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File Number: T 103/90 - 3.3.1
Application No.: 83 105 186.7
Publication No.: 0 095 722
Title of invention: Color photographic materials

Classification: G03C 11/10

DECISION
of 23 October 1991

Proprietor of the patent: KONICA CORPORATION
Opponent: Agfa-Gevaert AG, Leverkusen

Headword: Photographic material/KONICA

EPC Article 56

Keyword: "Inventive step (no)" - "Technical problem; comparison with the closest prior art, not with an artefact; routine considerations"

Headnote



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Boards of Appeal

Chambres de recours

Case Number : T 103/90 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 23 October 1991

Appellant :
(Opponent)

Agfa-Gevaert Ag, Leverkusen
-Patentabteilung-
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Respondent :
(Proprietor of the patent)

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Representative :

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Decision under appeal :

Decision of Opposition Division of the European
Patent Office dated 30 January 1990 rejecting the
opposition filed against European patent
No. 0 095 722 pursuant to Article 102(2) EPC.

Composition of the Board :

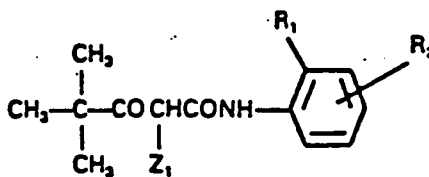
Chairman : K.J.A. Jahn
Members : R.K. Spangenberg
J.A. Stephens-Ofner

Summary of Facts and Submissions

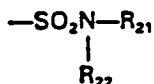
I. This appeal lies from the decision of the Opposition Division of the EPO of 30 January 1990 rejecting an opposition against European patent No. 0 095 722, granted in response to European patent application No. 83 105 186.7 filed on 25 May 1983 and claiming priority of 28 May 1982 of an earlier application in Japan and containing 8 claims. The only independent Claim 1 read as follows :

"1. A colour photographic material comprising a support, a first silver halide emulsion layer containing a yellow coupler, a second silver halide emulsion layer containing a magenta coupler, a third silver halide emulsion layer containing a cyan coupler and being positioned farthest from the support, a first non-light-sensitive layer on the side of said third emulsion layer opposite to the support and a second non-light-sensitive layer on the other side of said third emulsion layer, characterized in that the yellow coupler is represented by formula I, the magenta coupler is represented by formula II, the cyan coupler is represented by formula IIIa or IIIb and at least said first non-light-sensitive layer contains a UV absorber represented by formula IV:

Formula (I):

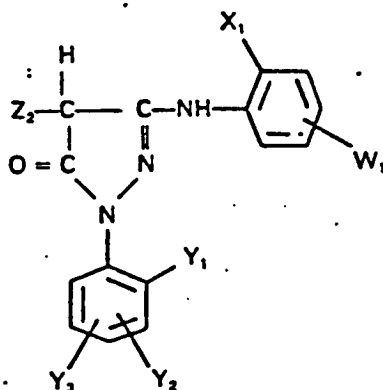


wherein R₁ is a hydrogen atom, a halogen atom or an alkoxy group; R₂ is -NHCOR₂₁, -NHSO₂R₂₁, -COOR₂₁ or



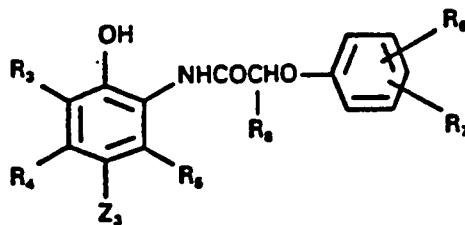
(wherein R₂₁ and R₂₂ are each an alkyl group which may be substituted); and Z₁ is a nitrogen-containing heterocyclic group the nitrogen atom of which is bonded to the carbon atom;

Formula (II)



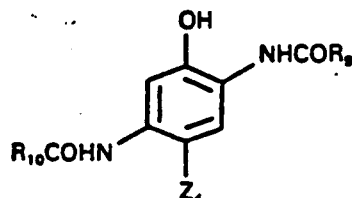
wherein X₁, is a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an aryloxy group, an amido group, a hydroxy group, a cyano group or a nitro group; Y₁, Y₂ and Y₃ are each a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, a carboxy group, an alkoxy carbonyl group, a nitro group, an aryloxy group, a cyano group or an acylamino group; W₁ is a hydrogen atom, a halogen atom or a monovalent organic group; and Z₂ is an atom or a group that is eliminated upon coupling;

Formula (IIIa)



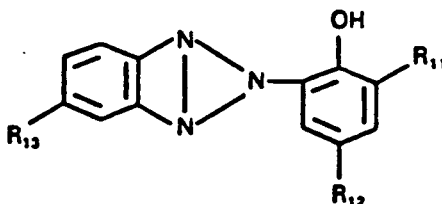
wherein R₃, R₄ and R₅ are each a hydrogen atom, a halogen atom, an alkyl group, an aryl group or an alkoxy group; R₆ and R₇ are each a hydrogen atom, an alkyl group or an alkoxy group; R₈ is a hydrogen atom or an alkyl group; and Z₃ is an atom or a group that is eliminated upon coupling;

Formula (IIIb)



wherein R₉ and R₁₀ are each an alkyl group, an aryl group or an alkenyl group which may be substituted; and Z₄ is an atom or a group that is eliminated upon coupling; and

Formula (IV)



wherein R₁₁, R₁₂ and R₁₃ are each a hydrogen atom, a halogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkenyl group, a nitro group or a hydroxyl group."

The decision under appeal referred to the following documents:

- (a) GB-A-2 017 325 (October 1979)
- (b) DE-B-2 036 719 (February 1981; A-document Feb. 1972)
- (c) DE-A-2 522 978 (= FR-A-2 272 418) (December 1975)
- (d) the publication "KODAK EKTACOLOR 74 RC and 78 Papers/Type 2492 (published 1979 by Eastman Kodak)
- (e) Research Disclosure 18716 (November 1979)

and to the prior use of the KODAK EKTACOLOR 78 paper type 2492 described in document (d).

According to the Opposition Division the subject-matter of the patent in suit was novel and involved an inventive step, since the technical problem of providing a colour photographic material capable of producing dye images of high colour stability and permitting only balanced colour fading was solved by the specific combination of technical features set out in Claim 1 in an unobvious manner, in particular having regard to the favourable test results submitted by the patentee on 1 December 1989.

II. An appeal was filed on 7 February 1990 and the appropriate fee paid at the same date. The notice of appeal was accompanied by a statement of grounds. Oral proceedings took place on 23 October 1991, during which the Respondent (patent proprietor) submitted a further test report in response to certain observations made by the Appellant with respect to an earlier test report submitted together with the reply to the statement of grounds of appeal.

III. The Appellant (Opponent) essentially argued that the principle of the claimed solution of the stated problem was already made available to the public by the prior use of a photographic material described in document (d). The analysis of this material had revealed before the priority date of the patent in suit the presence of a benzotriazole UV-stabilising agent in the non-light-sensitive layers on both sides of the light-sensitive layer containing the cyan coupler, which was the top layer of the three light-sensitive layers contained therein. The function of the benzotriazole was common general knowledge as was acknowledged in documents (a) and (c). It was therefore obvious to apply these compounds analogously in order to improve the photographic materials disclosed in documents (a) and (c). These materials already contained combinations of yellow, magenta, and cyan couplers in their respective light-sensitive layers which belonged to the classes of the respective couplers identified in the patent in suit. Document (c) already indicated that the fastness to light of the cyan dye forming layer could be improved by incorporating therein a benzotriazole UV-stabiliser. In these known materials the magenta dye was the most light-sensitive; therefore, in view of a balanced colour fading, it was undesirable to further stabilise the cyan dye. In the light of the common general knowledge reflected by documents (b) and (e) it was, however, obvious that a further improvement could be obtained by incorporating the UV-stabiliser in the layer situated above the cyan dye forming layer. Moreover, the use of a yellow coupler containing a coupling-off group different from that of the yellow coupler contained in the photographic material according to document (d) did not contribute to the solution of the stated problem as could be seen from the original disclosure of the patent in suit which was not restricted to the presence of the yellow couplers now specified in Claim 1 as granted. No

surprising effect resulted from this sole modification of the previously used material, as had been shown by the test results contained in the notice of opposition. The test results submitted by the Respondent during the opposition and appeal proceedings did not relate to that previously used material which was mentioned in document (d), and were, therefore, not relevant.

IV. The Respondent (Patentee) contested that the principle underlying the patent in suit was made available to the public by the analysis of the colour paper identified in document (d) by its trade mark, since this analysis had only revealed a certain composition of that paper, but not the function of the chemical compounds described therein. He emphasised that the problem of improving the fading characteristics of colour prints was old, and that a great number of quite different attempts to solve it were made by those skilled in the art. Therefore it was not reasonable to consider obvious the new solution to this problem according to the patent in suit, i.e. the use of a combination of conventional features which were available to those skilled in the art for a long period of time, since, if this were the case, this solution would have been found earlier. Moreover, the numerous test results contained in the patent in suit, and submitted during the opposition and appeal proceedings, clearly demonstrated that the particular combination of light-sensitive layers containing the selected classes of couplers indicated in the patent in suit, with at least one non-light-sensitive layer containing a benzotriazole UV-stabiliser, and being located upside the red-sensitive layer, resulted in dye images of superior fastness to light and better balanced fading characteristics in comparison with a great number of other equally possible modifications of the KODAK EKTACOLOR paper made available to the public by prior use. Thus, even if the photographic material of the patent in

suit would not have superior properties when compared with that known KODAK paper, it would not have been obvious to select just this particular combination of components in order to obtain an equally good result.

He also argued that the selection of documents (a) and (c) relating, inter alia, to the combination of couplers used in the patent in suit, but in combination with a different arrangement of the UV-stabiliser, was made with the benefit of hindsight. The reason for this was that these documents addressed a quite different technical problem, namely the overcoming of light-induced staining, which was the contrary of the light-induced fading addressed in the patent in suit, on the one hand, and the reduction of fading caused by humidity and temperature during storage in the dark on the other hand. It followed, he submitted, that the Appellant had failed to demonstrate that a person skilled in the art would have considered just these documents when looking even only for mere alternatives of the KODAK paper, let alone for an improvement of the same. Furthermore, however, the test results submitted albeit only during the oral proceedings demonstrated the superiority in respect of fastness to light of the material according to the disputed patent over a material containing the same arrangement of layers and the same couplers and UV-stabilisers as the said KODAK paper and being prepared in the same way as Sample 3 of Example 1 of the patent in suit. It would not have been correct to compare the prior used KODAK paper itself with Sample 3 according to the patent in suit because the results might have been influenced by unknown differences (e.g. further additives) between the two materials.

- V. The Appellant requested that the decision under appeal be set aside and the patent revoked. He further requested that if the late filed evidence were admitted into the

appeal proceedings he be permitted to file counter-evidence and that, in consequence, the proceedings be adjourned.

The Respondent requested that the appeal be dismissed.

At the end of the oral proceedings, the decision to allow the appeal was announced.

Reasons for the Decision

1. The appeal is admissible.

2. Novelty

The Board is satisfied that the combination of layers containing the UV-absorbers with the layers containing the specific classes of couplers shown in Claim 1 of the disputed patent is novel with respect to the cited state of the art. Since novelty was not contested, it is not necessary to give detailed reasons for this finding.

3. Inventive Step

3.1 In the patent in suit (page 2, lines 10 to 21) it is acknowledged that conventional photographic materials for obtaining colour prints (colour papers) consist of a reflective support which has successively formed thereon a blue-sensitive silver halide emulsion layer containing a yellow coupler, a first non-light-sensitive intermediate layer, a green-sensitive silver halide emulsion layer containing a magenta coupler, a second non-light-sensitive intermediate layer, a red-sensitive silver halide emulsion layer containing a cyan coupler, and a non-light-sensitive protective layer. To inhibit the fading of the dye images

upon exposure to light, a UV-absorber was incorporated in the first and/or second non-light-sensitive layer. The image keeping quality of these materials, especially fastness to light, was insufficient and, moreover, the colour balance of the dye images during fading upon exposure to light was poor, since the various couplers formed dye images which had greatly different rates of fading.

Thus, the technical problem was said to provide a colour photographic material capable of producing dye images that had improved fastness to light, and permitted only balanced colour fading.

3.2 However, in the Board's judgment, this problem has already been solved by the KODAK EKTACOLOR RC 78 paper/Type 2492 described in document (d). The Respondent no longer disputed in the appeal proceedings that this material was available to the public before the priority date, and that it had been analysed before that date, and that it had the composition indicated in the notice of opposition. According to the test results also contained in the notice of opposition, colour prints obtained from this known paper showed excellent fastness to light and and permitted only balanced colour fading.

3.3 Nevertheless, the Respondent observed that the test results submitted by him during the oral proceedings demonstrated superior fastness to light over the known KODAK EKTACOLOR paper. Therefore, he insisted that the technical problem should be seen in improving the said KODAK paper in respect of fastness to light.

3.3.1 The Board, however, cannot concur with that view, since it is based on a comparison that was made with an artefact rather than with the above mentioned paper. Regarding the

Respondent's observation with respect to the presence of other ingredients which may influence the fastness to light, the Board observes that Example 1 of the patent in suit does not exactly specify all ingredients of the tested materials (see the wording used on page 41, lines 1 to 11, "second layer ... containing ...", "fourth layer ... containing ...", "sixth layer ... containing ...", which does not exclude the presence of further ingredients in these layers). Moreover, and more important, Claim 1 of the patent in suit is not limited to photographic materials consisting of the couplers and benzotriazoles identified therein, but comprises materials which may contain an unlimited number of other components. In this situation, in order to demonstrate the superior properties of a product made according to the patent, it would have been necessary to compare the known product with a particular product made according to the patent which has the most similar composition to it (see e.g. T 181/82, OJ EPO 1984, 401, in particular items 4 and 5 of the reasons). This comparison cannot normally be replaced by one with an artificial product which does not belong to the state of the art, and is merely created by a modification of one of the examples of the patent, in order to arrive at a product which falls just outside the scope of the patent. In addition, in the present case where it is rather unlikely that a commercial product actually sold in 1982 would have shown such a bad balance of fading as the products used by the Respondent for comparison, the properties of the latter cannot be regarded as evidence for substantially similar properties of the former. For these reasons the Board disregards this late filed evidence pursuant to Article 114(2) EPC.

3.3.2 The test reports submitted together with the reply to the grounds of appeal and during the opposition proceedings are not suitable as evidence for the alleged improvement

either, since they also relate to compositions which do not represent the closest state of the art, because the former uses for comparison a material which further differs from the known KODAK paper in the magenta coupler, which is M-19 as in Sample 3 of the patent in suit, instead of M-33 used in the said KODAK paper.

The test report submitted on 25 April 1989, uses for comparison a material with the benzotriazole incorporated in the cyan dye forming layer and in the non-light-sensitive layer beneath that layer, as in document (c), but differs from the material exemplified in that document in the structure of the yellow and magenta couplers.

The test report submitted on 1 December 1989, compares materials having only one (yellow dye forming) light sensitive layer which is coated with one non-light-sensitive layer containing a benzotriazole. Moreover, the materials used for comparison in this test report contain yellow couplers different from that used in the known KODAK paper. These test results are not even sufficient evidence to support the Respondent's submission that, as a general rule, yellow couplers containing a coupling-off group bound to the dye forming moiety of the coupler through an oxygen atom result in yellow dyes of less favourable fastness to light than do yellow dyes obtained from couplers according to the patent in suit, having the coupling-off group bound through a nitrogen atom, since the general conclusion drawn from the above test report is in contradiction to the undisputed test results contained in the notice of opposition, according to which the fastness to light of one specific yellow dye, resulting from a coupler having the coupling-off group bound through an oxygen atom, is as good as that of the couplers indicated in the patent in suit.

The test conditions applied by both parties were different, but the Board is nevertheless satisfied that the test results obtained by both parties are comparable insofar as the relative fastness to light of the different dye containing layers within the same material is concerned, since both parties submitted during the oral proceedings that this relation does not significantly depend on the conditions under which they are obtained, e.g. intensity and duration of irradiation.

- 3.3.3 Therefore, the Board sees the technical problem underlying the disputed patent in proposing a further photographic material having high fastness to light and permitting only balanced colour fading, thus having properties comparable with those of the said KODAK EKTACOLOR paper.

The patent in suit proposes to solve this problem by a colour photographic material comprising a support, a first silver halide emulsion layer containing a yellow coupler, a second silver halide emulsion layer containing a magenta coupler, a third silver halide emulsion layer containing a cyan coupler and being positioned farthest from the support, a first non-light-sensitive layer on the side of said third emulsion layer opposite to the support and a second non-light-sensitive layer on the other side of said third emulsion layer, wherein specific classes of yellow, magenta and cyan couplers identified in Claim 1 are used in the respective silver halide emulsion layers together with a specified class of benzotriazole UV-absorbers incorporated at least in said first non-light-sensitive layer being positioned on the side opposite to the support of said third (cyan coupler containing) emulsion layer.

- 3.4 It therefore needs to be decided whether the cited prior art provided any incentive to consider the combination of couplers, and the particular arrangement of the UV-

absorber as a promising solution of the existing technical problem.

In this respect, the cited prior art does not only show that the couplers, as well as the UV-absorbers to be used according to the patent in suit, are conventional materials, see page 2, lines 24 to 27 and page 37, lines 33 to 35 of the patent specification, but also that the individual combinations of couplers belonging to the three classes of compounds indicated in Claim 1 of the patent in suit have in fact already been successfully used in photographic materials for obtaining colour prints according to documents (a) and (c).

According to document (a), the resistance of a photographic material against staining is improved by using specific high boiling solvents, namely branched chain alkyl esters of phosphoric acid having 8 or more carbon atoms in each alkyl group, for incorporating a benzotriazole UV-absorber in a non-light-sensitive interlayer of that material (page 1, lines 25 to 42). The interlayer may be located at any position in the photographic material; preferably it is located adjacent to the green sensitive, i.e. the magenta coupler containing, layer (page 7, lines 7 to 9). Such material, containing in the light-sensitive layers yellow, green and cyan couplers of the classes specified in the patent in suit and the benzotriazole UV-absorber in the interlayer between the green-sensitive and the red-sensitive layer, is shown in Example 1, which is the only Example in this document. In this example the yellow coupler is coupler Y-23 of the patent in suit, the magenta coupler is M-8 of the patent in suit, and the cyan coupler is coupler C-9 of the patent in suit (for the structures see pages 9, 14 and 25 of the patent specification).

While it is therefore true that this document sets out to solve the technical problem of "light staining" of colour prints exposed to (sun)light, the Board concludes that a person skilled in the art would never use a material of unacceptable fastness to light as a basis for further improvement with respect to any problem related to the manufacture of photographic materials for obtaining colour prints, including the one envisaged by the patent in suit, since the requirement of sufficient fastness to light and acceptable balance of fading is a basic requirement of all materials for obtaining colour prints, and will therefore always be borne in mind. This finding is in conformity not only with the general statement in document (b), column 5, lines 51 to 54, but also with the submissions made by both parties during the oral proceedings, according to which the improvement of the fastness to light is an old problem in the art concerned. Thus, the fact that the above combination of couplers was considered in that document as the basis for further development in respect of the problem of staining is a clear incentive to use this combination also in an attempt to provide a further photographic material with good fastness to light.

- 3.5 A further incentive for considering the combination of classes of couplers specified in the patent in suit as a basis for developing a photographic material of good fastness to light was provided by document (c) which, contrary to the Respondent's submission, not only relates to the technical problem of reducing the fading of the cyan image of a photographic material during storage in the darkness (see the description, page 5, second complete paragraph), but also to good fastness to light and balanced colour fading, see page 5, lines 20 to 29 in combination with the paragraph bridging pages 24 and 25 and Example 2. In this example, not only is the fastness to light tested (see Table II, page 43), but it is also

stated there that the fastness to light of the magenta and yellow dye forming layers was not significantly influenced by the distribution of the benzotriazole in the layers being positioned above these layers, but only by the total amount of benzotriazole being located upside the layers to be protected.

3.6 Therefore, if the person skilled in the art was faced with the problem of making another photographic material with a fastness to light comparable with the known KODAK EKTACOLOR paper, he additionally knew from the above general statement in Example 2 of document (c) as well as from document (b), column 5, lines 25 to 35 and lines 51 to 54, and document (e), page 650, left column, second complete paragraph, that the normal way of achieving this goal was to place sufficient UV-absorber over the dye-image to be protected. In particular, document (b) relates to the use of the benzotriazole compounds of formula IV of the patent in suit as UV absorbers in photographic materials in general, see Claim 1. Its disclosure is therefore not limited, contrary to the Respondent's submission, to the worked example describing a photographic material with a different order of the light-sensitive layers (support-red-magenta-yellow in contrast to support-yellow-magenta-red according to the patent in suit).

3.7 Thus the person skilled in the art having analysed the KODAK EKTACOLOR 78/type 2492 paper described in document (d) was aware of the purpose and the consequences of using the couplers and UV-absorbers as well as the sequence of layers applied in that paper. In the Board's judgment no inventive skill was therefore required to understand the principle on which the composition of this paper was based, namely to select cyan, magenta and yellow couplers of high fastness to light and to protect also the cyan dye

by incorporating a conventional benzotriazole UV-absorber in the layer covering the layer containing that dye in order to bring the fastness to light of that layer to the same level. Having regard to the consistent disclosure in documents (b), (c) and (e) the Board is satisfied that this consideration is the result of the application of no more than the routine skill of a person familiar with the art of making photographic materials, especially for obtaining colour prints. The incorporation of the UV-stabiliser in a layer situated above the cyan dye image could, according to the Appellant's submission, which is in conformity with the data contained in Example 2 of document (c), only be considered after the selection of a sufficiently stable magenta coupler from the broad class indicated in document (c). Once this had been done, the further step of protecting the cyan dye image was also taken, as it is demonstrated by the KODAK EKTACOLOR paper described in document (d). In these circumstances, the Respondent's submission that an attempt to protect the cyan dye forming layer as well has not been made earlier is not in agreement with the proven facts and has to be dismissed.

Furthermore, the Board is not convinced by the Respondent's submission that the patent in suit relates to a particular and uncommon selection of UV-absorbers and couplers which could only be derived from the prior art with the benefit of hindsight. On the contrary, the patent in suit is not limited to the presence of specific couplers in the respective light-sensitive layers and the Respondent was unable to rebut, e.g. by counter-evidence, the Appellant's submission, based on documents (a) and (c), that the broad classes of couplers and UV-absorbers indicated in the patent comprise compounds normally preferred for use in the manufacture of materials for colour prints at the date of filing of the patent in suit.

In addition, the person skilled in the art would have expected to obtain a material of comparable fastness to light by replacing particularly the yellow coupler of the known KODAK EKTACOLOR paper by one of the yellow couplers used in documents (a) or (c), because this coupler was in the light-sensitive layer closest to the support, i.e. in the layer which was the least exposed to light. This modification would have immediately resulted in obtaining a material having all the technical features set out in Claim 1 of the patent in suit.

4. For these reasons the Board has reached the conclusion that the subject-matter of Claim 1 of the patent in suit lacks inventive step and the patent cannot, therefore, be maintained on the basis of the text as granted and maintained by the Respondent in view of Articles 56 and 100(a) EPC.

5. In the light of the Board's finding the Appellant's further request to adjourn the proceedings need not be considered.

Order

For these reasons, it is decided that:

1. The appeal is allowed.
2. The patent is revoked.

The Registrar:



E. Görgmeier

The Chairman:



K.J.A. Jahn