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D E C I S I O N
of 19 January 1994

Case Number: T 0833/92 - 3.5.1

Application Number: 85308263.4

Publication Number: 0222047

IPC: G05B 9/03

Language of the proceedings: EN

Title of invention:
Fail-safe control circuit

Patentee:
NEC Home Electronics Ltd, et al.

Opponent:
Alfred Teves GmbH

Headword:
-

Relevant legal norms:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0833/92 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 19 January 1994

Appellant: (Opponent)
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Representative:
-

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office dated 3 July 1992 concerning maintenance of European patent No. 0 222 047 in amended form.**

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. 0 222 047 comprising five claims was granted on 25 January 1989 in response to European patent application No. 85 308 263.4 filed on 13 November 1985. The independent Claim 1 of the patent as granted reads as follows:

A fail safe control circuit connected to operational control units (l_1-l_n) producing control signals (A_1-A_n) and to a controlled device (4), the fail-safe control circuit including detection means (3,9) and being characterised by

(i) the detection means (3,9) detecting agreement between the control signals (A_1-A_n), activating the controlled device (4) when agreement occurs and producing a feedback signal (C),

(ii) each operational control unit (l_1-l_n) producing a disagreement signal (D_1-D_n) when the respective control signal (A_1-A_n) disagrees with the feedback signal (C), and

(iii) fail-safe means (10,11,8) for placing the controlled device (4) in a fail-safe state when at least one disagreement signal (D_1-D_n) is produced.

The identification by numeration of the three characterising features has been introduced by the Board.

II. An opposition was filed against the European patent requesting it be revoked on the grounds of lack of

novelty and inventive step. The opposition was supported by the following documents:

D1: GB-A-2 127 507
D2: FR-A-23 45 321.

III. According to the Appellant (then Opponent), the features of Claim 1 were disclosed by D1 or they were at least very obvious having regard to that document. D1, like the present patent, disclosed a fail-safe control circuit for an anti-skid brake control of a car. In both cases the problem to be solved appeared to be - in order to arrive at a very high operation security - to design the control circuit in such a way that it very quickly identified and reacted upon different errors in its internal and external environment. If an error was indicated, the fail-safe control circuit was disconnected so that at least normal breaking (without automatic control) was possible.

According to the only Figure in D1, only two parallel microcomputers were shown. However, according to the Appellant, in the text and in Claims 1 and 9 there was explicit mention of two or more synchronously-driven logical circuit units (microcomputers). Therefore, the teaching of the present patent almost fully corresponded to that of reference D1 as far as the problem and the basic considerations of the solution were concerned as well as to the final design of the circuit.

IV. By a decision dated 3 July 1992 the Opposition Division maintained the patent in amended form. It stated, *inter alia*:

"The Division accepts that the circuit of D1 and that of the present invention are very similar in the functions they carry out. The Division might even be prepared to

go so far as to regard the combination of units 12, 13, 14 and 16 of Figure 1 of D1 as forming a detection means detecting agreement between the control signals (produced by units 2 and 3 of D1), activating the controlled device (the brake pressure control valve 15 of D1) when agreement occurs and producing a feedback signal (the signal from the output of unit 14 to the input of unit 16). What the Division cannot accept is that D1 discloses or suggests the second feature of the characterising part of Claim 1, to wit: "each operational control unit producing a disagreement signal when the respective control signal disagrees with the feedback signal". The Division is of the view that the wording of that feature, in particular the use of the terms "each" and "respective", clearly indicates that the feedback signal is supplied to each and every operational control unit, and that each and every operational control unit compares its own output signal with the feedback signal. This is not the case in the circuit of D1. The signal fed back from the output of the unit 14 in Figure 1 of D1 is supplied only to the comparator 13 associated with the control unit 3. It is not fed to the comparator 12 associated with the control unit 2. Indeed the Division understood the Opponents to argue that it was not necessary to supply the feedback signal to the control unit 2. Be that as it may the fact remains that claim 1 of the patent in suit requires that the feedback signal be supplied to all operational control units and this feature is not suggested by D1, nor, so far as the Division can see, by FR 23 45 321, referred to in the Opponents' letter of 14.12.90. Nor would the Division come to a different view if it considered not figure 1 of D1 but claims 1, 5 and 11, as it was urged to during the oral proceedings. Claim 5 uses the wording: "the switching signals which ... are derived .. at the output of **a circuit unit** (2,20) are fed back ... **to the other circuit units** (3,21) and are

compared with the valve control signals **at the output of these circuit units** (emphasis added by the Division). What that states (using the language of claim 1 of the patent in suit) is that the control signal produced by one operational control unit is fed back to the other operational control units. The Division can see no suggestion in claim 5 that a feedback signal should be fed back to **all** operational control units."

The Opposition Division therefore formed the view that Claim 1 of the patent as granted involved an inventive step and decided to maintain the patent in amended form (i.e. the introductory part of the description was amended for the sake of clarity).

V. On 29 August 1992 the Appellant filed a notice of appeal, paying the prescribed fee on the same day. The Statement of Grounds of appeal was filed on 29 October 1992.

VI. After the Respondent had stated in a letter that he considered that no new matters had been raised in the grounds of appeal, the Rapporteur, on behalf of the Board in a communication pursuant to Article 11(2) of the RPBA expressed the preliminary opinion that it appeared that the decision taken by the Opposition Division was correct.

VII. In the course of the oral proceedings held on 19 January 1994, the Appellant tried to clarify his earlier argumentation. With the aid of drawings derived from the cited document D1, he made clear how he considered that the teaching of D1 should be interpreted.

The Appellant was of the opinion that the first characterising feature of Claim 1 of the present patent was disclosed by Claim 1 of D1 in that the controlled

device according to D1, like the one identified in Claim 1 of the present patent, was activated in the case of agreement between the different control signals.

Moreover, the Appellant was of the opinion that also the second characterising feature of Claim 1 of the present patent was disclosed by D1 - or at least very obvious having regard to that document. Although, it could be understood from Claim 5 of D1 that no direct feedback signal was supplied to one of the two logic circuit units, it nevertheless could be understood from the figures, in particular from Figure 3, that an indirect feedback signal was supplied to all of the logic circuit units (microcomputers), thus also when more than two units were used. Figure 3, thus, showed a signal inputted to one of the two units (20) from an output P_0 of the other unit 21 that received the feedback signal from the valve driver 14.

According to the Appellant, the third characterising feature of Claim 1 was also clearly disclosed by D1. In fact, it appeared that even the final design of that feature, which was identified by Claims 4 and 5 of the patent, was almost identical to the fail-safe means of D1.

The Appellant, however, admitted that the additional feature of Claim 2 (which according to the Patentee's auxiliary request in the oral proceedings before the Opposition Division was part of Claim 1), i.e. that the detection means

"comprising an AND gate connected to the operation control units and the controlled device"

and detecting agreement between the control signals, was not disclosed by D1 and that he could see some

differences in such a design in comparison to that of D1. However, such an embodiment of the circuit appeared also to be obvious to a skilled person.

VIII. The Respondent contested the argumentation of the Appellant. He expressed the opinion that already the beginning of the first characterising feature, "the detection means detecting agreement between the control signals" was new and that the controlled device was activated only in the case of agreement being detected. The arrangement according to D1 functioned in a passive way in that it did not detect agreement of the control signals, but switched off the system when errors were detected in the system. In fact, according to the teaching of D1 only one, true control signal was produced (from unit 2,20 along bus 10, Figure 1). The other "control signals" were only signals for testing the system.

Moreover, the Respondent emphasised that according to D1 absolutely no feedback signal was delivered to the unit (2,20) producing the said true control signal. That opinion was clearly supported by Claim 5 of D1, wherein it was stated that

"the switching signals which ... are derived from the valve control signals at the output of a circuit unit (2,20) are fed back ... to the other circuits (3,21)".

Therefore, it was not correct to allege that D1, like the patent, proposed that each operational control unit produced a disagreement signal.

IX. The Appellant requested that the decision under appeal be set aside and the patent revoked.

The Respondent requested that the appeal be dismissed. Auxiliarily, he requested that the patent be maintained on the basis of the auxiliary request submitted to the Opposition Division.

Reasons for the Decision

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

2. The Board fully agrees with the reasoning of the Opposition Division under point IV above with regard to the second characterising feature of Claim 1. Thus the Board can see no possibility at all to interpret the teaching of D1 in such a way that said feature would be disclosed by that document. Therefore, the subject-matter of Claim 1 is clearly new.

3. The Board also agrees with the opinion of the Opposition Division that the subject-matter of Claim 1 is not obvious. It appears that the Appellant arrived at his judgment of novelty and inventive step only after having become aware of the subject-matter of Claim 1 and with the aid of *ex post facto* analysis.

In fact, said analysis is not convincing. Thus, the Appellant tried to show with the aid of said figures representing the teaching of D1 that said document proposed different ways of providing a feedback signal. One way was the one identified by Claim 5 of D1, i.e. that "the switching signals ... which ... are derived at the output of a circuit unit are fed back ... to **the other circuits**". This clearly is true and, as also proposed by the Respondent, appears according to D1 to be the proper way of providing the feedback signals.

However, such teaching does in no way indicate that each circuit unit receives a feedback signal and that it would be obvious to arrive at the second characterising feature of Claim 1.

The Appellant, moreover, tried to show that the teaching of D1 also at least implicitly proposed to provide for a feedback signal from an output of a first unit back to an n:th unit and then over the (n-1), over the (n-2) etc. units back again to the first unit. The Board is of the opinion that even if this method were implicitly disclosed by D1 or inherently present in the Figures 1, 2 and 3 of D1 (although, the Board doubts it - cf. D1, page 3, lines 46 to 52, where it is indicated that only the internal signals, e.g. those representing vehicle speed, wheel speed and acceleration are compared mutually by the two circuit units), this method would not lead the skilled person to the solution proposed by Claim 1 of the present patent. In fact, it would appear that such a method - that proposes only one direct feed-back signal to only one circuit unit, although said signal at least indirectly governs a plurality of units - teaches away from the solution of the present patent, according to which apparently each unit receives one respective feedback signal.

Having regard to the first characterising feature of Claim 1, it appears to the Board that, although Claim 1 of D1 could be interpreted as proposed by the Appellant (see point VII above), it nevertheless appears that a skilled person, having regard to the teaching of D1, would, as proposed by the Respondent (see point VIII above), be inclined to understand the overall teaching of D1 along the lines proposed by Figures 1 to 3 and the corresponding text of D1, i.e. in the sense that only one true control signal is used.

Moreover, it appears to the Board that the first feature of Claim 1 very clearly points towards a solution using an AND-gate, although this is not explicitly claimed in Claim 1 (but only in present Claim 2). In this respect it is observed that, as indicated above (see point VII, last part), the Appellant admitted that he could see some differences between using an AND-gate, as according to Claim 2 of the present patent, and the arrangement of D1. To the Board, however, it appears that the first characterising feature of Claim 1 as it now stands already expresses clearly that several **equally important** and **active** control signals are generated which can only activate the controlled device when they agree with each other. Such equal control signals are not revealed by D1, which instead discloses how the only active control signal (e.g. supplied via line 10 from circuit unit 10 in Figure 1) can be suppressed in a complicated way when "passive" control signals (e.g. supplied via line 11 from unit 3 in Figure 1), which are generated for testing purposes (see page 3, left-hand side column, lines 41 to 45), do not agree with each other and/or said active signal.

Although the problem to be solved according to the patent, as well as according to the cited reference D1, could be seen to be the same (cf. point III above), i.e. to provide a fail-safe control circuit and to prevent erroneous operation when one of the operational control units or other parts of the circuit are malfunctioning, thereby putting the controlled device in a fail-safe state, it appears that the straightforward solution according to the present patent is quite different from the one according to D1. By designing the control circuit as identified by the first and second characterising features of Claim 1 a simple and secure arrangement for controlling the fail-safe means

according to the third characterising feature of Claim 1 is created.

4. The preceding paragraphs show that the arguments put forward by the Appellant fail to convince the Board that the subject-matter of Claim 1 as granted would be obvious to a skilled person.

Therefore, the subject-matter of Claim 1 involves an inventive step within the meaning of Article 56 EPC. Also the dependent Claims 2 to 5, which relate to particular embodiments of the invention, are allowable.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

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