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D E C I S I O N
of 16 May 2002

Case Number: T 0163/98 - 3.4.2

Application Number: 91308257.4

Publication Number: 0475731

IPC: G03G 15/09, G03G 9/093

Language of the proceedings: EN

Title of invention:
Development process and apparatus

Patentee:
SEIKO EPSON CORPORATION

Opponent:
Canon Inc. Corporate Intellectual Property and Legal
Headquarters

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Independent claims, inventive step - after amendment (yes)"

Decisions cited:
T 0192/82

Catchword:
-



Case Number: T 0163/98 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 16 May 2002

Appellant: SEIKO EPSON COPORATION
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 16 December 1997
revoking European patent No. 0 474 731 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: E. Turrini
Members: M. A. Rayner
V. Di Cerbo

Summary of Facts and Submissions

I. The appellant (= patent proprietor) has appealed against the decision of the opposition division revoking European patent number 475 731 (application number 91 308 257.4). The patent concerns a development process and apparatus.

II. The opposition division found that the subject matter of all the independent claims then under consideration lacked an inventive step. In the opposition or appeal proceedings, reference has been made, inter alia, to the following documents:-

D3: DE-A-3 428 728

D11: JP-A-02 074 969 (and English language translation)

D15: JP-A-1 185 555 (and English language translation)

In the decision under appeal, the opposition division came to the view that a difference in roughness between a toner transport means and an elastic blade achieved the same object according to both the patent in dispute and document D11, namely increasing the uniformity of toner on the toner transporting means. Moreover, the division considered it quite evident to the skilled person that particles of spherical shape forming a few layers between a rough and a smooth surface are inevitably given some rotational movement.

III. The appellant requested setting aside of the decision and maintenance of the patent in amended form. The respondent (=opponent) requested the board to dismiss the appeal. Oral proceedings were requested on an

auxiliary basis by the appellant and respondent. Oral proceedings were appointed, consequent to the auxiliary requests filed. During the oral proceedings the appellant filed sets of claims according to a main and auxiliary request. The board gave its decision at the end of the oral proceedings.

IV. The cases of the parties can be summarised as follows:

Appellant

The invention relates to single component toners and employs a blade which is rougher than a roller carrying the toner. Consequential reverse particle rolling provides a longer contact time and gives better charging. Documents D11 and D15 can be considered as the closest prior art as they both provides a rough roller, however in both cases, contrary to the patent, the blade is smooth. While a rough blade is shown in document D3, its function is to keep particles out of the region between the blade and roller. Since claim 6 concerns the use of toner particles in a development process according to claim 1, it stands or falls with claim 1.

Respondent

The problem addressed by the patent in relation to document D11 is to achieve rapid and sufficient charging of toner. Document D11 teaches with reference to page 7, line 3 and lines 25 to 26 provision of a different surface roughness of an elastic blade and a toner transporting means. Charging particles electrostatically is part of the disclosure of document D11, which even taken alone suggests provision of

spherical toner particles in order to obtain sufficient friction (see page 10, lines 19 to 22 average diameter 11 microns and Figure 1). Rotation of spherical toner particles is a feature which is self evident as it results automatically when particles can move easily relative to one another. A skilled person also recognises readily from document D15 that spherical toner particles are caused to rotate in the gap between surfaces of different roughness. When fairly read, the claim in dispute merely means there is roughness at the rotation point.

Document D15 is classified in IPC Class G03G 9/00 relating to developers in general. Document D3 is contained in the same IPC subgroup and Figure 11B thereof renders use of a rough roller obvious. The claims in dispute are not limited to all of the blade interacting surface. Moreover size ranges mentioned in the first and second paragraph on page 13 of document D3 meet the requirement of the claim. Accordingly, the subject matter of claim 1 in dispute and that of apparatus claim 7 must be considered to lack an inventive step. The subject matter of claim 6 concerns use of a product which is per se known and which according to decision T 192/82 cannot be made patentable by reference to a function.

V. Claims 1, 6 and 7 according to the main request of the appellant are worded as follows:

1. A development process comprising the following steps:
providing single-component toner consisting of spherical toner particles satisfying the equation $b/a=1$ to 1.5, where b is the length of the major axis and a

that of the minor axis of a cross section of the particle,
supplying the toner particles to an elastic toner transporting means (9) and forming thereon a homogeneously thin toner layer by means of an elastic blade (13), the elastic blade having a surface which is rougher than that of the toner transporting means, the roughness of the surface of the elastic blade being formed by concave and convex portions which hold and rotate the toner particles in order to charge the toner particles electrostatically,
bringing the thin toner on the elastic toner transporting means (9) into pressure contact with a latent image carrier (1) to develop an electrostatic latent image formed thereon.

6. Use of spherical toner particles satisfying the equation $b/a=1$ to 1.5, where b is the length of the major axis and a that of the minor axis of a cross section of the particle, in a development process as claimed in any one of claims 1 to 5.

7. An apparatus for developing an image, comprising single-component toner consisting of spherical toner particles which satisfy the equation $b/a=1$ to 1.5, where "a" is the length of the minor axis and "b" is the length of the major axis of the cross section of the toner particle;
a latent image carrier (1) on which a latent image is formed by potential contrast;
a toner transporting means (9) for transporting the spherical toner particles to the latent image carrier (1); and
an elastic blade (13) for regulating the toner particles carried on the toner transporting means to

pass the toner particles through a gap between the toner transporting means and the elastic blade thereby forming a thin toner layer which is charged, wherein the toner transporting means (9) is elastically deformed and brought into pressure contact with the latent image carrier (1) to develop an electrostatic latent image formed on the latent image carrier (1) by the thin toner layer which is charged, and wherein the elastic blade has a surface which is rougher than that of the toner transporting means, the roughness of the surface of the elastic blade being formed by concave and convex portions which hold and rotate the toner particles in order to charge the toner particles electrostatically.

Reasons for the Decision

1. *Admissibility of the appeal*

The appeal complies with the provisions mentioned in Rule 65(1) EPC and is therefore admissible.

2. *Main request - Amendments (Articles 123 EPC)*

Compared with claim 1 as granted, claim 1 is further limited by recitation of a single component toner and that the elastic blade has a surface which is rougher than that of the toner transporting means, the roughness of the surface of the elastic blade being formed by concave and convex portions which hold and rotate the toner particles in order to charge the toner particles electrostatically. A single component toner is used in all the examples in the application as filed

and the features relating to the blade derive from for example page 3, lines 46 to 53 of the patent (= page 4, lines 23 to 31 of the "A" publication). Articles 123(2) and (3) can therefore be considered satisfied by claim 1 as amended. A corresponding conclusion applies to claim 7 in view of the corresponding amendments made.

3. *Prior art*

Pertinent disclosures in prior art documents in the proceedings are as follows:

Document D3

This document discloses a non contact developing apparatus 8 including a developing roller 35 and an elastic blade 36 pressing against the surface of the developing roller 35 to coat the surface with the developing agent. A surface portion 46 (see Figure 4) with a roughness ranging from 0.1D to 2.0D, where D is the particle size of the developing agent, is formed on part of the surface of the elastic blade 36 located in a region *not* in contact with a monolayer of the developing agent, in which region the blade is smooth. A rough surface portion 45 (roughness range from 0.07D to 1.5D) is also formed on the developing roller 35 over a width substantially equal to the maximum image forming width of the photoconductive drum 2. A nondeveloping region with a smooth surface is formed on each side of the developing region. In operation, the developing agent is frictionally charged between the developing roller 35 and the elastic blade 36. The rough surface portion on the roller increases the conveying force. The developing agent in contact with

the rough surface portion of the elastic blade 36 is subjected to a relatively large resisting force, which slows the flow of the developing agent, whereas the developing agent touching the smooth surface of the elastic blade flows smoothly. Opposite to the nondeveloping regions of the developing roller, rough surface portions 60 are formed on corresponding surfaces of the elastic blade 36 (see Figures 9 and 11B) to give a relatively great resisting force to retain the developing agent.

Document D11

This document is directed to providing an image forming apparatus using a one component developing method (see second paragraph on page 4). The apparatus has a sleeve with an elastic surface for holding toner and a press contacting blade. The blade surface is polished or resin coated (see second paragraph on page 7). Roughness of the surface of the sleeve is given as 0.05 to 2.5 times average particle diameter (see last paragraph on page 8).

Document D15

This document is directed to providing a developer in which the ratio Y/X between the diameter X along the major axis of the projected area of a particle and the diameter Y along the axis perpendicular to X is 0.78 or more and 1 or less. A development roller made of for example stainless steel is processed to a rough surface. An elastic blade (see last eight lines on page 13) made of for example stainless steel forms a layer of toner on the development roller. A non contact process is described.

4. *Novelty - main request*

4.1 A comparison of the independent claims and any of the available prior art disclosures reveals that various differences exist between the claimed subject matter and individual ones of the prior art documents, for example an absence of recitation of spherical particles as claimed in document D11 or use of a non contact process in document D15. Most significantly, however, none of the prior art references teach that a homogeneously thin layer of toner particles should be charged using a blade which is rougher than the toner transporting means, the roughness of the surface of the elastic blade being formed by concave and convex portions which hold and rotate the toner particles in order to charge the toner particles electrostatically.

Therefore, the subject matter of claims 1 and 7 is novel.

4.2 Since the development process claimed in claim 1 is itself new, the board considers that the use according to claim 6 of a particle *in this process* remains new, whether or not the particle itself is new. Thus the board agrees with the appellant that claim 6 stands or falls with claim 1. Decision T 192/82 concerns a different case and is not in disagreement with the board's view as can be seen from section I of the headnote of decision T 192/82 which reads:

"If an article is known as a combination or mixture of components fulfilling known functions, the generation and application of an improved novel component for the same purpose may be patentable as such and also as an improved article incorporating the same. If the

component in question forms, on the other hand, part of the state of the art together with its relevant properties, the incorporation thereof in the same article will be obvious in view of its predictable beneficial effect ("analogous substitution")."

Thus, the board sees nothing in the decision cited by the respondent which could call into question the novelty of the subject matter of claim 6.

4.3 In view of the foregoing, the board is satisfied that the subject matter of claims 1, 6 and 7 is novel within the meaning of Article 54 EPC.

5. *Inventive step - main request*

5.1 The board concurs with the opposition division and the parties that document D11 can be considered the closest prior art. The problem solved by the claimed subject matter is improving charging of the toner particles.

5.2 All of the prior art documents concerned with surface roughness teach in the direction towards providing a rougher transport means. Even the sole mention of making parts of a blade rougher according to document D3 does not run counter to this teaching because the parts concerned are outside the charging area and relate to a function of either stopping too many particles entering the gap or preventing their exit at the lateral periphery of the charging area. In the charging area itself, the blade, just as with all the other prior art documents, is not rougher. Consequently, the board had to conclude that the skilled person expects from document D3 that a rougher blade impedes driving through the gap and therefore

would have concluded it should avoided. The board accordingly reached the conclusion that the teaching of document D3 is not only consistent with the other prior art documents but reinforces the unobvious nature of providing a rougher blade, concerning which the board has no reason to doubt the submission of the appellant that a longer contact time and thus improved charging is provided. The board therefore formed the view that the subject matter of the independent claims can be considered to involve an inventive step.

5.3 The challenge to inventive step advanced by the respondent was based on a combination of misreading the operation of the apparatus disclosed in document D3 and misinterpreting the claims of the patent. The misreading arose because the respondent oversimplified the disclosure as simply stopping at the disclosure of blade roughness. The disclosure of document D3 goes however further, because it recites quite clearly that the blade is smooth in the monolayer charging region. Reference to roughness in claim 1 was misinterpreted firstly as simply meaning "roughness at the rotation point" or secondly, at most, as "part of the blade" being rough. However, on the first point, the board has no doubt that the claim requires *the blade* to be rough so any implicit interpretation of the claim involving replacing the blade by any more general "roughness" on any element is not justified. On the second point, a careful reading of claim 1 shows that the roughness of the surface of the blade is formed by concave and convex portions which hold and rotate the toner particles in order to charge them electrostatically. The charging location and thus a particular part of the blade is accordingly specified (this part being on the contrary smooth according to document D3). Therefore

the interpretation of the claims relied on by the respondent is also wrong.

5.4 The board does not deem it necessary to delve any deeper into the extensive arguments and submissions of the respondent relating to whether one or more of the cited prior art documents are in a particular IPC classification group or whether various combinations of their disclosures, in relation for example to the size ranges of the particles, would have been obvious to the skilled person, since such arguments do not bear on the central issue of the rougher surface blade being formed by concave and convex portions which hold and rotate the toner particles in order to charge the toner particles electrostatically. Equally, the remaining prior art documents in the file are no more relevant to patentability than those mentioned in this decision, so that further analysis thereof in relation to the extensive submissions of the respondent is not necessary.

5.5 In view of their correspondence of features, the positive conclusion reached by the board in respect of inventive step of claim 1 applies correspondingly to claims 6 and 7. Therefore, the subject matter of claims 1, 6 and 7 can be considered to involve an inventive step within the meaning of Article 56 EPC.

6. *Auxiliary request*

In view of the positive conclusion reached by the board in relation to the main request of the appellant, it was not necessary to deal with the auxiliary request.

7. *Amendment of the description*

In amending the description consequent to this decision, attention should be given to the requirements of Rule 27(1)(b) and (c), for example documents D3, D11 and D15 should be discussed in the introduction and lines 22 to 44 should be amended to correspond to the claims. In addition, consistency between the claims and description should be ensured, for example by replacing lines 44 and 45 on page 3 by the wording "As shown".

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 in amended form as follows:
 - claims 1 to 15 of the main request filed during the oral proceedings,
 - description to be amended,
 - drawing sheets as in the patent specification.

The Registrar:

The Chairman:

P. Martorana

E. Turrini