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Beschwerdekammern
Boards of Appeal
Chambres de recours

Case Number : T 254/86

D E C I S I O N of 1 February 1988 correcting errors in the decision of the Technical Board of Appeal 3.3.2 of 5 November 1987

Appellant : (Proprietor of the patent)
SUMITOMO CHEMICAL COMPANY, LIMITED
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Japan

Representative :
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D-8000 München 86

Respondent : (Opponent)
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D-6230 Frankfurt am Main 80

Representative :

Decision under appeal : Decision of the Opposition Division of the European Patent Office dated 4 March 1986, posted on 28 May 1986, revoking European patent No. 21 105 pursuant to Article 102(1) EPC

Composition of the Board :

Chairman : G. Szabo
Members : A. Nuss
E. Persson

In application of Rule 89 EPC the Decision given on 5 November 1987 is hereby ordered to be corrected as follows:

On page 1, after II. replace the first three lines by:

"The Opposition Division revoked the patent at an oral hearing on 4 March 1986. According to the decision, which was notified on 28 May 1986, reactive dyes with the said reactive".

The Registrar:

F. Klein

The Chairman:

G. Szabo

Europäisches Patentamt
Beschwerdekammern

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Veröffentlichung im Amtsblatt Ja/Nein
Publication in the Official Journal Yes/No
Publication au Journal Officiel Oui/Non

001052

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Aktenzeichen / Case Number / N° du recours : T 254/86

Anmeldenummer / Filing No / N° de la demande : 80 103 005.7

Veröffentlichungs-Nr. / Publication No / N° de la publication : 21 105

Bezeichnung der Erfindung: Reactive dyes,process for their preparation and their
Title of invention: use for dyeing cellulose fibers
Titre de l'invention :

Klassifikation / Classification / Classement : C09B 62/085

ENTSCHEIDUNG / DECISION

vom / of / du 5 November 1987

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet : Sumitomo Chemical Company Ltd.

Einsprechender / Opponent / Opposant : Hoechst A.G.

Stichwort / Headword / Référence : Yellow dyes/SUMITOMO

EPÜ / EPC / CBE Article 56 and Rule 27(1)(d) EPC

Kennwort / Keyword / Mot clé : "Inventive step" (affirmed)
"Technical problem - Combination of effects"
"Comparison with closest state of art - No improvement in every respect required"

Leitsatz / Headnote / Sommaire

An invention which relies on a substantial and surprising improvement of a particular property need not also show advantages over the prior art with regard to other properties relevant to its use, provided the latter are maintained at a reasonable level so that the improvement is not completely offset by disadvantages in other respects to an unacceptable degree or in a manner which contradicts the disclosure of the invention fundamentally (following T 57/84, "Tolylfluanid", 12.8.86, to be reported and T 155/85, "Passivation of Catalyst", 28.7.87, to be reported).

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Summary of Facts and Submissions

I. European patent No. 21 105 was granted on 23 March 1983 with ten claims in response to the European patent application No. 80 103 005.7, filed on 29 May 1980. An opposition was filed on 19 December 1983 against the grant of the patent relating to a group of reactive dyes comprising a chlor-triazinyl substituent and a vinyl-sulfone subsitutent, as well as a chromophoric monoazo grouping carrying naphthalensulphonic, and phenyl or naphthelene residues. The revocation of the patent was requested on grounds of lack of inventive step inter alia on the basis of the following documents:

(4) US-A-3 223 470;
(5) DE-A-2 615 550;
(10) "KAGAKU TO KOGYO" (Science and Industry), Volume 42, No. 11 (1968), pages 23-35;
(13) "Lehrbuch der organischen Chemie", Volume III (1958), pages 33 and 36 (by F. Klages - edited by W. De Gruyter and Co.);
(14) "The Chemistry of Synthetic Dyes", Volume I (1952), pages 339 and 343 (K. Venkataraman - Academic Press);
(15) "The Chemistry of Synthetic Dyes", Volume VI (1972), page 229, penultimate line to page 231.

II. The Opposition revoked the patent at an oral hearing on 4 March 1986 which was notified on 28 May 1986. According to the decision, reactive dyes with the said reactive groupings were known (e.g. (4), (5) and (10)). Yellow dyes "C" and "D" of (10) constituted the closest state of the art. The only difference between the compounds in the patent and "C" or "D" was in certain substituents of the otherwise identical chromophoric group. The technical problem in respect of this particular art was to improve

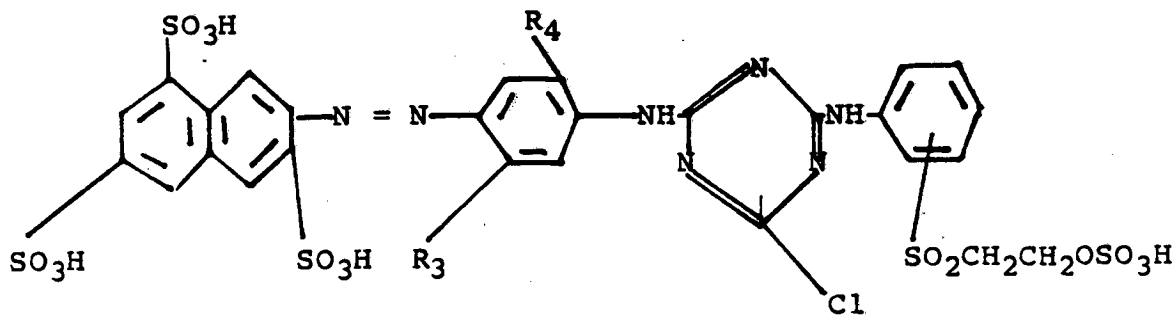
both the exhaustive dying properties as well as the fastness properties of such dyes. Some dyes with only one of the reactive groupings were already known to carry the suggested characteristic substituents, e.g. an Me or acylamino group in their chromophoric moiety.

III. The decision also emphasised that (10) had disclosed the superiority of compounds having two instead of three reactive groups and it was obvious that the other known chromophoric substituents would provide the same properties without losing the colour.

Moreover, document (14) referred to the possibility of increasing affinity by the incorporation of -CO-NH- groups and (15) described the presence of Me, -acylamino- or -ureido- groups into the phenylenic part of yellow dyes to increase colour strength. Increased colour value and build up properties were expected for the compounds now claimed, partly also in consequence of mesomerism experienced with similar groups (13). Even if small improvements in perspiration fastness values were to be taken as significant, these should be considered as obtained in consequence of an obvious solution of the problem.

IV. The Appellant (Patentee) filed a Notice of Appeal against the decision on 6 August 1986 with the payment of the fee and submitted a Statement of Grounds on 6 October 1986. At the same time, the scope of the main claim was effectively restricted to four compounds, i.e. those originally numbered as (13), (18), (19) and (23). The description was also appropriately amended. The new main claim was worded as follows:

"A compound of the following formula in the form of the free acid



wherein

R_3 is methyl and
R_4 is methoxy and residue $-SO_2CH_2CH_2OSO_3H$ is attached to the benzene ring in m-position; or

R_3 is acetylamino and
R_4 is hydrogen and the residue $-SO_2CH_2CH_2OSO_3H$ is attached to the benzene ring in m-position; or

R_3 is ureido and
R_4 is hydrogen and the residue $-SO_2CH_2CH_2OSO_3H$ is attached to the benzene ring in m- or p-position.

V. An oral hearing was held on 5 November 1987. During the proceedings and at the oral hearing the Appellant submitted substantially the following arguments:

(a) The consequence of the structural modifications which generated the claimed dyes were unpredictable. This was particularly true for the preferred compounds now claimed. Although the most relevant prior art was represented by compounds on the market which carried only one of the reactive groups, the invention also showed distinct advantages over the compounds in document (10).

(b) Citations (14) and (15) had no bearing on the case. The former relates to different chromophores and the latter failed to specify the colour strength in any detail. If anything, (10) achieved about the same level of fastness as the mono-reactive variants and only the fixation was increased to as much as 90%. There was no good reason to assume that any further improvement was possible through modifications on the chromophoric groups. The colour value was nevertheless almost doubled in the patent-in-suit whilst fastness levels were substantially maintained or even improved in some instances.

VI. The Respondent, that is the Opponent, argued that no improvement could be recognised on the basis of evidence. If anything, the known dyes of (10) possessed in some respects superior qualities. This was particularly apparent in fastness in the presence of hypochlorites. Even if the fixation rate was admittedly significantly improved there was an increased risk of instability when the dyed fabric was treated in the presence of chlorine containing bleaches. Whilst values substantially identical with those in the examples were obtained at a mild exposure to such conditions the results had certainly been disappointing under more severe conditions when compared with compound "C" of the cited art. Thus taken as a whole, the claimed compounds represented no real advantage at all and the results only confirmed what was expected. The disadvantages cancelled the value of any higher fixation rate in any case.

VII. The Appellant requests that the decision under appeal be set aside and that the patent be maintained on the basis of Claims 1 to 8 and adapted description filed on 6 October 1986. As a subsidiary request the maintenance of the patent on the basis of the same claims restricted by the excision of compound originally numbered (23) has been proposed. The Respondent requests that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. No formal objection can be raised against the further amendments of the claims. In effect, the main claim is now restricted to preferred compounds (1) to (4) which were originally numbered (13), (18), (19) and (23), all specifically disclosed in the patent. The other claims have also been appropriately restricted in a manner which is supported by the original disclosure and both the claims and the amended text therefore comply with Article 123(2) and (3) EPC.

3. The subject-matter of the patent relates to four compounds which represent yellow dyes. Compounds of similar structure and colour were also disclosed in the closest state of the art which is document (10). In the view of the Board, the technical problem in respect of this disclosure was how to achieve a substantial improvement of colour value whilst maintaining the fastness properties generally substantially at the same level or in certain instances at least at an acceptable level. The solution of this problem comprises the four claimed dyes showing some modifications on the chromophoric part. In particular, the substituents in the closest compound "C" were supplemented with a further

sulpho-group on the naphthalene radical whilst one of the original sulpho-groups was shifted to an adjacent position. In addition, the methyl substituent on the phenyl group was either replaced by an acylamino or an ureido group, or supplemented with a methoxy group in the opposition position on the ring.

4. The disclosure in the specification suggests that the compounds in the case have about the same colour fastness (i.e. 3-4) in the presence of hypochloride as compound "C" of the prior art (cf. also original Example 1 disclosing the same compound "C" with test results) and somewhat marginally improved fastness in respect of perspiration and sunlight, particularly at the higher concentration level (3%). This was apparent from the data in the specification and from the evidence presented on behalf of the patentee (31.1.86). It was also suggested there that the colour values, i.e. tinctorial value, for the compounds of the invention were about doubled when compared to compound "C".

5. The Respondent challenged these results by submitting evidence suggesting that the reduction of fastness to hypochlorite was significant, in particular under the more stringent conditions of prolonged treatment. The same would apply to light sensitivity (Table II received on 12.5.87). Even if the tests and inferences from the Respondent were conclusive beyond any doubt or uncertainty, the outcome could not be interpreted as a failure on the part of the patentee to solve the stated technical problem. Any losses in fastness properties are small and are particularly insignificant when it comes to fastness in relation to perspiration and sunlight. Such consequences cannot render the substantial improvement in colour value irrelevant or insignificant. The combination of all these properties must

be taken into consideration when assessing the overall value of the improvement. In addition, some of the aspects may become more or less relevant depending on the circumstances of use.

6. It is, therefore, the view of the Board that an invention which relies on a surprising substantial improvement of a particular property need not also show advantages with regard to other properties relevant to its use provided the latter are maintained at a reasonable level so that the improvement is not completely offset by disadvantages in other respects to an unacceptable degree or in a manner which contradicts the disclosure of the invention fundamentally (following T 57/84, "Tolylfluanid", 12.8.86, to be reported and T 155/85, "Passivation of Catalyst", 28.7.87, to be reported).

7. In the present situation the prolonged exposure to light or more severe conditions of hypochlorite bleaching could well be included in test systems, which are designed to evaluate and compare the properties of material under standardised conditions if the need arises. This should not mean, however, that certain results or the best results are obligatory, or are economically optimal, in respect of certain dyed materials. The overall result could still be very advantageous in some special situations, where repeated exposure to hypochlorite laundering was unlikely, e.g. in the case of fine curtain materials or neckties. In other words, some properties, other than the advantageous colour value, may become irrelevant to certain types of merchandise which are only used in particular circumstances. The invention need not, therefore, possess all the desired properties in all circumstances for any kind of user, in comparison with the closest state of the art.

In view of the fact that the dyes claimed in the patent-in-suit demonstrate a very reasonable maintenance of fastness properties especially under less stringent conditions, whilst showing a substantial improvement of the colour value, the solution of the stated problem appears to have been achieved by making the claimed compounds available.

Since none of the documents cited in these proceedings disclose these compounds, they are also novel. This is not contested by the Respondent.

8. As to the question of the inventive step, it is apparent that the structural differences between the claimed compounds and the closest state of the art, i.e. compounds "C" and "D" of (10) are minor. Thus, it would have been reasonable to expect that any such modification should, at the best, maintain the level already achieved in (10) unless there was a good reason to the contrary. The comparative success of the doubly reactive variants described in the same document (10) through the introduction of the second reactive group (vinyl-sulphonyl) was, nevertheless, confined to "the degree of fixation" in the cited art (page 584). There was no such improvement in light fastness (pages 584 and 586, Table 2). The fixation already reached 90% which is difficult to surpass and it was not envisaged that circumstances other than reactivity, which also influence the colour value, i.e. affinity, diffusion speed etc., could or would make a striking difference in the fixation rate. Increased solubility through the additional sulpho-group could have been expected to reduce the reactive affinity of the dye to the material, and improved substantivity might well reduce the diffusion power (14).

9. Notwithstanding the complex character of the various mechanisms contributing to the increased colour value, it is most relevant that this is achieved in proportion with the concentration of the bath. This is not only apparent from the evidence from the patentee but also from the submissions of the Respondent who uses lower, occasionally much lower, concentration of the dye in the solution to achieve the same colour strength as that employed for the compound from the state of the art (cf. submissions on 7.5.87). Inevitably, much less material of the invention was exposed to extreme conditions as in the case in comparison but specific fastness was then better than what could be expected in such circumstances.

10. The modification of the substitution was not in itself implying an expectation of an improvement in colour value. Although carboxamide groups were associated with an increase of substantivity according to (14), i.e. affinity to fibres, this appears to have been rather linked with the problem of colour and shift of wavelength to longer wavelengths (cf. page 343). In any case, the reference relied on carboxamide of J-acids which are not relevant to the present case where the same substituent is only linked to a nitrogen atom and not to a carbon atom, if at all.

11. The reliance on document (15), in order to predict the properties of the compounds at hand, is also unconvincing. This reference mentions the chromophoric groups of both (10) and the present patent side by side including acetylamino and ureido substituents but without any reactive groups. It is remarked that the "main considerations are colour strength and certain fastness properties". There is no information as to the relative level of these properties or that one should expect improvements one way or another when switching from one of the two kinds of chromophores to the other.

12. If the skilled person would have considered this presentation of alternative chromophores to modify the closest state of the art (10), he would have also been aware that on his way towards the compounds of the invention he should have passed through the compound described in Japanese patent publication No. 2634/1964 presented in the present specification (page, lines 45-50), which represents the same chromophore carrying the ureido substitution, and also the first reactive group and the whole anilino group suitable for carrying the second reactive group in (10). The numerous disappointing properties of this "nearly there" intermediary structure are listed in the present patent (page 5, lines 18-21), and were never challenged in opposition. The suggested disadvantages include high temperature dying, lack of exhaustion dying ability, inability to produce the desired colour density and poor stability. The skilled person would have been discouraged from embarking on the route from (15) to modify (10) in view of such warnings very close to the desired goal.

13. The further argument on the basis of (13) about expectations for increased fixing rate on the basis of mesomerism mentioned in document (13) cannot be accepted either. Any equilibrium between alternative structures might deepen the colour according to the citation. There was not even a suggestion here that this might be correlated with substantivity, as it was mentioned in respect of carboxamides in (14). In addition, the colour deepening effect was demonstrated with different chromophores, not azo-dyes, carrying different substituents. In any case, no real improvement of the colour value through the fixing rate could be reasonably expected since this was already at a 90% level in document

(10). There was no hint in any document that other characteristics which influence the colour value would be beneficially affected by the modifications with substituents which the claimed compounds display.

14. In summary, it can be stated that the combination of the problem solving effects could not be envisaged on the basis of the state of the art. The structural elements now responsible for achieving this were also associated with unimpressive properties pointing away from their use. There was no one-way-street situation for the skilled person in the direction of the invention on any grounds, which must therefore be recognised as representing an unexpected problem solving effect, and as such inventive.

15. The alternative submission of the Appellant that the closest, and therefore most relevant prior art to assess the inventive step, is a kind of dye which is commercially successful with only one reactive group, must be rejected. The fact that the cited closest state of the art is not commercially exploited could be due to various unknown and irrelevant circumstances, and cannot therefore cast shadow on its information content as a disclosure available to the skilled person, let alone lead to the exclusion of the same from consideration.

On the contrary, any non-obviousness vis-à-vis such art, if not closest to the invention, would be irrelevant and inconclusive to validity without the assessment of the inventive step in respect of the objectively closest state, i.e. the most promising springboard towards the invention which was, available to the skilled person (cf. T 164/83, "Antihistamines" OJ 4/1987, 149).

Order

For these reasons, it is decided that:

1. The decision of the Opposition Division is set aside.

2. The patent is maintained on the basis of Claims 1 to 8 and adapted description as filed on 6 October 1986.

The Registrar: The Chairman: