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**Datasheet for the decision
of 29 July 2008**

Case Number: T 1728/06 - 3.2.02

Application Number: 96202546.6

Publication Number: 0750883

IPC: A61B 8/12

Language of the proceedings: EN

Title of invention:

Method of making a transducer assembly for an imaging device

Patentee:

EndoSonics Corporation

Opponent:

Schmiendl, Roland, Prof. Dr.

Headword:

-

Relevant legal provisions:

EPC Art. 52(1), 108

RPBA Art. 12

Relevant legal provisions (EPC 1973):

EPC Art. 56

Keyword:

"Admissibility of the newly filed documents (yes)"

"Inventive step (yes)"

"Remittal to the first instance (no)"

Decisions cited:

T 0113/96

Catchword:

-



Case Number: T 1728/06 - 3.2.02

D E C I S I O N
of the Technical Board of Appeal 3.2.02
of 29 July 2008

Appellant: Schmiedl, Roland, Prof. Dr.
(Opponent) Am Pfarrholz 20
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Representative: Wuesthoff, Franz
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Respondent: EndoSonics Corporation
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Representative: Hatzmann, Martin
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
12 September 2006 concerning maintenance of
European patent No. 0750883 in amended form.

Composition of the Board:

Chairman: T. Kriner
Members: S. Chowdhury
A. Pignatelli

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the interlocutory decision of the opposition division relating to European patent No. 0 750 883.
- II. The decision was dispatched on 12 September 2006. The appeal was received on 10 November 2006, and the fee for the appeal was paid on the same day. The statement setting out the grounds of appeal was received on 9 January 2007.
- III. The opposition was filed against the whole patent and based on Article 100(a) EPC 1973 (lack of novelty and inventive step). The opposition division decided that the subject-matter of the claims of the auxiliary request 1 then on file met the novelty and inventive step requirements of Article 52(1) EPC 1973.
- IV. The following documents, of interest in the appeal procedure, were cited in the opposition procedure:

E1: JP-A-2 271 843

E1a: Translation of E1 into English by the opponent

E1b: Translation of E1 into English by the patentee.

The following documents, of interest in the appeal procedure, were cited in the grounds of appeal:

E6: "The Effects of Backing and Matching on the Performance of Piezoelectric Ceramic Transducers", IEEE TRANSACTIONS ON SONICS AND ULTRASONICS, Vol. SU43, No. 1, March 1966

E7: "Approximate Material Properties in Isotropic Materials", IEEE TRANSACTIONS ON SONICS AND ULTRASONICS, Vol. SU-32, No. 3, May 1985

V. Oral proceedings before the Board were held on 29 July 2008. The following requests were submitted:

The appellant requested that the decision under appeal be set aside and that European patent No. 0 750 883 be revoked, and on an auxiliary basis that the case be remitted to the department of the first instance for further examination.

The respondent (patent proprietor) requested that the patent be maintained in the following version:

Claims 1 to 5 filed with the letter dated 27 June 2008 as the main request
description columns 1 and 2 filed at the oral proceedings on 29 July 2008
description columns 5, 6, and 11 filed at the oral proceedings on 2 August 2006
description columns 3, 4, and 7 to 10 as granted
figures 1 to 6 as granted.

VI. Independent claim 1 reads as follows: -

"A method of making a transducer assembly (14) for an imaging device (10) for insertion into a cavity and emitting ultrasonic waves and providing a usable image in accordance with detected reflected ultrasonic acoustic waves, comprising the steps of manufacturing a planar sheet of transducer elements (22), and wrapping said planar sheet subsequently into a different shape,

wherein said planar sheet of transducer elements (22) is formed into a cylindrical shape, after which said cylinder is at least partly filled with a backing material (24), characterized in that said backing material (24) has an acoustic impedance, of less than $10^7 \text{ kgm}^{-2} \text{ s}^{-1}$ (10 MRayls), and a loss coefficient on the order of 20 to 40 dB/mm."

Claims 2 to 5 are dependent claims.

VII. The parties argued as follows:

Appellant

E1 disclosed all the features of the preamble of claim 1 and, additionally, a damping material whose purpose was to ensure energy loss of acoustic waves and thereby a reduction of echoes, cross-talk, and ringing, all these being related phenomena. The person skilled in the art would consult E6 as regards the backing material, this being a paper by a pioneer in the art.

E6 stated that the energy must be absorbed by the backing material in order to avoid false echoes, and discussed a specific epoxy resin whose acoustic impedance lay within the range of claim 1. E7 listed epoxy resin materials and their properties, including D.E.R.TM 332 whose loss coefficient lay within the claimed range. It would have been obvious for the person skilled in the art to use this material as the backing material in E1 in order to avoid false echoes.

In order to reduce echoes and cross-talk it was known that the acoustic waves must be absorbed in the backing

material, the particular properties of this material being a matter of optimisation in a given device. In any case, the ranges of properties set out in claim 1 were very broad and not particularly limiting over the prior art. If echoes and cross-talk were reduced then ringing would also be reduced as a bonus effect.

The technical problem discussed by the respondent, that of the ringing of the transducer, put the patent in suit in a new light which was not considered by the opposition division, for which reason the case should be remitted to the opposition division.

Respondent

The new documents introduced by the appellant in the appeal stage should not be admitted into the procedure since the appellant had not substantiated why these documents were filed so late and why they were prima-facie relevant. Numerous decisions of the Boards of Appeal of the EPO stated that to file prior art documents with the grounds of appeal was an abuse of procedure and that remittal of the case was advisable if the claims on file were likely to be invalid.

Starting from E1, there was no incentive for the person skilled in the art to consult E6, which did not deal with the problem of ringing. Moreover, E6 did not mention the loss coefficient of the materials, for this E7 had to be consulted. Of the numerous materials listed in E7 there was no reason to select a particular material. The appellant was mosaicing the documents.

Reasons for the decision

1. The appeal is admissible.

2. Admissibility of the documents E6 and E7

E6 and E7 were filed by the opponent with its statement of grounds of appeal in order to reinforce the line of attack already made before the first instance in view of the reasons of the decision of the first instance. According to Article 12(1) RPBA, appeal proceedings should be based on the statement of grounds. Under Article 12(4) RPBA, everything presented by the parties under (1) shall be taken into account by the Board without prejudice to the power of the Board to hold inadmissible facts, evidence or requests which could have been presented in the first- instance proceedings. Since, in the present case, the documents were used to raise more detailed objections in view of the reasons of the decision, the Board holds that they could not have been presented in the first-instance proceedings, because the reasons for the decision were not known at that point.

Moreover, according to T 113/96, filing with the statement setting out the grounds of appeal, new documents reinforcing the line of attack already made before the first instance has to be considered as the normal behaviour of a losing party.

Therefore, the documents are admissible.

3. Inventive step

- 3.1 The patent in suit relates to a method of making a transducer assembly for an imaging device for insertion into a cavity. The problem is that unwanted ringing occurs in the transducer assembly when an acoustic signal is received or transmitted by the catheter, which degrades the signal quality. The solution lies in the use of a backing material which has an acoustic impedance of less than $10^7 \text{ kgm}^{-2} \text{ s}^{-1}$ (10 MRayls), and a loss coefficient on the order of 20 to 40 dB/mm (paragraph [0026] of the patent in suit).

Ringling is the phenomena whereby, when a transducer is excited by a rectangular electrical pulse, it emits secondary vibrations which may mask the weaker received from bodies by reflection. The ringling of a transducer is analogous to that of a bell which rings with a decaying tone, owing to secondary vibrations.

- 3.2 It is common ground amongst the parties and the Board that the features of the preamble of claim 1 are disclosed in the document E1, and that this is the closest prior art document.

E1 mentions the use of a damping material, and the person skilled in the art would know that its purpose is to ensure energy loss of acoustic waves and thereby reduce echoes and cross-talk, which arise by the interaction of acoustic waves with the other elements of the transducer assembly.

Ringling, however, is a different mechanism; it is a property of the transducer itself rather than the

result of the interaction of acoustic waves with the other elements of the transducer assembly. Consequently, it is not to be expected that a backing material would necessarily help to reduce ringing as it does in the case of echoes and cross-talk.

- 3.3 E6 investigates the effects of backing and matching on the performance of piezoelectric ceramic transducers, and its tenor is that very wide bandwidths and efficient transducers are obtained by quarter-wave matching. It mentions that the bandwidth may be increased by backing, but this must be absorbed to avoid false echoes, but then the transducer becomes large and has low sensitivity (page 20, left column, penultimate sentence under "Introduction").

E6 then goes on to describe electromechanical equivalent circuits of transducers and their transfer functions, and on page 23 gives computational results for a PZT7A transducer both with and without a backing. The exemplified backing is a low impedance araldite, whose characteristic impedance happens to fall within the range of claim 1 of the patent in suit.

The voltage transfer function of transducers with backings of the PZT class of materials is computed (Table II), but nowhere are these materials said to be advantageous, the purpose of the computation is merely to compare the performance of transducers with matched and unmatched backings, as regards the symmetry of the transfer function and the bandwidth. The conclusion (page 30) is that sensitive air-backed transducers having a quarter-wave matching to the load have wider bandwidths than ordinary backed transducers.

On page 23, towards the end of the penultimate paragraph of the right column, there is a perfunctory reference to ringing, which is said to occur owing to large time delays of air backed transducers. This passage is not concerned with the ringing of the transducer itself or the reduction of the ringing.

Despite the fact that E6 is authored by a pioneer in the art, it is but one of numerous in the field of acoustic transducers, and there is no clear reason for the skilled person confronted with the problem of ringing to consult this document for a solution since it does not indicate a relationship between ringing and the properties of the backing material.

3.4 Even if the person skilled in the art were to consult this document there is still no reason for him to select a particular backing material for use with the transducer of E1 except with hindsight. The appellant cites E7 which lists numerous backing materials having a large range of loss characteristics, but there is no compelling reason to select a particular one of the materials (e.g. DER332) listed for use with the transducer of E1.

3.5 The Board concludes that the person skilled in the art, starting from document E1 and concerned with the problem of ringing of the transducer, would not find any suggestion in the prior art documents on file that a backing material having an acoustic impedance and a loss coefficient within certain respectively ranges would alleviate the problem.

3.6 The appellant argued that the skilled person would be motivated by E6 to employ the backing material mentioned on page 23 in the transducer of E1 in order to increase the bandwidth, and the ringing would be ameliorated as a bonus effect. This argument is not persuasive given that E1 does not clearly recommend the use of a backing to increase the bandwidth; it recommends instead the use of a quarter-wave matched to the load. Moreover, E6 is silent as to the loss coefficient, and only the combination of the loss coefficient and acoustic impedance within certain respective ranges is effective to reduce ringing.

3.7 For these reasons claim 1 involves an inventive step.

4. Request for remittal to the first instance

The appellant's argument, that the technical problem of ringing was not considered by the opposition division, is not correct. Present claim 1 is the main claim of the first auxiliary request considered by and upheld by the opposition division. As stated in paragraph 3.3 of their decision, the opposition division did not consider that the prior art disclosed the use of backing material with certain properties for countering ringing effects. Thus, the problem of ringing did form the basis of the decision, so that there is no need to remit the case.

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 the first instance with the order to maintain the patent in the following version:

Claims 1 to 5 filed with the letter dated 27 June 2008
as the main request
description columns 1 and 2 filed at the oral
proceedings on 29 July 2008
description columns 5, 6, and 11 filed at the oral
proceedings on 2 August 2006
description columns 3, 4, and 7 to 10 as granted
figures 1 to 6 as granted.

The Registrar

The Chairman

G. Magouliotis

T. Kriner