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Datasheet for the decision of 7 June 2018

Case Number: T 2225/13 - 3.4.02

Application Number: 06736194.9

Publication Number: 1994374

IPC: G01F1/84, G01F25/00

Language of the proceedings: EN

Title of invention:
FLOW METER AND METHOD FOR DETECTING A CABLE FAULT IN A CABLING OF THE FLOW METER

Applicant:
MICRO MOTION INCORPORATED

Headword:

Relevant legal provisions:
RPBA Art. 12(4)
EPC 1973 Art. 82, 56

Keyword:
Late-filed request - request could have been filed in first instance proceedings (yes)
Unity of invention - auxiliary requests 1 and 2 (no)
Inventive step - auxiliary request 3 (no)

Decisions cited:
G 0010/93, T 1090/12

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 2225/13 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 7 June 2018

Appellant: (Applicant)	MICRO MOTION INCORPORATED 7070 Winchester Circle Boulder Colorado 80301 (US)
Representative:	Vossius & Partner Patentanwälte Rechtsanwälte mbB Siebertstrasse 3 81675 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 5 June 2013 refusing European patent application No. 06736194.9 pursuant to Article 97(2) EPC**

Composition of the Board:

Chairwoman	T. Karamanli
Members:	H. von Gronau
	A. Hornung

Summary of Facts and Submissions

I. The appeal of the applicant is against the decision of the examining division to refuse European patent application No. 06 736 194.9, filed as an international application published as WO 2007/097760 A1. The examining division refused the application on the grounds that the subject-matter of independent claim 1 according to the main request then on file was not new in view of document

D4: WO 2006/001805 A1

and extended beyond the content of the application as originally filed, that claim 1 was not clear and that the subject-matter of independent claim 1 according to the auxiliary request then on file did not involve an inventive step over document D4 and the basic knowledge of the person skilled in the art.

II. With the statement setting out its grounds of appeal, the appellant requested that the examining division's decision be set aside and that a patent be granted on the basis of the claims filed as the main request with the grounds of appeal or on the basis of the claims filed as an auxiliary request with the grounds of appeal.

As an auxiliary measure oral proceedings were requested.

III. In a communication annexed to a summons to oral proceedings, the board indicated that, exercising its discretion under Article 12(4) RPBA, it would have to decide whether to admit the main request into the appeal proceedings, because its claim 1 corresponded to

claim 1 as originally filed, which had been replaced during the examination proceedings and so the examining division had not been able to decide on it. Further, the board inter alia expressed its provisional opinion that, according to the auxiliary request, the two inventions defined in independent claims 1 and 4 on the one hand and claims 5 and 7 on the other hand defined different solutions to different problems that were not linked by a single general inventive concept, contrary to Article 82 EPC 1973. Further, it was of the opinion that the subject-matter of claim 1 according to the auxiliary request did not involve an inventive step in view of document D4 and the basic knowledge of the person skilled in the art.

IV. In a reply dated 17 May 2018, the appellant put forward arguments as to why the main request should be admitted into the appeal proceedings and why the subject-matter of claim 1 according to the auxiliary request involved an inventive step. The appellant essentially argued that in document D4 there was no hint to the skilled person to test the one or more first pickoff wires and the one or more second pickoff wires for a pickoff connection orientation fault, or to compare a phase difference to a predetermined pickoff phase difference threshold. The board, in its inventive step assessment, had referred to knowledge that was allegedly part of the basic knowledge of a person skilled in the art but had provided no evidence in this regard.

The appellant also filed claims according to a second auxiliary request to overcome the clarity objections raised by the board.

V. With a further letter dated 5 June 2018, the appellant filed claims according to an auxiliary request 3, in

which independent claims 1 and 4 were further clarified and independent claim 5 and dependent claim 6 were deleted.

VI. Oral proceedings were held before the board on 7 June 2018. During them the appellant filed claims 1 to 4 according to a new auxiliary request 3, which replaced the claims of auxiliary request 3 filed with the letter dated 5 June 2018.

The appellant confirmed its final requests as follows:

It requested that the decision under appeal be set aside and that a European patent be granted on the basis of the claims of the main request filed with the statement of grounds of appeal or, in the alternative, of one of auxiliary request 1 filed as auxiliary request with the statement of grounds of appeal, auxiliary request 2 filed with the letter dated 17 May 2018 and auxiliary request 3 filed during the oral proceedings of 7 June 2018.

At the end of the oral proceedings the chairwoman announced the board's decision.

VII. Claim 1 according to the main request as filed with the grounds of appeal corresponds to claim 1 as originally filed and reads as follows:

"A meter electronics (20) for detecting a cable fault in a cabling (205) of a flow meter (5), with the meter electronics (20) including first and second pickoff sensors (201a and 201b) and the cabling (205) coupled to the first and second pickoff sensors (201a, 201b) and including one or more first pickoff wires and one

or more second pickoff wires, with the meter electronics (20) being characterized by:

a signal injection device (203) coupled to the cabling (205), with the signal injection device (203) being configured to generate an injection signal and communicate the injection signal into the cabling (205) and to the first and second pickoff sensors (201a, 201b); and

a signal conditioning circuit (202) coupled to the cabling (205), with the signal conditioning circuit (202) being configured to receive at least one response signal from at least one of the first and second pickoff sensors (201a, 201b) in response to the injection signal and determine one or more of a pickoff open wire fault and a pickoff connection orientation fault in one or both of the one or more first pickoff wires and the one or more second pickoff wires of the cabling (205)."

Independent claims 1 and 5 according to auxiliary request 1 read as follows:

"1. A meter electronics (20) for detecting a cable fault in a cabling (205) of a flow meter (5), with the meter electronics (20) including first and second pickoff sensors (201a and 201b) and the cabling (205) coupled to the first and second pickoff sensors (201a, 201b) and including one or more first pickoff wires and one or more second pickoff wires, with the meter electronics (20) being characterized by:

a signal injection device (203) coupled to the cabling (205), with the signal injection device (203) being configured to generate an injection signal and

communicate the injection signal into the cabling (205) and to the first and second pickoff sensors (201a, 201b); and

a signal conditioning circuit (202) coupled to the cabling (205), with the signal conditioning circuit (202) being configured to receive response signals from the first and second pickoff sensors (201a, 201b) in response to the injection signal, to receive a first pickoff response signal and a second pickoff response signal, to compare a phase difference between a first pickoff response phase and a second pickoff response phase to a predetermined pickoff phase difference threshold and to determine a pickoff connection orientation fault in the corresponding one or more first pickoff wires or in the corresponding one or more second pickoff wires if the phase difference exceeds the predetermined pickoff phase difference threshold."

"5. A meter electronics (20) for detecting a cable fault in a cabling (205) of a flow meter (5), with the meter electronics (20) including first and second pickoff sensors (201a and 201b) and the cabling (205) coupled to the first and second pickoff sensors (201a, 201b) and including one or more first pickoff wires and one or more second pickoff wires, with the meter electronics (20) being characterized by:

a signal injection device (203) coupled to the cabling (205), with the signal injection device (203) being configured to generate an injection signal and communicate the injection signal into the cabling (205) and to the first and second pickoff sensors (201a, 201b); and

a signal conditioning circuit (202) coupled to the cabling (205), with the signal conditioning circuit (202) being configured to receive at least one response signal from at least one of the first and second pickoff sensors (201a, 201b) in response to the injection signal, to compare an injection signal component of a response signal received from at least one of a first pickoff sensor and a second pickoff sensor to a predetermined pickoff amplitude threshold, and to determine a pickoff open wire fault in one or both of the one or more first pickoff wires and the one or more second pickoff wires of the cabling (205), a pickoff open wire fault being detected if the injection signal component does not exceed the predetermined pickoff amplitude threshold."

The claims of auxiliary request 1 also comprise corresponding independent method claims 4 and 7.

The claims according to auxiliary request 2 differ from the claims of auxiliary request 1 in that independent apparatus claim 5 and dependent apparatus claim 6 have been deleted, and in that in claim 1 it is specified that the signal injection device is configured to generate an injection signal "comprising a frequency".

The claims according to auxiliary request 3 comprise only one independent apparatus claim 1 and one independent method claim 4.

Independent apparatus claim 1 reads as follows:

"A meter electronics (20) for detecting a cable fault in a cabling (205) of a flow meter (5), with the meter electronics (20) including first and second pickoff sensors (201a and 201b) and the cabling (205) coupled

to the first and second pickoff sensors (201a, 201b) and including one or more first pickoff wires and one or more second pickoff wires, with the meter electronics (20) being characterized by:

a signal injection device (203) coupled to the cabling (205), with the signal injection device (203) being configured to generate an injection signal comprising a frequency and communicate the injection signal into the cabling (205) and to the first and second pickoff sensors (201a, 201b); and

a signal conditioning circuit (202) coupled to the cabling (205), with the signal conditioning circuit (202) being configured to receive a first pickoff response signal from the first pickoff sensor (201a) and a second pickoff response signal from the second pickoff sensor (201b) in response to the injection signal, to compare a phase difference between a phase of the first pickoff response signal and a phase of the second pickoff response signal to a predetermined pickoff phase difference threshold and to determine a pickoff connection orientation fault in the corresponding one or more first pickoff wires or in the corresponding one or more second pickoff wires if the phase difference exceeds the predetermined pickoff phase difference threshold."

Reasons for the Decision

1. Main request - admissibility (Article 12(4) RPBA)

1.1 With the grounds of appeal, the appellant filed claims according to the main request which are based on the claims of the international application as filed. In

particular, independent claim 1 of this request is identical to claim 1 of the originally filed application. By a letter dated 10 November 2011 filed during the examination proceedings, the appellant replaced independent claim 1 as originally filed with an amended claim 1. In the further course of the examination proceedings, claim 1 was amended several times. Claim 1 of the requests that are the subject of the contested decision also differs from claim 1 as originally filed.

1.2 Article 12(4) RPBA empowers the boards of appeal to hold inadmissible facts, evidence or requests which could have been presented or were not admitted in the first-instance proceedings. Thus, the boards of appeal, whose primary function is to review the decisions of the departments of first instance, have the discretion not to admit sets of claims according to requests which were not submitted during the first-instance proceedings (see Case Law of the Boards of Appeal of the EPO, 8th edition 2016, IV.E.4.3.3 b)) or were even withdrawn during the first-instance proceedings (see Case Law of the Boards of Appeal of the EPO, 8th edition 2016, IV.E.4.3.3 c)).

1.3 The appellant argued that the "*wording of original claim 1 was not withdrawn during the first-instance proceedings*" since, in its letter of 10 November 2011, the applicant had explicitly stated that it "*expressly reserved the right to reinstate any earlier claims*". The appellant was therefore of the opinion that the main request should be admitted into the appeal proceedings. It further submitted that in its grounds of appeal it provided a detailed discussion on novelty and inventive step regarding the subject-matter of the claimed invention according to the main request.

1.4 In the board's opinion, the fact that an appellant amended the originally filed claims in the first-instance proceedings is not to say that it was thereby abandoning the subject-matter of those claims. However, it is not necessarily to be inferred from this that an appellant is subject to no procedural restrictions if, at the appeal stage, it wishes to revert to the original version of claims which it did not maintain during the proceedings before the examining division. Whether sets of claims presented on appeal are to be considered is therefore to be determined in accordance with the provisions of the RPBA and the specific circumstances of the case. Accordingly, in the present case, the admission of the present main request is subject to Article 12(4) RPBA. Consequently, the issue of abandonment of subject-matter is not related to the question whether the board, in exercising its discretion under Article 12(4) RPBA, will hold inadmissible a request filed with the statement of grounds of appeal.

1.5 Taking the circumstances of the present case into account, the board concludes that a request comprising original claim 1 could and should have been maintained or re-filed during the examination proceedings so as to enable the examining division to take a decision on the admissibility and allowability of that claim. By failing to do so, the appellant prevented the examining division from giving a reasoned decision on the subject-matter of original claim 1.

1.6 By returning, with the statement of grounds of appeal, to a request which comprises original claim 1, the appellant confronted the board with subject-matter on which no decision could have been taken by the

department of first instance. Thus, if the board were to admit and consider the present main request, it would have to go beyond its primary role, namely examining the contested decision (G 10/93, OJ EPO 1995, 172, point 4 of the Reasons). Instead, the board would have to give a first ruling on the patentability of the subject-matter of independent claim 1 of the current main request in appeal proceedings. On the other hand, remittal to the department of first instance for further prosecution would go against the need for procedural economy, as it would require the examining division to take a decision on issues which could have been decided in the oral proceedings of 20 March 2013, had the applicant not amended its original claim 1 in the course of the examination proceedings.

1.7 In view of the above, the board, exercising its discretion under Article 12(4) RPBA, decided not to admit the present main request into the appeal proceedings.

2. Auxiliary request 1 - unity of invention (Article 82 EPC 1973)

2.1 Document D4, in particular figure 2 and the related portions of the description, discloses

a meter electronics 200 for detecting a cable fault in a cabling 205 of a flow meter 5 (cf. figure 1), with the meter electronics 200 including first and second pickoff sensors (201a and 201b) and the cabling 205 coupled to the first and second pickoff sensors and including one or more first pickoff wires and one or more second pickoff wires, with the meter electronics comprising:

a signal injection device 203 coupled to the cabling, with the signal injection device being configured to generate a reference signal and communicate the reference signal into the cabling and to the first and second pickoff sensors (cf. page 7, lines 31 - 33); and

a signal conditioning circuit 202 coupled to the cabling, with the signal conditioning circuit being configured to receive first and second response signals from the first and second pickoff sensors in response to the reference signal (cf. page 8, lines 17-21) and determine one or more of a pickoff open wire fault (cf. page 11, lines 7-10; the conditioning circuit can determine that the corresponding cabling portion comprises an open circuit) and a pickoff connection mis-wiring fault (cf. page 11, lines 17-18; detect customer mis-wiring or mis-installation) in one or both of the one or more first pickoff wires and the one or more second pickoff wires of the cabling.

2.2 Thus, the feature of detecting connection faults in the wiring to the first and second pickoff sensors using the response signals from the first and second pickoff sensors is already known from document D4.

2.3 Independent apparatus claim 1 of auxiliary request 1 is essentially a combination of features of original claims 1 and 3 and further specifies that the signal conditioning circuit is configured to compare a phase difference between a first pickoff response phase and a second pickoff response phase to a predetermined pickoff phase difference threshold and to determine therefrom a connection orientation fault.

2.4 Independent apparatus claim 5 of auxiliary request 1 essentially comprises a combination of features of

originally filed claims 1 and 2 and therefore further specifies that the signal conditioning circuit is configured to compare an injection signal component of the at least one response signal to a predetermined pickoff amplitude threshold and determine a pickoff open wire fault if the injection signal component does not exceed a predetermined pickoff amplitude threshold.

2.5 The two inventions defined in independent claims 1 and 5 therefore define different solutions to different technical problems that are not linked by a single general inventive concept. The solutions defined in independent method claims 4 and 7 are likewise not linked by a single general inventive concept.

2.6 The appellant did not comment on this issue.

2.7 In view of the above, the board concludes that the requirements of Article 82 EPC 1973 are not fulfilled.

3. Auxiliary request 2 - unity of invention (Article 82 EPC 1973)

3.1 The claims according to auxiliary request 2 are based on the claims of auxiliary request 1, with apparatus claims 5 and 6 deleted and method claims 7 and 8 renumbered as claims 5 and 6. The claims therefore comprise a single independent apparatus claim 1 and still two independent method claims 4 and 5.

3.2 The appellant argued that both the independent method claims and the independent apparatus claim represent the general idea of fault detection and that under other legal systems such method claims defining the same inventive concept would be allowable.

3.3 The board maintains the view expressed on the method claims of auxiliary request 1. It therefore comes to the conclusion that the requirements of Article 82 EPC 1973 are not fulfilled.

4. Auxiliary request 3 - claim 1 - inventive step (Article 56 EPC 1973)

4.1 Most of the features of claim 1 are known from document D4 (cf. point 2.1 above). The appellant agreed during the oral proceedings before the board that the signal conditioning circuit disclosed in document D4 determines the signal difference between the first and second response signals that are returned from the cabling and the first and second pickoff sensors (cf. page 8, lines 14-21). The signal difference can comprise a phase difference, a time delay, a Coriolis-induced pickoff difference, etc. (cf. page 10, lines 22-23). The first and second response signals can be used to detect customer mis-wiring or mis-installation (cf. page 11, lines 17-18).

4.2 Document D4 does not explicitly disclose how the first and second pickoff response signals can be used to detect customer mis-wiring or mis-installation. In particular, it does not disclose that the signal conditioning circuit is configured to compare a phase difference between a first pickoff response phase and a second pickoff response phase to a predetermined pickoff phase difference threshold and to determine a pickoff connection orientation fault in the corresponding one or more first pickoff wires or in the corresponding one or more second pickoff wires if the phase difference exceeds the predetermined pickoff phase difference threshold.

4.3 The distinguishing feature has the effect of determining a connection orientation fault from the first and second pickoff response signals.

4.4 The board therefore identifies the objective technical problem to be solved as how to detect customer mis-wiring by using the first and second response signals returned from the cabling.

4.5 The board considers it to be part of the basic knowledge of a person skilled in the art that a connection orientation fault regularly happens when wiring is connected by a user. When document D4 addresses customer mis-wiring, the person skilled in the art would therefore consider a connection orientation fault as an obvious possibility. Furthermore, the board considers that it is part of the basic knowledge of the person skilled in the art that a connection orientation change on wiring with a frequency signal results in a phase change of about 180 degrees in the frequency signal. Consequently, the person skilled in the art detecting a phase difference of about 180 degrees in the pickoff response phase of a first response signal with respect to a second response signal, which is much larger than the phase difference induced by the mass flow in the Coriolis flow meter, would immediately consider a wrong connection orientation of one of the pickoff wires. In addition, it is usual practice to use a threshold value to assess whether a characteristic of a signal meets certain requirements. Consequently, it would be evident for the person skilled in the art to apply this knowledge and to compare the phase difference between a first pickoff response phase and a second pickoff response phase to a predetermined pickoff phase difference threshold and

determine that a connection orientation fault is detected if the phase difference exceeds the threshold.

4.6 The appellant contested that the connection orientation fault is an obvious possibility for customer mis-wiring and argued as follows:

It was of the opinion that a change of the connection orientation of a cabling would not always lead to a phase shift of about 180 degrees in a frequency signal. In the flow meter, such a phase difference depended on the circumstances and could have lots of different causes. Therefore, an excessive phase difference was not indicative of a connection orientation fault. Furthermore, it was not part of the basic knowledge of the person skilled in the art to compare the phase difference to a predetermined pickoff phase difference threshold to determine a connection orientation fault. The board had not provided any written evidence showing that these options were part of the basic knowledge of the person skilled in the art, and it would be going too far to claim that a connection orientation fault was obvious for a person skilled in the art reading about mis-wiring in document D4, that a connection orientation fault resulted in an excessive phase difference, and that a person skilled in the art would compare the phase difference to a predetermined threshold to detect such a phase difference.

4.7 The board does not agree with this line of argument. Basic knowledge forming part of the fundamental skills of a person skilled in the art does not need to be proven e.g. by documentary evidence. The board has explained what it considers to be part of the basic knowledge of the person skilled in the art (cf. point 4.5 above).

The appellant simply denies that the person skilled in the art would have the above-mentioned basic knowledge and experience. It has given no reasons why the person skilled in the art would not consider a connection orientation fault when reading about customer mis-wiring. Nor has it explained what obvious reason there could be for a phase difference of about 180 degrees between the two pickoff response signals other than a connection orientation fault, and how the phase difference would be determined other than by comparing it with a predetermined phase difference threshold. The appellant has thus provided no arguments as to why it deems the facts the board relies on to be wrong (cf. T 1090/12, point 6.2 of the Reasons).

4.8 In view of the above, the board comes to the conclusion that the subject-matter of claim 1 does not involve an inventive step in view of document D4 and the basic knowledge of the person skilled in the art.

5. In summary, the board concludes that none of the requests on file are allowable. Hence, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairwoman:

M. Kiehl T. Karamanli

Decision electronically authenticated