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**Datasheet for the decision
of 10 December 2019**

Case Number: T 1470/17 - 3.4.02

Application Number: 01932635.4

Publication Number: 1279007

IPC: G01F1/00

Language of the proceedings: EN

Title of invention:

LOW THERMAL STRESS BALANCE BAR FOR A CORIOLIS FLOWMETER

Applicant:

Micro Motion, Inc.

Headword:

Relevant legal provisions:

EPC 1973 Art. 84, 54(1), 56

Keyword:

Claims - clarity (yes)

Novelty - (yes)

Inventive step - (yes)

Decisions cited:

Catchword:



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Case Number: T 1470/17 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 10 December 2019

Appellant: Micro Motion, Inc.
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Boulder, CO 80301 (US)

Representative: Vossius & Partner
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 6 February 2017
refusing European patent application No.
01932635.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Bekkering
Members: H. von Gronau
T. Karamanli

Summary of Facts and Submissions

- I. The appeal of the applicant is directed against the decision of the examining division to refuse the European patent application No. 01932635.4. The examining division refused the application because the amendments to claim 1 of all requests (main request, first and second auxiliary requests) filed with the response dated 13 January 2017 introduced subject-matter which extended beyond the content of the application as filed, contrary to Article 123(2) EPC.

- II. With the statement setting out the grounds of appeal, the appellant filed claims according to a main request and claims according to auxiliary requests 1 to 4 and requested that the decision of the examining division be set aside and that a patent be granted on the basis of the claims according to the main request or, as an auxiliary measure, on the basis of the claims of one of the auxiliary requests 1 to 4.

As a further auxiliary measure oral proceedings were requested.

- III. In a communication annexed to the summons to oral proceedings the board expressed its provisional opinion, that inter alia the requests filed with the statement setting out the grounds of appeal could have been filed already in the first-instance proceedings and that the board could not see prima facie that the claims of these requests and their subject-matter were clearly allowable in particular due to lack of clarity.

- IV. With letter dated 7 November 2019, the appellant filed claims 1-5 of an auxiliary request 0 to be considered

after the main request and before the auxiliary request 1. The appellant also put forward arguments why the claims of the requests on file met the requirements of the EPC.

- V. Oral proceedings took place on 10 December 2019. During the oral proceedings the appellant filed claims according to a new sole request replacing all previous requests on file.

The appellant requested that the decision under appeal be set aside and that a patent be granted in the following version:

Claims:

Nos. 1 to 5 of the sole request filed at the oral proceedings of 10 December 2019;

Description:

Pages 1 to 23 filed at the oral proceedings of 10 December 2019;

Drawings:

Sheets 1/9 to 9/9 as originally filed.

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

- VI. The following documents are relevant for the present decision:

D3: PATENT ABSTRACTS OF JAPAN vol. 1998 no. 13,
30-11-1998 & JPH 10 227677 A

D3': Machine-Translation of JPH 10 227677 A into
English

VII. Claim 1 according to the sole request as filed during the oral proceedings on 10 December 2019 reads as follows:

" A Coriolis flowmeter (800) adapted to receive a material flow at an inlet and to extend said material flow through flow tube means to an outlet of said Coriolis flowmeter; said Coriolis flowmeter also includes:

a balance bar positioned parallel to and co-axial with said flow tube means;

brace bars (810, 811) coupling ends of said balance bar to said flow tube means;

a driver (D) that vibrates said flow tube means and balance bar in phase opposition;

pick off means (LPO, RPO) coupled to said balance bar and to said flow tube means to generate signals representing the Coriolis response of said vibrating flow tube means with material flow;

wherein said Coriolis flowmeter further comprises:

a first end portion (802) of said balance bar extending axially inward from a first one of said brace bars (810, 811) towards an axial mid-portion of said balance bar;

a second end portion (803) of said balance bar extending axially inward from a second one of said brace bars (810, 811) towards said axial mid-portion of said balance bar; and

said axial mid-portion of said balance bar comprising:

a drive coil bracket means (841) coaxial with said flow tube means and having an axial length less than the distance between the axial inner extremities (836, 837) of said first and second end portions of said balance bar;

axially elongated support bars (835) coupling said axial inner extremities of said first and second end portions of said balance bar to the axial outer extremities of said drive coil bracket means;

said axially elongated support bars (835) being positioned in a vibrationally neutral plane of said balance bar and oriented parallel to said longitudinal axis of said flow tube means;

circumferentially oriented slots (842) in the walls of said drive coil bracket means (841), said slots (842) being parallel to and proximate said axial outer extremities of said drive coil bracket means (841) where said axially elongated support bars (835) couple to the axial outer extremities of the drive coil bracket means (841);

the wall material of said drive coil bracket means (841) between said slots (842) and said axial outer extremities of said drive coil bracket means (841) defining a first set of springs (846) that flex in response to changes in the axial length of said first and second end portions of said balance bar."

Reasons for the Decision

1. The appeal is admissible.
2. Sole request - Admission (Article 13(1) RPBA)

The claims and description pages according to the sole request were filed during the oral proceedings and resolved all outstanding issues with respect to the previous requests. The board exercised therefore its

discretion under Article 13(1) RPBA and decided to admit the sole request into the appeal proceedings..

3. Clarity (Article 84 EPC 1973)

The subject-matter of claim 1 is directed to the embodiment of figures 8 and 9. It overcomes the clarity objections raised by the board with respect to claim 1 of the main request filed with the statement setting out the grounds of appeal and defines clearly all essential features.

The board concludes that the claims meet the clarity requirements of Article 84 EPC 1973.

4. Claim 1 - novelty and inventive step (Article 54(1) and 56 EPC 1973)

4.1 The examining division considered the embodiment of figure 8 to be new and to involve an inventive step (see communication dated 18 December 2015, point 3).

4.2 The board is also of the opinion that none of the available prior-art documents discloses all the features of claim 1.

4.3 The claimed invention addresses the problem of thermal stress on the flow tube because of different thermal expansion between flow tube and balance bar (see originally filed description, page 1, line 6, to page 2, line 20). The board considers document D3 to be the closest prior art document because it also relates to a flow tube with a coaxial balance bar and also addresses the problem of thermal expansion that creates stress on the flow tube (see translation D3', paragraph [0001]).

Document D3 discloses

a Coriolis flowmeter 1 (see figures 4 or 5) adapted to receive a material flow at an inlet and to extend said material flow through flow tube means 2 to an outlet of said Coriolis flowmeter; said Coriolis flowmeter also includes:

a balance bar 8, 12 positioned parallel to and co-axial with said flow tube means 2;

brace bars 10 coupling ends of said balance bar to said flow tube means;

a driver (not shown, see D3', paragraph [0015]) that vibrates said flow tube means and balance bar in phase opposition;

pick off means (not shown) coupled to said balance bar and to said flow tube means to generate signals representing the Coriolis response of said vibrating flow tube means with material flow;

wherein said Coriolis flowmeter further comprises:

a first end portion of said balance bar (8a, 8c, 12) extending axially inward from a first one of said brace bars 10 towards an axial mid-portion of said balance bar;

a second end portion of said balance bar (8a, 8c, 12) extending axially inward from a second one of said brace bars 10 towards said axial mid-portion of said balance bar; and

said axial mid-portion of said balance bar comprising a bracket means 8b, 12 coaxial with said flow tube means and having an axial length less than the distance between the axial inner extremities of said first and second end portions of said balance bar.

4.4 The subject-matter of claim 1 differs from the disclosure of document D3 essentially by the following features:

axially elongated support bars coupling said axial inner extremities of said first and second end portions of said balance bar to the axial outer extremities of the bracket means that are implemented as drive coil bracket means;

said axially elongated support bars being positioned in a vibrationally neutral plane of said balance bar and oriented parallel to said longitudinal axis of said flow tube means;

circumferentially oriented slots in the walls of said drive coil bracket means, said slots being parallel to and proximate said axial outer extremities of said drive coil bracket means where said axially elongated support bars couple to the axial outer extremities of the drive coil bracket means;

the wall material of said drive coil bracket means between said slots and said axial outer extremities of said drive coil bracket means defining a first set of springs that flex in response to changes in the axial length of said first and second end portions of said balance bar.

- 4.5 These differing features provide an axial compliance that accommodates thermal expansion and contraction of balance bar end portions 802 and 803 (see originally filed description, page 20, line 32, to page 21, line 2).
- 4.6 Since document D3 provides also means to accommodate thermal expansion and contraction of the balance bar, the claimed invention solves the same problem in different way.
- 4.7 As already noted by the examining division none of the documents cited in the proceedings suggests the claimed solution, nor is the claimed solution obvious in the light of the common general knowledge of the person skilled in the art.
- 4.8 The board comes therefore to the conclusion that the subject-matter of claim 1 involves an inventive step.
5. Claims 2-5 are dependent on claim 1 and refer to preferred embodiments of the invention. Their subject-matter therefore also meets the novelty and inventive step requirements of the EPC.
6. The relevant prior art is cited in the description and the description has been adapted to the present claims. It meets therefore the requirements of Rule 27(1) EPC 1973.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent in the following version:

Claims:

Nos. 1 to 5 of the sole request filed at the oral proceedings of 10 December 2019;

Description:

Pages 1 to 23 filed at the oral proceedings of 10 December 2019;

Drawings:

Sheets 1/9 to 9/9 as originally filed.

The Registrar:

The Chairman:



M. Kiehl

R. Bekkering

Decision electronically authenticated