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Datasheet for the decision of 26 October 2023

Case Number: T 1371/21 - 3.4.02

Application Number: 13721528.1

Publication Number: 2992300

IPC: G01F1/00, G01F15/06

Language of the proceedings: EN

Title of invention:
VOLUME FLOW SENSOR SYSTEM COMPRISING A MASS FLOWMETER AND A DENSITY METER

Applicant:
Micro Motion, Inc.

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 1371/21 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 26 October 2023

Appellant: (Applicant)	Micro Motion, Inc. 7070 Winchester Circle Boulder, CO 80301 (US)
Representative:	Ellis, Christopher Paul Ollila Law Limited Unit 7 The Courtyard Timothys Bridge Road Stratford upon Avon CV37 9NP (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 7 April 2021 refusing European patent application No. 13721528.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Bekkering
Members:	A. Hornung
	B. Müller

Summary of Facts and Submissions

I. The applicant lodged an appeal against the decision of the examining division refusing European patent application No. 13721528.1 on the basis of Article 97(2) EPC because the requirements of Article 84 EPC (main request) and Article 56 EPC (main request and auxiliary requests 1 and 2) were not fulfilled

II. The applicant requested that the decision under appeal be set aside and a patent be granted on the basis of the claims according to the main request filed with a letter dated 4 December 2018.

III. Oral proceedings before the board were held on 26 October 2023.

IV. The following document, which the examining division relied on, is referred to in the present decision:

D6: US 2009/0013798 A1.

V. Claim 1 of the main request reads as follows:

"A volumetric flow rate sensor system (200), characterized by:

a density or specific gravity meter (202) including a sensor assembly (204a) and a density or specific gravity meter electronics (204b) configured to generate a density or specific gravity measurement of a process fluid;

a mass flow meter (203) including a sensor assembly (205a) and a mass flow meter electronics (205b) configured to

generate a mass flow rate of the process fluid and in electrical communication with the density or specific gravity meter electronics (204b); and

a remote processing system (207) in direct electrical communication with only a first meter electronics of the density or specific gravity meter electronics (204b) or the mass flow meter electronics (205b);

wherein the first meter electronics is configured to transmit the generated density or specific gravity measurement, or the mass flow rate generated by a second meter electronics of the density or specific gravity meter electronics or the mass flow meter electronics to the remote processing system, determine a volume or energy flow of the process fluid based on the determined density or specific gravity and the determined mass flow rate, and transmit the volume or energy flow of the process fluid to the remote processing system".

Reasons for the Decision

1. Inventive step

The subject-matter of claim 1 lacks an inventive step in view of the disclosure in D6 (Article 56 EPC).

1.1 Closest prior art

D6 is considered to represent the closest prior art.

1.2 Distinguishing features

1.2.1 Document D6 discloses a volumetric flow rate sensor system comprising:

a density or specific gravity meter (100_1; 100_2) including a sensor assembly and a density or specific gravity meter electronics configured to generate a density or specific gravity measurement of a process fluid

[the measuring system of D6, figure 1, is formed by means of two measuring device electronics (100_1; 100_2), which provide an "ascertained density and an ascertained mass flow" (see [0112]); therefore, it is implicit that one of these measuring device electronics (100_1; 100_2) includes a sensor assembly and a density meter electronics to generate a density measurement]

a mass flow meter (100_1; 100_2) including a sensor assembly and a mass flow meter electronics configured to generate a mass flow rate of the process fluid

[the measuring system of D6, figure 1, is formed by means of two measuring device electronics (100_1; 100_2), which provide an "ascertained density and an ascertained mass flow" (see [0112]); therefore, it is implicit that one of these measuring device electronics (100_1; 100_2) includes a sensor assembly and a mass flow meter electronics to generate a mass flow rate]

and in electrical communication with the density or specific gravity meter electronics

[see D6, [0108]: "data connections communicating bidirectionally between the two measuring device electronics 100_1, 100_2 can be used for transmission of the locally ascertained, measured variables to, in each case, the other measuring device electronics 100_1, 100_2, respectively"]; and

a remote processing system *[see D6, [0109] and [0112]: "a superordinated data processing system"]* in direct

electrical communication with only a first meter electronics of the density or specific gravity meter electronics or the mass flow meter electronics

[figure 1 shows a "single line-pair" connection between only one of the measuring device electronics (100_1) and the superordinated data processing system (2)];

wherein the first meter electronics is configured to transmit the generated density or specific gravity measurement, or the mass flow rate generated by a second meter electronics of the density or specific gravity meter electronics or the mass flow meter electronics to the remote processing system,

[see D6, [0112]: "the ascertained density and an ascertained mass flow, are transmitted at least in part, via the at least one line-pair 2L to the superordinated data processing system (2). (...) For this case, then, on the one hand, the measured-values, produced at least at times, are transmitted via this single line-pair 2L to the superordinated data processing system (...)."].

1.2.2 Furthermore, D6 discloses that a volume flow rate is determined by the measuring system (see e.g. [0020], claim 2). In particular, "the ascertaining of density can also serve for converting a directly measured, mass flow into an, as a result, indirectly or virtually measured, volume flow, or vice versa" (D6, [0005]).

However, D6 is silent on *where* exactly in the system of D6 the volume flow rate is determined.

1.2.3 It follows that the subject-matter of claim 1 differs from the measuring system of D6 only in that it comprises the following distinguishing feature **F**:

The first meter electronics (100_1; 100_2) is configured to determine a volume or energy flow of the process fluid based on the determined density or specific gravity and the determined mass flow rate, and transmit the volume or energy flow of the process fluid to the remote processing system.

1.3 Technical effect and objective technical problem

While D6 discloses the determination of the volume flow rate, it does not disclose where this determination takes place. Therefore, feature **F** has the technical effect of closing the gap in the disclosure of D6 by defining the exact location where the volume flow rate is determined.

The objective technical problem that is solved by feature **F** is therefore to determine the location in the system of D6 at which the volume flow rate is determined.

1.4 The solution is obvious

Starting from the embodiment shown in figure 1 of D6 and described *inter alia* in paragraph [0112], the skilled person, faced with the above objective technical problem, has only the choice of locating the determination of the volume flow rate in the superordinated data processing system (2) or in one of the two measuring device electronics (100_1; 100_2). In doing so, the skilled person would take into account various concrete circumstances relating to the system of D6, such as:

- whether calculation means for determining the volume flow rate are already present in the superordinated data processing system (2) or in one of the two measuring device electronics (100_1; 100_2),

- how easy is the accessibility on site of the superordinated data processing system (2) and of the two measuring device electronics (100_1; 100_2) for later maintenance interventions,

- what the general system requirements are, for instance, whether the system must be based on a modular design, i.e. each of the measuring device electronics (100_1; 100_2) comprise calculation means to determine on their own the volume flow rate, instead of the superordinated data processing system (2) playing the role of a central data processing means determining centrally the volume flow rate for a large number of measuring device electronics (100_1; 100_2).

Depending on such circumstances, the skilled person would have to weigh up the advantages and disadvantages between, on the one hand, measuring device electronics (100_1; 100_2) which are modular components for determining the volume flow rate on their own and independently of the superordinated data processing system (2), but which are more complex due to the presence of calculation means in the measuring device electronics (100_1; 100_2) and, on the other hand, measuring device electronics (100_1; 100_2) of simpler construction providing the superordinated data processing system (2) merely with the basic values of the measured density and the measured mass flow rate, but comprising no calculation means for determining the volume flow rate on their own.

The decision to determine the volume flow rate, as defined in feature **F**, in one of the measuring device electronics (100_1; 100_2), in particular in the first meter electronics (100_1) because it is in direct electrical communication with the superordinated data processing system (2), is an

obvious choice, since it merely means choosing one of two possibilities, each of which has specific advantages and disadvantages (e.g. "modularity" versus "simplicity" of the measuring device electronics (100_1; 100_2)), which the skilled person is aware of by virtue of its mental furniture.

Therefore, depending on the concrete circumstances of the case when making the trade-off, the skilled person would select the solution defined in feature **F** and arrive at the subject-matter of claim 1 without exercising any inventive skills.

1.5 Applicant's counter-arguments for inventive step

1.5.1 During oral proceedings, the applicant did not contest that D6 is considered to represent the closest prior art and that the only distinguishing feature of claim 1 with respect to the disclosure of D6 is feature **F**.

1.5.2 The applicant submitted in its letter of 22 September 2023, and reiterated during the oral proceedings before the board, that it disagreed with the board's statement in its communication annexed to the summons to oral proceedings, point 7.2.3, according to which "the distinguishing features of claim 1 merely define an alternative way of connecting two meters installed on a fluid conduit to a remote processing unit for providing a volume flow rate to a user". In the applicant's view, there were more than only one alternative. For instance, intermediate processing means or means additional to the existing measuring device electronics (100_1; 100_2) could be considered by the skilled person. Therefore, the skilled person did not have to choose between just two options.

The applicant's argument is not relevant to the present case in which the closest prior art is D6. Indeed, the board's statement cited by the applicant relates to a different situation where the closest prior art is the prior art volume flow rate sensor system of figure 1 of the patent application, disclosing a remote processing system connected to two meter electronics. However, in the system of D6, the remote processing system is connected with only a first meter electronics (100_1) as claimed.

1.5.3 During oral proceedings, the applicant put forward that the technical effect of the distinguishing feature **F** was more specific than only providing an alternative location where the volume flow rate was determined. Actually, due to feature **F**, the remote processing system received the information about the volume flow rate without taking into account how and where the volume flow rate was actually determined. This provided the advantage that if one of the meters was defective and was to be replaced, there was no need to reprogram the remote processing system. With respect to this advantage, the applicant referred to the patent application, page 2, lines 23 to 27. In other words, the meter electronics in claim 1 was a modular component, independent of the rest of the volumetric flow rate sensor system. Therefore, due to the volume flow rate being determined in the meter electronics, the technical effect of feature **F** was to facilitate the maintenance of the volumetric flow rate sensor system of claim 1. Consequently, the objective technical problem to be solved was to facilitate the maintenance of the volumetric flow rate sensor system. The solution as defined in feature **F** to this problem was neither disclosed nor hinted at in D6 or in any other prior art document. Therefore, the subject-matter of claim 1 involved an inventive step over D6.

The board is not convinced by the applicant's argumentation. While the board acknowledges that D6 does not define where exactly in the system of D6 the volume flow rate is determined, the board is of the opinion that the skilled person, when putting D6 into practice, will naturally be confronted with the problem to determine where the volume flow rate is to be calculated. In order to solve this problem, the skilled person, for the reasons given in point 1.4 above, would carry out the determination of the volume flow rate in the first meter electronics (100_1) instead of in the superordinated data processing system (2). In other words, regardless of whether feature **F** effectively has the technical effect of facilitating maintenance of the system, and regardless of whether the skilled person would think of how to facilitate maintenance, the skilled person would obviously be led to the claimed system simply by putting the system of D6 into practice.

1.5.4 During the oral proceedings, the applicant submitted that there was no incentive for the skilled person to simplify the maintenance of the volumetric flow rate sensor system of D6.

The board cannot follow the applicant's argument. As explained in point 1.4 above, the skilled person, while putting the teaching of D6 into practice, would inherently be led to choose a concrete location for the determination of the volume flow rate. Depending on the circumstances, the skilled person would obviously select the first meter electronics (100_1) to determine the volume flow rate.

1.5.5 According to the applicant, D6 "does not teach or suggest that one of the two measuring device electronics 100_1, 100_2 calculates anything from 'locally ascertained, measured variables' that it receives from the other of the two

measure device electronics 100_1, 100_2" (letter page 5, second paragraph).

The applicant's explanations in its letter of 22 September 2023, page 4, last paragraph, to page 8, first paragraph, merely confirm that D6 does not disclose feature **F** (see point 1.2.3 above). Otherwise, the subject-matter of claim 1 would lack novelty in view of D6. However, the applicant's submissions do not provide reasons why feature **F** would involve an inventive step.

2. In view of the above, the applicant's main and sole request is not allowable and, therefore, there is no basis for setting aside the contested decision.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

L. Gabor R. Bekkering

Decision electronically authenticated