



Europäisches Patentamt
Beschwerdekammern

European Patent Office
Boards of Appeal

Office européen des brevets
Chambres de recours

Veröffentlichung im Amtsblatt	Ja/Nein
Publication in the Official Journal	Yes/No
Publication au Journal Officiel	Oui/Non

Aktenzeichen / Case Number / N° du recours : T 64/85

Anmeldenummer / Filing No / N° de la demande : 79 104 035.5

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 010 304

14

Bezeichnung der Erfindung: Ultrasonic diagnostic apparatus

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement : A61B 10/00, A61B 5/02, G01N 29/00,
G01S 15/02

ENTSCHEIDUNG / DECISION

vom / of / du 19 January 1988

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /

Titulaire du brevet :

TOKYO SHIBAURA DENKI KABUSHIKI KAISHA

Einsprechender / Opponent / Opposant :

SIEMENS AG

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56 EPC

Kennwort / Keyword / Mot clé :

"Amendments" - "Abandonment of rights (no)" -
"Inventive step (yes)"

Leitsatz / Headnote / Sommaire

Europäisches
Patentamt

Beschwerdekammern

European Patent
Office

Boards of Appeal

Office européen
des brevets

Chambres de recours



Case Number : T 64/85

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 19 January 1988

Appellant :
(Opponent) Siemens AG
Postfach 22 02 61
D-8000 München 22

Representative :

Respondent :
(Proprietor of the patent) TOKYO SHIBAURA DENKI KABUSHIKI KAISHA
72, Horikawa-cho Saiwai-ku
JP - Kawasaki-shi Kanagawa-ken 210

Representative : Blumbach, Weser, Bergen, Kramer,
Zwirner, Hoffmann Patentanwälte
Radeckestrasse 43
D-8000 München 60

Decision under appeal : Decision of the Opposition Division of the European
Patent Office dated 9 October 1984 rejecting the
opposition filed against European patent
No. 0 010 304 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : K. Lederer
Members : J. Roscoe
E. Persson

Summary of Facts and Submissions

- I. European patent No. 0 010 304 was granted on the basis of European patent application No. 79 104 035.5. The right of priority based on two JP applications has been claimed. The European patent comprises ten claims, of which the sole independent claim reads:

"1. An ultrasonic diagnostic apparatus having an ultrasonic probe for transmitting an ultrasonic wave in response to a drive signal inputted thereto, said probe being provided with a plurality of electro-acoustic converting elements (42-1 to 42-N), a drive means (30, 32, 34, 36) for supplying a drive signal to the probe, and means (50, 52-61) for detecting the received signal corresponding to an ultrasonic wave received by the probe, characterised in that:

said drive means (30, 32, 34, 36) alternately supplied to said ultrasonic probe (42-1 to 42-N) a first drive signal to obtain tomographic image information and a second drive signal to obtain blood flow information; and

said detecting means includes means (50) which amplitude-detects a received signal when said probe (42-1 to 42-N) receives a reflected ultrasonic wave corresponding to the first drive signal, means (53 to 61) which phase-detects a received signal when said probe (42-1 to 42-N) receives a reflected ultrasonic wave corresponding to the second drive signal, and means (52) for displaying a tomographic image obtained from said amplitude-detecting means (50)."

II. The Appellant filed notice of opposition against the European patent and requested revocation of the patent in its entirety on the ground of non-patentability because of lack of inventive step having regard to the following documents:

(o) DE-A-2 719 866

(a) US-A-3 939 707

(b) US-A-3 858 446

(c) US-A-4 045 815

(d) US-A-4 010 634

(e) "Medical Imaging", 1st Quarter 1978, page 34,
"Clinical Evaluation of a Pulsed-Doppler Device Linked
to Gray-Scale B-Scan Equipment"

(e₁) Radiology 129, pages 745-749, Dec. 1978: "Clinical
Evaluation of Pulse-Doppler Device Linked to Gray
Scale B-Scan Equipment"

(f) "Medical Progress through Technology" 4, pages 157-
162 (1977); "Noninvasive Measurement of the
Intracardiac Blood Flow by Means of Ultra-sound
Techniques"

(g) EP-A-0 008 517.

III. In a letter filed on 29 November 1983 in response to the notice of opposition, the Respondent declared that the Opponent's statements had been carefully studied and that he had decided to amend Claim 1 and the preamble of the

description. Amended documents were attached to the letter.

Amended Claim 1 as filed on 29 November 1983 reads:

1. "An ultrasonic diagnostic apparatus having an ultrasonic probe for transmitting an ultrasonic wave in response to a drive signal, which is inputted into the ultrasonic probe, said probe having a plurality of electro-acoustic converting elements (42-1 to 42-N), a drive means (30, 32, 34, 36) for supplying a drive signal to the probe in order to emit an ultrasonic beam from the probe, and a means (50, 52-61) for detecting the received signal corresponding to an ultrasonic wave received by the probe, said detecting means includes means (50) which amplitude-detects the received signal when said probe (42-1 to 42-N) receives a reflected ultrasonic wave corresponding to a first drive signal, means (53 to 61) which phase-detects the received signal when said probe (42-1 to 42-N) receives a reflected ultrasonic wave corresponding to a second drive signal; and display means (52), characterised in that said drive means (30, 32, 34, 36) alternately supplies the first and second drive signals to the probe, which is set to a first mode for emitting a beam to obtain a tomogram in response to the first drive signal and is set to a second mode for emitting a beam to obtain a blood flow image in response to the second drive signal, the direction of the beam emission varying every time a beam is emitted in the first mode and being fixed in the second mode, and that said display means (52) simultaneously displays the tomogram and the blood flow image."

- IV. The Opponent maintained his objection of lack of inventive step against the subject-matter of amended Claim 1.
- V. In the course of oral proceedings held before the Opposition Division at a later stage of the opposition procedure, the Respondent changed his position, and requested as his main request that the patent be maintained as granted.

The Appellant contested the admissibility of this main request.

- VI. The Opposition Division considered the Respondent's main request to be admissible on the ground that it did not contravene the relevant provisions of Articles 123(2) and (3) EPC, and decided to reject the opposition.
- VII. The Appellant lodged an appeal against the decision.
- VIII. Oral proceedings were held, at the end of which the Appellant requested that the decision be set aside and the patent revoked in its entirety and the Respondent requested that the appeal be dismissed (main request). As an auxiliary request, the latter requested that the patent be maintained in amended form on the basis of the documents specified in a letter dated 31 July 1985 (see page 1, paragraph 2).
- IX. With respect to the admissibility of the Respondent's main request that the appeal be dismissed, the Appellant argued that the Respondent's submission filed on 29 November 1983 was tantamount to an unconditional renunciation of certain subject-matter covered by Claim 1 as granted. The public

and the Opponent should be entitled to draw reliable conclusions from such an action which therefore should not be reversible.

The Respondent submitted that his filing of an amended claim on 29 November 1983 could not be interpreted as an unambiguous waiver of any subject-matter covered by Claim 1 as granted but only as an attempt made of his own motion to clarify the claim's wording without intention to limit its scope.

- X. Concerning the patentability of the subject-matter of Claim 1 as granted, the Appellant essentially submitted that the latter was obvious from the disclosure of document (a), which taught the performance of both B mode tomographic imaging and Doppler blood flow analysis in an ultrasonic diagnostic apparatus using a single ultrasonic pulse transmitting and receiving probe. The probe was first used in the B mode to obtain a tomographic image of the tissue under examination and, after selection of a suitable direction, the apparatus was switched over to the Doppler mode operation. Since this sequence of operation could be repeated, the probe was alternately supplied with drive signals for each mode as defined in Claim 1. In support of his interpretation of document (a), the Appellant further cited the document:

- (h) Report PB-286 696; Mayo Foundation, Rochester, MN, USA; June 1978; "Development of High-Resolution Ultrasonic Imaging Techniques for Detection and Clinical Assessment of Cardiovascular Disease".

The Appellant further submitted that, even if the term "alternately" in Claim 1 were construed as implying a time-shared use of the single ultrasonic probe, such

alternate driving of the probe would have been an obvious way of achieving the simultaneous operation of the B-mode and Doppler systems suggested in the document, the more so since time-shared or multiplexed operation of an ultrasonic diagnostic apparatus for combined B-scan and Doppler analysis was already known from document (o) in connection with the control of common display means.

- XI. The Respondent submitted that the cited prior art documents relating to ultrasonic diagnostic apparatuses allowing both B-scan imaging and Doppler flow analysis all disclosed systems which either included a single ultrasonic probe operated first exclusively in the B-mode for obtaining a complete tomographic image and subsequently in the Doppler mode, or allowed simultaneous operation in the B-scan and Doppler modes, but needed separate ultrasonic probes, each dedicated to a single mode. Document (a) therefore could not, without hindsight, be interpreted as suggesting the claimed combination of the use of a single probe to simultaneously obtain tomographic images and Doppler flow information. Since the latter combination was not suggested by the prior art, the skilled person also had no obvious ground for contemplating adaptation of the multiplex techniques known from document (o) for controlling display means to the operation of a single ultrasonic probe.

Reasons for the Decision

1. The appeal is admissible.
2. Admissibility of the Respondent's main request.

- 2.1 The question to what extent an Applicant or a Patentee is legally bound by an amendment of originally filed claims limiting or deleting certain subject-matter in these claims has previously been particularly dealt with in two cases before the Boards of Appeal.
- 2.2 Thus, in its decision J 15/85 ("Abandonment of claims"; OJ 1986, 12, pages 395 to 399) the Legal Board of Appeal took the view that if an Applicant cancels claims included in a European patent application but fails to state at the same time that deletion is without prejudice to the filing of a divisional application, the Examining Division will be obliged to refuse its consent to the subsequent filing of a divisional application.

In a later decision T 61/85 ("Polyester crystallisation"; to be published) the Technical Board of Appeal 3.3.2 ruled that if on the true interpretation of a statement made by an Applicant or Patentee, it may be considered that a particular subject-matter has been expressly abandoned together with the complete deletion of the appropriate claim and, in addition, all support therefor in the specification, the same cannot be reinstated.

Both of these decisions would seem to be mainly based on the reason that once an Applicant or a Patentee, without making any reservation, has taken an action resulting in a limitation of the matter for which he previously sought protection, the public should be entitled to draw reliable conclusions from that action, e.g. as to the possibility of freely exploiting the abandoned subject-matter.

- 2.3 Irrespective of what general conclusions could be drawn from the decisions referred to under 2.2, it is to be noted that the action taken in these cases involved the

deletion of entire claims and resulted in a distinct and clear limitation of the protection originally sought. In the present case, the situation is not so simple. In substance, the amendment made in the Respondent's submission of 29 November 1983 amounted to

- (a) the introduction of the features of dependent Claim 3 as granted specifying the way in which the drive means alternately supplies the first and second drive signal to the ultrasonic probe; and
- (b) the indication that the display means for the tomographic image as previously defined in Claim 1 as granted simultaneously displays the blood flow-image (or information).

There is no embodiment in the description or the drawings as filed which was affected by this amendment of Claim 1.

In the Board's view the amendment appears in this case not to have resulted in an unambiguous limitation of the protection originally sought but rather in a clarification by the explicit adding to Claim 1 of features which, by way of interpretation, could have been considered already implicitly comprised therein. It follows that the main reason for the decisions referred to under 2.2 above, that is to say that the public should be entitled to draw reliable conclusions from the action taken by an Applicant or a Patentee, hardly applies at all to the present case.

- 2.4 There are also, in the present case, other circumstances pointing away from the conclusion that the amendment in question was meant to be, or could reasonably be interpreted as, a definitive abandonment of any subject-matter covered by Claim 1 as granted. Thus, it is to be

noted that the amendment was not made in response to any objection to Claim 1 as granted by the Opposition Division, but merely on the Respondent's own motion, possibly in an attempt to satisfy the interest of the Opponent. In the Board's opinion, an action taken in opposition proceedings by the proprietor of a patent before the Opposition Division has issued any comments on the relevance of the grounds for opposition should, unless its finality is clear from the context, be prima facie considered as a mere proposal directed to the Opponent and made with a view to reaching with him an early agreement on a form of the patent acceptable to both parties, the maintenance of such a proposal thus being implicitly subject to the Opponent's agreement. Such agreement was not reached in the present case.

- 2.5 In these circumstances the Board takes the view that the Respondent was entitled to reinstate Claim 1 as granted in the opposition proceedings and that, consequently, his main request before the Board is admissible.
- 2.6 The Board wishes to emphasise that the above conclusions are based on the specific circumstances of the present case and they should certainly not be interpreted as encouraging Applicants or Patentees to abuse the possibility of reverting to previous claims after having filed amended claims. Such abuse of the procedure may indeed be sanctioned under Article 114(2) EPC or, during the examining procedure, Rule 86(3) EPC, the application of which is at the discretion of the competent authority.
3. Patentability of the subject-matter of the claims as granted (main request).

3.1 Interpretation of Claim 1.

According to Claim 1, the drive means alternately supplies to the ultrasonic probe a first drive signal to obtain tomographic image information and a second drive signal to obtain blood flow information (see column 15, lines 4 to 8 of the patent as published). Since the claim further specifies that the probe transmits "an ultrasonic wave in response to a drive signal inputted therinto" (see column 14, lines 59 to 61) and that a reflected ultrasonic wave "corresponds" to each drive signal (see column 15, lines 11 to 16), it is clear from the wording of the claim itself that each drive signal causes the probe to emit one single corresponding ultrasonic wave only for obtaining tomographic or blood flow information from the direction in which said single wave has been emitted.

Therefore, the claim cannot be construed, as suggested by the Appellant, as meaning that a first drive signal comprises the whole series of pulses necessary to obtain a complete tomographic image of a section of the body under examination, and that consequently a plurality of complete successive images may be obtained in alternation with blood flow information from a determined direction in the body. On the contrary, Claim 1 can only be reasonably interpreted as meaning that the ultrasonic probe is controlled in such a way as to produce successive first ultrasonic pulsed waves, each emitted in a different direction for scanning the section under examination, and that these ultrasonic pulses are interleaved with second ultrasonic pulsed waves emitted in such a way as to obtain blood flow information.

This interpretation is entirely consistent with the description of the patent, which proposes the use of an alternate supply of drive signals exclusively for the emission of such interleaved pulses of ultrasonic energy, as disclosed for instance in connection with Figure 6, and in which the ultrasonic waves transmitted or received by the probe are consistently referred to and represented in the drawings as single pulses.

3.2 Novelty.

The nearest prior art appears to be that disclosed in document (o) which relates to an ultrasonic diagnostic apparatus for simultaneously obtaining and displaying tomographic image and blood flow information (see Claim 13) comprising at least one probe (20 or 22 in Figure 1A) which may be provided with a plurality of electro-acoustic converting elements (see description, page 7, second paragraph, last sentence).

In contrast to the subject-matter of Claim 1, this known apparatus comprises two independently acting probes, one for Doppler and one for B-scan mode (see Claim 18) and, in order to allow simultaneous operation of these two modes while avoiding interference between the respective acoustic wave fields, the Doppler and B-scan probes are driven in a way to operate asynchronously (see Claim 31).

Document (a) discloses in general terms that, when combining B-mode and Doppler techniques in an ultrasonic diagnostic apparatus:

- it is possible to use either the same probe (transducer) for both modes, or more than one probe (transducer); see column 4, lines 21 to 25; and

- the Doppler measurement may be made either simultaneously with or following the B-mode measurement; see column 4, lines 12 to 21, 31 to 33 and 51 to 54.

Document (a) however neither contains any detailed description of an apparatus embodying possible combinations of the proposed alternatives nor does it disclose how the probe or probes should be driven in such an apparatus.

Documents (f) and (g), the latter being part of the prior art under Article 54(3) EPC only (the priority of the patent-in-suit being rightfully claimed), both relate to an apparatus comprising a single ultrasonic probe operated at first in the tomographic imaging mode for obtaining a complete tomographic image, and subsequently only in the Doppler processing mode. In document (f) different parts of the probe act as transmitter and receiver respectively in the Doppler mode.

Document (e) also refers to an apparatus comprising a single ultrasonic probe (transducer) for both modes but lacks any detail of its construction or function.

Documents (b), (c) and (d) do not relate to ultrasonic diagnostic apparatuses operating in both B-scan and Doppler mode.

The Appellant failed to establish that the content of documents (e₁) and (h) was available to the public at the priority date of the patent-in-suit and, furthermore, their content does not extend beyond that of documents (o) or (f). They need not therefore be considered further.

The documents cited in the European Search Report but not further relied upon by the Appellant are less relevant than those considered above.

Thus, none of the above-cited documents discloses an alternate supply of first and second drive signals to a single ultrasonic probe as defined in claim 1, and the subject-matter of Claim 1 is therefore novel in the sense of Article 54 EPC.

3.3 Inventive step.

The subject-matter of Claim 1 is essentially distinguished from the nearest prior art as disclosed in document (o) by the provision of a single ultrasonic probe which is alternately driven by B-mode and Doppler mode drive signals. The detecting means also alternately detect from the received signals partial tomographic image information (along successive scanning lines) and blood flow information. Thus, starting from document (o) the problem solved by the invention as claimed in Claim 1 consists in simultaneously developing, while using a single probe only, a complete tomographic image and a blood flow value at a given position of the body under examination.

In the Board's opinion, there is no suggestion in the cited prior art that the tomographic image and blood flow information could be simultaneously obtained when using a single ultrasonic probe only.

Thus, document (o) clearly emphasizes the need to use separate probes operating asynchronously and at different frequencies in order to avoid interference between the B-scan and Doppler mode operations (see e.g. page 3,

2nd paragraph or page 68, last paragraph of the description). This teaches away from the claimed solution which provides for an alternate (i. e. synchronized) operation of the two modes of Claim 1.

It is recognised that document (o) teaches the use of a multiplex circuit to supply the tomographic image and blood flow information alternately to a common display means after they have been independently (asynchronously) obtained (see Claims 13 to 15), as submitted by the Appellant. Multiplexing, however, is a common technique for the superimposition of video signals on a single display means and, in the absence of any hint to do so, the skilled person cannot be expected to envisage its use also for driving ultrasonic probes simply because this known ultrasonic diagnostic apparatus comprises both display means and ultrasonic probes.

Document (a) also provides no hint to use a single ultrasonic probe in an apparatus producing simultaneous tomographic and blood flow information.

The passages in document (a) referred to in paragraph 3.2 above, which are not illustrated by any concrete embodiment, cannot without hindsight be construed as disclosing or even suggesting the specific combination of the proposed alternatives comprising the use of a single probe together with the simultaneous production of tomographic images and Doppler data. Neither are the claims of this document directed to such combination since the use of a single transducer and the simultaneous operation in the B-scan and Doppler modes are respectively claimed in separate Claims 2 and 6, neither of which is appendant to the other.

Thus, when reading document (a) the skilled person would a priori have no reasonable ground to read therein more than what is already known from the remaining prior art as summarised above, namely, that when using only a single transducer or probe, the Doppler and B-mode measurements should be made consecutively (as in document (f)), and that if simultaneous measurements are wanted, more than one transducer or probe is necessary (as in document (o)).

The remaining cited documents are also devoid of any teaching which would lead the skilled person to alternately supply first and second drive signals as defined in Claim 1 to a single ultrasonic probe.

The subject-matter of Claim 1, therefore, involves an inventive step in the sense of Article 56 EPC.

- 3.4 Accordingly, Claim 1 as granted defines patentable subject-matter (Article 52 EPC) and so therefore do Claims 2 to 10, which depend on Claim 1.

The patent can therefore be maintained unamended.

4. Respondent's main request, thus being allowable, his auxiliary request needs no further consideration.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

F. Klein

K. Lederer