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Datasheet for the decision of 17 March 2015

Case Number: T 0603/13 - 3.4.02

Application Number: 99104503.0

Publication Number: 0940657

IPC: G01F5/00, G01F1/684

Language of the proceedings: EN

Title of invention:
Air flow meter

Applicant:
DENSO CORPORATION

Relevant legal provisions:
EPC 1973 Art. 84, 54(1), 56

Keyword:
Clarity (yes - amended claims)
Novelty and inventive step (yes)

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European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0603/13 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 17 March 2015

Appellant: (Applicant)	DENSO CORPORATION 1-1, Showa-cho Kariya-city, Aichi-pref. 448-8661 (JP)
Representative:	TBK Bavariaring 4-6 80336 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 4 October 2012 refusing European patent application No. 99104503.0 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	F. Maaswinkel
Members:	F. J. Narganes-Quijano
	B. Müller

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 99104503.0 (publication No. 0940657).

In its decision the examining division held that the subject-matter defined in the set of claims then on file was not clear within the meaning of Article 84 EPC 1973. In an *obiter dictum* of the decision, the examining division also expressed its view that the claimed subject-matter appears to be anticipated by the disclosure of document

D1: EP-A-0803712.

II. With the statement setting out the grounds of appeal the appellant submitted amended sets of claims and requested that the decision under appeal be set aside and that a patent be granted.

III. In reply to a telephone consultation with the rapporteur of the Board, the appellant, with the letter dated 3 March 2015, filed an amended set of claims 1 to 5 as a main request. With the same letter the appellant cancelled page 14a of the description as originally filed.

IV. Claim 1 of the present main request reads as follows:

"1. An air flow meter for measuring air flow amount in an air flow passage (2), said air flow meter comprising:
a bypass member (30) disposed in said air flow passage (2) having an outer tube (31) and forming a

bypass passage (40) into which air flowing through said air flow passage partially flows, wherein said outer tube (31) has an upstream wall (32), a downstream wall (34) facing the upstream wall (32) with a partition wall (36) therebetween, and a pair of side walls (33) for connecting the upstream wall (32) and the downstream wall (34) so that the bypass passage comprises an upstream passage (41) and a downstream passage (42) connected by a communication passage (43), wherein the downstream passage (42) crosses said air flow passage so that air flowing through said bypass passage (40) is discharged therefrom; and

a sensor unit disposed in said bypass passage (40),

wherein said bypass passage (40) includes:

an outflow port (46, 73) disposed at a downstream air side of said downstream passage (42) downstream of the partition wall (36) communicated with said downstream passage (42), said outflow port (46, 73) being surrounded at three sides by a surface disposed at an upstream air side of said air flow passage and opposing surfaces facing each other in a direction perpendicular to an air flow direction in said air flow passage and to an air flow direction in said downstream passage (42), and said outflow port (46, 73) being opened in said air flow direction in said air flow passage and in said air flow direction in said downstream passage (42), wherein

the outflow port (46, 73) is opened also at the downstream air side of the downstream passage (42) and at the downstream air side of the air flow passage (2), wherein the outflow port (46, 73) is closed by the partition wall (36) at the upstream air side in the air flow passage (2) and is opened at the downstream air side in the air flow passage (2) making a part of air flowing from the downstream passage (42) into the outflow port (46, 73) to directly join the main air flow

discharged from the outflow port (46, 73) into the air flow passage (2), wherein another part of air flowing from the downstream passage (42) into the outflow port (46, 73) is discharged toward the downstream air side in the air flow passage (2) before joining the main air flow discharged from the outflow port (46, 73)."

The main request also includes dependent claims 2 to 5 all referring back to claim 1.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request - Amendments*

The Board is satisfied that the application documents amended according to the present main request of the appellant comply with the formal requirements of the EPC, and in particular with the requirements of Article 123(2) EPC. More particularly, claim 1 is based on claim 1 and on the passages on page 7, lines 18 to 27, page 8, second paragraph, page 10, line 21 to page 11, line 5, and page 11, lines 20 to 23 of the description, together with Figures 2, 3 and 5 and the corresponding description, all as originally filed; and dependent claims 2 to 5 are respectively based on dependent claim 2 as originally filed, dependent claim 3, together with the second paragraph of page 9 of the description, as originally filed, dependent claim 4 as originally filed,

and the passages on page 6, lines 9 and 10, and page 7, lines 18 to 21 of the description as originally filed.

The description has been amended in order to comply with the requirements of the EPC, and in particular with those set forth in Article 84, second sentence, and in Rule 27(1), paragraphs (b) and (c) EPC 1973.

3. *Main request - Clarity*

3.1 The claimed invention is directed to an air flow meter for measuring the air flow amount in an air flow passage. The air flow meter comprises a bypass member constituted by a tube forming a bypass passage, the tube having a sensor unit disposed within the tube for measuring the air flow.

3.2 In its decision the examining division raised a series of objections of lack of clarity (Article 84 EPC 1973) with regard to claim 1 then on file. Claim 1 of the present main request has been amended, and the Board is of the opinion that the objections raised by the examining division have been overcome by the amendments or are no longer pertinent with regard to the present claim, the reasons being as follows:

The examining division objected with regard to claim 1 then on file that the features of the air flow meter relating to the partition wall, the upstream and the downstream walls and the pair of side walls were unclear, in particular as regards their location and the relationship between them, and also as regards the actual shape of the bypass passage determined by all these elements. Claim 1 of the main request has been amended so as to require that the bypass passage within

the tube constituting the bypass member comprises an upstream passage and a downstream passage connected by a communication passage. This amended feature defines the configuration of the bypass passage within the tube and clarifies the location of, and the relationship between the different elements defined in the claim. In particular, it is now clear in the claimed subject-matter that the partition wall partitions the inner space of the tube into the upstream and the downstream passages, that the upstream and the downstream walls referred to in the claim correspond respectively to the walls of the tube delimiting, together with the partition wall, the upstream and the downstream passages, and that the "pair of side walls for connecting the upstream wall and the downstream wall" correspond to the lateral walls of the tube connecting the upstream and the downstream walls of the tube.

The examining division also held that the claimed features defining the configuration of the outflow port, and in particular the features relating to the outflow port "being surrounded at three sides", were not clear. However, it follows from the considerations in the former paragraph that the amendments to claim 1 make clear that the partition wall constitutes one of the walls forming the downstream passage within the tube. The outflow port of the air flow meter is then defined in claim 1 as being "disposed at a downstream air side of said downstream passage downstream of the partition wall", and the claim also specifies the three-dimensional configuration of the outflow port in terms of the different side sections at which the outflow port is opened. In the Board's opinion it is clear in the context of this three-dimensional configuration of the outflow port that the claimed feature relating to the outflow port "being surrounded at three sides by a

surface disposed at an upstream air side of said air flow passage and opposing surfaces facing each other in a direction perpendicular to an air flow direction in said air flow passage and to an air flow direction in said downstream passage" refers to the section of the surface of the partition wall and to each of the adjacent sections of the surfaces of the opposite lateral walls of the tube adjacent to the downstream end of the downstream passage, and that these surface sections determine part of the opening contour of the outflow port defined in the claim.

In addition, as it will be shown in point 4 below, the configuration of the outflow port of the claimed air flow meter is sufficient to ensure that - as required by the claimed subject-matter - a part of the air flowing through the downstream passage is directly discharged in a direction perpendicular to the flow direction of the air flow passage and another part is discharged in a direction parallel to it. Therefore, contrary to the view expressed by the examining division in its decision, the claimed subject-matter defines the essential features required for achieving the flow regime mentioned above.

3.3 The Board concludes that the subject-matter of claim 1 of the main request is sufficiently clear within the meaning of Article 84 EPC 1973. In addition, the Board is satisfied that the claimed subject-matter is supported by the description, and in particular by the explanation of Figures 1 to 3 of the application, within the meaning of Article 84 EPC 1973.

4. *Main request - Novelty and inventive step*

In an *obiter dictum* of the decision the examining division expressed the view that the subject-matter of claim 1 would be anticipated by the disclosure of document D1.

Document D1 discloses an air flow meter for measuring the air flow amount in an air flow passage, the air flow meter being of the same type as the claimed air flow meter (see document D1, abstract, and Figure 1, together with the corresponding description). However, in the air flow meter of document D1 the outflow port is not only surrounded at three sides, but also at the fourth adjacent side by a surface portion of the downstream wall, with the consequence that in document D1 the outflow port is only opened in the air flow direction of the downstream passage so that the opening determined by the contour of the outflow port directly ends in the main air stream of the air flow passage adjacent to the outflow port (Figure 1b of document D1). In contrast thereto, claim 1 requires that the outflow port is also opened in the air flow direction of the air flow passage so that the opening determined by the contour of the outflow port also ends in the air flow passage at its downstream side in the direction of the air flow of the air flow passage. As a consequence of this distinguishing feature, while in document D1 all the air flowing from the downstream passage through the outflow port directly joins the section of the main air flow passage adjacent to the outflow port, in the claimed configuration only a first part of that air follows this flow path, while - as explicitly required by the claimed subject-matter - a second part is discharged toward the downstream air side in the air flow passage before joining the first part of the air discharged from the outflow port.

In addition, the distinguishing features mentioned above have the effect that the air flowing through the bypass passage is smoothly discharged into the air flow of the air flow passage, thus decreasing the occurrence of turbulences that would otherwise have a negative impact on the accuracy in the measurement of the air flow amount (see description of the application, page 2, second and third paragraphs, and Figures 3 and 5 together with the corresponding description, in particular page 11, third paragraph to page 12, first paragraph). Neither document D1 nor the remaining prior art documents on file suggests modifying the structural configuration of the air flow meter of document D1 as claimed, nor the technical effects mentioned above.

Consequently, the subject-matter of claim 1 and that of dependent claims 2 to 5 is new and involves an inventive step over the available prior art (Articles 54(1) and 56 EPC 1973).

5. The Board is also satisfied that the application documents amended according to the present main request and the invention to which they relate meet the requirements of the EPC within the meaning of Article 97(1) EPC. The Board therefore concludes that the decision under appeal is to be set aside and a patent be granted on the basis of the application documents amended according to the present main request of the appellant.

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: claims 1 to 5 filed with the letter dated 3 March 2015;
   - description: pages 1, 2, 2a and 3 filed with the letter dated 6 August 2008, and pages 4 to 14 as originally filed, page 14a as originally filed being cancelled; and
   - drawings: sheets 1/7 to 7/7 as originally filed.

The Registrar: The Chairman:

M. Kiehl F. Maaswinkel

Decision electronically authenticated