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Datasheet for the decision of 23 April 2008

Case Number: T 0202/06 - 3.4.02

Application Number: 98949736.7

Publication Number: 0943091

IPC: G01N 29/02

Language of the proceedings: EN

Title of invention:
Method and apparatus for characterizing materials by using a mechanical resonator

Patentee:
Visyx Technologies Inc.

Opponent:
Degussa AG
hte Aktiengesellschaft
Robert Bosch GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - main request (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0202/06 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 23 April 2008

Appellant: (Patent Proprietor)
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Representative: -

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 25 November 2005 revoking European patent No. 0943091 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: A. Klein
Members: M. Rayner
B. Müller

Summary of Facts and Submissions

I. The patent proprietor appealed against the decision of the opposition division revoking European patent No. 943091 (application number 98 949 736.7, International Publication No. WO 99/18431). The patent concerns characterising materials using a mechanical resonator. The following documents, amongst others, have been referred to in the examination and appeal proceedings:

D2 EP-A-0 282 251

D15 Baltes H., Göpel W., Hesse J., Sensors Update, Volume 2, Chapter 2: Acoustic Wave Sensors, pages 37-83, VCH, Weinheim, ISBN: 3-527-29432-5,1996 (1996- 00-00)

In the decision under appeal, the opposition division found, inter alia, that the subject matter of the independent claims of auxiliary request 1 as presented to it lacked an inventive step. The division considered that the subject matter of claim 1 and, mutatis mutandis, claim 29, differed from the disclosure of document D2 in that frequency of a variable frequency input signal is varied over a predetermined frequency range to obtain a frequency dependent resonator response curve of the mechanical resonator and in that the response curve is fitted to a model curve using an equivalent circuit. However document D15 discloses, as one of three basic methods, a network analyser used for probing mechanical resonators of all kinds, which means the skilled person knows that it is appropriate for a tuning fork resonator. Scanning, fitting the data and determining fluid parameters are disclosed in document

D15. Thus, in combining the teachings of documents D2 and D15, the subject matter claimed would be reached without an inventive step. Moreover, the argumentation against inventive step of claims 1 and 29 for lack of inventive step also applies, by way of alternative, in a case where documents D2 and D15 are replaced by certain other documents in the proceedings. No explicit reasoning relating to the other documents or their combination in relation to inventive step was given in the decision.

II. In its appeal, the patent proprietor requested that the decision under appeal be set aside and that the patent be maintained on the basis of a main or one of four auxiliary requests. Oral proceedings were requested on an auxiliary basis. The patent proprietor stated that the subject matter of claims 1 and 29 of its main request are identical to that of auxiliary request 1 considered by the opposition division.

III. Opponents O1 (Degussa) and O3 (Bosch) requested that the appeal be dismissed and on an auxiliary basis oral proceedings, but did not take any position in writing on the appeal. Opponent O2 (hte) did not taken any position on the appeal at all.

Consequent to the auxiliary requests of the parties, the board appointed oral proceedings. Opponents O1 and O2 informed the board in advance of the oral proceedings that they would not attend and the oral proceedings took place in their absence.

IV. The board gave its decision at the end of the oral proceedings.

V. The case of the appellant can be summarised as follows.

A tuning fork resonator is versatile in its function of displacement and frictional drag, rather than emitting acoustic waves. Document D2 relates to a tuning fork, but only produces crude results such as density. Measurement takes place in resonance mode. The objective problem addressed by the invention is not resonance but frequency scanning and fitting a resulting curve to a model curve. The full capability of the resonator is employed to give parameters corresponding to fluid properties.

Document D15 teaches that there are considerable disadvantages to network analysers, including their expense and large size, which would have dissuaded the skilled person from using them unless there had been no other choice. It is not contested that network analysers were known per se before the priority date of the patent, but document D15 does not teach that a network analyser was capable of extracting information from a tuning fork sensor, but use only in conjunction with shear mode resonators and SAW resonators, operating at 5 MHz and 97 MHz. The reference to fitting data in document D15 is in relation to acoustic properties. Thus the skilled person understands that the logic is used to study RF circuits; whether or not the network analysers will operate with other lower frequency ranges is completely unanswered. Usually applicable frequencies for network analysers are 300 kHz and above. However, the network analyser mentioned in the proprietor's patent is somewhat unique in that it is operable from just 5 Hz. Absent the

teaching in the patent to use this analyser, it would have been an inventive leap to use flexural resonators. The natural choice would have been to use an oscillator with feedback to excite the resonator. The appellant advanced a reasoned analysis in writing to show the situation in relation to inventive step is not changed if documents D2 and D15 are replaced by certain other documents as specified by the examining division. Accordingly, the appellant reached the view that the subject matter of claim 1 and, correspondingly, claim 29 of the main request is based on an inventive step.

VI. No substantive response to the appeal was presented by opponents O1 and O2. The case presented by opponent O3 during the oral proceedings can be summarised as follows.

Document D2 concerns physical measurements of the type concerned in the patent. It is agreed that the problem addressed by the patent in dispute is to apply scanning and fitting a resulting curve to a model curve. The skilled person would have applied the teaching of document D15 to do this because of its text book nature. In fact, one could even have given a student the task of investigating a resonator response with a network analyser, there would be nothing particularly praiseworthy with the result attained by the patent in dispute. With respect to document D15, while a network analyser is said to be large and expensive, it is also said to find increased use; there is thus a balance struck and it cannot be concluded that disadvantages are implied. Claim 1 is, in any case, not limited to the kHz range, so the remarks of the appellant about

frequency are not convincing in relation to inventive step. Although a tuning fork is not explicitly named in document D15, this does not speak in favour of inventive step because it is also not excluded. While there are some advantages, it cannot be an invention to use a tuning fork with a network analyser as anyone would have come up with the idea.

VII. The independent claims according to the main request of the appellant are worded as follows.

" 1. A method for monitoring a property of a fluid composition, the method comprising:
placing a mechanical resonator selected from the group consisting of tuning fork, trident, and cantilever in the fluid composition such that at least a portion of the mechanical resonator is surrounded by the fluid composition;
applying a variable frequency input signal to a measurement circuit coupled with the resonator to oscillate the mechanical resonator to obtain a frequency-dependent resonator response of the mechanical resonator;
varying the frequency of the variable frequency input signal over a predetermined frequency range to obtain a frequency-dependent resonator response curve of the mechanical resonator;
fitting the response curve to a model curve using an equivalent circuit; and
determining the property of the fluid composition based on the mechanical resonator response,
said mechanical resonator containing velocity components normal to the vibrating surface.

29. An apparatus for measuring a property of a fluid composition, comprising:
a mechanical resonator (10, 20) selected from the group consisting of tuning fork, trident, and cantilever:
means for containing the fluid composition;
a measurement circuit coupled with said mechanical resonator, said measurement circuit having a signal generator for generating a variable frequency input signal to cause said mechanical resonator to oscillate;
a receiver coupled to the measurement circuit to output a frequency response of said mechanical resonator;
a frequency sweep system for varying the variable frequency input signal over a selected frequency range to generate a response curve;
a computer memory for storing the response curve; and
means for fitting the response curve to a model curve using an equivalent circuit,
said mechanical resonator containing velocity components normal to the vibrating surface."

VIII. Recitation of the wording of the claims according to the auxiliary requests is not given for the reasons set out in section 7 of the Reasons for the Decision below.

Reasons for the Decision

1. The appeal is admissible.

2. *Patentability*

2.1 The closest prior art, as established by the opposition division, can be considered to be represented by

document D2. The subject matter of claim 1 is novel over the disclosure of document D2 in that
(i) the frequency of the variable frequency input signal is varied over a predetermined frequency range to obtain a frequency dependent resonator response curve of the mechanical resonator, and in that
(ii) the response curve is fitted to a model curve using an equivalent circuit.

2.2 The objective problem solved by these features is increasing the accuracy of measurement. In solving the problem, it is not resonance around a particular frequency as in document D2 which is used, but scanning the resonator and fitting the response curve to a model curve. During the oral proceedings, the patent proprietor and opponent O3 agreed on this view, which view is also shared by the board.

2.3 The issue of inventive step therefore turns on the question of whether it would have been obvious for the skilled person to have turned to document D15, and applied the disclosure of a network analyser sending a signal scanned over a range of frequencies to a mechanical resonator described in document D2, i. e. a tuning fork.

2.4 The examining division was of the view that because document D15 discloses a network analyser for probing mechanical resonators of all kinds, the skilled person knows its teaching to be appropriate for a tuning fork. However, this approach beggars the question, in that it does not explain why, starting from document D2, the skilled person would, not could, have turned to the network analyser of document D15 and not simply have

done what is there taught instead. In the absence of a convincing answer, the board is not persuaded that the skilled person would have used a network analyser with the tuning fork of document D2.

2.5 The submissions of the opponent also failed to convince the board in this respect. There seemed to be a confusion about whether the skilled person, or the student referred to by the opponent, could have reached the invention, having been told what to do, as compared with this person realising what needs to be done. The board agrees with the opponent that once having been told to use a network analyser with a tuning fork, the skilled person could have done it, the board does not, however, agree that realising this is what to be done is obvious, i.e. does not agree that this would have been done. In particular, although the disclosure of document D15 is extensive, it does not suggest the possibility, but, as argued by the appellant, teaches in the direction of a network analyser with shear mode resonators. The documents do not therefore fit together very well, so that the approach of opponent O3 is not convincing

3. The discussion about size of the network analyser and particular frequencies of the tuning fork relate to general knowledge of the skilled person in relation to the items concerned. The board does not see its view on inventive step in relation to the combination of the teachings of documents D2 and D15 affected by this discussion, in particular it sees no need, in this context, for recitation of specific features along these lines for defining, in the claims, subject matter considered to involve an inventive step.

4. The description requires amendment so as to be consistent with the claims according to the main request. In particular, it should be clear that resonators not included in the claimed subject matter are not part of the invention.

5. With respect to the other documents cited in the decision under appeal by way of alternative reasons for lack of inventive step, the board observes that the respondents have not offered any challenge during the appeal proceedings against the argument of the appellant that the situation is not changed if documents D2 and D15 are replaced by certain others as set out in the decision. The board shares the view of the appellant and, consequent to the absence of any arguments from the respondents, sees no reason for further analysis of these other documents, which in the decision under appeal were referred to in an imprecise way.

6. The board therefore reached the view that the subject matter of method claim 1 of the main request, and, for corresponding reasons, that of corresponding apparatus claim 29, can be considered to involve an inventive step within the meaning of Article 56 EPC 1973.

7. The auxiliary requests have not been dealt with in the present decision, since the positive view of the board on the main request rendered consideration thereof unnecessary.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The case is remitted to the first instance with the order to maintain the patent with the following claims and a description to be adapted,

Claims:
No. 1-37 of the main request filed with the statement of the grounds of appeal of 5 April 2006.

The Registrar The Chairman

M. Kiehl A. G. Klein