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D E C I S I O N
of 18 November 1996

Case Number: T 593/96 - 3.4.2
Application Number: 90911653.5
Publication Number: 0495783
IPC: G03G 9/135, C07F 7/08, C07F 9/32,
C07F 9/09

Language of the proceedings: EN

Title of invention:
Improved charge director compositions for liquid developers

Patentee:
INDIGO N.V.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 82, 84

Keyword:
"Novelty inventive step, unity of invention - Yes"
"Undue breadth of claim - No"

Decisions cited:
-

Catchword:
-



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Boards of Appeal

Chambres de recours

Case Number: T 0593/96 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 18 November 1996

Appellant:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 22 February 1996
refusing European patent application
No. 90 911 653.5 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: E. Turrini
Members: C. Black
L. C. Mancini

Summary of Facts and Submissions

- I. European patent application No. 90 911 653.3 (publication No. 0495783) was based on internal application no. PCT/NL90/00101 (publication No. W091/02297).
- II. The application was refused by a decision of the examining division. In its decision, the examining division observed that the applicant (appellant) had requested a decision according to the state of one file in a letter dated 7 September 1995, and as grounds for the decision, referred to its communications dated 16 June 1993 and 31 August 1994 and to the result of consultation dated 25 January 1995 and the reasons contained therein.
- III. The examining division's first communication was based on a set of claims 1 to 28 which had been amended in comparison with those of the international application in order to take account in part of observations contained in a preliminary examination report in accordance with the PCT chapter II. The division's main objection was that the subject-matter of claim 23 of the set under consideration was already known from US-A-3 841 893.
- IV. In a response dated 7 December 1993, the applicant submitted an amended set of claims 1 to 27 and sought to defend the above-mentioned claim 23, amended and renumbered claim 22.
- V. In its second communication the examining division maintained its objection to claim 22.

It also objected that the charge director was too generally defined and that the claim lacked unity of invention with claim 1. The remaining claims 1 to 21 and 24 to 27 were stated to be acceptable.

- VI. In a response dated 10 January 1995 the applicant defended claim 22 against the latter objections.
- VII. There followed a personal interview dated 25 January 1995, according to the minutes of which the examining division maintained that claim 22 was unacceptable for reasons of undue breadth and lack of inventive step.
- VIII. The applicant subsequently requested the decision against which the present appeal lies.
- IX. With the grounds for the appeal, the appellant filed a set of claims 1 to 28 according to a main request and a set of claims 1 to 27 according to an auxiliary request. In the claim set according to the main request, claims 1 to 21 and 25 to 28 correspond to claims 1 to 21 and 24 to 27 filed with the response dated 7 December 1993 and found to be acceptable (see paragraph V above). Claims 22 to 24 replace claims 22, 23, claim 22 being reformulated as a dependent claim and claim 23 being an independent claim corresponding to claim 22 with further amendments. In the claim set according to the auxiliary request, claim 22 has been reformulated as a dependent claim, as had been proposed by the examining division and also contains further amendments.
- X. Claims 1 and 23 according to the main request read as follows:
 - 1. "A liquid developer for use in electrostatic imaging processes of the positive toner type, such developer comprising:

- a) an insulating non polar carrier liquid;
- b) toner particles micro-dispersed in said carrier liquid; and
- c) at least one charge director compound selected from the group consisting of sub-groups (i) and (ii), namely:

- (i) organo-silicon compounds of the general formula (I):



wherein

R is either a saturated hydrocarbon radical where one or more hydrogen atoms is optionally substituted by one or more halogen atoms or R is a hydrocarbon radical where one or more hydrogen atoms is substituted by one or more halogen atoms, and

X is a halogen atom or a lower alkoxy radical; and

- ii) the organo-silicon reaction product of at least one unreacted charge director compound of subgroup (i) formula (I), with at least about one mole of at least one acid containing at least one organic moiety wherein said acid is effective in that said reacted positive charge director compound increases the short-term charging of said micro-dispersed toner particles as compared with said charging when the same molar amount of unreacted charge director compound is used."

23. "A liquid developer for use in electrostatic imaging processes comprising:

- an insulating non-polar carrier liquid;
- toner particles micro-dispersed in said carrier liquid; and
- at least one charge director compound soluble in said carrier liquid, present in an amount sufficient to charge the toner particles to a level suitable for a liquid toner process;

characterized in that at concentrations suitable for use in a liquid toner, essentially the entire amount of the at least one charge director is associated essentially only with said toner particles in such a way, that, when the liquid developer is separated by centrifugation to give a supernatant fraction comprising the carrier liquid and a toner fraction, essentially the entire amount of the at least one charge director is present in the toner fraction."

XI. The appellant's argumentation may be summarised as follows:

The examining division's finding that the subject-matter of claim 22 (now claim 23 according to the main request) was not inventive over US-A-3 841 893 was based on an incorrect appraisal of its teaching. The passage in column 4, lines 10 to 19 merely says that the charge control agent, which is soluble in the carrier liquid, should be present in a suitable amount, too little being inadequate for the desired effect and too much lowering the volume resistivity of the liquid developer excessively. The examining division argued that at low concentrations of charge control agent, essentially the entire amount thereof would be associated with the toner particles as is required by

claim 1. Even if this were the case, such concentrations would not be suitable for use in a liquid toner as is required by claim 1. Further, the charge control agent disclosed in US-A-3 841 893 is present in a relatively large amount, namely, 0.5 to 2.0 per cent by volume of the developer. Accordingly there is nothing in US-A-3 841 893 to suggest that the liquid developer differs from conventional ones wherein the charge control agent is distributed between the toner particles and the carrier liquid when present in an amount suitable for charge control.

The application in suit makes available for the first time liquid developers containing charge control agents (charge directors) which are associated essentially only with the toner particles as set out in claim 23. Such developers have the advantages of time stability of the charge of the toner particles and copy quality, and simplicity of replenishment of toner particles and charge directors.

The examining division's further objection that claim 22 (now claim 23) was unduly broad is taken to be an objection under Article 84 EPC, because the application discloses at least one way of carrying out the claimed invention, thereby meeting the requirement of Article 83 EPC. Undue breadth is not a reason for refusing a claim under the EPC as long as its subject-matter is novel and inventive, and sufficiently disclosed in and supported by the description. In the present case there is no prior art which would be a bar to patentability of the subject-matter of claim 23, which defines an entirely new type of developer liquid with a new and surprising physical property. This is not reflected in the wording of claim 1 and at least for this reason claim 23 should be allowable. The liquid developer claimed is moreover defined in terms of a physical feature thereof, that is that the charge

director compound is associated essentially only with the toner particles, and it can readily be determined whether or not a liquid developer falls within the scope of the claim by the procedure described in examples 16 and 17 and now reflected in the wording of the claim. Any restrictive amendment to claim 23, e.g. by making it appendant to claim 1, would not adequately define the scope of protection justified by the pioneering character of the invention.

Reasons for the Decision

1. The appeal is admissible.
2. In the grounds for the decision refusing the application, the examining division referred to the reasons given in three communications (see paragraph II above). It is clear from the content of these communications (see paragraphs III, V and VII above) that the reasons for the refusal were lack of inventive step of the subject-matter of claim 22 then under consideration and undue breadth of this claim. The remaining claims, apart from those appendant to claim 22, were stated to be acceptable (see paragraph V above). However the Enlarged Board of Appeal has decided in the case G10/93 (OJ EPO 1995, 172) that in an appeal from a decision of an examining division in which a European patent application has been refused, the board of appeal has the power to examine whether the application or the invention to which it relates meets the requirements of the EPC and that this is true for requirements which the examining division regarded as having been met. If there is reason to believe that such a requirement has not been met, the board shall include this ground in the proceedings.

In the present case, the Board sees no reason to doubt the examining division's finding that the said remaining claims were acceptable, and will therefore confine its considerations, in respect of the main request, to claim 23 and claims referring back thereto.

3. As compared with the corresponding claim 27 originally filed, claim 23 has been reformulated in the two-part form, the first part containing the features of known liquid developers disclosed for example in US-A-3 841 893. It also includes the additional wording that the charge director compound should be present in an amount sufficient to charge the toner particles to a level suitable for a liquid toner process. This would seem to be a self-evident requirement and in any case is implicit in the description, for example on page 2, lines 3 to 15. The original claim 27 merely required that the total amount of the charge director compound is associated essentially only with the toner particles. In the characterising portion of claim 23, this has been amplified to make it clear that this occurs at concentrations suitable for use in a liquid toner. The basis is to be found in the description, page 10, line 30 to page 13, line 6 and examples 16 and 17. The characterising portion also includes an indication of how this feature is identified, based on page 12, lines 26 to 30 and examples 16 and 17. The requirement of Article 123(2) EPC is therefore satisfied. The claim is also clear in that by a simple procedure (centrifugation followed by IR spectroscopy analysis of the supernatant) it can be established whether or not a liquid developer falls within the scope of claim 23. To this extent the requirement of Article 84 EPC is satisfied. As regards the objection of undue breadth raised by the examining division, this is more conveniently dealt with after the evaluation of novelty and inventive step.

4. In its international preliminary examination report, the examining division expressed the opinion that the claim on which claim 23 was based lacked novelty as well as inventive step over the disclosure in US-A-3 841 893. It noted that it was not mentioned in this document that the total amount of the charge director compound was associated with the toner particles, but that this was certainly the case when small amounts of charge director compounds are used. This position was maintained in the communications dated 16 June 1993 and 31 August 1994, but the result of consultation dated 25 January did not mention lack of novelty.

The Board, in agreement with the appellant, is of the opinion that US-A-3 841 893 does not disclose a liquid developer in which at concentrations suitable for use in a liquid toner, essentially the entire amount of the charge director is associated essentially only with the toner particles in the manner required by claim 23. The charge directors (called charge control agents in US-A-3 841 893) are indeed soluble in the carrier liquid (see claim 1) and are present in the liquid developer in any suitable amount (column 4, line 19 *et seq*). By this is meant however that there should be enough of the charge director so that the charge control effect is adequate but not so much that the volume resistivity of the developer is lowered excessively. The Board accepts the argumentation of the appellant, reflected in the paragraph on lines 12 to 23 of page 30 of the description, that for known charge directors, at concentrations suitable for use in liquid toners, there is a balance between the amount of the charge director associated with the toner particles and the amount dissolved in the carrier liquid. While it may be, though this is not certain, that, as argued by the examining division, at low concentrations the charge directors disclosed in US-A-3 841 893 may be associated

entirely with the toner particles, at such concentrations the liquid developer will not be suitable for use in a liquid tones process. In this respect the Board can agree with the appellant that the amount of charge director stated to be suitable in US-A-3 841 893, that is 0.5 to 2.0 per cent by volume of the developer, is much greater than that of the application in suit, namely 2.5 to 600 ppm by volume of the developer. The subject-matter of claim 23 is therefore novel over US-A-3 841 893.

The subject-matter of claim 23 is also not obvious over the disclosure in US-A-3 841 893. As previously indicated, the Board sees no reason to doubt the appellant's contention that in all prior art liquid developers, at useful concentrations part of the charge director remains dissolved in the carrier liquid and there is not even the suggestion that a liquid developer having the features claimed in claim 23 would be an obvious desideratum. One advantage of the claimed developer is that because the charge director is associated entirely with the toner, the two will be depleted in use at the same proportionate rate and can therefore be replenished from a single source of toner combined with the appropriate amount of charge director. This is clearly a simplification as compared with prior art processes where toner and charge director are depleted at different rates so that more control is required for replenishing. Moreover less charge director is required since substantially none is lost to the carrier liquid.

5. The Board can agree with the appellant that the examining division's objection to claim 23 as being of undue breadth should be considered as an objection under Article 84 EPC rather than Article 83 EPC, because at least examples 16 and 17 describe how to carry out the invention claimed.

The liquid developers particularly described comprise the organosilicon compounds defined in claim 1 as features (c) (i) and (c) (ii). The applicant discovered that at least some of these liquid developers had the property that at concentrations suitable for use in liquid toner processes, the total amount of the charge director was associated only with the toner particles. Claim 23 is a generalisation from this to embrace all liquid toner wherein the charge director compound behaves thus.

The examining division in effect took the view that this generalisation went beyond what was warranted by the applicant's contribution to the art. On the other hand, the appellant considers that the generalisation is justified because of the pioneering character of the invention. It is true that, as stated in the Guidelines for Examination in the EPO, C-III 6.2, an invention which opens up a whole new field is entitled to more generality in the claims than one which is concerned with advances in a known technology. Now in the Board's view it would be something of an exaggeration to say that the present invention had opened up a whole new field. Nevertheless each case should be judged on its merits, and the present application discloses for the first time liquid developers wherein at useful concentrations the total amount of charge director is associated essentially only with the tones particles. Accordingly in the absence of any relevant prior art, the Board finds that the invention claimed in claim 23 lies closer to one opening up a new field than to one concerned with advances in a known technology and therefore that claim 23 is not unduly broad.

6. The question of lack of unity of invention between claim 23 (or any claim corresponding thereto) and claim 1 was raised during the PCT Chapter II proceedings and again during the examination

proceedings (communication dated 31 August 1994). In the first place it should be noted that the International Search Report was drawn up in respect of all claims. This is not in itself an indication that the requirement of Article 82 EPC is necessarily complied with but in such a situation the Board would have some reservations about raising or maintaining an objection on the ground of lack of unity. In any case, in the Board's opinion there is sufficient overlap in the subject-matter of claims 1 and 23 that unity of invention can be recognised. Claim 1 includes within its scope liquid developers which, at least at certain charge director concentrations, fall within the scope of claim 23. Further, although the particular advantage of the liquid developer according to claim 23 is the simplicity of replenishment as set out above (end of paragraph 4), this clearly contributes to achieving the object of the invention as claimed in claim 1, namely improved time stability and therefore copy quality (see page 4, lines 10 to 15 and the examples) because the constitution of the liquid developer remains substantially constant with time.

7. In view of the foregoing, it is not necessary for the Board to consider the auxiliary request.

8. It is not apparent from the file that the description has been examined for conformity with the requirements of the EPC. In any case it will require to be adapted to the amended claims. The case is therefore remitted to the examining division for completion of the examination in these respects in accordance with Article 111 (1) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to complete the examination of the application as indicated in paragraph 8, on the basis of the claims according to the appellant's main request (identified as primary request) dated 24 June 1996.

The Registrar:

The Chairman:

P. Martorona

E. Turrini