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D E C I S I O N
of 1 March 1994

Case Number: T 0179/92 - 3.4.2

Application Number: 86305962.2

Publication Number: 0217509

IPC: G01L 27/00

Language of the proceedings: EN

Title of invention:
Pressure transducer assemblies

Applicant:
International Control Automation Finance S.A.

Opponent:
-

Headword:
-

Relevant legal norms:
EPC Art. 56, 122

Keyword:
"Re-establishment of rights: yes"
"Inventive step: after amendment, yes"

Decisions cited:
-

Catchword:
-

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Case Number: T 0179/92 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 1 March 1994

Appellant: International Control Automation Finance S.A.
16 Rue des Bains
Ville de Luxembourg (LU)

Representative: Cotter, Ivan John
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 13 June 1991 refusing European patent application No. 86 305 962.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: E. Turrini
Members: M. Chomentowski
J.-C. Saisset

Summary of Facts and Submissions

I. European patent application No. 86 305 962.2 (publication No. 0 217 509) was refused by decision dated 13 June 1991 on the grounds that the subject-matter of its claims did not involve an inventive step having regard to

D1: US-A-3 509 767

and the expertise of the skilled person.

In particular, the Examining Division took the view that the technique of D1 could be run automatically with preselected time intervals and, in order that the automatic operation be checked or interrupted, a zeroing when desired by a user could also be necessary; timed working steps and the evaluation of data being however usually worked out using a computer, the microprocessor needed information indicating when a zero signal should appear; therefore, the present technique was obvious having regard to the teaching of D1; in this respect, the submitted particular argument that with the arrangement of D1 the self-zeroing action was performed more frequently than it was in fact necessary was considered as irrelevant because, with a microprocessor, one was free of constructional constraints and thus preselected time intervals or a chosen moment might be used.

II. By telefax transmitted on 7 February 1992, the Appellant (Applicant) filed an application for re-establishment of rights, with a notice setting out the grounds on which said application for re-establishment was based and the relevant facts of

the case, with an affidavit of Mr Eric Marich, patent attorney in the Patent Department of McDermott Inc., USA, which had the responsibility for this and other applications, and copies of correspondence items between the European attorney in charge and said Patent Department or with the EPO. The telefax also comprised a notice of appeal for dismissing the decision of the Examining Division and a Statement of Grounds of appeal with the request of granting a patent on the basis of the same claims as in said decision, or according to auxiliary submissions. The Appellant also requested oral proceedings auxiliarily. Moreover, with letter dated 12 February 1992, the Appellant filed the original Affidavit of Mr Eric Marich.

III. The Board of Appeal informed the Appellant by a communication dated 26 November 1993 that, in view of the arguments provided, the application for re-establishment of rights could be considered as allowable and that, contrary to the main claims of the requests, which did not appear to be inventive, amended main claims based on the combination of main claims and respective dependent claims of the main request and specifying moreover the feature mentioned in the application as filed that the time interval between zeroing operations is in accordance with suspected drift of the transducer (12) from its zero position, could involve an inventive step by taking into account the Appellant's arguments.

IV. With letter dated 21 February 1994, the Appellant signified its agreement in principle to the proposal of the Board and accordingly submitted replacement pages of the specification incorporating amendments broadly in accordance therewith. Moreover, the

Appellant withdrew his request for oral proceedings.
Claims 1 and 6 read as follows:

"1. A self-zeroing pressure transducer assembly comprising:
a pressure transducer (12) having two inputs (14, 16);
a first pressure line (32) connected to a first (14) of the two inputs (14, 16);
a second pressure line (34) connected to the second (16) of the two inputs (14, 16);
a first valve (36) in the first pressure line (32);
a second valve (38) in the second pressure line (34);
a pressure equalising connecting line (40) connected between the first and second pressure lines (32, 34) at a point on the first and second pressure lines between the first and second valves (36, 38) and the transducer (12);
a pressure equalising valve (28) in the connecting line (40);
a switch means (26) connected to the first valve (36) and the pressure equalising valve (28) and functioning, upon receiving one control signal, to open the first valve (36) while maintaining the pressure equalising valve (28) closed whereby the two inputs (14, 16) of the pressure transducer (12) are exposed to separate pressures on the first and second pressure lines (32, 34), and, upon receiving another control signal, to close the first valve (36) while opening the pressure equalising valve (28) so as to equalise the pressure between the first and second pressure lines (32, 34) and thus equalise the pressure at the two inputs (14, 16) of the transducer (12);
and control means (20) connected to the pressure transducer (12) for receiving a pressure signal therefrom and connected to the switch means (26) for generating said one and said other control signals, the control means (20) being operative to provide

self-zeroing of the pressure transducer assembly in response to the value of the pressure signal produced by the pressure transducer (12) when said other control signal is generated;
characterised in that said control means (20) is operable to generate said other control signal after a preselected time interval or when desired by a user and the control means comprises a microprocessor (20) which is responsive to the value of the pressure signal produced by the pressure transducer (12) when the switch means (26) receives said other control signal to provide self-zeroing of the pressure transducer assembly by recalibrating the pressure transducer assembly such that, when said one control signal is thereafter generated, said value of the pressure signal is treated as a zero indication for the pressure transducer (12) until said other signal is again generated, wherein the microprocessor (20) is operative to generate said other control signal, in place of said one control signal, each time that a preselected maintenance time interval, in accordance with suspected drift of the pressure transducer (12) from its zero position, has elapsed.

6. A method of operating a pressure transducer assembly having a transducer (12) with two inputs (14, 16) for receiving two separate pressures (P1, P2) on two separate pressure lines (32, 34), the method comprising:

establishing communication between the two separate pressure lines (32, 34) while closing off communication between external separate pressures (P1, P2) connected to the pressure lines (32, 34) and the pressure transducer (12) for equalising a pressure between the first and second pressure lines;

measuring an output signal from the transducer (12) with the communication established between the first and second pressure lines (32, 34); and

utilising the measured output signal from the transducer assembly to effect self-zeroing of the pressure transducer assembly;

characterised in that communication between the two separate pressure lines (32, 34) is established after a preselected time interval or when desired by a user and said utilisation step comprises supplying the measured output signal to a microprocessor (20) which is responsive to the value of the measured output signal to provide self-zeroing of the pressure transducer assembly by recalibrating the pressure transducer assembly such that, when said communication between the two separate pressure lines (32, 34) is thereafter disestablished, said value of the measured output signal is treated as a zero indication for the pressure transducer (12) until said communication between the two separate pressure lines is again established, and in that the microprocessor is operative to cause said disestablishment of the communication between the two separate pressure lines (32, 34) after recalibration, wherein the microprocessor (20) establishes said communication between the two separate pressure lines (32, 34) each time that a preselected maintenance time interval, in accordance with suspected drift of the transducer (12) from its zero position, has elapsed."

Claims 2 to 5 and 7 are dependent claims.

V. In the telefax dated 7 February 1992, the Appellant submitted the following arguments in support of his application for re-establishment of rights:

The facts concerning said application:

The present application 86 305 962.2 had been originally filed in the name of Babcock & Wilcox Cy, a subsidiary of McDermott Inc.; it was then transferred, during prosecution, to International Control Automation S.A, the present Applicant (Appellant); the responsibility for this and other applications remained however with the Patent Department of McDermott Inc. The European applications 86 305 963.0 and 86 305 962.2 (McDermott cases 4732 and 4733, respectively), were both with priority date 12 August 1985 and with filing date 1 August 1986. A letter of McDermott Patent Department of 6 May 1991 advised the European attorney that it was desired to abandon the European patent application No. 86 305 962.2, mentioned however with case number 4732 in place of 4733; the European attorney acknowledged with letter dated 9 May 1991, by referring however to case 4733, in accordance with the other information in the letter; it is only when he received the communication of the EPO concerning an overdue maintenance fee with respect to 86 305 963.0 (McDermott 4732), which was ready for grant, that he noticed that the fees, for the payment of which he was not responsible, had not been paid and he inquired, by a telephone conversation of 10 December 1991 with Mr Eric Marich, about these facts. By fax of 11 December 1991, Mr Eric Marich informed the European attorney that in the letter dated 6 May 1991, only the McDermott case number 4733 was correct, all the other details being erroneous, the intention of McDermott being thus to abandon the application No. 86 305 963.0 (4732) and not application No. 86 305 962.2 (4733), for which maintenance fee had indeed been paid.

The grounds for the application:

The date of notification of the decision of the Examining Division dated 13 June 1991 is deemed to have been 24 June 1991 (23 June being a Sunday), and thus the applicable term for filing the notice of appeal and paying the appeal fee ended 26 August 1991 (24 and 25 August 1991 being Saturday and Sunday, respectively). The failure to fulfil the requirements of the appeal (namely filing the notice of appeal, the Statement of Grounds and paying the appeal fee) was unintentional and contrary to the Appellant's wishes and took place in spite of their having exercised all due care required by the circumstances, as a result of an unfortunate combination of events initiated by an isolated error in an item of correspondence which was outside the control of the Applicant. Removal of the cause of non-compliance with the time limit of 26 August 1991 was effected on 10 December 1991 because, indeed, it was only during the telephone conversation of said day that the real situation regarding cases 4732 and 4733 was clarified; consequently, the application which was filed on 7 February 1992 was filed within the two-month time limit. Thus, the application for re-establishment of rights was made within both of the time limits specified in Article 122(2) EPC. For these reasons, the application is allowable.

Moreover, the Appellant submitted the following arguments in support of the requests of his appeal:

The manometric apparatus known from D1 has means for reducing zero drift in which one valve is closed and another opened to equalise the pressures on both sides of the measuring chamber and for providing a signal indicative of zero pressure difference; if not, a self zeroing can be generated in response to the value of the non-zero pressure difference differential signal;

the control circuit is analogue-based and the self-zeroing signal is stored as a voltage in a capacitor. Since the charge on said capacitor (32) will be maintained for a comparatively short time and so the "refresh" operation which recharges the capacitor must accordingly be implemented at periods which do not allow substantial charge leakage from the capacitor to have occurred between updating intervals and thus must be frequent, this will result in a significant wear on the valves (60) and (64) of the pressure lines. Furthermore, the frequent nature of self-zeroing operation causes difficulties in that, during self-zeroing, no real-time pressure measurement is being provided. In contrast to this, the presently claimed pressure transducer assembly can be recalibrated to zero when it is considered necessary by the user, regular and periodic interruptions for self-zeroing not being needed. Whereas it is accepted that merely replacing an existing control system by a microprocessor would not in general be inventive, this is not the case with the presently claimed assembly wherein significant further advantages, which would not be possible in the known apparatus, are involved in the microprocessor-based implementation taking account of the features of the claimed assembly.

Reasons for the Decision

1. *Application for re-establishment of rights*

1.1 Admissibility (Article 122(2) and (3) EPC)

1.1.1 Because it was only during the telephone conversation of 10 December 1991 that the real situation regarding cases 4732 and 4733 was clarified, it is considered

that this date is the one of the removal of the cause of non-compliance and consequently that the application which was filed on 7 February 1992 was filed within the two- month time limit. The written statement setting out the grounds of appeal, which was the omitted act, was filed together with the application, i.e. in due time. The application shall only be admissible within the year immediately following the expiry of unobserved time limit and, because this time limit expired in the present case in August 1992, it is not disputed that this application fulfils this condition. There is also no problem relating to the filing of the grounds of the application and the payment of fees (for the re-establishment of rights and for the appeal). For these reasons, the Board considers the application for re-establishment of rights as admissible.

1.2 Allowability (Article 122(1) EPC)

1.2.1 In accordance with Decision J 2/86, J 3/86, OJ EPO 1987, 362, which states that Article 122 EPC is intended to ensure that the loss of rights does not result from an isolated mistake within a normally satisfactory system, in the present case, taking into account the evidences and namely the affidavits submitted by the Appellant, the isolated mistake is the involuntary inversion of the numbers given to two different applications whereas the internal numbering of the cases is a normally satisfactory system. Consequently, the Board considers the application of re-establishment of rights as allowable.

2. *Appeal*

2.1 The appeal is admissible.

2.2. Allowability of the amendments

2.2.1. The present application is based on the application documents which had been mentioned in the appealed decision as being correctly based on the original patent application, and moreover specifies, in accordance with the original description (see in particular page 4, lines 31 to 34), that the microprocessor of the presently claimed assembly is operative to generate the control for self-zeroing, in place of the measurement control signal, each time that a preselected maintenance time interval in accordance with suspected drift of the transducer from its zero position has elapsed. Therefore, the Board is satisfied that the present European patent application has not been amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Article 123(2) EPC).

2.3. Claim 1

2.3.1 Novelty

2.3.1.1 A self-zeroing pressure transducer assembly is known from D1 (see column 1, line 25 to column 2, line 3; column 2, line 13 to column 4, line 2; column 4, lines 17 to 27; Figure 1); the assembly comprises:

a pressure transducer (5) having two inputs (5a, 5b);

a first pressure line (4) connected to a first (5a) of the two inputs (5a, 5b);

a second pressure line (3) connected to the second (5b) of the two inputs (5a, 5b);

a first valve (60) in the first pressure line (4);

a second valve (65) in the second pressure line (3);

a pressure equalising connecting line connected between the first and second pressure lines (4, 3) at a point on the first and second pressure lines between the first and second valves (60, 65) and the transducer (5);

a pressure equalising valve (64) in the connecting line;

a switch means (A2, 58) connected to the first valve (60) and the pressure equalising valve (64) and functioning, upon receiving one control signal, to open the first valve (60) while maintaining the pressure equalising valve (64) closed whereby the two inputs (5a, 5b) of the pressure transducer (5) are exposed to separate pressures on the first and second pressure lines (4, 3), and, upon receiving another control signal, to close the first valve (60) while opening the pressure equalising valve (64) so as to equalise the pressure between the first and second pressure lines (4, 3) and thus equalise the pressure at the two inputs (5a, 5b) of the transducer (5); and

control means, comprising in particular the relay (A/3), the relay contact (A3) and the threshold switch (62) connected to the pressure transducer (5) for receiving a pressure signal therefrom and connected to the switch means (A2, 58) for generating said one and said other control signals, the control means being operative to provide self-zeroing of the pressure transducer assembly in response to the value of the pressure signal produced by the pressure transducer (5) when said other control signal is generated.

However, contrary to present Claim 1, the known assembly in particular does not comprise any microprocessor as part of the control means.

2.3.1.2 The other prior art documents are not more relevant than D1.

2.3.1.3 Therefore, the subject-matter of Claim 1 is novel in the sense of Article 54 EPC.

2.3.2 Inventive step

2.3.2.1 The Appellant has argued that the known self-zeroing pressure transducer assembly has the following drawbacks:

the switch error reducing feedback circuit for minimising zero error comprises a capacitor (32) which is used to maintain the applied correction; said capacitor indeed stores an output voltage of a measurement by the transducer (5); however, the stored value will vary within a period cycle and, because the charge on the capacitor will only be maintained for a comparatively short time, making "refresh" operations necessary for obtaining new, actualised correction values, this will result in considerable wear on the valves (60) and (64) during continuous operation; moreover, no real-time differential pressure measurement can be done during the "refresh" operations, and this will result in less time available for real-time measurement operations.

The assembly of Claim 1 intends to solve these drawbacks. In particular, as convincingly argued by the Appellant, with the means of the presently claimed assembly, less frequent measurements with the other control signals are necessary because the time

interval is selected in accordance with suspected drift of the transducer (12) from its zero position, as mentioned in the present application (see page 4, line 24 to page 5, line 10).

Indeed, as admitted by the Appellants, merely replacing an existing analogue control system by a microprocessor would not in general involve an inventive step. However, although by doing such replacement the problems related to the decay of the charge stored in the capacitor (32) would be automatically solved, there is no indication derivable from D1 or from the other prior art documents that there are problems due to the too frequent other control signals for zero drift correction when using a storing capacitor and resulting in

(a) significant wear on the valves (60) and (64), and

(b) reduction of the time available for real measurements.

Thus, there is no indication for modifying the frequency of said other control signals for zero drift correction by taking into account the suspected drift of the transducer from its zero position, i.e. of modifying the instructions in the program loaded in the microprocessor in this sense.

2.3.2.3 Therefore, the subject-matter of Claim 1 is not evident having regard to the state of the art and, thus, it involves an inventive step in the sense of Article 56 EPC.

2.4. Claim 6

2.4.1 The subject-matter of present Claim 6, which concerns a method of operating a pressure transducer assembly having a transducer with two inputs for receiving two separate pressures on two separate pressure lines, and having the same features as the assembly of present Claim 1, is novel and involves an inventive step for, *mutatis mutandis*, the same reasons.

2.5 Thus, the claims are allowable (Article 52(1) EPC).

2.6. Since the application satisfies the requirements of the Convention, a patent may be granted (Article 97(2) EPC).

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 a patent on the basis of the following documents:

Description: page 1 filed with letter of 21 September 1990;
pages 2, 3 and 4 filed with letter of 21 February 1994;
page 5 as originally filed;

Claims: 1 (part on page 6 filed with letter dated 16 April 1991 and remainder on page 7 filed with letter of 21 February 1994);

2 to 7 filed with letter of 21 February 1994;

Drawings: sheet 1/1 (sole Figure) as originally filed.

The Registrar:

P. Martorana

The Chairman:

E. Turrini