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Datasheet for the decision of 7 December 2010

Case Number: T 1820/08 - 3.5.03

Application Number: 02257698.7

Publication Number: 1310338

IPC: G05B 19/4069

Language of the proceedings: EN

Title of invention:
Simulation system

Patentee:
FANUC LTD

Opponent:
-

Headword:
Simulation system/FANUC

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - no"

Decisions cited:
-

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Case Number: T 1820/08 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 7 December 2010

Appellant: FANUC LTD
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 31 March 2008 refusing European patent application No. 02257698.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: A. S. Clelland
Members: A. J. Madenach
M-B. Tardo-Dino

Summary of Facts and Submissions

I. The present appeal is against the decision of the examining division to refuse application No. 02257698.7 on the ground of lack of inventive step (Article 56 EPC) having regard to the disclosure of *inter alia* the following document:

D1: US 4 879 667 A.

II. The appellant requested the cancellation of the decision and the grant of a patent on the basis of the documents considered by the examining division in the decision. A conditional request was made for oral proceedings.

III. In a communication of 10 August 2010 pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal, accompanying a summons to oral proceedings, the board gave its preliminary opinion, raising *inter alia* objections under Article 52(1) in combination with Article 56 EPC.

IV. With letter of 14 September 2010 the appellant's representative informed the board that the appellant would not be represented at the scheduled oral proceedings. No further requests or arguments were submitted.

V. Oral proceedings took place on 7 December 2010 in the absence of the appellant.

VI. Independent claim 1 of the sole request reads as follows:

"A simulation system arranged for performing a practical simulation combining a three-dimensional model of a robot (35) with a three-dimensional model of a peripheral equipment (37) or of a workpiece (36), comprising:

means storing a three-dimensional model of the robot (35);

means storing layout information on said three-dimensional model of the robot (35);

means arranged for reading layout information from said layout information storing means and laying out the three-dimensional model of the robot (35) on a screen (38) of the simulation system based on the read-out layout information;

drawing information input means arranged for inputting two-dimensional drawing information representing at least one view of the peripheral equipment (37) or of the workpiece (36), the drawing information including three-dimensional layout information for laying out said at least one view of the peripheral equipment (37) or the workpiece (36) in a three-dimensional manner;

three-dimensional model generation means arranged for assembling the three-dimensional model of the peripheral equipment (37) or the workpiece (36) by laying out said at least one view thereof on the screen (38) of the simulation system based on the associated three-dimensional layout information, thereby obtaining a three-dimensional model of the peripheral equipment (37) or the workpiece (36) which is analogous to an actual peripheral equipment (37) or workpiece (36); and

means arranged for operating the three-dimensional model of the robot (35) on said screen (38) based on

robot operating point or points information which indicates a position or positions at which said robot (35) operates and which is accepted as being part of said drawing information inputted by said drawing information input means."

Reasons for the decision:

1. *Procedural questions:*

1.1 The board considered it to be expedient to hold oral proceedings for reasons of procedural economy (Article 116(1) EPC). The appellant, which was duly summoned, had informed the board that it did not intend to take part in the oral proceedings and, indeed, was absent. The oral proceedings were therefore held in the absence of the appellant (Rule 115(2) EPC, Article 15(3) RPBA).

1.2 In the communication accompanying the summons, objections under Article 56 EPC were raised in respect of claim 1 of the sole request. The appellant was thereby informed that at the oral proceedings it would be necessary to discuss these objections. In deciding not to attend the oral proceedings the appellant chose not to make use of the opportunity to comment but, instead, chose to rely on the arguments as set out in the written submissions, which the board duly considered below.

In view of the above and for the reasons set out below, the board was in a position to give at the oral

proceedings a decision which complied with the requirements of Article 113(1) EPC.

2. *Inventive step, Article 56 EPC:*

2.1 The application in suit relates to a simulation system "in which three-dimensional models of peripheral equipment and workpiece[s] which are placed near an operating machine to be simulated, such as a robot and a machine tool, are generated, and these models are used with a three-dimensional model of the operating machine to be simulated" (paragraph [0001] of the published application).

2.2 The board considers D1 as the closest prior art. This document relates to a process for generating a data structure of a computer model of a processed workpiece whereby the contours of the workpiece and the cross section of the tool as well as the path movement of the tool are analysed in three dimensions (see abstract in combination with Figures 3 and 5).

The board follows essentially the analysis of the process disclosed in D1 as given by the examining division, which as such was not put in question by the appellant who argued rather that D1 was not relevant prior art (see point 2.5 below).

D1 discloses a simulation system arranged for performing a simulation (claims 1-3; column 1, lines 46-55; column 2, line 61 - column 3, line 2; column 3, lines 55-61) combining a three-dimensional model of an operating machine such as a machine tool (column 2, lines 56-63; and figure 5) with a three-dimensional

model of a workpiece (column 1, lines 45-54; column 2, lines 32-48; and figures 3 and 5).

The three-dimensional model of the machine tool consists in a data structure which is based on the information on the cross-section and length of the tool installed on the machine, said data structure being necessarily stored in the simulation system to make possible the graphical simulation shown in Figure 5 and explained *inter alia* from column 2, line 61 to column 3, line 2, and on column 3, lines 18-55. Therefore, the known simulation system comprises means storing a three-dimensional model of the machine tool.

The three-dimensional model of the machine tool is displayed on the screen using the same perspective as that adopted for the three-dimensional model of the workpiece. In the example shown in figure 4 and described from column 4, line 19 to column 5, line 31 the layout information consists in displacing successive, equidistant, parallel views by a distance P both upwards and to the right. It is clear that said layout information (*i.e.* at least the parameter P) must necessarily be stored in the simulation system. Therefore, the known simulation system further comprises means storing layout information on said three-dimensional model of the machine tool.

The program stored in the simulation system and comprising the instructions for constructing the image on the screen are considered to correspond to means arranged for reading layout information from said layout information storing means and laying out the three-dimensional model of the machine tool on a screen

of the simulation system based on the read-out layout information (column 3, lines 48-51; column 4, lines 24-53; and figure 5).

The information on the base surface of the workpiece and on the section planes which is stored in the simulation system according to D1 and which originates from typical technical drawings as those shown in figures 1 and 2 corresponds to two-dimensional drawing information representing different views of the workpiece as follows *e.g.* from the wording of claim 4 of D1 ("plurality of two dimensional views"). In order to store said information in the simulation system, it must be input first, for example, through an I/O device used for programming the simulation system, such as a keyboard. By definition, such an input device must be considered as "drawing information input means" and the "drawing information" input in the simulation system includes said "two-dimensional drawing information". Therefore, the known simulation system further comprises drawing information input means arranged for inputting two-dimensional drawing information representing at least one view of the peripheral equipment or of the workpiece.

As indicated above, in the example shown in figure 4 and described from column 4, line 19 to column 5, line 31 said layout information consists in displacing successive, equidistant, parallel views by a distance P both upwards and to the right; it relates thus to the display of the aforesaid "two-dimensional drawing information". Said layout information is stored in the simulation system, where it must be input first through an I/O device used for programming the simulation

system, *i.e.* the "drawing information input means". Based on the above, the "drawing information" input in the simulation system is considered to include said "three-dimensional layout information". Therefore, the drawing information includes three-dimensional layout information for laying out said at least one view of the workpiece in a three-dimensional manner.

As indicated above with respect to the graphical representation of the tool, the program stored in the simulation system according to D1 and comprising the instructions for constructing the image on the screen can also be considered as a three-dimensional model generation means arranged for assembling the three-dimensional model of the workpiece by laying out said at least one view thereof on the screen of the simulation system based on the associated three-dimensional layout information, thereby obtaining a three-dimensional model of the workpiece which is analogous to an actual workpiece (see in particular: column 2, line 61 - column 3, line 2; column 4, line 19 - to column 5, line 31; claims 1-3; and figure 5).

The simulation program which displays the alteration to the workpiece caused by the movement of the tool along its path, *i.e.* at the machine tool operating points, corresponds to means arranged for operating the three-dimensional model of the machine tool on said screen based on machine tool operating point information which indicates a position or positions at which said machine tool operates (column 2, line 61 - column 3, line 61; and claims 1-3), the machine tool operating point information being considered as part of said drawing

information input by said drawing information input means (see also column 4, lines 5-11).

The processing program, which - by definition - defines the operating point information which indicates positions at which the machine tool operates, is obtained from the technical drawings of the workpiece; it relates thus to "drawing information". Moreover, said processing program must necessarily be input in the simulation system through an I/O device used for programming the simulation system, *i.e.* a "drawing information input means". Therefore, the drawing information input in the simulation system is deemed to include said machine tool operating point information.

2.3 The subject-matter of independent claim 1 differs thus from the simulation system shown in document Dl only in that the operating machine being simulated is a robot instead of a machine tool.

This conclusion is confirmed by the fact that the simulation system according claim 1 essentially comprises with respect to the three dimensional model of a robot:

- means for storing the model;
- means for storing layout information of the model;
- means for reading out the layout information and or laying out the model on a screen;
- means for operating the model on the screen based on robot point or points information which indicates a position or positions at which said robot operates and which is accepted as being part

of drawing information inputted by drawing information input means.

According to the application in suit, these means are implemented by known software products ("stored ... utilizing ... 'ROBOGUIDE'", col. 9, l. 47-49; "software ... for screen display ... provided by ... 'ROBOGUIDE'", col. 10, l. 1-5) or appear to be generally known ("The creation of the motion program from the operating-point sequence is similar to an ordinary off-line programming, and therefore its explanation is omitted.", col. 10, l. 36-39).

Therefore, the only feature which could thus justify an inventive step is the fact that the claimed invention relates to a simulation system for performing a simulation combining a three-dimensional model of a robot instead of a machine tool as in D1.

2.4 The problem to be solved by using a robot instead of a machine tool is the increased versatility provided by a robot. This problem is well known in the art and cannot, as such, justify an inventive step.

It would have been obvious for the skilled person starting from D1 and considering the advantages conferred by it (i.e. simplicity and rapidity, col. 1, lines 43-44 and col. 5, lines 32-37) that he could apply this teaching to a robot in order to have a more versatile system, as already indicated in the board's communication of 10 August 2010.

The board notes in this respect that the application itself does not strictly distinguish between a robot

and a machine tool (col. 1, lines 3-9 and col. 5, lines 13-15), nor does it specify any specific characteristics which would characterise a robot compared to a machine tool. Thus, the claimed simulation was apparently originally foreseen for any kind of operating machine, and any differences between a machine tool and a robot are apparently not relevant in the context of the present invention.

The subject-matter of independent claim 1 does not, therefore, involve an inventive step in the sense of Article 56 EPC. The appeal is therefore not allowable.

2.5 The appellant basically argued in the grounds of appeal that what is shown in Figure 5 of D1 is the machining tip of a processing tool 3. This could not be considered as a machine tool, which would be the whole milling machine. Figure 5 of D1 showed in detail how a workpiece 2 is altered by the machining executed by the tip of the processing or milling tool 3, whereas the present invention was concerned with displaying the operating path taken by a robot, which covered a far greater spatial area or volume than shown in Figure 5 of D1.

The board is not convinced by this argument for the following reasons:

The skilled person would readily consider the tip of the milling tool shown in Figure 5 of D1 as the relevant part of the whole machine tool. If it were otherwise, the skilled person would expect D1 to include indications as to how to deal with the further parts of the machine tool. Indeed, the application in

suit also only considers the relevant portions of a robot and not the movement of the robot as a whole (see paragraph [0029] of the published application: "an operating point sequence ... is created by specifying a sequence of points"). Furthermore, as already noted above the application itself not only fails to make any distinction between a robot and a machine tool, it also does not make any distinction between the point sequence or the motion locus 12 of the tip of a robot arm (see Figure 2 and column 7, lines 19-22 of the published application) and the robot as a whole, nor does it specify any specific characteristics which would characterise a robot compared to a machine tool.

In the relevant technical field (*i.e.* simulation of a three-dimensional robot and of a three-dimensional workpiece) it is therefore justified to consider the tip of a machine tool as a *pars pro toto* as far as its motion relative to the workpiece is concerned.

3. Since claim 1 of the only request lacks an inventive step, the application does not satisfy the requirements of Article 56 EPC. For this reason the appeal cannot be allowed. It is therefore not necessary to examine the other claims or to verify if the application satisfies the further requirements of the EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar The Chairman

G. Rauh A. S. Clelland