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D E C I S I O N
of 10 August 1994

Case Number: T 0825/92 - 3.5.1

Application Number: 82108935.6

Publication Number: 0075916

IPC: G05B 19/407

Language of the proceedings: EN

Title of invention:
Industrial robot control apparatus

Patentee:
KABUSHIKI KAISHA SANKYO SEIKI SEISAKUSHO

Opponent:
Siemens AG

Headword:
-

Relevant legal norms:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0825/92 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 10 August 1994

Appellant: (Opponent)
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Representative:
-

Respondent: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office dated 27 July 1992 rejecting the opposition filed against European patent No. 0 075 916 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: R. Randes
G. Davies

Summary of Facts and Submissions

I. European patent No. 0 075 916 concerning an "industrial robot control apparatus" and comprising an independent Claim 1 and dependent Claims 2 to 5 was granted on 8 June 1988 in response to European patent application No. 82 108 935.6 filed on 27 September 1982.

II. The independent Claim 1 reads as follows:

"An industrial robot control apparatus comprising: an operating program memory (6-10), changeover signal generator means (16) for generating a changeover signal in response to either a sensed predetermined parameter of said robot or to operation of a manual switch, and robot drive control unit means (12) for instructing movement of said industrial robot (1), characterized in that the parameter is the weight of a robot swing arm which in use supports workpieces of different weights, the movement of which arm is controlled within a polar co- ordinate system, that a speed pattern memory (14) is provided which stores a plurality of speed patterns corresponding to the different weights, said speed patterns having an initial rising slope and a final falling slope, and further characterized by a changeover circuit means (15) which selects a speed pattern in response to said changeover signal, said robot drive control unit means (12) instructing the movement in accordance with a selected operating program read out from said operating program memory (6-10) and a speed pattern supplied from said speed pattern memory (14)."

III. A notice of opposition was filed by the Appellant (then Opponent) on 7 March 1989, requesting revocation of the patent in suit in its entirety on the grounds of Article 100 (a) EPC. The Appellant cited the following documents:

Da: SU-PS-480 083

Db: Design Engineering, volume 51, No. 4, April 1980, London (GB), pages 13 to 14, "New ac servo provides precise control of slide motions".

IV. By its decision, dated 27 July 1992, the Opposition Division rejected the opposition.

The Opposition Division considered that the closest prior art still was to be seen in the teaching of the document

Dc: US-A-4 156 835

cited in the pre-grant proceedings and which disclosed the prior art portion of Claim 1. Starting from said prior art, the problem to be solved by the present invention was (in accordance with the patent specification, column 2, lines 13 to 18)

to provide an industrial robot with a capability of selectively changing the speed characteristics of the robot while in motion for providing a maximum work efficiency of the industrial robot at all times.

The Opposition Division argued in the following way:

"As is clear from the translation of the SU document, this transport device, which is not part of a robot control apparatus, sets itself the task to stop

accurately at the desired position. Accordingly, there is only one speed pattern which consists in changing the speed from one high speed V1 to a slow speed V2 before stopping. There is no "speed pattern" prescored, but only a position shift which shifts the position where the speed is changed from V1 to V2. It can therefore not give any hint to the contrasting solution of the invention, which provides a speed pattern memory with several patterns having each a different initial rising and final falling slope, correlating these patterns to different weights of a swing arm of the robot, depending of the loads carried. Such a load weight can be weighted by a sensor which then activates the changeover. Thus, when moving, the swinging of the arm can be optimised to a minimum."

The Opposition Division, moreover, was of the opinion that the said problem could not be derived from the teaching of Da, since it related to a pallet transport system and not to a swing arm robot.

It, also, argued that "a solution can furthermore not be induced" by the teaching of Db, although according to this document different speed patterns might be used. They were, however, simply correlated to the kind of tool used, without involving an adaption to any weight. "When considering this document", the Opposition Division stated, "the skilled person would still have to recognise that adapting speed patterns to varying tools chosen by an operator could be replaced by adapting speed patterns automatically dependent on measured weights of a swing arm load in a swing arm robot according to the US document [Dc]. This would, however, go beyond what is obvious for said skilled person."

V. On 31 August 1992, the Appellant (Opponent) filed an appeal against the decision, paying the appropriate fee. The Statement of Grounds was filed on 27 November 1992.

VI. In the grounds of appeal the Appellant, like the Opposition Division, considered that the subject-matter of the prior art portion of Claim 1 was disclosed by Dc. However, according to his opinion also document Da disclosed the features of said prior art portion. Therefore, it appeared to be obvious to a skilled man to arrive at the invention according to Claim 1 already by combining the documents Da and Db. Starting from the teaching of Da, wherein the possibility to take into account the weight of a transporter (such as a trailer, carriage or crane) is indicated when the speed of said transporter is to be controlled and combining this teaching with the teaching of Db, the skilled man would realize that it would be possible to store different speed patterns in a memory and use them for the control of said transporter.

When starting from the teaching of Dc it would of course also be obvious to a skilled man to arrive at the claimed invention.

The Appellant requested that the decision under appeal be set aside and the patent revoked. An auxiliary request for oral proceedings was also made.

VII. In a letter, filed on 1 April 1993, the Respondent contested the arguments of the Appellant and requested that the appeal be dismissed.

VIII. After the Registrar of the Board had sent an inquiry to the parties to find out whether the date suggested by the Board for oral proceedings to be held was acceptable

for the parties, the Appellant in a letter, filed on 16 June 1994, withdrew its auxiliary request for oral proceedings.

IX. Thus, the Appellant requests that the decision under appeal be set aside and the patent revoked.

The Respondent requests that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. The only question to be answered in this appeal is whether or not the claims of the patent in suit involve an inventive step.

It appears to the Board that the Opposition Division in its decision has analysed the cited documents properly.

In the Statement of Grounds of Appeal the Appellant tries to convince the Board that the skilled man would arrive at the subject-matter of Claim 1 of the patent by combining only the cited documents Da and Db. This argumentation cannot, however, convince the Board, which is of the opinion that those two documents alone would in no way give the skilled man the idea of the invention. This follows already from the fact that the teaching of said documents does not relate to the robot field - at least not in the sense of the invention - and does not disclose a robot swing arm or its functioning. Thus, apparently the problem to be solved by the invention (see under IV above) cannot be derived from

said documents. Therefore, having regard to the teaching of Da and Db only, the subject-matter of Claim 1 would not be obvious to a skilled man.

Also, when considering the teaching of document Dc, which corresponds to the prior art portion of Claim 1, as the starting-point of the invention, the Board - like the Opposition Division - is of the opinion that documents Da and Db do not contribute to the solution of the problem.

Document Da only teaches that before the stopping of e.g. a transport carriage, the carriage is slowed down from a **high speed** V1 to a **low speed** V2. When the carriage is loaded (measured by a weight sensor) the speed is changed at a distance from the stop position that is larger than said distance when the carriage is unloaded. In this document there is no reference to speed patterns, not to mention a speed pattern memory. It only discloses a system wherein the transport carriages are slowed down before stopping but does not teach how they are stopped.

Document Db discloses a speed pattern memory. However, the speed patterns are adapted to the different tools used and acceleration and deceleration rates can e.g. be determined by the inertia characteristics of the drive and the slide of the tool.

Thus, it cannot be understood that the skilled man would arrive at the present invention when starting from the teaching of document Dc and having regard to the disclosures of Da and Db.

By simply measuring the weight of the robot swing arm and by utilising the speed patterns according to Claim 1 a robot control apparatus is created by the invention

that enables the robot swing arm always to have the maximum speed and yet to avoid abrupt speed changes. It appears, therefore, that - as has been said by the Respondent (see e.g. letter of 26 July 1991, page 3) - unwanted vibrations of the arm can be avoided and, moreover, a speed pattern can always be chosen that brings the arm to a soft stop. All this is achieved although a very high accuracy (in the order of µm units) is required, which accuracy apparently is not at all present in the systems described in documents Da and Db.

3. Thus, it appears to be a very clear case and the Board fully agrees with the decision of the Opposition Division, that the subject-matter of Claim 1 involves an inventive step within the meaning of Article 56 EPC.

4. In view of the above, the patent can be maintained as granted.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl P. K. J. van den Berg