of the monomers is polymerized.

Accordingly, the features (b), (c) and (d) are quantitatively fixed ranges of values, whilst feature (a) i.e. the nature of the polyfunctional monomer is defined in the main claim by the number of ethylenic double bonds and comprehensively illustrated in the description (cf. page 6, lines 1 to 21). There can be no doubt that a process including these features can be carried out by an expert, which was not contested by the Examining Division.

5. However, this Division took the position that the specification as filed did not tell the expert how to select the parameters required for a consistently successful preparation of the resin. On this, the Division relies particularly on the comparative results forming part of the original description, which results demonstrate the occasional lack of success of the claimed process to achieve its objective, notwithstanding strict adherence to the features as claimed.

Among the 25 runs shown in tables 1 to 4 comprising examples and comparative examples 6 runs (No. 12, 13, 14, 17 and 18) do not result in the desired resins, although all claimed features were followed. Run 6 must herein be disregarded, since it is in respect to feature (c) outside the scope of the invention.

6. However, occasional lack of success of a claimed process does not impair its feasibility in the sense of Article 83 EPC if, e.g., some experimentation is still to be done to transform the failure into success, provided that such experimentation is not undue and does not require inventive activity. In the present case experimentation was altogether unnecessary, since tables 1 and 2 give sufficient instruction to the skilled reader on how to operate the process in the event of failure.

Having regard to table 1 of the specification (runs 1 to 5) it can be recognised that increasing the polymerization temperature (with simultaneous reduction of the duration of polymerization) decreases both the "gel content" and the "polymerization degree" of the "soluble fraction" (the amount of the polyfunctional comonomer diallyl phthalate being constant). From this it can conversely be concluded that a reduction in polymerization temperature would entail an increase in the above two values of the resin.

Table 2 shows the influence of the amount of the same comonomer on "gel content" and "polymerization degree" at otherwise constant conditions, in such a way that the increase of that amount implies an increase of the "gel content" and a simultaneous decrease of the average "polymerization degree" of the "soluble fraction". From this an expert would draw the conclusion that a reduction of the amount of a polyfunctional comonomer would result in a decrease of "gel content" and simultaneously in an increase of the said "polymerization degree".

These empirical rules about the influence of alteration of the polymerization temperature and the amount of polyfunc-

tional comonomer on the resulting resin enable the skilled person, notwithstanding occasional lack of success when applying the individual process variables, to realise the desired result, as set out below in detail.

7. The resins obtained in runs 8, 13 and 14 present too low a gel content. The practical rules set out above offer the expert two correcting measures therefor: (i) increase of the amount of the polyfunctional comonomer as the result of which the polymerization degree of the "soluble fraction" declines, or (ii) decrease of the polymerization temperature whereby the "polymerization degree" goes up. According to what is wanted the polymerization degree can be simultaneously affected in contrary directions.

The matter is similar in the runs No. 17 and 18 where the soluble fraction of the resin has too low an average polymerization degree. To redress this undesired result two possibilities also exist: (iii) diminishing the amount of the polyfunctional comonomer whereby the gel content declines consequentially, or (iv) decreasing the temperature which entails a consequential increase of the gel content.

Run No. 12 finally shows that the resin presents too high a gel content and too low an average polymerization degree of the soluble fraction. In that case only one remedy can be applied to correct the result. Operating as set out in case (iii) above will diminish the gel content and simultaneously increase the polymerization degree.

In summary it is clear that the expert who carried out the claimed processes strictly in accordance with the instructions and occasionally missed the desired target at the

first attempt would be able to bring about the desired composition of the resin quickly and reliably by having recourse to the said empirical rules disclosed in the description of the present specification.

8. Although these rules can be derived from examples concerning the one alternative form of the process, the Board cannot see any reason why these rules should not extend to the other alternative of the process in which additionally a minor amount of at least one monofunctional comonomer is used. It could be expected that these comonomers would not affect the gel content (cf. description page 5, lines 17 to 22). Furthermore, experiments summarised in Appendix III of the Statement of Grounds of Appeal confirm that the addition of such a monofunctional comonomer hardly influence the gel content and the average degree of polymerization of the soluble fraction.

9. Accordingly, the invention defined by the present claims is considered to have been sufficiently clearly and completely disclosed within the meaning of Article 83 EPC. Mention should also be made that in the event that such a teaching cannot be defined in a claim precisely enough to rule out occasional lack of success, such a claim is not to be objected to provided it is possible to deduce from the description the action to be taken - and which also cannot be precisely defined - by way of fine tuning of the variables.

10. From the foregoing, it follows that the decision under appeal is not supported by the grounds for refusal. However, the patent sought cannot be granted at present, since substantive examination has not yet been completed.

ORDER

It is decided that:

(i) The decision of the Examining Division of the European Patent Office dated 18 August 1982 is set aside.

(ii) The case is remitted to the first instance for substantive examination on the basis of the 7 claims dated 11 March 1983, received on 11 April 1983.

J. Rhe

D Cadman

In 7/6.83