BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

A		B		C	X

File No.: T 0265/91 - 3.3.1

Application No.: 84 102 233.8

Publication No.: 0 125 405

Classification: G03C 7/26

Title of invention: Silver halide light-sensitive material

D E C I S I O N
of 1 April 1993

Applicant: FUJI PHOTO FILM CO., LTD.

Proprietor of the patent: -

Opponent: Agfa Gevaert AG, Leverkusen

Headword: Silver halide light-sensitive material/FUJI

EPC: Art- 54, 56

Keyword: "Novelty (confirmed) inventive step - main request (no) - auxiliary request (yes)

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Case Number: T 265/91 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 1 April 1993

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office dated 7 February 1991 concerning maintenance of European patent No. 0 125 405 in amended form.**

Composition of the Board:

Chairman: K.J.A. Jahn
Members: Bauriedel
J.A. Stephens-Ofner

Summary of Facts and Submissions

I. European patent No. 0 125 405 was granted on 6 July 1988 on the basis of nine claims in response to European patent application No. 84 102 233.8 filed on 2 March 1984. The only independent claim read as follows:

"1. A silver halide light-sensitive material comprising a support bearing at least two silver halide emulsion layers having the same color sensitivity but being different in sensitivity, with a layer containing comparatively light-insensitive silver halide grains having an average grain size of 0.6 µm or less between the at least two silver halide emulsion layers, characterized in that the layer containing comparatively light-insensitive silver halide grains contains these grains in an amount of 0.03 to 5 g/m^2 based on the amount of silver, contains no color coupler and has a sensitivity lower than the least sensitive layer of the at least two light sensitive silver halide emulsion layers of the same color sensitivity by 0.5 or more in log units."

II. Notice of opposition was duly filed requesting the revocation of the patent on the grounds that its subject-matter lacked novelty and did not involve an inventive step. The opposition was supported by documents:

(1) DE-OS 32 09 995

(2) DE-OS 26 22 924

(3) DE-PS 27 04 797

(4) DE-OS 28 05 707.

III. By a decision dated 7 February 1991 the Opposition Division rejected the opposition filed against the aformentioned patent.

The Opposition Division held that the claimed photographic material was novel since none of the documents cited by the opponent disclosed all of its features in combination. The Opposition Division also found that from pages 7 to 9 of (1) it might well have been possible for a person skilled in the art to have arrived at the intermediate layer defined in Claim 1, but that there was nothing in (1) to suggest that further improvements in sensitivity and grain were to be expected by banishing colour coupler from the intermediate layer of Example 1, sample 106 of the contested patent. In fact, so they held page 8, lines 15 to 17 of (1) suggested that the absence of a coupler from the intermediate layer would have led to a deterioration of sensitivity and grain. It also seemed unlikely that a person skilled in the art would have considered employing the intermediate silver halide layers described in (2) to (4) in the photographic materials according to (1).

The Opposition Division's decision was based on the version of Claim 1 filed on 16 July 1990.

"1. A silver halide light-sensitive material comprising a support bearing at least two silver halide emulsion layers having the same color sensitivity but being different in sensitivity, with a layer containing comparatively light-insensitive silver halide grains having an average grain size of 0,6 µ or less between the at least two silver halide emulsion layers and with no layer being different in color sensitivity from said

at least two emulsion layers being positioned between two adjacent members of said at least two emulsion layers, c h a r a c t e r i z e d in that the layer containing comparatively light-insensitive silver halide grains contains these grains in an amount of 0,03 to 5 g/m2 based on the amount of silver, contains no color coupler and has a sensitivity lower than the least sensitive layer of the at least two light sensitive silver halide emulsion layers of the same color sensitivity by 0,5 or more in log units."

IV. Notice of appeal was lodged simultaneously with a statement of grounds of appeal by the appellant (opponent) on 14 March 1991 with payment of the prescribed fee.

In his written submissions and during the oral proceedings held on 1 April 1993 the Appellant argued as follows:

(a) Colour photographic materials having an arrangement typical for the claimed materials, in which a relatively light-insensitive silver halide layer is disposed between two light-sensitive silver halide layers of the same colour sensitivity, but different in sensitivity, were known from Claim 1 of (4), in conjunction with the information on page 52, paragraph 2. A person skilled in the art could deduce from this information an arrangement in which - as in the subject-matter of the contested patent - there was no layer of different colour sensitivity between the two layers of the same sensitivity. Since in addition to this there was identity on the silver coating and the grain size of the silver halide particles in the interlayer, the subject-matter of Claim 1 lacked novelty.

(b) Moreover, the subject-matter of the patent was based on the same problem as those in (4) and (1), where the problem was solved by means of the layer arrangements disclosed in those two documents. The improvements in photographic sensitivity and graininess mentioned in these publications were achieved by a layer order in which a high-sensitivity and a low-sensitivity silver halide emulsion layer having the same colour sensitivity were likewise separated by an interlayer which, according to page 8, line 27 to page 9, line 17 in (1) or Claim 1 in (4), could contain relatively light-insensitive silver halide. Starting, for example, from the layer structure known from (1), it would have been a matter of routine for a person skilled in the art to establish in connection with such interlayers the grain size which is the most suitable in terms of graininess and sensitivity for the comparatively light-insensitive silver halide, and the coating amounts most suitable for it.

It could also be seen from (2), (3) and (4), that the claimed diameters of the silver halide grains and the claimed silver halide coating amount are within the usual ranges. The difference in sensitivity described in the claim between the relatively light-insensitive (inter-)layer and the least sensitive colour-coupler-containing silver halide emulsion layer of 0.5 or more log units (I.t) was also obvious. Claim 1 was thus not based on an inventive step.

(c) The fact that better results were achieved with a coupler-free interlayer than with an interlayer containing coupler was not sufficient proof of an inventive step, as coupler-free interlayers were already provided in the materials of (1).

(d) Taking all these factors into account, the novelty of the subject-matter of the auxiliary request, or failing that, the existence of an inventive step, should also be denied, as Claim 1 of (4) and Claim 1 of (1) were also directed to an arrangement of interlayers within the blue-sensitive layer unit.

V. The Respondent argued that (4) was principally concerned with the presence of intermediate silver halide emulsion layers between, rather than within, the colour-forming units. In colour materials known from (4), the light-insensitive silver halide emulsion layer was used for controlling diffusion or adsorption of a developing inhibitor and not, as in the present invention, for light reflection. This latter, quite different mechanism of enhancing sensitivity also required a different coating amount for the light-insensitive silver halide layer in terms of gAg/m^2. These differences warranted a finding that the claimed materials were novel.

Document (1), which represented the closest prior art, also provided for an arrangement of interlayers within a layer unit having layers of equal colour sensitivity. However, (1) lacked information about the grain sizes for the comparatively light-insensitive silver halide and the comparatively coating amount in these interlayers. These parameters, which were an essential part of the solution to the problem according to the invention, could not be established by a few simple tests, but only by a complex one. Document (1) also tought that the best results for graininess and sensitivity were obtained if the interlayer contained a coupler. There was no indication that further improvements to graininess and sensitivity could be obtained if - as could be seen from a comparison of samples 103/106 in Example 1 of the contested patent -

the coupler was omitted. As the materials disclosed in (2) and (3) had an unconventional layer structure, a person skilled in the art could not have expected that the interlayers described in them would be able to lead to the desired improvements when used in materials having a conventional layer structure, such as the one comprised in the subject-matter of the patent and in the materials according to (1).

VI. The Appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested (main request) that the appeal be dismissed and the patent be maintained on the basis of the amended claims submitted on 16 July 1990 or, by way of auxiliary request, on the basis of the claims submitted in the course of oral proceedings.

Claim 1 of the auxiliary request reads as follows:

"1. A silver halide light-sensitive material comprising a support comprising thereon a red-sensitive silver halide emulsion layer unit, a green-sensitive silver halide emulsion layer unit and a blue sensitive emulsion layer unit in this order, said every color-sensitive silver halide emulsion layer unit comprising at least two emulsion layers having the same color sensitivity and being different in sensitivity therein with a layer containing comparatively light-insensitive silver halide grains having an average grain size of 0,6 µm or less between one of the at least two silver halide emulsion layers, characterized in that the layer containing comparatively light-insensitive silver halide grains

a) is arranged between the at least two blue-sensitive silver halide emulsion layers,

b) contains these grains in an amount of 0.03 to 5g/m2 based on the amount of silver,

c) contains no colour coupler and

d) has a sensitivity lower than the least sensitive layer of the at least two blue sensitive silver halide emulsion layers by 0,5 or more in log units."

At the conclusion of the oral proceedings, the Board announced its decision to allow the appeal on the basis of the auxiliary request.

Reasons for the Decision

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

2. For the reasons set out below, no objections under Article 123(2) and (3) EPC arise against the wording of the amended versions of present Claim 1 according to the main as well as the auxiliary requests. The features of Claim 1 of the main request are disclosed in Claims 1, 2 and 9, at page 3, line 18 to page 4, line 1, page 5, lines 11-14 and page 6, lines 11-13 of the application as filed and in Claim 1 of the granted patent. The insertion of the passage "and with no layer being different in color sensitivity from said at least two emulsion layers being positioned between two adjacent members of said at least two emulsion layers" is supported by the description on page 3, lines 18 - 25 as filed and page 2, lines 53 - 56 as granted.

Claim 1 of the auxiliary request can be obtained from Claim 6 in conjunction with page 4, lines 2 to 12, page 7, lines 2 to 14 and the examples from the original application, as well as from Claim 6 in conjunction with page 2, lines 56 to 64 and page 3, lines 35 to 41 of the patent specification. The dependent claims according to both the main request and the auxiliary request are also based on the documents making up the application as filed and the patent as granted.

The claims of the main and auxiliary requests do not increase the extent of the protection conferred by the patent.

3. *Main request*

The subject-matter of this request is concerned with a silver halide colour photographic material, which shows both an improved graininess and an enhanced sensitivity. The claimed material bears on a support one or more emulsion layer units (with a sensitivity either to the blue, green or red regions of visible light) comprising at least two silver halide emulsion layers having the same colour sensitivity but being different in sensitivity and is characterised by a layer containing comparatively light-insensitive silver halide grains between the at least two silver halide layers. One of its layers contains a colour coupler, possibly a DIR coupler (see page 2, lines 1 to 7 and page 5, lines 16 to 31). The interlayer containing the relatively light-insensitive silver halide acts as a light-reflecting layer (see page 3, lines 9 to 10 and line 39).

The claimed colour photographic material is not described in any of documents (1) to (4) in terms of all its features and is thus novel. Compared with the materials known from (4), the novelty of the claimed

materials is directly evident from the fact that it does not disclose any layer structures in which the interlayer containing the comparatively light-insensitive silver halide is disposed in an emulsion layer unit between two silver halide emulsion layers having the same colour sensitivity but being different in sensitivity. Document (4) teaches that interlayers should be disposed between a green-sensitive and a red-sensitive layer, that is between light-sensitive layers of different colour sensitivity (Claim 1 in conjunction with the passage from the bottom of page 51 to page 52, paragraph 2, and the examples).

Contrary to the submissions of the Appellant, it is not clear exactly what layer structures are meant by the "non-preferred" layer structures referred to in paragraph 2 on page 52 and novelty can only be destroyed by something which can be unambiguously deduced from a publication by a person skilled in the art.

Compared with the materials known from (1), novelty can be deduced from the fact that (1) makes no reference to the grain size of the light-insensitive silver halide or the coating amount of the interlayer.

4.1 The subject-matter of the claims of this request is not inventive. Document (1) discloses a comparable photographic material comprising at least one emulsion layer unit which is divided by an interlayer into high- and low-sensitivity layers having the same colour sensitivity. At least one of these layers must contain a timing DIR coupler. According to page 7, lines 30 to 33, the interlayer is a gelatin layer which may contain practically light-insensitive fine-grained silver halide.

The test results reproduced in Examples 1 and 2 of (1) show that placing interlayers containing gelatin and possibly silver halide in a red-sensitive layer unit providing the blue-green partial colour image between the high- and low-sensitive silver halide emulsion layers produces enhanced sensitivity and improved grain (see Table, compare samples 1 to 3 (without interlayer) with samples 4 to 7 (with interlayer); this effect is particularly marked if a DIR coupler is used (see also page 8, lines 15 to 18).

4.2 Document (1) gives no indication as to how such interlayers - if they are to contain practically light-insensitive silver halide - should be formed in terms of the size of the practically light-insensitive silver halide grains and the coating amount in order (see (1), page 6, lines 22 to 23) for the desired high sensitivity and excellent grain to be achieved.

4.3 Compared with this prior art, the technical problem in the contested patent is to provide an improved silver halide material with comparatively high sensitivity and good graininess.

This problem is solved in the contested patent in that the layer containing comparatively light-insensitive silver halide grains contains these grains in an amount of 0.03 to 5 g/m2 based on the amount of silver; contains no colour coupler and has a sensitivity lower than that of the least sensitive layer of two or more light-sensitive silver halide emulsion layers of the same colour sensitivity by 0.5 or more in log units.

With regard to the technical details set forth in (1) in connection with such a material for solving the same technical problem, it was an obvious step to ascertain the missing information about grain size and coating

amount by means of routine tests (see (3), column 6, lines 16 to 20). These tests were relatively easy to carry out, as a person skilled in the art would only have to follow the models supplied by (2) and (3) for an interlayer made of practically light-insensitive silver halide acting on a red-sensitive silver halide emulsion layer. They disclose the average grain sizes and coating amounts for the silver halide contained in these interlayers (corresponding to the interlayers of the claimed material) (see, for example, (2), Claim 3: average grain sizes less than 0.5 µm, and bottom of page 10: coating amount 0.1 to 1.2 g $AgNO/m^2$, i.e. 0.063 to 0.75 g silver/m^2). According to the information given in (2), bottom of page 8, these interlayers are supposed to be disposed between the more sensitive red-sensitive silver halide emulsion layer and the more sensitive green-sensitive silver halide emulsion layer, wherein, according to the last paragraph on page 9 and the test results in Table 1 on page 21, a sensitivity-enhancing effect is exerted in particular on the adjacent red- and/or green-sensitive layers. Independently of the unconventional layer structure provided in (2), in which this effect is said according to page 10, paragraph 3, sentence 3, to be particularly marked, a person skilled in the art could thus expect the interlayers described in (2) to have a sensitivity-enhancing effect even if, as claimed, they were disposed in a conventional layer structure, as in (1), adjacent to the more red-sensitive layer. The incentive thus existed for a person skilled in the art to make the coating amount and the average grain size of the interlayers containing light-insensitive silver halide already provided in (1) the same as that recommended in (2) and (3).

4.4 For the materials covered by the main request and made obvious by the prior art, which have an interlayer which contains relatively light-insensitive silver halide

between two differently light-sensitive silver halide emulsion layers of the red-sensitive layer unit, inventive step cannot be supported by the result of the comparison of sample 103 with sample 106 (Example 1 in table on page 13).

This comparison (samples 103/106) shows that the arrangement of a coupler-free interlayer containing light-insensitive silver halide within the blue-sensitive emulsion layer unit produces an unexpected result (enhanced sensitivity, and improved graininess compared with an interlayer containing a coupler). This result, which was shown for the blue-sensitive emulsion layer unit only, does not, however, give any indication as to the effect of the presence of a coupler-free interlayer arranged between the light-sensitive layers of the red-sensitive layer unit in those materials, which are also claimed, but are obvious, as explained before. In those layer units other diffusion passages during development and other exposure relations prevail (see (4), to of page 11; naturally there is less light available for reflection in the green- and red-sensitive layer units, which are usually arranged beneath the blue-sensitive layer unit). Moreover, the contents of the patent in suit do not give any indication that the arrangement of the interlayer within these lower-lying emulsion layer units would make it possible, through reflection, to improve sensitivity and graininess. Thus the case for an unexpected improvement does not stand up as far as these layer structures, covered by the main request, are concerned.

4.5 As it was obvious from (1) to (4) to arrange the interlayers defined in Claim 1 of the main request within the red-sensitive layer unit to improve sensitivity and/or graininess, an assessment of inventive step no longer hinges on the mechanism by

which the arrangements of a practically light-insensitive interlayer containing silver halide grains lead to the improvements set forth therein. The discovery according to the contested patent, namely that the improvements listed are not brought about, as stated in (1), page 34, lines 21 to 24, (2), page 10, paragraph 3, (3), column 6, lines 1 to 8 or (4), page 56, by controlling the development processes (possibly with the aid of a DIR compound which may be present in the claimed materials) but by light reflection, does not add anything technical to the known teaching, and in fact amounts to nothing more than a different technical explanation.

5. *Auxiliary request*

5.1 For the following reasons, this request needs to considered and judged in a different manner from the main request:

Claim 1 of this request differs from Claim 1 of the main request primarily in that in the case of the claimed materials the interlayer containing the light-insensitive silver halide must be disposed between the at least two silver halide layers of different sensitivity of the **blue-sensitive** layer unit.

5.2 The novelty of this material compared with the material known from (4) arises from the fact that (4) does not at any stage disclose layer orders in which the interlayer containing the practically light-insensitive silver halide grains

> should be disposed between at least two silver halide emulsion layers, having the same colour sensitivity and being different in sensitivity, of a blue-sensitive emulsion layer unit -

as claimed in Claim 1 of the auxiliary request (see the comments on the novelty of the main request in section 3 above).

5.3 Compared with (1) the material in accordance with the above request is novel because (1) does not reveal the composition of an interlayer disposed between the at least two layers of different sensitivity of a blue-sensitive layer unit, in particular the grain size of the particles in it or the coating amount, required to achieve improvements, for example the excellent grain which is an objective in (1) (page 6, line 22) and high sensitivity.

6. In contrast to the subject-matter of the main request, the parameters to be met in order to achieve the desired success with these materials could not be ascertained by means of a few routine tests, because the prior art in prior publications (1), (2), (3) and (4) did not contain any examples of interlayers arranged in this way. Thus the colour photographic materials disclosed in (2), (3) and (4), which contain details about these interlayers, are, in accordance with the information given in (2), bottom of page 6 and bottom of page 12, (3), column 4, lines 34 to 42 and column 5, lines 45 to 51, and (4), bottom of page 15, exclusively directed towards improvements in photographic sensitivity and/or graininess in red- or green-sensitive silver halide emulsion layers. Accordingly, the test results summarised in the tables of all the examples in (2), (3) and (4) only show improvements in those layer orders, in which the interlayer containing the relatively insensitive silver halide is disposed adjacent to a red- or green-sensitive silver halide emulsion layer. There are no indications in (2), (3) or (4) that the arrangement of an interlayer containing the comparatively light-insensitive silver halide within two

silver halide emulsion layers of different sensitivity of a blue-sensitive layer unit also leads to improvements in photographic sensitivity or graininess. Because of the lack of such indications, the prior art does not provide any suggestions for the teaching of the contested patent that the sensitivity and graininess of a colour photographic material can be improved by disposing an interlayer containing a comparatively insensitive silver halide within a layer unit which is sensitive to blue light only. This assessment applies regardless of whether such material contains a coupler in the interlayer or not.

The same considerations apply to the subject-matter of the dependent claims, which merely present further embodiments of the same inventive concept.

Accordingly, the subject-matter of this request is inventive.

Order

For these reasons it is decided that:

The Opposition Division's decision is set aside.

The case ist remitted to the Opposition Division with the order to maintain the patent on the basis of the auxiliary request.

The Registrar:

E. Görgmaier

The Chairman:

K. Jahn