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D E C I S I O N
of 13 July 2000

Case Number: T 0848/96 - 3.3.6

Application Number: 87107297.1

Publication Number: 0246624

IPC: G03C 7/26

Language of the proceedings: EN

Title of invention:
Method of forming a color image

Patentee:
FUJI PHOTO FILM CO., LTD.

Opponent:
Agfa-Gevaert AG

Headword:
Bromide concentration/AGFA

Relevant legal provisions:
EPC Art. 56, 84, 123

Keyword:
"Inventive step - main request (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0848/96 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 13 July 2000

Appellant: (Opponent)
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-Patentabteilung-
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Representative:
-

Respondent: (Proprietor of the patent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 9 September 1996 concerning maintenance of European patent No. 0 246 624 in amended form.

Composition of the Board:

Chairman: P. Krasa
Members: G. N. C. Raths
J. H. P. Willems

Summary of Facts and Submissions

I. This appeal lies from the Opposition Division's decision maintaining European patent No. 0 246 624 in amended form. In a notice of opposition, based on lack of inventive step, the following documents had been submitted, inter alia:

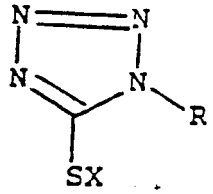
(1) a partial translation of JP-A-59 232 342

(2) DE-A-3 431 860

(3) EP-A-0 107 488

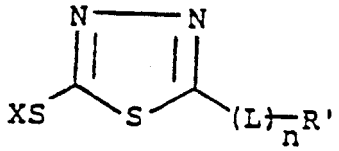
II. Claim 1 of the patent as maintained by the Opposition Division reads:

"1. A method of forming a colour image which comprises processing a silver halide colour photographic material comprising a reflective support having thereon at least one light-sensitive layer containing at least one coupler which forms a dye upon a coupling reaction with an oxidation product of an aromatic primary colour developing agent and a silver halide emulsion which contains at least 95% by mol of silver chloride and substantially no silver iodide with a colour developing solution which contains not more than 0.002 mol/l of bromine ions and substantially no benzyl alcohol for a development time of not more than 2 min and 30 s, wherein at least one compound represented by the following formulae (I) or (II) is contained in any layer of the silver halide colour photographic material:



(I)

wherein R represents an alkyl group, an alkenyl group, or an aryl group; and X represents a hydrogen atom, or alkali metal atom, an ammonium group, or a precursor;



(II)

wherein L represents a divalent connecting group, R' represents a hydrogen atom, an alkyl group, an alkenyl group, or an aryl group; X has the same meaning as defined in formula (I); and n represents 0 or 1."

III. In its decision the Opposition Division found that the subject-matter of the claims as maintained was novel and inventive in view of documents (1),(2) and (3) because mercaptotetrazoles and mercaptothiadiazoles were not mentioned in document (1) according to which the developer contains benzyl alcohol, and documents (2) and (3) disclose colour developing solutions with a bromide content above 0.002 mol/l, and in documents (1) and (3) the use of specific combinations of compounds i.e. adenine and mercaptotriazoles or tetraazaindenes, respectively mercapto N-heterocyclic compounds and hydroxytetraazaindens is disclosed.

IV. The Appellant (Opponent) filed an appeal and submitted

that the subject-matter of Claim 1 did not involve an inventive step in view of documents (2) and (3). He argued in essence

- that the subject-matter of Claim 1 differed from that disclosed in document (2) only by the presence of specific mercapto-substituted heterocycles and by an upper limit for the bromide content of the developer;

- that the materials according to document (2) could contain antifogging agents (page 20, lines 1 to 2) which - according to the Appellant - did not need to be precisely specified;

- that according to the patent in suit good fog values were obtained with the compounds of formulae I and II which were known to reduce fog (see document (3), page 16 and Table 2, absence and presence of compound Y-1); the use of compounds of formulae I and II of document (3) as antifogging agents in the compositions of document (2) was therefore obvious;

- that whereas the developer exemplified in document (2) contained more bromide (page 24, line 20) than was allowed according to the patent in suit and although document (2) did not indicate the maximum and minimum bromide quantities, it mentioned the negative influence of bromide on the development activity (page 5, lines 15 to 19), and that the skilled person would therefore conclude that a reduction in bromide content would lead to an increase in sensitivity.

V. The Respondent (Patent Owner) argued in essence

- that the object of document (2) was to avoid the disadvantages which occurred by the use of a replenisher such as the enrichment of bromide in the developer solution and the reduction of the volume of the developer due to evaporation and that such an object was different from the object of the patent in suit (page 5, line 1 to page 6, line 6);

- that the developer solution exemplified in document (2) contained 0.006 mol/l of KBr (example 1, page 24, line 20) which was above the limit of 0.002 mol/l of bromide set in Claim 1 of the patent in suit;

- that document (2) did not disclose the use of a mercapto compound of formulae (I) or (II) as an antifogging agent;

- that the object of document (3) was to provide a silver halide emulsion being highly stabilized against variations in the concentration of the bromide ions and the developing solution (page 2, lines 14 to 17);

- that the bromide ions concentration according to document (3) in the developer solution was in the range of 0.8 g/l to 2.4 g/l (page 11, line 7), i.e. 0.007 mol/l to 0.020 mol/l, which was above the upper limit of 0.002 mol/l required by the patent in suit;

- that document (3) taught that advantageous effects

were only obtained by a **combination** of a hydroxytetraazaindene compound **and** a nitrogen containing heterocyclic compound having at least one mercapto group (the paragraph bridging pages 5 and 6);

- that the comparative tests submitted by the Appellant with the letter dated 20 December 1996 were in accordance with the invention of the patent in suit and confirmed the teaching of the patent in suit.

VI. During the oral proceedings which took place on 13 July 2000, the Appellant submitted a new set of 12 claims as main request Claim 1 thereof is the only independent claim and differs from that maintained by the Opposition Division in that the term "amine" was inserted after the words "an aromatic primary".

VII. The Appellant requested that the patent be revoked.

The Respondent requested that the appeal be dismissed and that the patent be maintained in amended form on the basis of Claims 1 to 12 submitted as main request during oral proceedings or, alternatively, on the basis of Claims 1 to 11 submitted as auxiliary request during oral proceedings.

VIII. At the end of the oral proceedings the Chairman announced the Board's decision.

Reasons for the Decision

Main request

1. *Amendments (Articles 84 and 123 EPC)*

Claim 1 as submitted during oral proceedings differs from Claim 1 as originally filed by

- the change of "80% by mol of silver chloride" to "95% by mol of silver chloride",

- the change of "in the presence of at least one compound represented by the following formulae (I), (II), or (III)" to "wherein at least one compound represented by the following formulae (I) or (II) is contained in any layer of the silver halide colour photographic material",

- the deletion of all references to compound (III).

The content of silver chloride of 95 mol% and the presence of the compounds of formulae (I) or (II) in the photographic material find their support on page 49, line 14, and page 47, lines 5 to 8, respectively, of the application as filed. The omission of the term "amine" in Claim 1 as maintained by the Opposition Division was an obvious error and its rectification according to Rule 88 EPC by inserting "amine" was not contested by the Appellant during the appeal proceedings (see also Claim 1 as originally filed).

Further, the Board is satisfied that Claim 1 as amended does not extend the protection conferred by the patent. Therefore, the requirements of Article 123 EPC are met. The Board is also satisfied that the claims of the main request are clear and comply with the requirements of Article 84 EPC. Since no objections have been raised by

the Appellant in the respect of Articles 84 and 123 EPC, no further reasons have to be given.

2. *Novelty*

The Board is satisfied that the subject-matter of Claim 1 is novel in view of documents (1), (2) and (3). Since no objections were raised by the Appellant, no further reasons have to be given.

3. *Inventive step*

3.1 The patent in suit according to Claim 1 concerns a method of forming a colour image which comprises inter alia a colour developing solution containing less than 0.002 mol/l of bromide ions, any layer of the photographic material comprising at least one compound of formulae (I) or (II).

3.2 The technical problem as stated in the patent in suit was to provide a method of forming a colour image which has a small load for prevention of environmental pollution and simple work for preparation of a processing solution using a silver halide colour photographic material which is applicable to rapid processing providing high sensitivity and low fog, whereby simplification of laboratory work, improvement in productivity and miniaturization, simple operation, and low environmental pollution of the processing system are achieved (patent in suit, page 3, lines 3 to 7).

3.3 At the priority date of the patent in suit, it was known to the notional skilled person that bromide ions have an inhibiting effect on the development speed (see

document (2), page 5, lines 5 and 15 to 20; patent in suit, page 2, lines 34 and 35). However, their presence in the colour developing solution reduces the fog formation. Therefore, conventional colour developing solutions comprise bromide ions and in addition benzyl alcohol which acts as a development accelerator (patent in suit, page 2, lines 11 and 13 to 14) and thereby compensates the bromide ions' inhibiting effect. At the priority date of the patent in suit it was also known that benzyl alcohol pollutes the environment (patent in suit, page 2, lines 21 and 22); its elimination from the colour developing solution would be the simplest measure for achieving environmental protection although the development time would become longer.

This core objective of environmental protection was already achieved by the method of document (2) which discloses a method of forming a colour dye image in the absence of benzyl alcohol. Although the protection of environment was not the main objective of document (2), it was nevertheless addressed there (page 4, lines 18 and 19; page 5, lines 6 to 8). The Appellant took this document as starting point for evaluating inventive step. The Board can accept this.

3.4 The technical problem underlying the invention is hence to be determined in the light of the state of the art disclosed in document (2).

3.5 Document (2) concerns a process for forming colour images; the object is to avoid the disadvantages which are linked to the overflow of used developer solution caused by the addition of a replenisher to the developer bath on the one hand (work up of overflow or pollution problems) or to higher concentrations of the

bromide ions and to higher temperatures required therefore to overcome their inhibiting effect if the overflow is reduced on the other hand. The object of document (2) is achieved by a method of forming an image wherein a photographic material containing silver halide particles substantially consisting of silver chloride, namely more than 70 mol% or more than 90 mol% AgCl (see Claims 1 and 2) is developed by a processing solution free of benzyl alcohol (see Claim 3).

The problem underlying the patent in suit can, therefore, be reformulated in view of document (2) as the provision of a further method of forming a colour image or, in other words, as to how to modify the method of document (2) comprising high contents of silver chloride in such a way that non-acceptable fog formation is avoided and high sensitivity is obtained.

3.6 The results of samples 7, 13 and 18 in Table 4 of the patent in suit show that high colour densities (colour forming property) and high sensitivity are obtained without an increase in fog (shown by the low Dmin values) even when a rapid processing is carried out using a colour developing solution containing no benzyl alcohol. In view of these examples the Board is satisfied that the problem underlying the patent in suit is solved by the claimed solution.

The test results submitted by the Appellant in his letter dated 20 December 1996 are not adequate for calling in question this conclusion. They show that the sensitivity of each sample is improved (increased) when the bromide ion content is lowered whereas the fog values representing the invention (0.162; 0.094; twice 0.087) obtained with a bromide ion concentration of

0.002 mol/l - according to the Appellant's table - are higher (worse) than the fog values representing the prior art (0.108; 0.083; twice 0.081). However, it is up to the producer of the photographic material to decide upon the balance between sensitivity and fog; in this respect, the test results displayed in Table 1 annexed to the Respondent's letter of 11 January 1995 reflect in a more complete way the influence of the different parameters like benzyl alcohol, the kind of the antifogging agent and the bromide ion concentration. For instance, by adding the compounds of formulae (I) or (II) to a developing solution containing 0.002 mol/l KBr, the fog is reduced (improved) significantly from only 0.15 to 0.09 or 0.10, respectively, whereas the sensitivity decreases from 108 to 101 or 99, respectively. These results confirm, in the Board's judgment, that the subject-matter of Claim 1 plausibly solves the existing technical problem.

3.7 It remains to be decided whether the modification of the method of document (2) to arrive at the method of the patent in suit involves an inventive step.

3.8 Document (2) teaches, as already stated, the negative influence of the bromide ions on the colour developing process. Therefore, the skilled person would keep the bromide concentration at a low level (page 5, lines 1 to 8). The skilled person knew that bromide ions have a development inhibiting function (patent in suit, page 2, lines 34 and 35) and he was also aware of the warning in document (2) that bromide ions have an inhibiting effect on the developer substance N-ethyl-N-(ß-methylsulfonamidoethyl)-3-methyl-p-phenyldiamine-sesquisulfate monohydrate (page 5, lines 15 to 19). An

enrichment of the bromide concentration leads not only to an inhibiting effect but requires also higher temperatures to overcome the inhibiting effect (document (2) page 5, lines 1 to 8). Since the skilled person would therefore focus on the concentration levels of bromide ions, the bromide concentrations disclosed in document (2) give already some indication as to what a skilled person would consider to be useful low levels of bromide ion concentrations. It has to be established what "low level" means according to the state of the art.

Such low levels of bromide are exemplified in document (2) by 0.7 g/l (page 24, line 30 and page 25, line 12) corresponding to 0.006 mol/l. There is no pointer in document (2) to a value below 0.006 mol/l. The skilled person would also consult document (3) concerning silver halide emulsions which are stabilized against variations in bromide ions concentration. Document (3) mentions as the lowest limit of the bromide ions concentration range of a developing solution 0.8 g/l corresponding to about 0.007 mol/1 (page 31, line 12, see also page 30, line 9). Hence in the light of the state of the art, the skilled person would have understood by an acceptable "low level" of bromide ions concentrations of about 0.006 mol/l or 0.007 mol/l developing solution.

Therefore, the Board concludes that the maximum allowable content of not more than 0.002 mol/1 of bromide ions as called for by the patent in suit cannot be inferred from documents (2) or (3).

Thus, the Board cannot accept the Appellant's argument that it was obvious for a skilled person to use the

compounds of formulae (I) and (II) (known from document (3)) as antifogging agents in the developing solutions disclosed in document (2).

First of all, the bromide ions concentration of the developing solution used in the method of Claim 1 of the patent in suit is considerably lower than that disclosed in document (2) and also in document (3). Therefore, the claimed subject-matter would not result from a simple combination of the respective disclosures.

Furthermore, no one of these documents contains any information from which the skilled person could have expected the demonstrated performance of the antifogging agents of formula (I) or (II) at bromide concentrations of not more than 0.002 mol/l.

3.9 During oral proceedings the Appellant argued that the processing of emulsions having a high concentration of silver bromide, what means 4 mol% of AgBr in the context of document (2), would enrich the development bath with bromide ions; he concluded that the content of bromide ions in the developer solution according to the patent in suit, which allows for 5 mol% of AgBr in the emulsion (see Claim 1), would increase above the value of 0.002 mol/l during the colour developing process. The Board cannot accept this argument. Claim 1 of the patent in suit is directed to a method comprising a developing solution which contains not more than 0.002 mol/l bromide ions; this requirement is unequivocal and has to be respected when processing the colour photographic material, also in case of an emulsion having a silver bromide content of 5 mol% as also the Respondent pointed out.

3.10 The Board, therefore, concludes that the subject-matter of Claim 1 involves an inventive step.

Claims 2 to 12 concern specific embodiments of the process of Claim 1 from which they derive their patentability.

Auxiliary request

4. Since the main request is allowable, the auxiliary request has not to be considered.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent with Claims 1 to 12 of the main request and pages 2 to 84 of the description of the patent as maintained by the Opposition Division.

The Registrar: The Chairman:

G. Rauh P. Krasa