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D E C I S I O N
of 10 January 1997

Case Number: T 0561/95 - 3.2.3

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Title of invention:
Centrifuge control system having dual processors

Applicant/Patentee:
E.I. DU PONT DE NEMOURS AND COMPANY

Opponent:
SIGMA Laborzentrifugen GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56, 100(a)

Keyword:
"Inventive step (confirmed)"

Decisions cited:
-

Catchword:
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Case Number: T 0561/95 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 10 January 1997

Appellant: (Opponent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office dated 19 June 1995 rejecting the opposition filed against European patent No. 0 321 920 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: C. T. Wilson
Members: F. Brösamle
L. C. Mancini

Summary of Facts and Submissions

I. European patent No. 0 321 920 was granted on 29 September 1993 with a single claim which reads as follows:

"A control system for centrifuge instrument having a motor (30) with a shaft (34) and a source of energy for the motor, the motor (30) being operative to rotate the shaft (34) to a rotational speed, a tachometer (52) operative to generate a signal representative of the actual rotational speed of the shaft, the control system including a programmable controller (60) operative to provide a predetermined set of instrument control functions including the function of conditionally coupling of the source to the motor, characterized in that
the programmable controller (60) having a first and a second processor (72, 74) therein,
the processors (72, 74) being configured in a master-slave relationship for some predetermined subset of the instrument control functions during the execution of which the slave (74) operates under the direction of the master (72) to effect that subset of control functions,
each of the processors (72, 74) being independently responsive to the speed signal from the tachometer (52) and being independently capable of controlling the function of conditionally coupling of the source to the motor (30)."

II. An opposition filed against the patent in suit was rejected by the Opposition Division on 19 June 1995.

III. The Opposition Division came in its decision pursuant to Article 102(2) EPC to the result that the subject-matter of the single claim as granted has to be seen as non-obvious within the meaning of Articles 56 and 100(a) EPC so that the opposition was rejected and the patent upheld unamended.

The opposition was based on the following documents:

(D1) WO-A-87/00770 (cited in the contested patent);
(D2) British Standard 4402 - Sicherheitsanforderungen an Laborzentrifugen, Entwurf Oktober 1979;
(D3) Handbuch für Hochfrequenz- und Elektrotechniker, Band 5, Dr. Alfred Hüthig Verlag, Heidelberg, 1981, pages 78, 79;
(D4) TÜV Rheinland Seminar "Zuverlässige und sichere Rechnersysteme", 19 May 1982;
(D5) BSI British Standards Institution 4402 "Specification for Safety requirements for laboratory centrifuges", 1982 and
(D6) Mikrocomputer in der Sicherheitstechnik, Verlag TÜV Rheinland, Köln, 1984

IV. The appellant (opponent) with letter of 4 July 1995, received on 5 July 1995, lodged an appeal against the decision of the Opposition Division and paid the fee on the same day. The Statement of Grounds of Appeal was received on 11 October 1995. It was argued that the claimed subject-matter is not based on an inventive step so that it is requested (by implication) to set aside the impugned decision and to revoke fully European patent No. 0 321 920.

V. The proprietor - respondent in the following - requests to dismiss the appeal (and to maintain the patent as granted).

VI. The essential arguments of the parties with respect to their requests can be summarised as follows:

(a) Appellant

- the known control system is based on a single processor whereas the claim is based on two processors, i.e. achieving redundancy in the sense of technical general knowledge;

- the claim is not restricted to identical or differing processors so that these may or may not be different in make and function; their function is, however, not claimed in the attacked single claim;

- the object of the claimed invention covers two aspects, namely to increase the security and reliability and also to offer the possibility to use two differing processors; to offer the possibility to use differing processors is seen as simply optional since the claim does not contain a teaching which is linked to the second aspect of the object of the invention;

- the first aspect thereof is nothing other than the provision of a redundant control unit for the motor; such control units are, however, clearly known from (D3), (D4) and (D6) as well as from (D2) and (D5);

- in the above prior art the control units work independently from each other and fulfil the requirements of increasing the security and reliability of the centrifuge-control system within the meaning of the first aspect of the object of the invention;

- even if a "master-slave relationship" as claimed in the characterising clause of the single claim is not explicitly mentioned in the above prior art, the control system as claimed is rendered obvious since the feature "master-slave relationship" does not contribute to its inventiveness;

- summarising, the patent in suit has to be revoked.

(b) Respondent

- the essential features of the single claim are the specific hierarchical relationship in which the two processors are configured and their independent responsiveness to the speed signal from the tachometer;

- both processors can be different in make and function, each processor being able to generate a control signal to the drive circuit of the motor in order to increase the degree of security and reliability;

- appellant's arguments that a skilled person would use basic rules of formal logic and the available prior art knowledge to solve the object of the invention are lacking in an explanation of why it should be obvious to provide a master-slave configuration for the processors, which is one of the essential features of the invention;

- via a link "78" the slave processor operates under the direction of the master processor to effect a subset of control functions;

- the teachings that a second processor be configurated to operate in a master-slave relationship and that both processors be independently responsive to the speed signals from the tachometer are by no means obvious;

- the appeal should therefore be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Novelty*

Novelty of the subject-matter of the single claim is not contested by the Opposition Division, the opponent or the Board and needs therefore no detailed arguments.

3. *Inventive step*

3.1 Nearest prior art document is (D1) which is dealt with in the opening of EP-B1-0 321 920, see page 2, lines 24 to 26 and see also lines 7 to 11. Failure of the single processor thereof could lead to a catastrophic failure of the rotor.

3.2 Starting from (D1) it is the object of the invention to create a safe and reliable control system, see EP-B1-0 321 920 page 2, lines 27 to 29.

3.3 This object is solved with the features according to the single claim as granted.

In contrast to the teaching of (D1) **two** processors are arranged which are independently linked to a speed signal tachometer and which are configured in a master-

slave relationship for some predetermined subset of control functions of conditionally coupling of the source to the motor.

3.4 With this control system the degree of safety and reliability is increased and the possibility is provided of using two processors which can be different in make and function.

3.5 It is obvious that all features of the single claim as granted serve to solve the above object of the invention, even the feature named "(1.5)" by the appellant i.e. master-slave relationship for a subset of control functions between the two processors.

3.6 The appellant essentially argues that the teaching of the attacked claim is nothing other than the provision of a redundant control system well known to a skilled person from different technical fields.

3.7 This argument is not convincing since redundancy per se has nothing to do with the provision of a **hierarchical** relationship of processors, namely of a master-slave relationship, so that the prior art cited by the appellant would not lead a skilled person to the claimed control system for a centrifuge instrument.

3.8 The following has to be observed in connection with (D2) to (D6):

In (D2), see remark 7.2, in particular 7.2.2, a speed control system is disclosed which is completely based on redundancy since these systems should be provided in double ("zweimal vorhanden sein...") and these control systems should operate the motor independently.

(D3) originates from a remote technical field and has nothing to do with a centrifuge instrument and its control system; what can, however, be derived from (D3) is the possibility of a "functional redundancy" in combination with the background of reliability, see page 78, line 7 from bottom ("funktionelle Redundanz").

(D4) is based on a computer system with a multi-channel structure, see "Blatt 5" paragraph 3/4 ("mehrkanalig...zweikanalige System"), for reasons of reliability of the system. Without any further information as to the interrelationship between the two or more channels (D4) has to be seen as a disclosure in the direction of the provision of a redundant structure for reasons of reliability of the computer system.

(D5) deals with laboratory centrifuges and their safety requirements. Again a second speed limitation device is provided for in order to make the centrifuge instrument more reliable, see remark 9.2.2 ("not less than two such devices"), whereby these devices operate the centrifuge-rotor independently, see also remark 9.2.5 of (D5).

(D6) deals with safety considerations in combination with computer systems and its teaching can be seen in providing double-channel systems which operate independently, see remarks 7.3 and 7.10.1 ("zweikanalige Strukturen" and "Verdoppelung der CPU"), so that again a redundant system is used to increase the reliability of a (computer) system without any hint of a master-slave relationship between the system.

3.9 Summarising the teachings of (D2) to (D6) a skilled person would not be directed towards a master-slave relationship of processors - i.e. to a hierarchy

between the two processors - but only to the possibility of doubling a system, namely making one of them redundant - to tackle the problem of making a system safer and more reliable.

The master-slave relationship of the two processors claimed in the single claim as granted maintains the possibility that both processors are directly linked to the speed signal tachometer and offers the possibility that only a **subset** of the instrument control functions is dealt with in the second processor enabling or even encouraging a skilled person to use processors of different make and function - the latter feature not being claimed but **being possible** in combination with the control system claimed.

As can be seen from the above considerations a master-slave relationship of processors has an effect on their **number of control functions** - namely only a subset of them for the second processor - and possibly on their make and function so that a master-slave relationship of processors implies features not necessarily involved in a redundant system known from the prior art.

3.10 The master-slave relationship is therefore a feature not derivable from (D1) to (D6) so that the skilled person confronted with the above object of the invention could not simply select a model from the available prior art, which is per se a clear support for the existence of an inventive step within the meaning of Articles 56 and 100(a) EPC.

3.11 The single claim as granted is not restricted to processors which are different in make and function. The existence of a master-slave relationship between the first and second processor enables, however, the possibility of providing for processors **which are**

different in make and function in contrast to the teachings of (D2) to (D6) which basically aim at a **simple duplication of systems**, namely achieving redundant systems, to increase the overall safety and reliability of the control device.

3.12 Since the function of the systems according to the single claim is not an essential feature for solving the posed problem, the question of whether it is claimed or not is irrelevant for the assessment of the issue of inventive step so that appellant's argument has to be rejected in this respect.

Appellant's further argument that the master-slave relationship does not contribute to the solution of the object of the invention fails since the object of the invention cannot be split into two aspects without violating established principles in combination with the problem-solution-approach. The Board holds that the absence of a master-slave teaching in the complete prior art is not a matter of pure chance but is an indication that the claimed subject-matter is clearly distinguished from the known teachings.

3.13 The absence of the master-slave feature of the single claim in the prior art cannot be overcome by simply pointing to "basic rules of formal logic" as done by the appellant since he could not bring forward a convincing explanation of why it should be obvious not to use a simply redundant system but provide for a master-slave relationship as one of the essential features of the invention.

3.14 Summarising the above considerations the control system for a centrifuge instrument according to the single claim as granted has to be seen as the result of an

inventive endeavour of a skilled person starting from (D1) so that the requirements of Articles 56 and 100(a) EPC are fulfilled and the claim under discussion is valid.

Order

for these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Maslin C. T. Wilson

Rv Lc