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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 334/90 - 3.4.2

D E C I S I O N
of 31 October 1991
correcting errors in the Decision
of the Technical Board of Appeal 3.4.2
of 17 September 1991

Appellant : (Proprietor of the patent)
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Respondent : (Opponent)
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Representative :
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Decision under appeal :
Decision of Opposition Division of the European Patent Office dated 25 January 1990, posted on 23 February 1990 revoking European patent No. 0 138 458 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : E. Turrini
Members : W.W.G. Hofmann
C.V. Payraudeau

BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Publication in the Official Journal ~~Yes~~ / No

File Number: T 334/90 - 3.4.2

Application No.: 84 306 561.6

Publication No.: 0 138 458

Title of invention: Developing apparatus

Classification: G03G 15/08

D E C I S I O N
of 17 September 1991

Proprietor of the patent: KABUSHIKI KAISHA TOSHIBA

Opponent: Canon Kabushiki Kaisha

Headword:

EPC Article 56

Keyword: "Inventive step (yes, after amendments)"

Headnote

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Summary of Facts and Submissions

I. European patent No. 0 138 458 was granted on the basis of European patent application No. 84 306 561.6.

II. The patent was revoked by a decision of the Opposition Division on opposition by the Respondent, on the ground that Claim 1 according to the main request and according to the first and second auxiliary requests did not satisfy Article 123(2) EPC, and that Claim 1 according to the third auxiliary request was not clear in the sense of Article 84 EPC. The Opposition Division further stated that even if Claim 1 of the third auxiliary request could be clarified, its subject-matter would lack an inventive step (Article 56 EPC). In the decision the following documents were referred to:

(D1) JP-A-58-116 559 (and English translation thereof),
(D2) JP-A-54-43 038 " " ,
(D3) JP-A-53-101 431 " " ,
(D4) JP-A-57-86 869 " " ,
(D5) JP-U-55-45 392 " " ,
(D6) DE-A-3 212 865.

III. The Appellant (Patentee) lodged an appeal against this decision.

IV. The Respondent advised the Board that he did not intend to make any submissions in response to the Grounds of Appeal filed by the Appellant.

V. In a communication pursuant to Article 11(2) of the Rules of procedure of the Boards of Appeal, issued together with summons to oral proceedings, the Board additionally mentioned the document

(D7) DE-A-31 17 036

which had already been cited in the European search report.

VI. The Respondent notified the Board that he would not be represented at the oral proceedings.

VII. Oral proceedings were held at the end of which the Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of Claims 1 to 5 handed over at the oral proceedings. No explicit request was received from the Respondent. However, since the Respondent has not withdrawn the opposition, the Board acts under the assumption that he requests dismissal of the appeal.

VIII. Independent Claim 1 now under consideration reads as follows:

"An electrophotographic developing apparatus comprising a developing agent carrier (11) for carrying a developing agent in the form of non-magnetic particles (17) thereon, said developing agent carrier (11) having a surface (12) which is opposite to an image carrier (15), and an elastic member (13) having a surface not at its free end portion which is pressed against the surface of the developing agent carrier (11) to apply the developing agent thereto, so that the developing agent is applied to the surface of the developing agent carrier (11) by the elastic member (13) to form a thin layer of the developing agent on the surface (12) of the developing agent carrier (11) and so that the thin layer is opposed to the image carrier (15) to deposit the developing agent on a latent image on the image carrier (15), the whole of the surface (12) of said developing agent carrier (11) being roughened, and the

surface roughness of said developing agent carrier (11) being 0.07 to 1.0 times of the average diameter of the non-magnetic particles (17),

characterized in that said elastic member (13) is formed of a thin phosphor bronze blade having thickness of 0.1 to 0.4 mm and is pressed against said developing agent carrier (11) at a force of between 100 and 2,500 g/cm."

Claims 2 to 5 are dependent on Claim 1.

IX. The arguments of the Appellant are in substance as follows:

While it is true that for pressing forces near the upper limit, the desired image density of 1.0 is not achieved at low surface roughnesses as can be seen from Figure 7, it is equally clear from that figure that in any case a worthwhile improvement is achieved.

Document D6 relates to a pressure of 700 g/cm^2 between the elastic element and the developing agent carrier, contrary to present Claim 1 which relates to a load per unit length of 100 to 2500 g/cm. In the known case, a calculation of the load per unit length from the pressure is not possible since the nip width of 2 mm given in document D6 does not actually correspond to the width over which the pressure exists. An important feature of present Claim 1 is the fact that the phosphor bronze blade has a thickness of 0.1 to 0.4 mm. As is indicated in the patent specification (column 8, lines 4 to 11), bronze blades having a thickness outside this range do not provide good images. None of the cited documents suggests the use of a 0.1 to 0.4 mm thick phosphor bronze blade for the purpose specified in Claim 1.

Reasons for the Decision

1. The appeal is admissible.

2. Claim 1 under consideration differs from the granted Claim 1 by the insertion of the features of granted Claims 3, 4, 5 and 12 (original Claims 3, 5, 6 and 14) and of the word "electrophotographic" (cf. e.g. original page 1, lines 6 and 7). These amendments restrict the scope of protection conferred.

Claims 2 to 5 correspond to the original Claims 10 to 13.

The amendments to the claims therefore satisfy the requirements of Article 123(2) and (3) EPC.

3. During the opposition procedure the Respondent (Opponent) brought up the question whether Claim 1 was clear (Article 84 EPC) since according to Figure 7 of the patent the image density drops to unsatisfactory values of below 1.0 if the pressing force is chosen near to 2500 g/cm and the roughness near to 1 μm (corresponding to a roughness factor of 0.07), which values both fall within the ranges given in Claim 1.

The problem to be solved by the invention is (among other things) to form a high quality image which has sufficient copy density. In the view of the Board, high quality of an image and sufficient copy density cannot be pinned down to one specific value of the image density. A copy is not automatically unsatisfactory just because its image density is e.g. 0.7. Moreover, the Board is satisfied that an image density of more than 1.0 is achieved for most of the multi-parametric range (roughness - thickness of the

blade - pressing force) defined in Claim 1. If for some combinations of two parameter values chosen so that they are both close to one end of their respective indicated range, the desired image quality should not be fully obtained, this cannot invalidate the fact that as a whole the specified ranges correctly indicate the features of the invention. Regarding further parameters (e.g. drum diameter, toner composition, voltages etc.) which certainly also influence the quality of the copy but are not mentioned in Claim 1, the Board is convinced that they can be suitably chosen by a person skilled in the art. Claim 1 is therefore clear in the sense of Article 84 EPC.

4. Novelty

4.1 Document D6 discloses an electrophotographic developing apparatus having all the features of the pre-characterising portion of Claim 1 (the roughness of the developing agent carrier is mentioned as corresponding to the diameter of the development agent particles (page 10, lines 31 to 36), the thus disclosed factor of 1 falling within the claimed range).

In the known case, the elastic member is not a phosphor bronze blade having a thickness of 0.1 to 0.4 mm, but a rubber blade (or combined rubber-aluminium electrode blade) the thickness of which is not mentioned.

The meaning of the somewhat contradictory disclosure of document D6 relating to the pressing force of the elastic member (page 11, lines 21 to 33) has been thoroughly discussed during both the opposition and appeal procedures. The indicated value cannot be said to point unambiguously to a pressing force within the range defined in Claim 1 since, despite the use of the term "pressing

force", the dimension of g/cm^2 does not indicate a force, but a pressure. On the other hand, if the reference to 700 g/cm^2 should be understood as relating to a pressure, the calculation of the force from this pressure value is again ambiguous. Although the nip width is given as 2 mm, it is not certain that the pressure is actually evenly distributed over this width (which assumption would lead to a force of 140 g/cm). If the distribution is very uneven, the force integrated over the nip width may fall outside the range of 100 to 2500 g/cm. Thus, the disclosure is not clear enough to anticipate directly the values of the pressing force specified in Claim 1.

4.2 The other documents D1 to D5 and D7 do not come closer to the claimed subject-matter. In particular, none of these documents mentions an elastic member made of phosphor bronze and having a thickness of 0.1 to 0.4 mm, for applying the developing agent to the developing agent carrier; and according to none of these documents is the elastic member pressed against the developing agent carrier at a force of between 100 and 2500 g/cm.

4.3 Thus, the subject-matter of Claim 1 is novel in the sense of Article 54 EPC.

5. Inventive step

5.1 The closest document to the claimed invention is D6. Its disclosure corresponds to the pre-characterising portion of Claim 1.

As indicated in column 3, lines 15 to 19, of the patent specification, the object of the invention is to provide a developing apparatus in which a high quality image which is uniform and has sufficient copy density can be stably

formed by using a one-component developing agent consisting of non-magnetic toner.

The Board has no reason to doubt that this object is achieved by choosing as the elastic member a thin phosphor bronze blade having a thickness of 0.1 to 0.4 mm and pressed against the developing agent carrier at a force of between 100 and 2500 g/cm (cf. also the statement in point 3. above).

5.2 As regards the force of 100 to 2500 g/cm, the Board is of the opinion that document D6, although not directly disclosing this feature, nevertheless leads a person skilled in the art to trying a pressing force of 700 g/cm. Not only does the term "Andruckkraft" used several times on page 11, lines 21 to 33, indicate a force, and not a pressure. But the idea that "700 g/cm^2 " should actually read "700 g/cm" would also have come to a skilled reader since he could see that pressure values would probably neither have been determinable or "settable" (page 11, line 31) by the authors of document D6, nor would such information have appeared useful for the reader.

Thus, this feature does not make a contribution to the inventive step of the claimed subject-matter.

5.3 However, the feature that a phosphor bronze blade having a thickness of 0.1 to 0.4 mm is used as the elastic element, is suggested neither in document D6 nor in any other cited document.

The material phosphor bronze is mentioned in document D6 (page 12, line 19) and in document D7 (page 14, lines 1 and 2), but only for a different purpose, namely as scraping member. According to Claim 1, phosphor bronze is used for forming the blade coating the developing agent

to the carrier, which is a very special application requiring suitable properties regarding elasticity, hardness and electrical conductivity.

The thickness of 0.1 to 0.4 mm is not irrelevant. As can be seen from column 8, lines 4 to 11, thicknesses outside the claimed range do not provide good images.

5.4 In the appeal procedure, the Respondent did not submit any arguments which could have been taken into account.

5.5 It is thus concluded that the subject-matter of Claim 1 involves an inventive step in the sense of Article 56 EPC.

5.6 Claims 2 to 5, by virtue of their dependence on allowable Claim 1, are also considered allowable under Article 52(1) EPC.

6. The description needed adaptation to the wording of Claim 1 and an acknowledgment of document D6.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

Claims 1 to 5;

Description columns 1 to 10 and annexed pages designated respectively 1 and 2 to be inserted in column 3 respectively after line 14 and after line 20;

Figures 1 to 7;

as presented at the oral proceedings.

The Registrar: The Chairman:

P. Martorana E. Turrini