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**D E C I S I O N**  
**of 28 June 2000**

**Case Number:** T 0150/99 - 3.5.1

**Application Number:** 89313233.2

**Publication Number:** 0376577

**IPC:** G05B 19/414

**Language of the proceedings:** EN

**Title of invention:**  
Multiple channel servo system

**Patentee:**  
PITNEY BOWES, INC.

**Opponent:**  
Société SECAP

**Headword:**  
Multiple Channel Servo System/PITNEY BOWES

**Relevant legal provisions:**  
EPC Art. 52(1), 56

**Keyword:**  
"Inventive step (no)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0150/99 - 3.5.1

**D E C I S I O N**  
**of the Technical Board of Appeal 3.5.1**  
**of 28 June 2000**

**Appellant:** PITNEY BOWES, INC.  
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**Representative:** Frank, Veit Peter, Dipl.-Ing.  
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**Respondent:** Société SECAP  
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**Representative:** Rinuy, Santarelli  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 7 December 1998  
revoking European patent No. 0 376 577 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** P. K. J. van den Berg  
**Members:** R. Randes  
P. H. Mühlens

## Summary of Facts and Submissions

- I. This is an appeal by the proprietor against the decision of the opposition division to revoke the patent (Article 102(1) EPC).
- II. Opposition was filed against the patent as a whole and based inter alia on Article 100(a) EPC together with Articles 52(1), 54 and 56(1) EPC. The following documents were cited in the proceedings:
- D1: "Factory Automation Gains from Controllers offering Multitasking Capabilities" by P. Chimes et al. in Computer Technology Review, winter 1987,
- D2: "Gould FA 3240 Automation Controller", a brochure giving technical information about the automation controller FA 3240, published by Gould Inc. Cybernetic Controls Division, May 1987,
- III. The opposition division held that the grounds for opposition mentioned in Article 100(a) EPC prejudiced the maintenance of the patent as granted, as well as the patent as amended in accordance with an auxiliary request, having regard to documents D1 and D2. The opposition division considered that the invention according to both requests was novel, however it did not have an inventive step.
- IV. The appellant (proprietor) lodged an appeal against the decision, paid the prescribed fee and filed a statement of grounds of appeal in time. With the grounds of appeal it filed an amended claim 1, which had a couple of additional clarifications in relation to granted claim 1.

Claim 1 reads as follows (the identification letters of the different features have been added by the Board in accordance with the identification made in the decision of the opposition division and the amendments in relation to granted claim 1 are identified in bold. The word "of" in brackets in feature (f) was erroneously missing in the claim, but it was introduced into the claim in the proceedings before the Board):

"A multiple channel servo system for engaging in bus communication with a micro-controller, comprising:

- a) motor driver means (DA1 etc.) for driving a plurality of motors (M1, M2 etc.) and
- b) motor servo informing means for providing servo information for selected ones of said motors;
- c) said micro-controller (25) being arranged to generate respective motion command profile information (PC) for each of said selected motors (M1, M2 etc.);
- d) first means (70) for receiving and storing said motion command profile information from said micro-controller for said selected motors; and
- e) servo means (Fig. 4) for sequentially comparing said respective servo information with said respective motor command information and generating respective motor control information for said respective motor for causing said motor driver to cause said respective motor to closely track said respective motion command profile;

**characterized by said servo means (Fig. 4) comprising:**

- f) second means (74) for receiving and storing microcode **defining a respective control algorithm** for each [of] said selected motors (M1 M2 etc.); and
- g) an algorithm logic unit (ALU, 27) selectively configurable for said selected motors in accordance with said microcode such that said algorithm logic unit can be reconfigured to sequentially generate respective motor control information **according to the respective control algorithm** for each of said selected motors."

The **appellant requested that the decision under appeal be set aside** and that **the patent be maintained in amended form** based on the amended claim filed with the statement of grounds of appeal.

In a letter of reply the **respondent** (opponent) **requested that the appeal be dismissed**. With that letter the respondent also filed a document by Mr. Chimes, who was said to be one of the authors of D1 and D2. Both parties made an auxiliary request for oral proceedings.

- VI. Following a communication from the Board, oral proceedings were held on 28 June 2000 at which the parties reiterated their requests.

The respondent argued as follows:

It did not appear that the additional words introduced into claim 1 in reality added any new matter to the

subject-matter of claim 1, but only clarified the wording that had already been considered in the proceedings before the opposition division.

The opposition division had considered the documents D1 and D2 to be separate documents, but, nevertheless they disclose the same apparatus. The article D1 was written by Mr. Chimes only some months later than the Gould product description D2. It has not been denied that the apparatus FA 3240 was made public before the priority date.

As the opposition division had shown in their argumentation the features (a) to (e) of the precharacterizing part were disclosed in D2. It was true that the characterizing features (f) and (g) were not explicitly disclosed by D2. Nevertheless for a skilled person they were implicitly disclosed by D2 or it was at least obvious to the skilled person to realise that these features should be present in an apparatus wherein the different motors had to be controlled independently of each other, as was the case in D2.

A claim should be interpreted in the light of its wording, but if the wording of the claim was not clear, in respect of a feature having regard to a cited reference, it had to be interpreted with regard to the description of the patent specification. In the present case claim 1 was claiming the features (f) and (g) and involved the phrase, "means for .... storing microcode defining a respective control algorithm" and the phrase that the ALU was reconfigurable "such that said algorithm logic unit can be reconfigured to sequentially generate respective motor control

information according to the respective control algorithm for each of said selected motors". Thus, it could be understood from the claim that the control algorithm could be arbitrarily changed at every control cycle. However, in the description in the patent specification (column 9) the control algorithm used in the invention, was apparently given as a difference equation, and was a direct form realization of a digital filter. Only the coefficients A and B had to be changed and a number of them could be set to zero. Thus it was understood from the description that the normal polynomial formula for a digital filter had to be used, wherein the coefficients had to be changed having regard to the different motors which all had different dynamic characteristics. Therefore, however, it appeared that the invention functioned exactly as the arrangement according to D2. The arrangement of D2 had like the invention a micro controller, which was on a CPU-card (Figure, page 4) and which controlled the function of the motors in cooperation with an integrated circuit on the card for "DNP Digital Servo Control". This DNP corresponded to the application specific integrated circuit (MCS ASIC, reference numeral 11) in the present invention. According to D2, the DNP got the necessary information from the CPU and this information had, of course, to be stored intermediately in the RAM. Thus the profile command was according to D2 stored in a similar way as according to the invention. The DNP then used the profile for the control of the four motors. The control cycle for the arrangement in D2 was repeated 1000 times/sec, just as according to the invention. Thus, like the invention the command profile could be changed several times pro second. In D2 the term microcode was not mentioned, but it was clear that the control algorithm could be

changed as often as necessary and also independently for each of the four motors, since the arrangement had a program module storing up to five multi-axis programs, thus one for each of the motors (axis). Therefore, the subject-matter of the invention did not involve an inventive step.

The appellant argued as follows:

The documents D1 and D2 could not be considered as one only document, since each of them was a separate document. Also it appeared that it had not been proved that the apparatus described in the two documents had been made available to the public before the priority date of the patent. Moreover, the letter by Mr. Chimes could not be considered as a cited prior art document.

D2 did not at all disclose a system having the features of claim 1. Not even all the features of the prior art portion of the claim were disclosed by document D2, which apparently was considered to represent the closest prior art. Thus, it was not disclosed in D2 that a motion command profile information for each of said selected motors was generated and received by a first means. Also, there was nowhere an indication that the servo means was suitable for "sequentially comparing said respective servo information". Moreover, the key-feature of the invention, the "microcode"; was not at all mentioned in D2. According to the characterizing part of claim 1, however, it was the microcode that was responsible for defining the control algorithm. The ALU, however, was selectively configurable for said selected motors in accordance with that microcode. These features were not at all disclosed in D2, in particular an ALU was not

mentioned.

Also the algorithm disclosed in the description of the present invention was neither disclosed, nor mentioned in D2. This polynomial formula (algorithm) could be changed by the microcode instruction, i.e. the number of product terms could be changed to more closely track the series of position commands (see the patent specification, column 7, line 56 to column 8, line 6). In the apparatus disclosed in D2, it might be that only the coefficients were independently set for each motor; this is, however, different from the present invention, wherein the whole algorithm could be changed.

It was also referred to the passage in D2 (page 10, left hand column), wherein it was stated:

"Users set all gains, bandwidth values, current monitoring, and current limits digitally with software command stored in the FA 3240. These commands function like adjustment potentiometers but produce more reliable motion control....."

Since this setting was stated to be equivalent to the adjustment of a potentiometer, it was clear that this was technically different from the selective configuration of a programmable ALU, as recited in claim 1.

It appeared also that the letter of Chimes described a different control apparatus than that of the invention. In the second paragraph of page 2 of his letter Mr. Chimes said:

"It should be noted that in the run mode the DNP

axis cards were all highly independent of the application processor. For example, if the application told axis 2 to index 500 units at 5 units per second, the axis controller would manage all aspects of this 100 second move without further intervention by the application processor."

This was quite different from the present invention, wherein the algorithm could be changed every millisecond.

The invention solved the problem to allow the motors to track the desired profile with a selectable degree of accuracy, which had not been disclosed in any documents. Thus, it appeared that it was possible to arrive at the invention only with hindsight.

### **Reasons for the Decision**

1. The appeal is admissible.
2. The Board considers, like the opposition division and the respondent, that all features of the prior art portion of claim 1 are disclosed in D2. Thus, the Board does not agree with the opinion of the appellant, that the features (c) and (d) are not disclosed by D2. It appears to be quite clear from D2 that the DNP in the described system receives, like the application specific integrated circuit (MCS ASIC 11) in the invention, the necessary "profile information" from the CPU in order to control the servo motors properly. According to D2 the DNP "checks for commands from the CPU card or fault conditions", and this is done one

thousand times a second (see D2, page 10, column 2). Also, it is disclosed in D2, that the received profile information is stored by suitable means, since it is disclosed therein (D2, page 10, right hand column) that e.g. the position coordinates are stored in the DNP. Therefore, as suggested by the respondent, it must be self-evident to a skilled person that the DNP-card has a RAM- memory, which stores intermediate "profile information". Since also all the other features ( (a), (b) and (e)) of the prior art portion are disclosed in D2 (the parties have not contested this finding by the opposition division), the Board concludes that the subject-matter of the prior art portion is disclosed in D2.

It is true that the characterising features (f) and (g) are not explicitly disclosed by document D2. However, the Board is, like the opposition division, convinced that these features are obvious to a skilled person having regard to the prior art disclosed in D2 and who tries to solve the problem as suggested by the respondent, i.e. to allow the motors to track the desired profile with a selectable degree of accuracy.

Having regard to the first characterising feature, it is true that the word microcode has not been used in claim 1 (and also not in the description of the patent), but microcode is, as also admitted by the appellant, a set of instructions that can interpret and perform higher language instructions. Therefore, it appears that although D2 does not mention microcode, it must, nevertheless, be used also in the arrangement of D2. In any case according to D2 there is a module with four control programs for four different axis (four motors), which module is plugged into the CPU. These

separate application control programs operate the separate axis motors quite independently in the described controller system FA 3240 (D2, page 5, left hand column, at the top). The CPU must apparently transmit the necessary data to the DNP in that the application program sets gains of the motor position and velocity loops (D2, page 5, right hand column, at bottom). Apparently, also in the system of D2 it is necessary to use control algorithms, which must be independent of each other, since they control four independent motors, which have different characteristics.

Moreover, the polynomial formula disclosed in the patent description (column 9) is the formula that represents the digital filter function, from which, in fact, all the different "independent algorithms" for the separate motors can be derived. Thus, as proposed by the respondents, this formula, and thus the filter characteristics, can be changed and adapted to the operation conditions of the different motors (thereby taking into account the motor characteristics of the different motors) only by changing the coefficients A and B. Also the coefficients can be set to zero. Thus, it appears to the Board that the "respective control algorithm for each of said selected motors" means that said coefficients in the same formula are adapted to the special motor concerned. Since this polynomial formula apparently represents the normal mathematical form of a digital filter, it appears that it would be obvious for a skilled person to use this formula to arrive at separate digital filters.

Having regard to the last characterising feature of claim 1 it is, moreover, stated in D2 (page 10, left

hand column) that "users set all gains, bandwidth values, current monitoring, and current limits digitally with software commands stored in the FA 3240". The Board, like the opponent and the opposition division is of the opinion that this feature of D2 corresponds very well to the last characterising feature of claim 1, i.e. the software and the hardware of the arrangement of D2 are so manipulated that motor control information is independently generated for each of the separate four motors. In D2 it has not been mentioned that an ALU is present. However, it is obvious to a skilled person that also the processor in the DNP must have an ALU, which must be reconfigured by algorithms.

Thus, although the two last characterising features are not explicitly mentioned in D2, the arrangement of D2 functions in the same way and solves the same problem as the invention. It appears also, as has been shown, to be self-evident or at least obvious to a skilled person to use the same means as suggested in claim 1 in the arrangement of D2.

The appellant in the oral proceedings (see above under VI) forwarded the argument that, since it was stated in D2 (page 10, left hand column) that the commands used for setting of new values functioned like adjustment potentiometers commands, it could not be that the setting was made in the sophisticated way as according to the invention. However, the Board takes the view as suggested by the respondent, that the comparison with older primitive techniques, i.e. the reference to a potentiometer, is in D2 made only to make clear for the reader of the D2-brochure, in which way the new digitally functioning arrangement according to D2 is

working in relation to prior art.

The respondent also made a reference to the letter of Mr. Chimes (see under VI above, the quotation by Mr. Chimes) who suggested that the "axis controller [in D2] would manage all aspects of this 100 second move without further intervention by the application processor". This control manner was according to the appellant quite different from the present invention wherein the algorithm manipulating the ALU could be changed hundreds of times during an operation cycle. However, the Board agrees with the respondent on this point, in that this manner of control must, of course, also be included in the present invention of the appellant, if there is no need to make changes because of the working conditions.

3. Thus, the Board is of the opinion that the invention of claim 1 of the present invention does not involve an inventive step and, therefore, does not meet the requirements of the Articles 52(1) and 56 EPC.

## **Order**

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

M. Kiehl

P. K. J. van den Berg

