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**Datasheet for the decision
of 4 March 2019**

Case Number: T 0635/14 - 3.3.02

Application Number: 06122412.7

Publication Number: 1780013

IPC: B41J2/00, C09D11/00

Language of the proceedings: EN

Title of invention:

Aqueous ink, ink jet recording method, ink cartridge, recording unit and ink jet recording apparatus

Patent Proprietor:

CANON KABUSHIKI KAISHA

Opponent:

Gill Jennings & Every LLP

Headword:

Relevant legal provisions:

RPBA Art. 12(4)

EPC Art. 123(2), 84, 83, 54, 56

Keyword:

Late-filed facts
Late-filed evidence
Amendments
Clarity
Sufficiency of disclosure
Novelty
Inventive step

Decisions cited:

G 0003/14, T 0223/05

Catchword:



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Case Number: T 0635/14 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 4 March 2019

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Decision under appeal: **Interlocutory decision of the Opposition**
Division of the European Patent Office posted on
16 January 2014 concerning maintenance of the
European Patent No. 1780013 in amended form.

Composition of the Board:

Chairman M. O. Müller
Members: A. Lenzen
P. de Heij

Summary of Facts and Submissions

- I. This decision concerns the appeal filed by the opponent against the interlocutory decision of the opposition division according to which European patent No. 1 780 013 in amended form and the invention to which it relates met the requirements of the EPC.
- II. In its notice of opposition the opponent requested revocation of the patent in its entirety on the grounds that the claimed subject-matter was neither novel nor inventive (Article 100(a) EPC), that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art (Article 100(b) EPC), and that the subject-matter of the patent extended beyond the content of the application as filed (Article 100(c) EPC).

The documents submitted during the opposition proceedings included:

D7 US 5,160,370

D28 declaration of 3 March 2009 by Mr M. Udagawa

- III. The decision of the opposition division was based on the patent as granted (main request) and auxiliary request 1 filed during the oral proceedings before the opposition division on 3 December 2013.

It can be summarised as follows:

- (a) The claimed subject-matter of the main request was not in accordance with the requirements of Article 100(c) EPC.

(b) Auxiliary request 1 was considered to meet the requirements of the EPC. In particular, the opposition division held that its subject-matter was novel over D7, example 1, because *"the term "polymer having hydroxyl groups" should be interpreted in such a way that acidic group containing polymers such as disclosed in D7 are not considered to fall under the definition"*, in other words, because carboxylic acid groups should not be considered as comprising hydroxyl groups (see the impugned decision, points III.4 and III.5.5).

IV. This decision was appealed by the opponent (appellant hereinafter).

V. With its statement of grounds of appeal, the appellant also filed an "annex 1" (entitled "Calculation of % Free Polymer in D7, Examples 1 and 9 (US 5,160,370)") and:

D16 Extract from the UCLA website entitled "Illustrated Glossary of Organic Chemistry", http://www.chem.ucla.edu/harding/IGOC/H/hydroxyl_group.html

D17 Extract from the UCLA website entitled "Illustrated Glossary of Organic Chemistry", http://www.chem.ucla.edu/harding/IGOC/C/carboxyl_group.html

D18 The Principles of Biochemistry and Biophysics, Dr Chauhan, OUP 2008

D19 Principles of Drug Action 1, Spring 2005, Carboxylic Acids Part 1, "Carboxylic Acid

Structure and Chemistry: Part 1"

- D20 Organic Chemistry, Fourth Edition, McGraw-Hill Higher Education, published in 2000
- D21 Bioconjugate Techniques, Greg T. Hermanson, 1996, 2008 and 2013, page 188
- D22 Reactive Modifiers for Polymers, edited by S. Al-Malaika, 1997, page 137
- D23 Advanced Organic Chemistry, A. Bahl and B. S. Bahl, 1997-2009, chapter 18

VI. With its letter dated 10 June 2016, the appellant filed an "annex 2" (entitled "Annex Calculations on D7, Example 2") and:

- D24 Extract from Phys. Chem. Chem. Phys., 2011, 13, page 2766
- D25 Extract from ligninchina.com, <http://ligninchina.com/lignin-sulfonate-solubility-and-ph-value-of-the-relationship/>
- D26 Alternating Maleic Anhydride Copolymers, Prog. Polym. Sci., vol. 13, 277-337, 1988, pages 303-305

In its submission, the appellant also referred to "experimental evidence" contained therein (chapters "4.2 Experimental evidence" and "6. Experimental work", starting on pages 8 and 14 of this submission, respectively).

VII. In its response to the statement of grounds of appeal, the proprietor (respondent hereinafter) filed auxiliary requests 1 to 4. By letter dated 7 November 2016, it filed further auxiliary requests 5-8 and:

D27 data sheet of "Poly(styrene-co-maleic anhydride), cumene terminated"

VIII. In its communication pursuant to Article 15(1) RPBA, the board set out what it considered to be common ground between the parties, namely that:

(a) Claim 1 of the main request, in as much as it related to:

"An aqueous ink comprising a polymer having hydroxyl groups and a pigment, wherein a proportion of a content of a polymer that is not adsorbed on the pigment out of the polymer having hydroxyl groups to a content of the pigment in the ink is 2.0 mass% or more, and wherein a content (mass%) of the polymer that is not adsorbed on the pigment out of the polymer having hydroxyl groups is 0.20 mass% or less based on the total mass of the ink [...]"

was directed at

an aqueous ink comprising a polymer having hydroxyl groups and a pigment, wherein the amount of the free polymer having hydroxyl groups amounts to (A) 2.0 mass% or more relative to the pigment, and (B) 0.20 mass% or less relative to the ink.

(b) Polymers in the ink could be either "free" (i.e. in solution) or adsorbed on the pigment.

These points were not contested by either party.

IX. Oral proceedings before the board were held on 4 March 2019. The appellant was absent during these oral proceedings. During the oral proceedings, a calculation with regard to the application of the acid dipping method to the separated liquid phase of the ink of D7, example 1, was discussed (see below). The respondent could not provide counter-arguments as to why this calculation was incorrect.

X. The appellant requested

- that the decision of the opposition division be set aside and the patent be revoked in its entirety,
- that the documents accompanying the appeal (i.e. apparently D16-D23) be admitted into the proceedings, and
- that its 'June 2016 response' be admitted and heard.

XI. The respondent requested

- that the appeal be dismissed and the decision under appeal be confirmed (main request), thus that the patent be maintained on the basis of auxiliary request 1, filed during the oral proceedings on 3 December 2013 before the opposition division,
- in the alternative, that the patent be maintained on the basis of one of auxiliary requests 1-4, filed with its reply to the statement of grounds of

appeal, or auxiliary requests 5-8, filed with its letter dated 7 November 2016, and

- that documents D16-D26, the appellant's experimental evidence, and the new attacks and arguments relating to Articles 123(2), 83 and 54 EPC and raised for the first time in the statement of grounds of appeal and in the appellant's letter dated 10 June 2016, not be admitted into the appeal proceedings.

XII. Claim 1 of the main request reads as follows:

"An aqueous ink comprising a polymer having hydroxyl groups and a pigment, wherein a proportion of a content of the polymer that is not adsorbed on the pigment out of the polymer having hydroxyl groups to a content of the pigment in the ink is 2.0 mass% or more, and wherein a content (mass%) of the polymer that is not adsorbed on the pigment out of the polymer having hydroxyl groups is 0.20 mass% or less based on the total mass of the ink, wherein when the ink is centrifuged under conditions of 400,000 G and 16 hours, and then 95 mass% of a liquid in a supernatant portion is taken out, thereafter the resultant liquid is subjected to acid dipping to take out a free polymer, the resultant free polymer is then dried to solid, and the obtained polymer is determined as a polymer that is not adsorbed on the pigment."

Claim 1 of auxiliary request 1 differs from claim 1 of the main request only in that it additionally specifies that:

"wherein the polymer having hydroxyl groups is a polyvinyl alcohol type polymer".

XIII. The following abbreviations are used in this decision (mass% (patent in suit) and wt% (D7) units are used interchangeably in the art):

- ratio A (in mass% or wt%): amount of the free polymer having hydroxyl groups relative to the pigment
- ratio A requirement: the requirement of claim 1 that ratio A has to amount to 2.0 mass% or more
- ratio B (in mass% or wt%): amount of the free polymer having hydroxyl groups relative to the ink
- ratio B requirement: the requirement of claim 1 that ratio B has to amount to 0.20 mass% or less

XIV. The appellant's arguments presented in writing, insofar as they are relevant to the present decision, can be summarised as follows:

- Admittance of D16-D20, D23

The question of whether polymers having hydroxyl groups should be interpreted to include polymers having carboxylic acid groups was discussed during the oral proceedings before the opposition division. D16-20 and D23 were filed to show that the interpretation adopted by the opposition division was incorrect. These documents were very brief and self-explanatory, and a detailed discussion of them in the statement of grounds of appeal was not necessary.

- Admittance of objections under Articles 83 EPC and Article 123(2) EPC

Objections under Article 83 EPC and Article 123(2) EPC relating to the acid dipping method had already been put forward in the notice of opposition. The objections raised in the appeal proceedings also related to this method, and it was no real surprise that they were an issue at appeal.

- Main request

As was clear from D16-D20 and D23, a carboxylic acid group comprised a hydroxyl group. Thus, a polymer having carboxylic acid groups, such as the one used in D7, example 1, was to be considered as the "*polymer having hydroxyl groups*" of claim 1. The ink composition of this example also met both ratio requirements of claim 1. It was therefore novelty-destroying.

- Auxiliary request 1

Contrary to the feature of claim 1 of measuring the amount of the "*obtained polymer*", the application as filed in paragraph [0055] determined the amount of the "*solid matter*". The "*obtained polymer*" and the "*solid matter*" did not have the same meaning because the acid dipping method precipitated everything acidic, such as acidic dyes, for instance. Furthermore, the feature "*and the obtained polymer is determined as a polymer that is not adsorbed on the pigment*" in claim 1 had no basis in the application as filed, and the sentence "*The content of the free polymer based on the total mass of the ink is then found from the proportion*

to the charged amount." of paragraph [0055] in the application as filed was completely absent from claim 1, creating an intermediate generalisation. Therefore, claim 1 and all claims dependent on it contravened Article 123(2) EPC.

The claims also contravened Article 123(3) EPC (no detailed arguments given).

The features "*polyvinyl alcohol type polymer*" lacked clarity because the word "*type*" created a penumbra of uncertainty and created a claim of unknown breadth.

The acid dipping method of claim 1 precipitated all acidic substances present in the ink and not only the free polymer having hydroxyl groups. Similar to the situation described in relation to Article 123(2) EPC, the amount of all acidic substances and the amount of only the free polymer having hydroxyl groups were not necessarily the same thing as the former could be higher. Therefore, the method recited in claim 1, and thus also the ink composition of claim 1, contravened Article 83 EPC. Furthermore, the patent in suit did not provide enough guidance in paragraph [0127] on how to determine the amount of a free polymer not having hydroxyl groups in case that it was also contained in an ink composition next to a free polymer having hydroxyl groups. It was also not made clear how to determine its structure.

The subject-matter of claim 1 lacked novelty over D7. The polymers used in this document were not excluded from claim 1 as they were also of the "*polyvinyl alcohol type*".

XV. The respondent's arguments, insofar as they are relevant to the present decision, can be summarised as follows:

- Admittance of D16-D20, D23

These documents were only filed with the appellant's statement of grounds of appeal, i.e. they were filed late, and not even discussed. They were irrelevant and could have been presented earlier in the proceedings, i.e. at the latest during the oral proceedings before the opposition division. They should therefore not be admitted.

- Admittance of objections under Articles 83 EPC and Article 123(2) EPC

The appellant's objections under Article 83 EPC and Article 123(2) EPC, alleging that there was a discrepancy between the "*obtained polymer*" and the "*solid matter*" due to the fact that the acid dipping method precipitated not only the free polymer having hydroxyl groups but everything acidic, were raised for the first time in the appellant's statement of grounds of appeal. Although both objections related to the acid dipping method in claim 1, they were still new allegations of facts. The wording of the acid dipping method objected to was already present in the claims as granted. Consequently, these objections should have been presented during the opposition proceedings and should not be admitted.

- Main request

Both carboxylic acid and hydroxyl groups had considerably different characteristics. From the description of the patent in suit, also in connection with Article 69(1) EPC, it could be concluded that polymers having only carboxylic acid groups were not to be considered as polymers having hydroxyl groups. The concentrations of the unadsorbed resins were not determined in the same manner in D7, example 1, and claim 1. Therefore, it was not clear whether the application of the acid dipping method to D7, example 1, would still have the consequence that both ratio requirements of claim 1 were met.

- Auxiliary request 1

The subject-matter of the claims was directly and unambiguously derivable from the set of claims and paragraph [0055] in the application documents as filed.

The feature "*polyvinyl alcohol type polymer*" was present in claim 3 as granted and therefore not objectionable under Article 84 EPC pursuant to G 3/14.

The appellant's arguments as to the structure of the polymers constituted an issue of clarity but not sufficiency: the skilled person trying to put the invention into practice would have known which polymers they were starting from when preparing the ink. There would have been no need to determine their structure.

D28 showed that only polymers having hydroxyl groups but not polymers very similar to the ones of D7 exhibited the "seeping out phenomenon". Consequently, this phenomenon was distinctly different from the "clogging" observed in D7. An inventive step had to be acknowledged based on this.

Reasons for the Decision

Main request

1. Admittance of D16-D20, D23

These documents were filed by the appellant with its statement of grounds of appeal to support its view that a carboxylic acid group comprised a hydroxyl group. They thus merely confirm a position taken by the appellant, which indeed the respondent shared at that time, in the first-instance proceedings (appellant's letter dated 22 November 2013). Furthermore, they can be considered a response to the finding in the opposition division's decision that the carboxylic acid groups containing polymers of D7 are not polymers having hydroxyl groups (point III.4 of the reasons of the decision).

Based on the above, the board decided to admit these documents into the proceedings pursuant to Article 12(4) RPBA.

2. Novelty

2.1 The appellant contested novelty on the basis of example 1 of D7.

2.2 D7 sets out the manufacture of ink compositions in two steps. First, a pigment dispersion is prepared which is then diluted to give the final ink composition.

In example 1, this pigment dispersion is prepared by mixing (in wt%):

- (i) styrene/acrylic acid/ethyl acrylate copolymer having an acid value of 174 (5)
- (ii) monoethanolamine (1.5)
- (iii) ion-exchanged water (68.5)
- (iv) ethylene glycol (5)
- (v) carbon black (15)
- (vi) ethanol (5)

50 parts of the above pigment dispersion are then diluted with 50 parts of a mixture of glycerol (8 parts), ethylene glycol (10 parts), ethanol (4 parts) and ion-exchanged water (28 parts). This gives the following final ink composition (in wt%):

- (i) styrene/acrylic acid/ethyl acrylate copolymer having an acid value of 174 (2.5)
- (ii) monoethanolamine (0.75)
- (iii) ion-exchanged water (62.25)
- (iv) ethylene glycol (12.5)
- (v) carbon black (7.5)
- (vi) ethanol (6.5)
- (vii) glycerol (8)

The concentration of the copolymer (i) dissolved in the ink and not adsorbed on the pigment, the "residual resin concentration" pursuant to D7, is determined as follows (D7: column 11, lines 40-50): the ink is centrifuged at 55000 rpm for 5 hours so that the pigment (and the copolymer adsorbed to it) is precipitated. The supernatant liquid is dried to solid, and its amount is set in relation to the amount of ink

used to calculate the residual resin concentration. For the ink composition of example 1, the residual resin concentration is 0.2 wt% (D7: table 1).

2.3 Features of claim 1 of the patent and their correspondence in D7

2.3.1 The ink composition of D7, example 1, comprises water and is therefore aqueous as required by claim 1. It also contains carbon black. This is a pigment (see column 3, lines 45-57 of D7). The ink composition of D7, example 1, thus contains a pigment as required by claim 1.

2.3.2 The feature "*polymer having hydroxyl groups*"

D20 is an excerpt from a standard textbook of organic chemistry. It states: "***The hydroxyl group of one carboxylic acid molecule acts as a proton donor toward the carbonyl oxygen of a second.***" (page 739, penultimate paragraph; emphasis added by the board). Thus, a carboxylic acid group comprises a hydroxyl group. The polymer used in D7, example 1, namely a styrene/acrylic acid/ethyl acrylate copolymer, is derived from, *inter alia*, acrylic acid and does therefore contain carboxylic acid groups. Based on the above, it is to be considered as a "*polymer having hydroxyl groups*" according to claim 1.

In this respect, the respondent referred to various passages of the description of the patent in suit (paragraphs [0045], [0046], [0048], [0069], [0070], [0100], [0101], [0107] and ink example 3) also in connection with Article 69(1) EPC and summarised: "*Therefore, at least when referring to the description, there can be no doubt that a polymer having (only) a*

carboxylic acid group does not fall under the definition of a "polymer having hydroxyl groups." (letter dated 1 October 2014, page 4, paragraph 3).

This line of argument is not convincing. The term "hydroxyl group" is clear in itself. There is no need to consult the description to clarify it or even to give it a different or narrower meaning. In fact, the proprietor should base any argument it wishes to make for a narrower scope of a claim on the basis of the ordinary wording of the claim, not on the basis of something appearing only in the description. Article 69 EPC does not offer any basis for reading into a claim features, and thus restrictions, which can be found in the description when judging novelty (T 223/05).

The respondent also argued that *"the characteristics of carboxylic acid groups are considerably different from those of hydroxyl groups"* (letter dated 1 October 2014, page 3, last paragraph), and thus that carboxylic acid groups were necessarily different from hydroxyl groups. While this holds true for alcoholic hydroxyl groups (as implied by the respondent), the term "hydroxyl group" is by no means limited to those but encompasses, for example, also those hydroxyl groups which are part of a carboxylic group (see above). Thus, this argument is not valid.

2.3.3 Ratio A and ratio B requirements

The concentration of the copolymer dissolved in the ink and not adsorbed on the pigment, i.e. the residual resin concentration pursuant to D7, is 0.2 wt% (see above). This concentration corresponds to the amount of the free polymer having hydroxyl groups relative to the

ink in claim 1, i.e. ratio B. The ratio B requirement of claim 1, stipulating this value to be 0.2 mass% or less, is thus met.

As is clear from the calculations in the patent in suit (e.g. table 1) and from the appellant's calculations, both ratios A and B are interrelated as follows:

ratio A = ratio B / (concentration of pigment) · 100 mass %. The ink composition of D7, example 1, contains 7.5 wt% of pigment (see above). Ratio A thus amounts to $0.2 / 7.5 \cdot 100 \text{ wt\%} = 2.7 \text{ wt\%}$, and the corresponding ratio A requirement of claim 1, stipulating its value to be 2.0 mass% or more, is also met.

2.3.4 The method for the isolation of the free polymer

The respondent argued that the way the amount of free polymer and thus ratios A and B were determined according to claim 1 differed from that of D7. In claim 1, the calculations were based on the amount of the polymer in its acidic form, i.e. the polymer comprising carboxylic acid groups. In D7, however, the alkaline monoethanolamine was also present in the ink composition and what was obtained after drying could also be the partly or fully neutralised copolymer comprising monoethanol ammonium carboxylate groups. Thus, even though the values reported in D7 were within the claimed ranges, the ratio A and B requirements were not met in D7.

The board does not agree. The amount of the free polymer in the liquid phase of the ink, both in claim 1 and D7, is determined in two subsequent steps: (a) first, the pigment is separated from the liquid phase, (b) then the amount of the free polymer in the separated liquid phase is determined.

Ad (a):

Although the pigment is separated from the liquid phase differently in claim 1 (centrifugation under conditions of 400,000 G and 16 hours) and D7 (centrifugation at 55000 rpm for 5 hours), this difference will not affect the determination of the amount of the free polymer in the separated liquid phase afterwards as the separation of the pigment from the liquid phase is supposed to be complete in both cases.

Ad (b):

The amount of the free polymer in the separated liquid phase is also determined differently in claim 1 and D7:

- Claim 1 uses the acid dipping method: an acid is added to the separated liquid phase to transform, for example, neutralised carboxylic acid groups of the polymer into their corresponding acids and to thereby precipitate as much of the polymer as possible. Afterwards, the precipitated polymer is separated from the liquid phase and dried. Thus, by performing the acid dipping method, the acidic form of the polymer comprising carboxylic acid groups is obtained.
- In contrast, D7 dries the separated liquid phase immediately, i.e. without any other steps in between. D7 does not specify which polymer form is obtained after drying, i.e. whether it is the acidic form or whether parts or all of the carboxylic acid groups are, for example, neutralised.

The values derived (directly) from D7 (see above under 2.3.3: ratio A = 2.7 wt%; ratio B = 0.2 wt%) are based on the assumption that the acidic form of the copolymer is obtained after drying. During the oral proceedings, the board explained that even assuming the respondents allegation to be true, i.e. the dried copolymer in D7 to be the partly or fully neutralised copolymer, the values for the two ratios A and B obtained via the acid dipping method would still be as required by claim 1. This was not contested by the respondent. This explanation was based on the following: if the dried copolymer in D7 is partly or fully neutralised, the values for the two ratios A and B obtained via the acid dipping method deviate more from the values given above under 2.3.3 the higher the degree of neutralisation of the copolymer. When assuming the dried copolymer to be fully neutralised with monoethanolamine, the concentration of the corresponding acidic form that would be obtained via the acid dipping method can be calculated as follows:

The acid value of a polymer is defined as the amount of potassium hydroxide (in mg) needed for the neutralisation of 1 g of the polymer. The copolymer of D7, example 1, has an acid value of 174 which means that 174 mg of potassium hydroxide is needed for the neutralisation of 1 g of this copolymer. Since the only acidic groups in the copolymer are carboxylic acid groups and since one mole of potassium hydroxide neutralises one mole of carboxylic acid groups, the number of carboxylic acid groups in 1 g of the copolymer, $n(\text{COOH})$, is given by $n(\text{COOH}) = 0.174 \text{ g KOH} / M(\text{KOH})$. Where $M(\text{KOH}) = 56.11 \text{ g/mol}$, the number of carboxylic acid groups is 0.0031 mol. The amount of monoethanolamine needed for full neutralisation,

$m(\text{monoethanolamine})$, is given by
 $m(\text{monoethanolamine}) = n(\text{COOH}) \cdot M(\text{monoethanolamine})$.
Where $M(\text{monoethanolamine}) = 61.08 \text{ g/mol}$,
 $m(\text{monoethanolamine}) = 0.19 \text{ g}$ is obtained. Thus, the complete neutralisation of 1 g of the copolymer yields $1 \text{ g} + 0.19 \text{ g} = 1.19 \text{ g}$ of neutralised copolymer. Vice versa, applying the acid dipping method to 1.19 g of such a neutralised copolymer gives 1 g of the original copolymer in its acidic form. Now assuming that the residual resin concentration of D7, i.e. 0.2 wt%, actually refers to the fully neutralised copolymer, applying the acid dipping method gives a residual resin concentration of $0.2 \text{ wt\%} \cdot 1/1.19 = 0.17 \text{ wt\%}$ of the copolymer in its acidic form.

As clear from the above, the residual resin concentration of D7 corresponds to ratio B of claim 1. The corresponding requirement is therefore still met. Likewise, the ratio A requirement is also met as ratio A amounts to $0.17/7.5 \cdot 100 \text{ wt\%} = 2.2 \text{ wt\%}$.

Therefore, the values for ratios A and B will always, i.e. irrespective of the degree of neutralisation, be between those given in the preceding paragraph and those given above under 2.3.3, and the corresponding requirements will always be met.

2.4 Based on the above, the subject-matter of at least claim 1 is not novel. The main request is therefore not allowable.

Auxiliary request 1

3. Admittance of new objections under Article 123(2) and 83 EPC

3.1 In the appeal proceedings, the appellant (i.e. the former opponent) argued that:

- with respect to Article 123(2) EPC,

a comparison of paragraph [0055] in the application as filed with claim 1 of auxiliary request 1 held allowable by the opposition division showed that the application as filed determined the amount of the "solid matter", contrary to claim 1 determining the "obtained polymer". The appellant held that "*[t]he amount of "solid matter" does not have the same meaning as the amount of "obtained polymer" because the acid dipping will precipitate everything acidic, e.g. dyes (which are not even polymers), acidic polymers not having hydroxyl groups and so forth.*" (statement of grounds of appeal, page 3, penultimate paragraph; emphasis added by the board).

- with respect to Article 83 EPC,

"*[t]he "acid dipping" method described in claim 1 will precipitate all acidic solids dissolved in the ink. This includes acidic solids which are not polymers (e.g. dyes which are often included in pigment inks as shading and/or dispersing components, acidic dispersants, acidic surfactants etc.)*". Based on this, the appellant concluded that "*the specification fails to describe the invention clearly and completely enough for it to be*

*performed by a person skilled in the art **because the method which is supposed to determine the mass% of free hydroxy polymer actually provides the mass% of all dissolved acidic substances present in the ink, which is not necessarily the same thing, e.g. when the ink contains acidic dyes, acidic dispersants, acidic surfactants and/or acidic polymers lacking 'hydroxyl' groups according to P's interpretation.***" (statement of grounds of appeal, page 4, first two paragraphs under point 3.1; emphasis in bold added by the board). The appellant also stated that "[0127] does not provide any guidance at all on how to determine the amount of 'free polymer having hydroxyl groups' **when non-polymeric, acid precipitable components are also present in the ink (e.g. acidic pigments (e.g. of the Cabot type), dyes, acidic dispersants, acidic surfactants etc.)**" (the appellant's submission of 10 June 2016, page 6, first paragraph; emphasis added by the board).

- 3.2 It is clear from the excerpts from the appellant's submissions recited above that the objections under Articles 123(2) and 83 EPC reside on the proposition that the acid dipping method precipitates not only the free polymer having hydroxyl groups (this being the "obtained polymer") but also other acidic components of the ink (which, together with the "obtained polymer", forms the "solid matter"). Thus, according to the appellant, depending on the ingredients of the ink composition, there might be a discrepancy between the "obtained polymer" and the "solid matter".

These objections are new as can be seen when comparing the above with the objections submitted during the opposition proceedings. More specifically, the attacks

made under Article 100(c) and (b) EPC during the opposition proceedings did not relate to the question of what exactly the acid dipping method precipitates and whether as a consequence there might be a discrepancy between the "*obtained polymer*" and the "*solid matter*" obtained thereby.

More specifically, during the opposition proceedings, the appellant argued with regard to Article 100(c) EPC that:

- (a) The wording in paragraph [0055] of the application as filed was more specific ("*acid dipping to take out a **free polymer***"; emphasis added by the board) than in claim 1 as granted.
- (b) The drying step of this paragraph ("***The resultant free polymer is then dried to solid to determine the amount of the solid matter.***"; emphasis added by the board) was missing from claim 1 as granted.

With regard to Article 100(b) EPC, the appellant argued that:

- (c) The patent did not teach the conditions under which the ultra-filtration was to be performed.
- (d) The patent did not teach what was meant by "acid dipping".
- (e) The examples in the patent contained further ingredients which were to be considered as polymers containing hydroxyl groups - when taking their amounts into account none of the examples was according to the invention.

(f) It was mathematically impossible to satisfy both ratio requirements of claim 1 at higher pigment loadings.

(g) Claim 2 could not be understood, as it was in conflict with claim 1.

(h) The word "segment" (introduced into auxiliary request 4 before the opposition division) had no well understood meaning in the art.

3.3 In the board's view, the new objections raised in appeal under Articles 123(2) and 83 EPC are new allegations of facts relating to the question of what exactly is precipitated when the acid dipping method is used. This being the case, the admittance of these objections is subject to the board's discretion pursuant to Article 12(4) EPC.

The precipitation employing the acid dipping method was part of claim 1 as granted. These objections should thus have been submitted in the first-instance proceedings within the nine-month opposition period (Article 99(1) in conjunction with Rule 76(2)(c) EPC). The appellant did not put forward any reasons as to why it could not file these objections earlier.

Based on the above, the board decided not to admit the new objections under Article 123(2) and 83 EPC into the proceedings pursuant to Article 12(4) RPBA.

4. Amendments - Article 123(2) EPC

4.1 Claim 1

4.1.1 Compared to claim 1 as filed, claim 1 of auxiliary request 1 additionally states:

"wherein when the ink is centrifuged under conditions of 400,000 G and 16 hours, and then 95 mass% of a liquid in a supernatant portion is taken out, thereafter the resultant liquid is subjected to acid dipping to take out a free polymer, the resultant free polymer is then dried to solid, and the obtained polymer is determined as a polymer that is not adsorbed on the pigment, wherein the polymer having hydroxyl groups is a polyvinyl alcohol type polymer."

The first six lines above recite the method for determining the amount of the free polymer. It is described as such verbatim in paragraph [0055] of the application as filed, i.e. in its first three sentences. The last two lines above specify the *"polymer having hydroxyl groups"* to be a *"polyvinyl alcohol type polymer"*, basis for which can be found in claim 3 in the application as filed.

4.1.2 The appellant raised two objections that were also new compared to the appellant's objections raised during the opposition proceedings. The board decided to admit them into the proceedings. However, as they are not successful (see below), a detailed reasoning as to their admittance does not need to be given.

These two objections of the appellant were as follows:

- (a) The wording "*and the obtained polymer is determined as a polymer that is not adsorbed on the pigment*" in claim 1 found no basis in the application as filed (see lines 7 and 8 of the passage quoted above under point 4.1.1).

- (b) The fourth sentence in paragraph [0055] of the application as filed, i.e. "*The content of the free polymer based on the total mass of the ink is then found from the proportion to the charged amount.*", was missing from claim 1 thereby giving rise to an intermediate generalisation.

The board does not find these objections convincing. The wording "*and the obtained polymer is determined as a polymer that is not adsorbed on the pigment*" merely reflects what the method steps are supposed to achieve, namely, to determine the amount of the free polymer. It does not, therefore add subject-matter to claim 1 which would not have been contained in the application as filed. The sentence in the application as filed "*The content of the free polymer based on the total mass of the ink is then found from the proportion to the charged amount.*" is indeed absent in claim 1. However, this wording does not relate to the determination of the amount of the free polymer in the ink composition itself but to the mathematical calculation making use of this amount to calculate the two ratios A and B referred to in claim 1. Such a calculation is implicit to the determination of these ratios. Its omission in claim 1 therefore does not violate the requirements of Article 123(2) EPC.

4.2 Claims 2-6

Claims 2-6 correspond to claims 2 and 4-7 as filed, respectively.

4.3 Based on the above, the board considers the requirements of Article 123(2) EPC to be met.

5. Amendments - Article 123(3) EPC

With regard to the requirements of Article 123(3) EPC, the appellant put forward only a very general objection: "*All of the New Auxiliary Requests contravene Art 123(3) EPC because they narrow a claim limitation, thereby impermissibly extending the scope of protection after grant.*" (page 10, point 6 of its letter dated 10 June 2016; reiterated on page 3, point 4 of its letter received on 21 December 2018).

However, this objection is so general that it can hardly be considered sufficiently substantiated. The appellant does not explain which part of the claim is concerned and to which extent it is actually narrowed. It by no means becomes clear why narrowing a claim or a claim limitation further should extend its scope of protection. For these reasons, the board does not find the appellant's objection convincing and considers the requirements of Article 123(3) EPC to be met.

6. Amendments - Article 84 EPC

The appellant argued that the term "*polyvinyl alcohol type polymer*" in claim 1 of auxiliary request 1 was unclear.

The term "*polyvinyl alcohol type polymer*" is contained in claim 3 as granted and may therefore not be objected to under Article 84 EPC (G 3/14). The appellant's objection is therefore not admissible.

7. Sufficiency - Article 83 EPC

7.1 In addition to the objection under Article 83 EPC mentioned above and not admitted by the board, the appellant raised the following further new objections.

- The patent in suit did not provide enough guidance in paragraph [0127] on how to determine the amount of the free polymer not having hydroxyl groups in case such a polymer was also contained in the ink composition.
- It was also not made clear how to determine its structure as it not only depended on the structure of the monomers used for its preparation but also on the process conditions.

Even though these objections are new, the board decided to admit them into the proceedings. However, as they are not successful (see point 7.2 below), a detailed reasoning as to their admittance does not need to be given.

7.2 The appellant's arguments are not convincing:

- Paragraph [0127] of the patent in suit describes how to measure the amount of the free polymer having hydroxyl groups, i.e. the amount required to calculate both ratios A and B in claim 1. The amount of any free polymer not having hydroxyl groups is actually irrelevant for the subject-

matter of claim 1.

- The skilled person trying to put the invention into practice would have known which polymers they were starting from and would have also been in a position to prepare the standard solutions needed for comparative purposes, such as in the method described in paragraph [0127] of the patent in suit.

For these reasons, the board considers the requirements of Article 83 EPC to be met.

8. Novelty - Article 54 EPC

8.1 Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that it additionally specifies that "*wherein the polymer having hydroxyl groups is a polyvinyl alcohol type polymer*".

8.2 Construction of the term "*polyvinyl alcohol type polymer*"

Polyvinyl alcohol has vinyl alcohol, i.e. $-\text{CH}_2-\text{CH}(\text{OH})-$, repeating units. A polyvinyl alcohol type polymer must thus contain these repeating units or at least derivatives of them. This is in accordance with the description of the opposed patent, paragraph [0048], which reads as follows: "*As the polymer having hydroxyl groups, may also be preferably used a polymer obtained by saponifying a vinyl acetate-acrylic ester polymer obtained by copolymerizing an acrylic ester monomer and a vinyl acetate monomer with a strong base such as sodium hydroxide, i.e., a polyvinyl alcohol type polymer.*" Such a polymer will be a copolymer of vinyl

alcohol (obtained from saponification of vinyl acetate) and acrylic ester.

- 8.3 D7, example 1, does not disclose "*polyvinyl alcohol type polymers*" as construed above.

The subject-matter of claim 1 is therefore novel. The same reasoning applies *mutatis mutandis* to dependent claim 2 and the other independent claims 3-6.

- 8.4 Apart from its novelty objection based on D7, example 1, the appellant for the first time in appeal put forward novelty objections based on:

- (a) D7, examples 2, 7 and 9
- (b) the examples of D7 in connection with the description disclosing shellac and lignin sulfonate as possible water-soluble resins of its inks

It also filed additional documents (D21, D22 and D26 regarding (a); D24 and D25 regarding (b)) as well as calculative and experimental evidence in this respect ("annex 1", "annex 2", "experimental evidence" all regarding (a)).

However, these new objections are not convincing for the same reasons as explained above in connection with D7, example 1 (no disclosure of a "*polyvinyl alcohol type polymer*" in D7). Therefore, it was not necessary to decide whether these objections and pieces of evidence should be admitted.

9. Inventive step - Article 56 EPC
- 9.1 The appellant considered D7 as the closest prior art document.
- 9.2 D7, example 1, has already been discussed above.
- 9.3 As set out above, the subject-matter of claim 1 differs from example 1 of D7 in that the polymer having hydroxyl groups is a polyvinyl alcohol type polymer.
- 9.4 The respondent argued that certain effects were obtained by the above distinguishing feature and that the problem to be solved was to obtain these effects. However, as set out below, even when formulating the objective technical problem in the least ambitious manner as the provision of an alternative ink composition, inventive step can be acknowledged in the respondent's favour. There is, therefore, no need to address the question of whether certain effects relied upon by the respondent are obtained and can be taken into account when formulating the objective technical problem.
- 9.5 The appellant did not argue why it would be obvious for the skilled person to have included polyvinyl alcohol type polymers into the compositions of D7 when looking for alternative compositions.

The appellant merely stated that the features "*the polymer having hydroxyl groups is a polyvinyl alcohol type polymer*" did not further distinguish the subject-matter of auxiliary request 1 from the cited prior art D7. However, this argument pertains to an alleged lack of novelty over D7, which the board does not accept as explained above.

In view of this, the board sees no reason to conclude that it would have been obvious for the skilled person to include a "polyvinyl alcohol type polymer" into the compositions of D7. The subject-matter of claim 1 therefore involves an inventive step. The same reasoning applies *mutatis mutandis* to dependent claim 2 and the other independent claims 3-6.

10. Thus, auxiliary request 1 is allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent with the following claims and a description to be adapted thereto:

Claims 1 to 6 of auxiliary request 1, filed with the reply to the statement of the grounds of appeal.

The Registrar:

The Chairman:



N. Maslin

M. O. Müller

Decision electronically authenticated