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**Datasheet for the decision
of 2 October 2012**

Case Number: T 1668/10 - 3.3.09

Application Number: 01309736.5

Publication Number: 1207433

IPC: G03G 9/083, G03G 9/09

Language of the proceedings: EN

Title of invention:

Toner for developing latent electrostatic images, and image forming method and device

Patent Proprietor:

Ricoh Company, Ltd.

Opponent:

Canon Kabushiki Kaisha

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56

Keyword:

"Novelty - yes"
"Inventive step - yes"

Decisions cited:

-

Catchword:

-



Case Number: T 1668/10 - 3.3.09

DECISION
of the Technical Board of Appeal 3.3.09
of 2 October 2012

Appellant: Canon Kabushiki Kaisha
(Opponent) 30-2, Shimomaruko 3-chome
Ohta-ku, Tokyo 146-8501 (JP)

Representative: TBK
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Respondent: Ricoh Company, Ltd.
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Tokyo 143-8555 (JP)

Representative: Lamb, Martin John Carstairs
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
25 May 2010 concerning maintenance of European
patent No. 1207433 in amended form.

Composition of the Board:

Chairman: W. Sieber
Members: J. Jardón Álvarez
K. Garnett

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 1 207 433 in the name of Ricoh Company, Ltd., in respect of European patent application No. 01309736.5, filed on 19 November 2001, was published on 11 October 2006 (Bulletin 2006/41). The granted patent contained 39 claims, claim 1 reading as follows:

"1. A toner for developing latent electrostatic images comprising:

at least a coloring agent formed from a metal material;
and
a binder resin containing the coloring agent;
wherein the toner has a saturation magnetization, measured when a magnetic field of 10 kOe is applied, of 0.01 to 10 Am²/kg (0.01 to 10 emu/g), and a true specific gravity of 1.33 to 1.62 g/cm³."

The other independent claims related to a container (claim 20), an image forming method (claim 24) and an image forming device (claim 32), all of them containing a reference to the toner of claim 1.

II. A notice of opposition against claims 1 to 28 and 32 to 36 of the patent was filed by Canon Kabushiki Kaisha on 10 July 2007. The opponent invoked the grounds of opposition pursuant to Article 100(a) EPC (lack of novelty and lack of inventive step).

The documents cited during the opposition proceedings included the following:

D1: JP 9-288374 A;

D2: JP 7-77828 A;

D3: JP 4-184354 A;

D10: Concise Encyclopedia of Polymer Science and Engineering; Published by Maruzen Company, Limited, 1994, page 1104 and its English translation; and

D15: JP 2000-353013.

III. By its interlocutory decision announced orally on 27 April 2010 and issued in writing on 25 May 2010, the opposition division decided that the claims of the proprietor's main request filed during the oral proceedings met the requirements of the EPC.

Claim 1 as maintained by the opposition division differed from claim 1 as granted only in that the true specific gravity was amended to 1.35 to 1.60 g/cm³ (previously 1.33 to 1.62 g/cm³).

The opposition division found that the amendments made to the claims complied with Article 123(2) EPC, that the subject-matter of the claims was novel over the disclosures of D1, D2 and D3 and that the claimed subject-matter involved an inventive step starting from D1 or D2 as closest prior art document.

IV. On 3 August 2010 the opponent (in the following: the appellant) filed an appeal against the decision of the

opposition division and on the same day paid the prescribed fee. The appellant requested that the interlocutory decision of the opposition be set aside and the amended patent be revoked. On 1 October 2010 the appellant filed the statement setting out the grounds of appeal including experimental results (page 2/7 of the statement of grounds of appeal) and a better copy of page 4 of D15 (D15a).

- V. With its reply dated 16 February 2011 the patent proprietor (in the following: the respondent) disputed all the arguments submitted by the appellant and requested that the appeal be dismissed and the patent be maintained in the form upheld by the opposition division (main request) or, alternatively on the basis of the first auxiliary request filed with letter of 26 March 2010 during the first instance proceedings.
- VI. On 25 April 2012 the board dispatched a summons to attend oral proceedings on 2 October 2012. In the attached communication the board drew the attention of the parties to the points to be discussed during the oral proceedings.
- VII. With letter dated 30 August 2012 the appellant put forward further arguments.
- VIII. The arguments presented by the appellant in its written submissions and during the oral proceedings may be summarised as follows:
- Toners 8, 9 and 13 disclosed in document D2 anticipated the subject-matter of claim 1. These toners inherently had a specific gravity falling

within the claimed range, the only feature not explicitly disclosed in D2. The specific gravities of toners 8, 9 and 13 were calculated from the specific gravities of the components used in these examples. Since, however, the specific gravity of the toner binder resin of D2, i.e. polyester A (Tm: 138°C; Tg: 51°C) comprising diethylene oxide of bisphenol A and terephthalic acid, was not disclosed, two kinds of polyester resin from diethylene oxide of bisphenol A and terephthalic acid were synthesized, and the specific gravity of the synthesized polyesters was measured (samples 1 & 2). These values were used in the calculation of the specific gravity of the toners.

Moreover, the further calculations filed with letter dated 30 August 2012 showed that any binder resin with a specific gravity in the range from 1.08 to 1.49 g/cm³ when used in a toner according to toners 8, 9 or 13 of D2 would result in a toner falling within the scope of claim 1. In this connection it was noted that according to D10 the specific gravity of polyester resins can vary within the range of 1.1 to 1.4 g/cm³.

- Concerning inventive step, the appellant saw document D1 as the closest prior art, in particular example 4. As apparent from D15 and D15a, respectively, the true specific gravity of this toner was 1.52 g/cm³. Moreover D1, as the patent in suit, aimed to provide a toner wherein filming was prevented. The only difference between D1 and the patent was the saturation magnetization. However this difference could not justify an

inventive step because D1 already gave an indication that this parameter should be maintained within a given range to avoid filming and scattering of the toner. A further hint was to be found in D2 which explained how an improvement resulting in less toner deposition in the background of images could be obtained by setting the saturation magnetization to a value over 5 emu/g. Finally, the selection of a specific range within the broad disclosure of D1 or D2 was an optimization of a parameter, which according to EPO case law could not justify an inventive step.

IX. The arguments presented by the respondent may be summarised as follows:

- The subject-matter of the claims was novel. The derivation of the specific gravity of toners 8, 9 and 13 of D2 was flawed in the origin of the specific gravity of the polymer binder and also in the calculation of the specific gravity of the toner as a whole. It was well known by the skilled person that polymerization reactions can lead to different polymer products, having different physical properties, according to the reaction conditions under which they are prepared. The specific gravity of the toners was calculated simply by arithmetic weight average of the components' specific gravity values. However, in the manufacturing method specified in D2, the toner materials were premixed and then melt-kneaded with a pressure kneader. It would be readily appreciated that the specific gravity of a toner obtained after these steps could not be

obtained simply by arithmetic addition. The specific gravity of a toner varied in some degree depending on the manufacturing process conditions. Thus, the preparations of the appellant and the calculations made did not satisfy the "clear and unmistakable disclosure" criteria necessary to support a finding of lack of novelty.

- The examples and comparative examples in the patent specification justified the presence of an inventive step. There was nothing in the prior art that would teach the skilled person, either explicitly or implicitly, to make certain selections of parameters within the claimed ranges in order to obtain the advantageous properties of the claimed toners, namely reduced deposition in image background, reduced toner scattering, reduced filming and increased durability.
- X. The appellant requested that the decision under appeal be set aside and that the patent be revoked as regards the claims attacked in the opposition proceedings (*i.e.*, claims 1 to 28 and 32 to 36 as granted).

The respondent requested that the appeal be dismissed (main request) or, alternatively, that the patent be maintained in amended form with the claims according to the auxiliary request filed with letter of 26 March 2010 during the first instance proceedings.

Reasons for the Decision

1. The appeal is admissible.

MAIN REQUEST

2. *Novelty*

- 2.1 Claim 1 is directed to a toner for developing latent electrostatic images comprising:

- (i) at least a colouring agent formed from a metal material; and
- (ii) a binder resin containing the colouring agent

wherein the toner has

- (iiia) a saturation magnetization of 0.01 to 10 Am²/kg, measured when a magnetic field of 10 kOe is applied, and
- (iiib) a true specific gravity of 1.35 to 1.60 g/cm³.

- 2.2 The appellant contested the novelty of this claim having regard to the disclosure of document D2, in particular toners 8, 9 and 13.

- 2.2.1 D2 is directed to a toner for an image forming apparatus containing over 10 wt.% carbon and an inorganic filler comprising magnetic powder which keeps the saturation magnetization of the toner above 5 emu/g (at 10 kOe), and wherein the thermal diffusibility of the toner is over 1×10^{-7} m²/s (claim 1). Toner 8 having an inorganic filler content of 10 wt.% has a saturation magnetization value of 5 emu/g (at 10 kOe)

and toner 9 having an inorganic filler content of 10 wt.% has a saturation magnetization of 10 emu/g, as can be inferred from paragraph [0061]. No value is given for toner 13 but the appellant assumed a value of 0.5 emu/g in view of the small amount of magnetic inorganic filler used (1 wt.%).

2.2.2 Document D2 is silent about the true specific gravity (feature (iiib)) of the toners. The appellant maintained that this feature was implicit in the toners of D2. In order to prove that the toners of D2 have a true specific gravity within the claimed range, the appellant calculated the specific gravities of toners 8, 9 and 13 by arithmetic weight average of the components' specific gravity values. Since, however, the specific gravity of the toner binder resin of D2, i.e. "polyester A" comprising diethylene oxide of bisphenol A and terephthalic acid, was not disclosed, the appellant synthesized two kinds of polyester resin from diethylene oxide of bisphenol A and terephthalic acid (samples 1 & 2) and measured the specific gravity of the synthesized polyesters. Using the values from samples 1 & 2 and the known values of the specific gravity of the other components of the toner (Nigrosine dye, carbon black, magnetite and aluminium oxide), the appellant calculated the specific gravity of toners 8, 9 and 13 and obtained values falling within the range covered by claim 1.

2.2.3 The board agrees with the respondent that the appellant's preparations and calculations do not satisfy the "clear and unmistakable disclosure" criteria necessary to support a finding of lack of novelty for the following reasons:

- (a) Document D2 indicates that the toners were prepared using crystalline polyester A (T_m : 138°C ; T_g : 51°C) comprising diethylene oxide of bisphenol A and terephthalic acid as a toner binder, and aluminium oxide as an inorganic filler. However, D2 is silent about the manufacture of the binder resin itself. As pointed out by the respondent, polymerisation reactions can lead to different polymer products, having different physical properties, according to the reaction conditions under which they are prepared. Thus, it is not clear whether samples 1 & 2 are essentially the same material as polyester A as described in D2. In other words, the specific gravity values of the polyesters "samples 1 and 2" of 1.2605 g/cm^3 and 1.2511 g/cm^3 cannot be representative for polyester A of D2. Consequently, the specific gravity calculations made by the appellant cannot show the true specific gravity of toners 8, 9 and 13 of D2.
- (b) Secondly, according to paragraph [0048] in the patent in suit the specific gravity of the toner is measured using an air comparator type specific gravity meter 930 (manufactured by Beckman Japan KK). The appellant, on the contrary, has not actually measured the specific gravity of the toners of D2 but has merely calculated this value by arithmetic weight average of the components' specific gravity values. As pointed out by the respondent, the specific gravity of a toner varies at least in some degree depending on the manufacturing process and conditions (in D2 the

toner is prepared "through melting and kneading performed for 30 minutes at 140°C in a pressure kneader" see page 18, lines 2 to 3 from the bottom). Since there was no evidence showing that a calculated value would be equal to the measured value, the board has to conclude that the appellant's novelty attack based on D2 is also defective in this respect.

- (c) Finally, as regards toner 13, the appellant assumed that the saturation magnetisation of that toner was 0.5 Am²/kg, simply because the toner contained one tenth of the magnetic material compared to another toner having a saturation magnetisation of 5 Am²/kg. This was not found to be convincing by the opposition division. In the appeal proceedings the appellant has provided no further evidence to clear up this issue.

In summary, the disclosure of D2 does not amount to clear and unmistakable disclosure of an embodiment falling within the scope of claim 1.

- 2.2.4 The appellant also argued that the range covered by claim 1 was so broad that at least one of toners 8, 9 or 13 would have the claimed specific gravity. According to its calculations, toner 8 would fulfil the "true specific gravity" criterion of claim 1 if the specific gravity of the binder resin in toner 8 was in the range from 1.21 to 1.49 g/cm³. In toner 9 this range for the binder resin was from 1.08 to 1.34 g/cm³ and in toner 13 from 1.10 to 1.32 g/cm³. Since, furthermore, a polyester resin has, according to D10, a specific gravity of 1.1 to 1.4 g/cm³, at least one of toners 8, 9

or 13 of D2 clearly anticipated the subject-matter of claim 1.

Apart from the fact that this line of argument does not invalidate the reasoning of point 2.2.3(b) or point 2.2.3(c) (for toner 13), the actual specific gravity of polyester A of D2 remains unknown. In this context, the respondent also challenged the appellant's argument that the range of 1.1 to 1.4 g/cm³ disclosed in D10 was generally valid for all polyester resins.

2.3 For these reasons the subject-matter of claim 1 of the main request is novel.

3. *Inventive step*

3.1 The patent in suit relates to a toner for developing latent electrostatic images, the toner being characterized by its saturation magnetization and by its true specific gravity.

3.2 As acknowledged in the introduction of the patent specification toners for developing electrostatic images are well known. These toners are said to present some drawbacks, in particular with respect to deterioration of the image quality due to toner deposition in the background, toner scattering and toner filming. Since document D1 discloses such a prior art toner and aims at preventing smearing, offsetting, and filming during copying (see paragraph [008]), D1 was regarded by the opposition division and by the appellant during the oral proceedings as representing the closest prior art. The board sees no reason to depart from this view.

D1 discloses in claim 1 a toner for a two-component developer containing a binder resin, a colouring agent, a polyethylene, a polypropylene and a magnetic powder having a BET specific surface area in the range of 2 to 15 m²/g in an amount of 1 to 150 parts relative to 100 parts of the binder resin by weight. The saturation magnetization of the toner measured under a magnetic field of 1KOe is in the range of 0.05 to 30 emu/g (paragraphs [0018] and [0070]). The specific gravity of the toner is not disclosed in D1 but the appellant has filed document D15/D15a to demonstrate that the specific gravity of the toner of example 4 of D1 is 1.52 g/cm³ and thus falling within the range of claim 1. The respondent agreed that the toner of example 4 indeed had a specific gravity of 1.52 g/cm³.

- 3.3 Having regard to this prior art, the technical problem underlying the patent can be seen in the provision of a toner having improved printing properties. In particular, the toner should provide reduced deposition in background, reduced toner scattering and reduced filming.
- 3.4 As a solution to this problem the patent proposes the claimed toner having a saturation magnetization and a true specific gravity within the narrow ranges given in claim 1.
- 3.5 The board is satisfied that this technical problem has been credibly solved by the claimed toners. The examples and comparative examples in tables 1-4 of the patent show that even when a large number of images have been printed, toner deposition of the background

of images, toner scattering and toner filming are improved when working within the claimed ranges.

Moreover, these examples show that improved results are obtained only when **both** values are within the claimed ranges. Thus, comparative example A-2 and A-6, which have a saturation magnetization within the claimed range but a true specific gravity below or above the claimed range, give worse results than the working examples A1 to A16. Similarly, comparative examples A-3, A-4 and A-5, which have a true specific gravity within the claimed range but a saturation magnetization above $10 \text{ Am}^2/\text{kg}$, also give worse results than the working examples having the same true specific gravity and a saturation magnetization as claimed (compare, for instance, with example A-12).

- 3.6 It remains to be decided whether, in view of the available prior art documents, it would have been obvious for the skilled person to solve the technical problem identified above by the claimed selection of values for true specific gravity and saturation magnetization.
- 3.7 There is no hint to this solution in the prior art cited by the appellant:
- 3.7.1 Document D1 is silent about the true specific gravity of the toners and uses a broad range for the magnetization saturation, this range being not directly comparable with the claimed range as it is measured using a different magnetic field. Thus D1 cannot suggest the claimed toners.

3.7.2 The same applies to D2. As indicated above in the discussion of novelty, D2 does not disclose the specific gravity of the toner. The appellant correctly indicated that D2 indeed suggests the use of a saturation magnetization over 5 emu/g to prevent occurrence of fog. However, D2 fails to suggest the combination of specific values for the saturation magnetization with specific values for the specific gravity. In fact D2 suggests values of the saturation magnetization up to 25 emu/g (see [0032]) for which the comparative examples in the patent give bad printing properties (see comparative examples A-3, A-4, A-5 and B-1).

3.7.3 Although some of the toners disclosed in D1 and D2 could have a true specific gravity within the claimed range and the claimed values for the saturation magnetization overlap to some extent with the values known from D2, there is no hint in the prior art documents that by selecting the claimed values improved toners could be obtained. As discussed in point 3.6 above, unexpectedly good results are obtained only when both parameters are within the claimed values.

3.7.4 The fact that the saturation magnetization now claimed overlaps in part with the values of D2 does not mean that it would have been obvious for the skilled person to combine purposively a part of the known range with specific values of the specific gravity with the aim of solving the existing technical problem. This combination is not merely the result of an optimisation within the competence of the skilled person, since in the prior art these values are not mentioned in relation to the problem now to be solved.

3.8 In view of the above, the board concludes that the person skilled in the art would not have arrived in an obvious manner at the subject-matter of claim 1. Consequently, the subject-matter of claim 1 and, by the same token, the subject-matter of claims 2 to 39 which are directly or indirectly dependent on claim 1, involves an inventive step within the meaning of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

M. Cañueto Carbajo

W. Sieber