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Datasheet for the decision of 18 May 2021

Case Number: T 0507/15 - 3.4.01

Application Number: 10716890.8

Publication Number: 2422207

IPC: G01R33/28

Language of the proceedings: EN

Title of invention:
HIGH MAGNETIC FIELD COMPATIBLE INTERVENTIONAL NEEDLE WITH INTEGRATED PASSIVE L-C CIRCUIT FOR NEEDLE POSITION TRACKING IN MRI

Applicant:
Koninklijke Philips N.V.
Philips Intellectual Property & Standards GmbH

Headword:
MRI needle / Philips

Relevant legal provisions:
EPC Art. 54, 84, 110
EPC R. 99(2), 101(1)
RPBA 2020 Art. 13(1)

Keyword:
Claims - clarity (no)
Novelty - (no)

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Beschwerdekammern

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Case Number: T 0507/15 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 18 May 2021

Appellant: (Applicant 1)	Koninklijke Philips N.V. High Tech Campus 52 5656 AG Eindhoven (NL)
Appellant: (Applicant 2)	Philips Intellectual Property & Standards GmbH Lübeckertordamm 5 20099 Hamburg (DE)
Representative:	van Velzen, Maaike Mathilde Philips Intellectual Property & Standards High Tech Campus 5 5656 AE Eindhoven (NL)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 30 October 2014 refusing European patent application No. 10716890.8 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	P. Scriven
Members:	T. Alecu
	R. Winkelhofer

Summary of Facts and Submissions

I. The appeal is against the Examining Division's decision to refuse the application.

II. The grounds for refusal were lack of clarity and support (Article 84 EPC), insufficiency of disclosure (Article 83 EPC), lack of novelty (Article 54 EPC), and added matter (Article 123(2) EPC).

III. The decision referred to the following prior art documents:

D1: Weiss et al., "MR-controlled fast optical switching of a resonant circuit mounted to the tip of a clinical catheter", Proceedings of the International Society for magnetic Resonance in Medicine, vol. 9, 29 April 2001, page 544, ISSN 1524-6965

D2: Ellersiek et al., "A monolithically fabricated flexible resonant circuit for catheter tracking in magnetic resonance imaging", 22nd International Conference on Eurosensors - Sensors and Actuators B: Chemical 7 - 10 October 2008, vol. 144, issue 2, pages 432 - 436, retrieved online on 26 March 2009, doi:10.1016/j.snb.2009.03.026

D3: Kuehne et al., "Catheter Visualization with resonant markers at MR imaging-guided

deployment of endovascular stents in swine", Radiology, vol. 233, No 3, 1 December 2004, pages 774 - 780, doi: 10.1148/RADIOL.2333031710

D4: Uelzen et al., "Mechanical and electrical properties of electroplated copper for MR-imaging coils", Microsystem Technologies, vol. 12, 2006, pages 343 - 351, doi:10.1007/s00542-005-0069-8

D5: Syms et al., "Microengineered needle micro-coils for magnetic resonance spectroscopy", Journal of Micromechanics and Microengineering, vol. 16, No. 12, 17 November 2006, pages 2755 - 2764, doi: 10.1088/0960-1317/16/12/032

D6: Renaud et al., "Implantable planar rf microcoils for NMR microspectroscopy", Sensors and Actuators A: Physical, vol. 99, issue 3, 5 June 2002, pages 244 - 248, doi: 10.1016/SO924-4247(01)00914-1

IV. With the statement setting out the grounds of appeal, the appellant requested that the decision of the Examining Division be set aside and that a patent be granted on the basis of the main request or on one of three auxiliary requests, all filed with the statement of grounds of appeal. These requests were identical to those before the Examining Division, but taken in a different order.

V. In a communication accompanying a summons to oral proceedings, the Board indicated that all the requests on file lacked, inter alia, clarity and novelty, upholding, in part, the Examining Division's objections. The Board also questioned the admissibility of the appeal, as not all the grounds for refusal had been addressed, and cited document:

D7: Howe et al. "In vivo ^{31}P magnetic resonance spectroscopy using a needle microcoil", Magnetic Resonance in Medicine, vol. 61, issue 5, 27 February 2009, doi: 10.1002/mrm.21941.

VI. In response, the appellant filed three more auxiliary requests.

VII. In a further communication, the Board indicated that these requests were unlikely to be admitted.

VIII. The appellant then withdrew the request for oral proceedings and asked for a decision *according to the state of the file*. The oral proceedings were cancelled.

IX. Claim 1 of the main request reads as follows (reference signs removed).

A device for intervention in a high magnetic field, the device comprising
an elongate shaft,
a passive LC-circuit which has been realized on top of a Si wafer,

and a separate tip portion which has been formed by having diced the Si wafer, wherein the tip portion integrally includes the LC-circuit, wherein the LC-circuit has been formed as an inductor-capacitor resonator, and wherein the tip portion with the LC-circuit has been fixed at the shaft.

X. Claim 1 of the first auxiliary request reads as follows.

A device for intervention in a high magnetic field, the device comprising an elongate shaft, a tip portion made out of silicon, and a passive LC-circuit which has been realized on top of a Si wafer, the LC-circuit having been positioned and fixed at the tip portion, wherein the LC-circuit has been formed as an inductor-capacitor resonator.

XI. Claim 1 of the second auxiliary request differs from that of the first auxiliary request in the definition of the LC circuit.

... a passive LC-circuit positioned and fixed at the tip portion, wherein the LC-circuit has been formed as an inductor-capacitor resonator.

XII. Claim 1 of the third auxiliary request reads as follows.

A needle for biopsy compatible with a high magnetic field of an MR imaging system, the needle comprising
an elongate shaft,
a tip portion with a sharp needle tip, the tip portion having been made out of silicon and having been mounted on the shaft, and
a tracking modality on the needle tip, the tracking modality having been provided as a passive LC-circuit, wherein the LC-circuit comprises an inductor and a capacitor, the LC-circuit being activatable by the magnetic field of the MR imaging system to oscillate.

XIII. Claim 1 of the fourth auxiliary request reads as follows.

A surgical needle compatible with a high magnetic field of 3 T of an MR imaging system, the needle comprising
an elongate shaft with
a tip portion with a sharp needle tip, the tip portion having been made out of silicon by dicing, and
a tracking modality on the needle tip, the tracking modality having been provided as a passive LC-circuit and having been produced by forming a capacitor, by forming an inductor, wherein the inductor has been connected to the capacitor so that the passive LC-circuit is provided and wherein

the LC-circuit is realized on top of a Si wafer, by dicing the Si wafer so that a single LC-circuit is isolated and by subsequently fixing the isolated LC-circuit at the tip portion.

XIV. Claim 1 of the fifth auxiliary request differs from that of the fourth by adding, at the end of the claim:

... wherein a main axis of the inductor of the LC-circuit has been orientated parallel to the longitudinal axis of the shaft or radial to the shaft, wherein the capacitor of the LC-circuit has been formed as a three dimensional trench capacitor.

XV. Claim 1 of the sixth auxiliary request differs from that of the fifth by further adding, at the end of the claim:

... wherein the surgical needle comprises further a sensing element, wherein the sensing element comprises at least two optical fibers, wherein one of the fibers is adapted to emit light and another one of the fibers is adapted to receive light reflected back into said fiber.

Reasons for the Decision

Admissibility

1. In section A) 4 of their decision, the Examining Division deemed that the main request (then auxiliary request 2) lacked sufficient disclosure (Article 83 EPC). The appeal did not deal directly with this point. Nonetheless, arguments pertinent to it can be found under the heading *Clarity* (in particular, in the last bullet point on page 4). The appeal is admissible in view of Article 110, Rule 101(1) and Rule 99(2) EPC.

Main Request - Clarity (Article 84 EPC)

2. The main request was the second auxiliary request before the Examining Division. The Board agrees with section A) 1.1.1 and 1.1.2 of the Examining Division's decision, which concluded that the terms *intervention* and *high magnetic field* have no clear meaning.

3. In the absence of any specification of a medical context, it is unclear to the skilled per, both in regard of what can be considered an intervention (two possibilities are entering a synchrotron to effect repairs, and tracking a drone in the Earth's magnetic field); and in regard of which magnetic fields count as high, as this term is per definition relative and depends on the (unspecified) context.

4. The appellant referred to the description for clarification of *intervention* (page 4 of the statement of grounds, first bullet point). This argument is not persuasive.

5. If, as here, the description talks of medical interventions, but the claim only of *interventions* without specifying that they are *medical*, that is a deliberate choice and means that a broader class of interventions are included. The question is, which broader class of activities is covered by the term. This is clear to the skilled person, neither from reading the claim itself, nor when taking account of the description. The term *intervention* is not one with a clear technical meaning.

6. Similarly, if the description talks of MRI but the claims only of *high magnetic fields*, unconnected to MRI, that is a deliberate choice, and it means something. It means that the fields need not be those used in MRI, but it does not specify which other magnetic fields are meant. Magnetic fields are omnipresent, so for a clear scope restriction, a further characterization is needed.

7. The appellant's argument (page 4 of the statement of grounds, second bullet point), that any kind of magnetic field, from any kind of MRI, falls within the definition if it can make a passive LC circuit oscillate, fails on three counts. Firstly, it seeks to import MRI into the claim, which the claim itself deliberately avoids doing. Secondly, it seeks to define the field by reference to an unspecified LC circuit. And thirdly, none of this says anything about which fields count as *high*.

8. The definition of product features by steps of the product's fabrication ("has been realized", "has been formed", "having diced" - see sections B) 1.1 and C) 1.1.2) of the Examining Division's decision) is also problematic, because it is not clear what discernible

properties the manufacturing process imparts to the final device. For instance, as document D7 shows in the all-plastic design (D7, bottom of page 3), realizing an LC circuit on top of an Si wafer does not imply the presence of Si in the final product.

9. The appellant argues (page 4 of the statement of grounds) that the method claim concisely defines the necessary steps of manufacturing the device, including, for example, dicing. This may be true, but it does not mean that the manufacturing steps serve to define the device.

10. In conclusion, claim 1 of this request lacks clarity (Article 84 EPC), for the above reasons. There is no need to decide on the other issues raised by the Examining Division.

First and second auxiliary requests

11. The problems with *intervention* and *high magnetic field*, set out in points 2 - 7 above, apply equally to these requests. The problem with defining a device by steps in its fabrication apply to the first auxiliary request. It follows that these requests lack clarity (Article 84 EPC) as well.

Third auxiliary request

12. Although the *high magnetic* field is now *of an MR imaging system,* the meaning of *high* remains vague, and would also evolve with MRI instrumentation. Claim 1 of this request is thus still not clear (Article 84 EPC).

13. Nonetheless, the claim allows a meaningful comparison with the prior art to be made.

14. Document D5 discloses the features of claim 1 as follows:

> *A needle for biopsy compatible with a high magnetic field of an MR imaging system* (D5: Introduction, third paragraph), *the needle comprising*
> *an elongate shaft* (D5: the printed circuit board in figure 7(a)),
> *a tip portion with a sharp needle tip, the tip portion having been made out of silicon* (D5: section 4) *and having been mounted on the shaft* (D5: figure 7(a)), *and*
> *a tracking modality on the needle tip, the tracking modality having been provided as a passive LC-circuit, wherein the LC-circuit comprises an inductor and a capacitor, the LC-circuit being activatable by the magnetic field of the MR imaging system to oscillate* (D5: see section 3).

15. The appellant argued that the printed circuit board of D5 is neither an elongated shaft, nor compatible with a high magnetic field of an MRI system. This is incorrect, because the printed circuit board serves as a shaft (D5: figure 8(a)), and D7 shows that the device of D5 is actually suitable for a medical intervention in a MRI system (see D7 Figure 3, and the section "Coil fabrication", which refers to D5 as reference 6). The term *high* cannot make a difference over D5, because its meaning is not clear.

16. In conclusion, this request lacks clarity (Article 84 EPC) and novelty (Article 54 EPC).

Fourth auxiliary request

17. This request reintroduces unclear wording (*the LC-circuit is realized on top of a Si wafer, by dicing the Si wafer,* see point 8. above). In view of this, the Board will not consider it (Article 13(1) RPBA 2020).

Fifth and sixth auxiliary requests

18. These requests introduce inter alia the features of *wherein the capacitor of the LC-circuit has been formed as a three dimensional trench capacitor* (both requests), and of a *sensing elemen*t with *at least two optical fibers* (sixth auxiliary request).

19. Neither the trench capacitor nor the sensing element has been searched, as the Search Division found the original set of claims to lack unity, and the appellant chose not to pay further search fees. These features were part of the second (original claim 6) and third (original claims 7, 8, 15) inventions identified. If the appellant thought the objection of lack of unity was incorrect, they should have raised the issue before the Examining Division.

20. These requests will not be considered either (Article 13(1) RPBA 2020).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

H. Jenney P. Scriven

Decision electronically authenticated