BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

A		B		C	X

File Number: T 940/91 - 3.5.1

Application No.: 84 111 709.6

Publication No.: 0 138 135

Title of invention: Plant management system

Classification: G06F 15/46

D E C I S I O N
of 12 October 1992

Applicant: Honeywell Inc.

Headword:

EPC Articles 54, 56

Keyword: "Novelty and inventive step (yes, after amendment)"

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 940/91 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 12 October 1992

Appellant : Honeywell Inc.
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Decision under appeal : **Decision of the Examining Division of the European Patent Office dated 5 July 1991 refusing European patent application No. 84 111 709.6 pursuant to Article 97(1) EPC.**

Composition of the Board :

Chairman : P.K.J. van den Berg
Members : A.S. Clelland
W.M. Schar-Schuppisser

Summary of Facts and Submissions

I. European patent application 84 111 709.6, filed on 1 October 1984 claiming a priority of 7 October 1983 and published under No. 0 138 135, was refused by a decision of the examining division dated 5 July 1991.

II. The reason given for the refusal was that Claim 1 was worded in such a manner that it could reasonably be interpreted in two different ways, the interpretation adopted by the Examining Division leading to the conclusion that the subject-matter was not novel having regard to the disclosure of the document

D1: US-A-4 296 464

acknowledged in the application.

The dependent Claims 2 to 11 were held not allowable since their subject-matter lacked an inventive step, the decision referring to reasoned grounds contained in a communication from the Examining Division dated 2 November 1988, in which the document

D2: JP-A-57 114 901

was cited in addition to D1. D2 was interpreted with the aid of the corresponding, late published document US-A-4 500 951.

The Decision also included observations on the question of whether the deletion from Claim 1 of a feature, namely the token-passing principle, constituted a contravention of Article 123(2) EPC.

III. On 2 September 1991 the Applicant lodged an appeal against this decision and paid the prescribed appeal fee. On 7 November 1991 a statement setting out the grounds of appeal was filed, together with a main set and an auxiliary set of new claims.

IV. In a communication dated 8 July 1992 the Rapporteur expressed the preliminary view that Claim 1 in accordance with both the main request and the auxiliary request was open to interpretation in a manner giving rise to a novelty objection having regard to the disclosure of D1. It was also stated that the deletion of the token-passing principle appeared to offend Article 123(2) EPC, given the prominent part it occupied in the originally filed application.

V. Oral Proceedings were held on 12 October 1992. In the course of the proceedings the Appellant amended the claims and the description. The Appellant requested that the impugned decision be set aside and a patent be granted on the base of the following documents:

Claims:
Claim 1 as filed at the oral proceedings;
Claims 2 to 4 and 7 to 9 as filed with the "auxiliary demand" of 7 November 1991, with revised numbering and appendancies;

Description:
Pages 1 to 26 as originally filed, with the following amendments:

at page 11, line 4, the word "controllers" inserted after "extended", and

on page 15, lines 12 and 14, the two numbers in brackets replaced by "EP-A-0 137 437" and "EP-A-0 137 438", respectively;

Page 2a filed at the oral proceedings, the text to be inserted at page 2, line 19, after the full stop;

Drawings:
Sheets 1/3 to 3/3 as originally filed.

VI. Claim 1 reads (omitting the reference signs):

"A plant management system comprising:

a) several digital process control and data acquisition subsystems, each including process controller and process interface units and an internal data highway, wherein said units of a particular subsystem communicate with one another by means of the internal data highway of said subsystem;

b) a central computer connected to a communication bus; and

c) bus interface units which connect said subsystems to said communication bus;

characterized in that

d) said communication bus is a high-speed bit serial plant control bus;

e) a plant control network in the form of a token-passing network is provided, comprising different types of separate modules including
e1) said central computer,
e2) said bus interface units,

e3) a plant-wide operator control station including a human interface which provides access to all the data of said subsystems and of said plant control network and presents to the operator data from selected units of a selected subsystem and/or the plant control network;

e4) an application module providing data-processing support for process controller units within said subsystems; and

e5) a history module for storing digital data;

f) said central computer and each of said further modules includes a group of basic units which are common to all modules, and may comprise additional units for performing additional functions of the particular module;

g) said bus interface units control communication

g1) between other type modules of the plant control network and

g2) between said modules and units of said subsystems utilizing the data highway of a selected subsystem; and

h) said communication bus provides real-time exchange of information between

h1) the modules of the plant control network and between

h2) said modules and said subsystems".

VII. The Appellant's arguments in support of the patentability of Claim 1 can be summarised as follows:

D1 describes one of the Applicant's own plant management systems. This system is an example of a distributed controller which had replaced previous controllers employing a central processor. In D1 a number of subsystems are connected to a single computer over a

parallel bus. The computer has a monitoring function and exercises no direct control over the individual subsystems, which are controlled by dedicated microprocessors and other devices ordered along a "data highway", typically a dual conductor coaxial cable of up to a few kilometres of length.

This known system gives rise to the problem that with increasing data rates the subsystems can need more computing power than can be provided by the individual microcomputers. The mere upgrading of the microcomputers is expensive. The invention therefore keeps the subsystems unchanged but alters the system architecture by providing additional data processing modules at the same level as the central computer. According to Claim 1, these additional units include application modules providing data-processing support, a history module for recording process data, and plant-wide operator control stations. These modules are accessible to all subsystems and capable of communicating with each other. For this purpose a token-passing network is provided. Such a system is not obvious from D1.

Reasons for the Decision

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

2. Although the originally filed Claim 1 referred to the module means transmitting and receiving "binary" signals, the omission of this feature is not considered to alter the scope of the claim since the limitation to a token-passing network implies the use of binary or digital signals. The revised Claim 1 complies with Article 123(2) EPC and is therefore also admissible.

3. Interpretation of Claim 1

3.1 In its analysis of D1 the Examining Division adopted an interpretation of Claim 1 which was contested by the Appellant. The Examining Division held that the process interface units 14, 16, etc. shown in Figure 1 of D1 could validly be taken to constitute "digital process control and data acquisition subsystems" having a "data highway" 56, see Fig 5; The bus referred to in D1 as a data highway 6 was considered to be the "communication bus" of the claim. An optional "plant-wide operator control station" 10 was also identifiable in D1 on this interpretation.

3.2 The Appellant argued that this interpretation of D1 was incorrect: shown in D1 was merely a single subsystem corresponding to the subsystem 22-1 in Fig. 1 of the application and connected by way of the data highway 6, a communication bus interface controller 8 and a communication bus 4 to a CPU 2; the bus 56 was an internal parallel microprocessor bus which could not be compared with a data highway. Admittedly other subsystems might be connected by way of further controllers 8 to the bus 4 but this was not disclosed and only the single module 2 was connected to bus 4, there being no plant-wide operator control station as required by the claim.

3.3 The Board considers that although the Examining Division's interpretation of Claim 1 may have been valid in respect of the claim before them, the present Claim 1 does not lend itself to a reading which identifies each of the PIU modules shown in Figure 1 of D1 as a separate process control and data acquisition subsystem. The claim includes various features which make a distinction between on the one hand the digital process control subsystems and

on the other a plant control network comprising various modules defined in the characterising part of the claim, such that the only reasonable interpretation of the claim is that the plant control bus (18) and the data highway (20) are respectively identifiable with the communication bus 4 and data highway 6 of D1. The components shown below data highway 6 of D1 merely form a single subsystem; that this is the correct interpretation of D1 can be seen from a comparison of Figures 1 of D1 and the application, the former including below data highway 6 three of the components shown in the subsystem 22-1 of the latter, namely a highway traffic director, a PIU and an operator station.

3.4 The subject-matter of Claim 1 as considered by the Board is accordingly not open to the objection of lack of novelty.

4. Inventive step

4.1 The Examining Division's comments on inventive step in the impugned Decision were based on a particular interpretation of the then Claim 1 which is not applicable to the present claim. In these circumstances a remittal of the case to the Examining Division for further examination might appear justified; however, given the extensive discussion of D1 in the course of the proceedings the Board does not consider that any useful purpose would be served by such a remittal. The Board accordingly makes use of its power under Article 111(1) EPC to settle the question of inventive step directly.

4.2 The Board takes the view, as did the Examining Division, that D1 represents the closest prior art. The control system described in D1 is clearly a plant management system comprising, as shown in Figure 1, a single digital

process control subsystem consisting of a communication bus interface controller 8, a data highway 6 internal to the subsystem, a plurality of process interface units 14, 16 and associated devices 18, 20 respectively, and an optional operator station 10. The subsystem is connected to a CPU 2 by way of a parallel bus 4, the illustration of the bus in Figure 1 suggesting - as was indeed accepted by the Appellant - that other subsystems are also connected to it. Claim 1 is thus correctly delimited with respect to the disclosure of D1.

4.3 It will be noted that in D1 the processing capacity is distributed, i.e. data processing is not confined to the higher level central computer but is performed in the lower level subsystems, so that control tasks do not necessarily require communication with the main computer. A problem which arises in such a system is that the processing capacity of the subsystems may be insufficient, but making them more intelligent is itself expensive. The technical problem solved by the invention can therefore be seen as improving the data processing power of the system as a whole so as to enable plant-wide control by means of a higher-level plant management system.

4.4 To solve this problem, the invention proposes leaving the individual subsystems unchanged whilst changing the system architecture at the level above the subsystems. The data processing capabilities are redistributed at the higher level or indeed increased while maintaining the same basic lower level structure. Thus, additional facilities are provided at the same level as the central computer in the form of a token-passing network. This network comprises a plurality of modules, including inter alia the central computer and the interface units of the individual subsystems, all modules being interconnected by a high-

speed bit-serial plant control bus and communicating by token-passing.

4.5 Such an arrangement is not derivable from D1, which is almost exclusively concerned with the structure of the individual sub-systems. In D1 the CPU 2 is connected to all other modules by a parallel communication bus 4 of which no further details are given. Although such a bus will be "high speed" in the same sense as in Claim 1 and is apparently intended for connection to other process control subsystems, such buses are invariably of limited length and unsuitable for a plant-wide network. Bus 4 acts exclusively as a communication medium between the higher system level - the CPU 2 - and the lower level process interface units 14, 16, etc. There is no disclosure of any higher-level modules other than the CPU or of communication between modules at the same level on bus 4 such as between differing process interface units. The Board accordingly concludes that D1 would not lead the skilled man along the path followed in the application and claimed in the characterising part of D1.

4.6 In their communication of 2 November 1988, the Examining Division had also considered document D2 when assessing the inventive step of the original Claim 1. This document describes a plant management system comprising a plurality of process control and data acquisition systems connected by means of a token ring to a display station. It is not evident that the display station has the function of a computer; it appears rather to constitute a simple display facility common to all the control and data acquisition systems. Thus D2 shows the possibility of connecting process control and data acquisition systems and a display station to a token ring, but does not suggest the claimed hierarchical structure specified in Claim 1 or the

addition to this token ring of data processing modules as specified in Claim 1.

4.7 A combination of D1 with D2 does not appear to the Board to be plausible, given the hierarchical structure of D1 and the single-level structure of D2. Even if for the sake of argument such a combination were made and the skilled man were to import into D1 the token ring network of D2, the most plausible combination - given the concentration of D1 on the subsystem level and the limited number of higher level devices compared with the number of lower-level devices - would involve use of the data highway 6 as a token ring for communication between subsystems 14, 16, etc, the CPU 2 and the operator station 10.

4.8 The Board has also considered whether the replacement of a main computer and its associated peripherals by a network of smaller units could be regarded as a technical trend which would inevitably have led the skilled man to the claimed invention. It is noted in this context that, although such a trend might have existed in office automation, there is no record on file disclosing a similar movement in the technical field of plant management. Moreover, there appears to be no good reason why the skilled man, even if he would have considered replacing the CPU in D1 by some form of distributed processing, would have dispensed with a parallel bus and arrived at a token-passing network interconnected by a high speed serial bus with the specific modules of the characterising part of Claim 1.

5. Since the subject-matter of Claim 1 is held to involve an inventive step and the claim is therefore allowable, it follows that those claims appendant to it are also allowable, there being no other outstanding objection to them.

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 grant the patent according to the Appellant's request (see points V and VI above).

The Registrar: The Chairman:

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