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D E C I S I O N
of 11 October 2000

Case Number: T 0046/99 - 3.4.2

Application Number: 92306183.2

Publication Number: 0522812

IPC: G03G 15/16

Language of the proceedings: EN

Title of invention:
Image transferring device

Patentee:
FUJITSU LIMITED

Opponent:
Canon Kabushiki Kaisha

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"lack of inventive step (confirmed)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0046/99 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 11 October 2000

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 13 November 1998 revoking European patent No. 0 522 812 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: E. Turrini
Members: A. G. Klein
V. Di Cerbo

Summary of Facts and Submissions

I. European patent No. 0 522 812 (application No. 92 306 183.2) was granted with a set of claims of which claim 1, the only independent claim, reads as follows:

"1. A toner image transferring device for electrostatically transferring a charged toner image electrostatically held by a toner image carrying body means to a sheet or paper, which comprises:

a conductive elastic transfer roller means (18,78) disposed in contact with said toner image carrying body means (10,76) to form a nip therebetween for passing the sheet or paper; and
an electric source means (20,66) for selectively applying a first electric energy and a second electric energy to said conductive elastic transfer roller means (18,78), said first electric energy giving the sheet or paper an electric charge having a polarity opposite to that of a charge of the toner image, during passage of the sheet or paper through the nip between said toner image carrying body means and said conductive elastic transfer roller means, whereby the charged toner image can be transferred from said toner image carrying body means to the sheet or paper, said second electric energy giving said conductive elastic transfer roller means an electric charge having the same polarity as the charge of the toner image, during a period when no sheet or

paper is in the nip, whereby a toner pollution of said conductive elastic transfer roller means (18,78) can be electrostatically removed therefrom:

characterised in that said electric source means (20,66) includes a constant current source (20a,66-1) having a substantially constant current output as said first electric energy, and a constant voltage source (20b,66-1) having a substantially constant voltage output as said second electric energy."

II. Following the filing of an opposition founded amongst others on the ground that the subject-matter of claim 1 lacked an inventive step within the meaning of Article 56 EPC in view in particular of the contents of the following documents:

D1: JP-A-2 285 377 and an English translation thereof;

D2: US-A-3 781 105;

D4: JP-A-3 085 575 and an English translation thereof; and

D5: EP-A-0 323 226,

the patent was revoked by the Opposition Division.

The Opposition Division in its decision revoking the patent held that the skilled person did not need an inventive skill to arrive at the subject-matter of claim 1 starting from the nearest prior art as disclosed in document D1 and using his technical

knowledge. Document D1 indeed disclosed supplying a constant current to the transfer roller means during transfer of an image and it also suggested to supply a voltage of the same polarity as the toner charge, for cleaning. This was considered as a clear hint at supplying a constant voltage to the transfer roller means in a cleaning phase, "taking into account the unknown advantage of the replacement of the voltage supply by a constant voltage supply" (see point 5.4 of the Reasons).

III. The proprietor of the patent (appellant) filed an appeal against the Opposition Division's decision.

IV. Oral proceedings were held on 11 October 2000, at the end of which the appellant requested that the decision under appeal be set aside and, as his main request, that the patent be maintained as granted.

As an auxiliary request, he requested that the patent be maintained as amended, on the basis of an amended claim 1 filed with his statement of the grounds of appeal of 15 March 1999. This amended claim 1 corresponds in substance to claim 1 as granted, except for the replacement in the characterising portion of the expression "and a constant voltage source" by the expression "and means (66-2 to 66-7) for causing said electric source means (66) including said constant current source (66-1) to serve as a constant voltage source", and for the amendments of several reference signs.

The respondent (opponent) for his part requested that the appeal be dismissed.

V. The arguments submitted by the appellant in support of his requests can be summarized as follows:

When considering the various prior art citations on the file in a chronological order, it emerges that, apart from document D2 which relates to an obsolete technology involving high voltage corona discharge, the development of the toner image transferring techniques has followed two distinct approaches.

According to a first approach, a number of citations including document D4 disclose a technique in which the instantaneous electrical characteristics of the transfer roller are detected in a preliminary phase, when no paper is present in the nip between the transfer roller and the toner image carrying drum. The voltage applied to the transfer roller during actual transfer of an image from the drum to a sheet is then set in accordance with the result of the preliminary detection step. Since in these embodiments the preliminary energizing of the transfer roller specifically aims at setting the level of the voltage applied to it in the image transfer phase, borrowing therefrom only features pertaining to the detection procedure and combining them with a different way of energizing the transfer roller in the actual image transfer phase would not make any technical sense.

In accordance with a second approach illustrated for instance by documents D1 and D5, it is the same type of energizing of the transfer roller which is recommended both in the roller cleaning and in the image transfer phases.

The fact that numerous prior art citations on the file

consist of patent applications filed by the respondent himself to cover various ways of controlling the transfer roller, other than the specific technique of the present patent, provides additional evidence that this technique was not obvious.

The provision of a **constant** voltage source for energizing the transfer roller in the cleaning step is not disclosed in any of the prior art citations. Its advantages become clear when considering Figure 14 of the patent in suit which shows that cleaning is effective in a narrow voltage range only. This knowledge was not available to the skilled person before the filing date of the patent. Substantial voltage variations can indeed occur in use, in particular as a result of an important toner pollution caused e.g. by paper getting jammed in the machine. This is confirmed in particular by the teaching in document D4 that cleaning of the transfer roller is necessary before detection of the electrical characteristics of the transfer roller.

Finally, the scope of claim 1 of the auxiliary request was restricted in substance to the embodiment disclosed in the patent in conjunction with Figure 20(a). Providing an electric source means including a constant current source which is caused to serve as a constant voltage source advantageously overcomes the need of providing a separate constant voltage source. This feature is not suggested by any of the prior art citations, which either disclose separate constant current or voltage sources, like document D1 or D4, or which do not disclose any such source at all, like document D5.

VI. The respondent submitted that document D5 disclosed a toner image transferring device as set out in the preamble of claim 1, which included a voltage source for energizing the transfer roller both during the image transfer phase and the roller cleaning phase when no sheet of paper was present in the nip. Figure 5B of document D5 showed that the voltage source was of a customary type, providing a stabilized, constant voltage which would not substantially fluctuate in the roller cleaning process, given the small electrical loads displaced at a very low current level, namely in the microampere region. A similar type of customary voltage source was provided in the embodiment of Figure 20(a) of the patent in suit, and considered there to constitute a "constant voltage source", so that no technical difference could be seen in this respect.

Thus, the only difference between the claimed arrangement as compared to the device of document D5 was that the former comprised a constant current source for energizing the transfer roller during the image transfer phase. This distinguishing feature was however known from document D1 which, incidentally, also suggested that such constant current supply be combined with the supply of an adequate voltage of -500 V for cleaning the transfer roller. This value exactly fell in the range recommended in the patent in suit in conjunction with the curve of Figure 14.

Finally, the reference to unspecified "means for causing the electric source means to serve as a constant voltage source" as introduced into claim 1 of the auxiliary request did not meet the requirement of Article 84 EPC that the claims be clear. This

additional feature broadened the scope of protection beyond the specific arrangement actually disclosed in conjunction with Figure 20(a) of the patent in suit, and it shifted the focus of the subject-matter for which protection was sought, contrary to the requirements of Articles 123(2) and (3) EPC.

Reasons for the Decision

1. The appeal is admissible.

2. *Claim 1 in accordance with the appellant's main request*

2.1 Novelty

2.1.1 Document D1 discloses a toner image transferring device as set out in the preamble of claim 1, which comprises a conductive elastic transfer roller means (see Figure 1) disposed in contact with a toner image carrying body means 1 to form a nip therebetween for a sheet or paper and electric source means 14 for selectively applying a first electric energy and a second electric energy to the conductive elastic transfer roller means, the first electric energy giving the sheet an adequate electric charge during its passage through the nip and the second electric energy giving the transfer roller means an electric charge of adequate polarity during a period when no sheet is in the nip, to remove toner pollution from the roller means. The electric source means 14 comprises a constant current source 15 having a substantially constant current output, at least in a selected voltage range limited by lowest and highest values (see page 9 of the English translation, third paragraph to page 10,

third paragraph and Figures 2 and 3). The Board in this respect notices that the constant current operation of the constant current source of the present patent is also subject to the voltage being comprised in a given range (see page 8 of the specification, lines 43 to 45).

Document D1 also recommends to apply a negative voltage to the roller means during the non-image period, i.e. when there is no sheet in the nip, to prevent it from being contaminated by toner (see the paragraph bridging pages 14 and 15 of the translation in conjunction with the second paragraph on page 16). The document does not explicitly disclose how this negative voltage is obtained, but it is evident to the skilled reader that the electric source means necessarily includes a voltage source having the desired roller cleaning voltage as an output.

Thus, the subject-matter of claim 1 is distinguished from the device disclosed in document D1 in that the voltage source for supplying the roller cleaning voltage so as to electrostatically remove toner pollution is of the **constant** voltage source type.

2.1.2 Document D4 discloses a toner image transferring device in which image transfer is achieved by applying a voltage to the transfer roller means, which is determined from a measurement of the electrical characteristics of said roller means as measured during a period when no paper is present in the nip (see the claim on page 1 of the translation). This document also discloses cleaning of the surface of the transfer roller by applying a direct voltage derived from a negative **constant voltage** source 51 (see the second

paragraph on page 11, and the third and fourth paragraphs on page 13 of the translation, in conjunction with Figure 1).

The subject-matter of claim 1 is distinguished from the device disclosed in document D4 in that it comprises a constant current source for applying a substantially constant current to the transfer roller means in the image transfer phase, instead of the known voltage supply.

2.1.3 The electric source means of the toner image transferring device of document D5, like that of document D4, also applies predetermined voltages to the transfer roller both in the image transfer phase and for the cleaning of the transfer roller (see claim 1). It does not however explicitly specify that the voltage source for providing the cleaning voltage is of the constant voltage source type.

2.1.4 The remaining citations on the file do not come closer to the subject-matter of claim 1, which is novel within the meaning of Article 54 EPC, accordingly.

2.2 Inventive step

2.2.1 The toner image transferring device of claim 1 is distinguished from the arrangement disclosed in document D1 essentially in that the voltage applied to the transfer roller in the cleaning step and the voltage source which supplies it are specified to be of the "constant" voltage type. Document D1 therefore in the Board's opinion constitutes the closest prior art.

2.2.2 Document D1 in the passage referring to the controlling

of the transfer roller in the cleaning process does not indicate which type of voltage source is to be used.

Thus, the technical problem underlying the subject-matter of the patent in suit as determined from the analysis of the closest prior art can be seen in designing the technical means which are required for putting into practice the teaching of document D1, in relation in particular to the cleaning of the transfer roller.

2.2.3 The skilled person facing the above technical problem will have to select, *inter alia*, an appropriate voltage source for applying the negative voltage bias expressly required by document D1.

Document D5 in conjunction with Figure 5A and 5B discloses the use, for the above purpose, of a customary voltage source which in accordance with the respondent's submissions, seems to provide amply sufficient voltage control during the roller cleaning step, which only requires the transfer of a small amount of electrical charges. Accordingly, the appellant argued that there was no obvious reason for the skilled person to contemplate using a more sophisticated **constant** voltage source in accordance with present claim 1.

However, the fact that a technical solution is selected which is clearly less advantageous, like here the choice of a more complex constant voltage source, cannot alone justify recognition of an inventive step, if the alleged invention simply results in the expected disadvantages being accepted.

Although the issue of the technical effect provided by the use of a constant voltage control of the transfer roller in the cleaning phase was central to the opposition and appeal procedures, the appellant did not so far submit any evidence showing that the increased complexity of such constant voltage source was offset by any unexpected advantage, or that it solved any still unrecognized technical problem. In the absence of such evidence, his allegation that a customary voltage source could not cope with an important pollution caused by paper getting jammed in the machine, which is not supported by the presently available citations, is not considered convincing.

In addition, the applying of a **constant** voltage to clean the surface of the transfer roller in a similar image forming apparatus, during a period when there is no sheet or paper in the nip, is already known from document D4 (see point 2.1.2 above).

2.2.4 For these reasons, the subject-matter of claim 1 of the main request does not involve an inventive step within the meaning of Article 56 EPC.

2.3 The appellant's main request cannot be allowed, accordingly.

3. *Auxiliary request*

3.1 The characterising portion of claim 1 of the main request recites in substance that the electric source means includes a constant current source **and a constant voltage source**.

In contrast, amended claim 1 of the first auxiliary

request now in substance sets out that the electric source means includes a constant current source and **means for causing said electric source means including said constant current source to serve as a constant voltage source**.

The appellant submitted that this amendment was meant to limit the scope of a claim to an arrangement as illustrated in Figure 20(a) of the patent in suit, in which the constant voltage is derived from a circuit comprising the constant current source, without the need for a separate constant voltage source.

The respondent amongst others objected to the clarity of the amended claim under Article 84 EPC.

3.2 The Board cannot identify any clear difference between the scope of claim 1 of the main request and the scope of the amended claim 1 of the auxiliary request.

The amended wording in particular can still be read on the embodiment of Figure 3(b) of the patent in suit, which comprises a constant current source 20a and a separate constant source 20b, with the switch 20c allowing for selectively connecting the constant current source or the constant voltage source to the transfer roller. As a matter of fact, the constant voltage source 20b and the switch 20c constitute "means for causing the electric source means including said constant current source (said electric source means being represented by the broken lines in Figure 3(b)) to serve as a constant voltage source" within the meaning of claim 1.

Conversely, the reference in claim 1 of the main

request to the electric source means comprising a constant current source and a constant voltage source does not necessarily exclude the possibility of the constant voltage source being constituted by a circuit which itself comprises the constant current source, like the one disclosed in conjunction with Figure 20(a) of the patent in suit. Claim 1 of the main request was obviously meant to cover such embodiment as well (see in particular page 4 of the specification, lines 34 to 35, where the circuit of Figure 20(a) is presented as an embodiment of the invention).

Since for the above reasons the scope of claim 1 of the auxiliary request is substantially identical to that of claim 1 of the main request, the objections raised above against claim 1 of the main request equally apply to claim 1 of the auxiliary request, which cannot be allowed either, accordingly.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

P. Martorana E. Turrini