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File Number: T 439/90 - 3.4.2

Application No.: 83 305 590.8

Publication No.: 0 104 090

Title of invention: Control system reproduction machine having job recovery

Classification: G03G 15/00, G06F 11/00

# D E C I S I O N
of 24 October 1991

Proprietor of the patent: XEROX CORPORATION

Opponent: Océ-Nederland B.V., Venlo

Headword:

EPC Article 56

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

## Headnote

Europäisches Patentamt | European Patent Office | Office européen des brevets

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**Case Number : T 439/90 - 3.4.2**

# D E C I S I O N
## of the Technical Board of Appeal 3.4.2
## of 24 October 1991

**Appellant :** (Opponent)
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**Decision under appeal :**
**Interlocutory decision of the Opposition Division of the European Patent Office dated 24 January 1990 concerning maintenance of European patent No. 0 104 090 in amended form.**

**Composition of the Board :**

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

**Summary of Facts and Submissions**

I. European patent No. 0 104 090 was granted on the basis of European patent application No. 83 305 590.8.

II. The Appellant filed a notice of opposition against the patent. He requested that the patent be revoked in its entirety because its subject-matter was obvious in view of the following documents:

(D1) R. Samuel et al.: "A fault tolerant distributed real-time machine"; Proceedings: Microprocessing and Microprogramming, 1977,
(D2) US-A-4 152 134,
(D3) US-A-3 917 396,
(D4) "IBM-TDB", vol.17, No. 8, (1975), pages 2239 to 2242,
(D5) DE-A-31 51 634.

III. The Opposition Division maintained the patent in amended form.

IV. Within the time limit of Article 108 EPC, the Appellant paid the appeal fee mentioning the file number of the patent in suit. Later on he filed the Grounds of Appeal mentioning that an appeal had already been filed and citing the further document (D6) US-A-4 099 860.

The appeal file did not contain any written notice of appeal as required by Article 108 EPC. However, the Appellant addressed to the Board, on request from the Registrar, a telecopy of the original notice of appeal in which is indicated that the voucher for the appeal fee is enclosed.

V. In a communication, the Board notified the parties that according to its provisional opinion the appeal fulfilled the requirements of Article 108 EPC, first sentence.

The Respondent (Patentee) did not comment on the question whether the notice of appeal is deemed to have been filed.

VI. Oral proceedings were held before the Board, at the end of which the Appellant requested that the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the decision under appeal be set aside and that the patent be maintained on the basis of the Claims 1 to 9 presented during the oral proceedings and of the correspondingly amended columns 1 and 2 of the description of the granted patent.

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

"A reproduction machine having a multiprocessor control, the processors (70, 72, 74, 76, 78, 82) controlling the operation of the machine, one of the processors continually updating and maintaining status information for the/each other processor, by status information being meant the information about the instantaneous state of the operating components and of the job in progress, the control comprising:
means (100) for recognizing a malfunction in one of the processors, and the source of the malfunction,
means (108) for resetting only the processor so recognized as manifesting said malfunction, and
means for downloading status information from the processor maintaining status information to the so recognized processor, whereby the machine operation

continues from the point of the recognition of the malfunction."

Independent Claim 4 reads as follows:

"A method of system recovery after a system malfunction in a reproduction machine having a multiprocessor system (70, 72, 74, 76, 78, 82) controlling the operation of the machine, one of the processors being a master processor (70) with a memory storing continually-updated status information for the/each other processor, by status information being meant the information about the instantaneous state of the operating components and of the job in progress, the method comprising the steps of:
1) recognizing the existence of a malfunction in the/a said other processor,
2) recognizing the source of the malfunction,
3) resetting only the processor so recognized without destroying the contents of the master processor memory storing the status information,
4) downloading status information from the master processor to the so recognized processor, and
5) continuing the machine operation from the point of recognition of the malfunction."

Claims 2, 3 and 5 to 9 are dependent on Claims 1 and 4, respectively.

VIII. The Appellant's arguments in support of his request can be summarised as follows:

Document D6 discloses a copier which performs production runs producing multiple copies of documents (jobs) and includes an interrupt apparatus which can interrupt a running job for executing an intermediate job whereby e.g. the number of copies is stored in a memory and whereby,

after the intermediate job has been executed, the parameters of the interrupted job are restored. The stored parameters can be considered to be "status information". Thus, the general idea of storing status information in a reproduction machine to be able to resume operation with the current job at the right moment in order to preserve job integrity, is well known in the art. Doing this in a multiprocessor controlled machine, as the one described in document D2, is not to be regarded as involving an inventive step. According to D2, program data and data about the working conditions of the individual computers are continually stored in a non-volatile memory coupled to a machine supervisory computer and, after an abnormal condition has occurred, are downloaded into the individual computers. A skilled person would combine the teachings from both documents to replace the working conditions in D2 by status information from D6, to arrive at the reproduction machine and method of job recovery according to Claims 1 and 4.

Similarly, document D6 in combination with documents D1 or D4 renders the subject-matter of Claims 1 and 4 obvious.

IX. The Respondent essentially contended that document D6 related to a so-called "job interrupt" technique. With this technique, when an "interrupt" button is actuated, the copier waits for a specific stage or cycle in the job in progress until it stops the copier. It is clear that then the job status has to be maintained. This is different from the opposed patent where one does not know when the stop will occur. Moreover, an essential point of the present invention is the designation of one processor to maintain status information for all the other processors.

When an abnormal condition is recognised in one of the processors, only that processor is reset and reloaded with status information (current at the time of recognition of the abnormal condition) from the designated processor. This feature is not shown in D6 or any other prior art cited by the Appellant. In document D2, although there is a supervisory computer, nevertheless, when an abnormal condition is detected, all the processors are reset.

According to the opposed patent, when a processor is reset after a crash, it is immediately loaded with the relevant data giving its status at the instant of the crash, and the copier can continue functioning without missing a beat. According to document D1, a malfunctioning processor is not reset but bypassed.

Reasons for the Decision

1. In the present case, no original notice of appeal has been received by the Board.

However, a voucher for a "fee for appeal" mentioning the file number of the patent in suit has been received by the cashier of the EPO, and the account of the Appellant has been debited accordingly on 8 March 1990 (the appealed decision of the Opposition Division had been posted on 25 January 1990). The Appellant has also addressed to the Board, on verbal request of the Registrar, a telecopy of the original notice of appeal bearing the date of 6 March 1990 and mentioning that a voucher for the appeal fee was enclosed.

In view of these circumstances, it cannot be reasonably doubted that the Appellant has effectively sent the notice of appeal on the date indicated in the telecopy (i.e.

6 March 1990), that this letter has been effectively received by the EPO on or before 8 March 1990 when the voucher was cashed, and that the letter has then been mislaid in the office. The appeal is therefore deemed to fulfil the requirements of Article 108 EPC, first sentence, and is thus deemed to have been filed.

The appeal is also admissible.

2. Amendments

2.1 Apart from the replacement of the term "abnormal condition" by the practically synonymous term "malfunction" (cf. original page 1, line 3 and original Claim 14), the present Claim 1 differs from the original Claim 1 by the following features:

"Continually updating", see original page 2, lines 26 to 27;

"information about the instantaneous state of the operating components and of the job in progress" is nothing but the generally accepted definition of the term "status information" contained in original Claim 1;

"and the source of the malfunction", see original Claims 4 and 14;

"resetting only the processor", see original page 17, lines 8 to 10.

The features of method Claim 4 correspond to those of Claim 1.

Claims 2, 3 and 5 to 9 are based on the original Claims 2, 3 and 5 to 9.

The description has been adapted to the claims and the prior art document D5 acknowledged.

Thus, no subject-matter extending beyond the content of the original application has been added (Article 123(2) EPC).

2.2 Replacing the designation "A reproduction machine multiprocessor control" of the granted Claim 1 by "A reproduction machine having a multiprocessor control" only limits the conferred protection to a specific application of a multiprocessor control.

Further, in Claim 1 the text "for each of the other processors" has been replaced by "for the/each other processor". In the view of the Board, the given context of the granted Claim 1 relating to a multiprocessor control (i.e. leaving it open whether there are two or more processors) pointed to the fact that the text "for each of the other processors" had to be understood as covering both cases, that of one other processor and that of a plurality of other processors (see also granted Claim 4, lines 5 and 6). Therefore, the amended text is only a clearer version of what had been the meaning of the granted text.

Thus, the amendments are also in agreement with Article 123(3) EPC.

3. Novelty

3.1 Document D5 discloses a reproduction machine having a multiprocessor control, the processors controlling the operation of the machine (cf. Claim 1 and page 6, lines 21 to 26). One of the processors comprises a counter which continually updates and maintains the number of copies made, which information is a status information about the

instantaneous state of the job in progress (see Claim 8; page 22, lines 17 to 19; page 27, lines 8 to 15; page 30, line 25 to page 31, line 6; page 35, lines 6 to 18; page 48, lines 6 to 9). The control comprises means for recognising a malfunction in one of the processors and the source of the malfunction, and means for resetting the processors (Claim 10; page 10, lines 7 to 20; page 47, lines 7 to 14; page 59, lines 13 to 18).

The reproduction machine according to Claim 1 differs from this known machine by the fact that the one processor updates and maintains the status information for the other processor(s), the fact that only the processor recognised as manifesting the malfunction is reset, and the fact that the status information is downloaded from the processor maintaining status information to the so recognised processor. The known machine cannot continue from the point of the recognition of the malfunction since it has at least to restart at the point of beginning of a copying cycle (cf. Claim 8; page 10, lines 17 to 20).

3.2 Document D6 describes a processor controlled reproduction machine wherein status information about the job in progress (e.g. remaining number of copies of the run to be made) is continually updated and - if a production run is interrupted for giving precedence to a higher priority run - is also maintained in a memory (cf. "Abstract"; column 6, lines 2 to 6; column 12, lines 6 to 15). After the interruption, the status information is restored and the machine operation continues the interrupted run.

The reproduction machine according to Claim 1 differs from this known machine in that the control is a multiprocessor control, that the status information is updated and stored for the other processor(s), that means for recognising a malfunction in one of the processors and the source of the

malfunction are provided, that means for resetting the processor so recognised as manifesting the malfunction are also provided, that the status information is downloaded to the so recognised processor, and that the machine operation continues from the point of the recognition of the malfunction.

3.3 Document D3 relates to a one-processor control of a copying machine and mentions neither processor malfunctions, nor resetting of a processor, nor downloading status information to it.

3.4 The other documents D1, D2 and D4 do not relate to a reproduction machine and are thus farther away from the subject-matter of present Claim 1.

3.5 The features of method Claim 4 correspond to those of Claim 1. The above comments therefore apply to Claim 4 as well.

3.6 For these reasons, the subject-matter of Claims 1 and 4 is novel in the sense of Article 54 EPC.

4. Inventive step

4.1 Of the cited documents, D5 is considered to be closest to the subject-matter of the patent in suit since it describes a reproduction machine having a multiprocessor control and dealing with processor malfunctions by resetting the processors. It is a well-known fact that in many cases the functioning of a processor can be corrected by this resetting procedure.

It is clear that resetting the processors leads back to the initial status of these processors and the machine has to continue its operation from a somewhat earlier state of

operation than the state at which the malfunction occurred. The problem solved by the patent in suit is therefore to be seen in avoiding this delay of operation and allowing resetting of the processors while still obtaining full continuation of the operation of the machine from the point of occurrence of the malfunction (cf. column 1, lines 38 to 43 of the present description).

Since quite generally any delay in the ideal operation of a machine is undesirable, the fact alone of finding this problem cannot be considered inventive.

The features of Claim 1 responsible for the solution of this problem are indicated in point 3.1 above.

4.2 Besides resetting of the processors, document D5 also describes a counter for the number of copies already made (or still to be made). Although this number of copies is also part of the status information of the copier, the counter has nothing to do with malfunctions of the processors correctable by resetting and is not able to download to each one of the processors which may have been reset, the current status information which brings this processor back to the very status it had when the malfunction was detected. This counter only stores the number of copies for the case that after an interruption because of a higher priority copying cycle initiated by the technical representative or because of a paper jam the copier has to know at which copy number it has to go on with its original job (in any case at the beginning of a copying cycle).

Contrary to this, the essential point of the subject-matter of present Claim 1 is to be seen in reloading each processor which had been malfunctioning and has been

corrected by resetting, with its current status information, and in the computer organisation which makes this possible.

4.3 Document D4 describes a processor for a computer, including a retry mechanism for restoring, after a failure in any of its processor units, the units to the condition which existed immediately before the failure occurred and retrying the instruction step during which the failure occurred. In two copy storages (20, 40), the instructions (status) for the processor units 14 to 16 and 13 are updated and stored, in order to be downloaded to these units after a failure. This technique is comparable to resetting and reloading with status information.

However, the organisation of this storage and transmission of the information is completely different from that according to present Claim 1, mainly since the construction according to D4 is designed for a single processor only. There is no central processor which stores the status for all the other processors, but two memories (20, 40) within the single processor. Even if considering the processor units of D4 as equivalent to processors, there would be the further difference that it is not only the malfunctioning processor unit which is reset and reloaded, but all processors units.

The possibility of using a multiprocessor environment is briefly mentioned at the end of document D4 in the sense that the retry might be performed on a second processor which would then take the place of the first processor. How the combination of the different elements would be organised in the multiprocessor case, is neither mentioned nor readily apparent.

It is concluded that even under the assumption that the person skilled in the art receives from D4 the suggestion to reload reset processors with updated status information and to use this technique in a reproduction machine as disclosed in D5, this suggestion would not lead to the - particularly efficient - form of organisation according to Claim 1, comprising a multiprocessor system with a central processor for storing the status information for all the other processors wherein only the malfunctioning processor is reset and the updated status information is downloaded only to this processor.

4.4 The other cited documents also cannot contribute any ideas which would lead the person skilled in the art to the subject-matter of present Claim 1.

Of the other documents relating to copiers, the teachings of D6 are similar to those of D5 as regards maintaining status information during an interruption initiated by the technical representative for performing a higher priority job. However, D6 does not even mention multiprocessor control, and has nothing to do with malfunctioning processors and their correction by resetting.

The latter is also true for document D3 which, furthermore, does not mention maintaining status information.

Document D1 is a general article describing multiprocessor structures. Status information of the processors is updated and stored in common storages. However, the teachings of this document are not applicable to avoid the delay occurring when malfunctioning processors are reset in accordance with document D5 since document D1 does not deal with resetting processors. According to D1, malfunctioning processors are just isolated and their job

and status information distributed to the other processors.

The glassware forming machine of document D2 has a supervisory computer which stores data for the other computers and downloads the data to these computers if their own register contents are lost, e.g. in case of a power failure. However, the failures envisaged in this document are not processor malfunctions and resetting would be useless. Moreover, despite the term "job history", the stored and downloaded data are not status information which could avoid delay of the continuation of the production cycle, but rather relate to the "job description".

Therefore, a person skilled in the art would have no reason to combine any features of D2 with those of D5.

4.5 The arguments of the Appellant relate to the combination of documents D6, D2 and possibly D1 or D4. As indicated above, for judging the present Claim 1, the Board considers D6 to be less relevant than D5, and, contrary to the opinion of the Appellant, it is not only the feature "multiprocessor system" which is lacking in D6, but above all the resetting of the processors for correcting malfunctions, and the downloading of the status of these processors. Therefore, it is not sufficient that other documents, as e.g. D2, D1 or D4, disclose multiprocessor systems; the main point is that the features of Claim 1 relating to the resetting and reloading only of the malfunctioning processor cannot be derived from these documents.

4.6 The Board therefore comes to the conclusion that the subject-matter of Claim 1 involves an inventive step in the sense of Article 56 EPC.

The same is true for method Claim 4 which contains essentially the same features as Claim 1.

Claims 2, 3 and 5 to 9 are allowable by virtue of their dependence on Claims 1 or 4.

Consequently, the patent as amended meets the requirements of the Convention (Article 102(3) EPC).

**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 Claims 1 to 9 presented by the Respondent during the oral proceedings,

   - of columns 1 and 2 of the granted patent as amended during the oral proceedings,

   - of columns 3 to 18 of the granted patent with the correction of clerical errors as accepted by the Opposition Division during the oral proceedings held on 6 July 1989,

   - and of Figures 1 to 9 and 10a to 10e of the granted patent.

The Registrar: The Chairman:

P. Martorana E. Turrini

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