Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 20 February 2020

Case Number: T 0178/17 - 3.4.02

Application Number: 11723598.6

Publication Number: 2569616

IPC: G01N22/02

Language of the proceedings: EN

Title of invention:
RF REFLECTION FOR INSPECTING CARBON FIBRE-REINFORCED COMPOSITE MATERIALS

Applicant:
Paramata Ltd

Relevant legal provisions:
EPC Art. 84

Keyword:
Claims: clarity and support in the description (all requests: no)

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0178/17 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 20 February 2020

Appellant: (Applicant)	Paramata Ltd St. John's Innovation Centre Cowley Road Cambridge, Cambridgeshire CB4 0WS (GB)
Representative:	Gill Jennings & Every LLP The Broadgate Tower 20 Primrose Street London EC2A 2ES (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 9 September 2016 refusing European patent application No. 11723598.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Bekkering
Members:	F. J. Narganes-Quijano
	G. Decker

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 11723598.6.

The decision was issued after the appellant declined to approve the text proposed for grant by the examining division in the communication under Rule 71(3) EPC dated 7 July 2016 and requested a decision on the state of the file, the mentioned text being based on the then second auxiliary request and containing further amendments proposed by the examining division. In the decision under appeal the examining division held by reference to an annex of the mentioned communication that

- the invention defined in the main request then on file did not comply with the requirements of Article 83 and Rule 42(1)(e) EPC, and
- the independent claims of the first auxiliary request then on file did not comply with the requirements of Articles 123(2) and 84 EPC.

II. With the statement setting out the grounds of appeal the appellant submitted claims according to a main and first and second auxiliary requests. The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the claims of the main request or of one of the first and the second auxiliary requests filed with the statement of grounds of appeal.

III. In a communication annexed to the summons to oral proceedings the board presented a preliminary assessment of the case. In particular, the board raised

a series of objections - in particular, under Article 84 EPC - in respect of the claims - in particular, in respect of claim 1 - of the main request and the first and second auxiliary requests.

IV. In reply to the summons to oral proceedings the appellant, by letter dated 7 February 2020, informed the board that they did not intend to attend the oral proceedings and asked for a decision according to the state of the file.

Subsequently, the oral proceedings were cancelled.

V. Claim 1 of the main request reads as follows:

"A sensing system comprising:

a composite material comprising a matrix and a plurality of non-insulating particles substantially equally spaced within the matrix such that the composite material has coherent electrical periodicity in at least one dimension; and

a receiver for interrogating the material, the receiver arranged to receive a source RF signal and a returned RF signal, the source RF signal being reflected by the non-insulating particles to produce the returned RF signal;

characterised in that:

the system is adapted to determine a change in the crystallinity of the composite material from the returned RF signal,

wherein interrogating the composite material comprises exciting the material as though it was an antenna to generate a surface field profile and coupling the source RF signal to the evanescent surface field of the material; and

wherein a change in the position of one or more of the non-insulating particles causes the returned RF signal to change."

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that

- the expression "a composite material comprising a matrix and a plurality of non-insulating particles substantially equally spaced within the matrix such that the composite material has" has been replaced by the expression "a composite material which is a carbon-fibre reinforced polymer or carbon fibre-reinforced plastic having",
- the expression "the source RF signal being reflected by the non-insulating particles" has been replaced by "the source RF signal being reflected by the composite material",
- the expression "a change in the crystallinity of the composite material" has been replaced by "a change in the ordered lattice-like structure of the composite material", and
- the expression "a change in the position of one or more of the non-insulating particles" has been replaced by "a change in the position of one or more of the carbon fibres".

Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary request in that the expression "from the returned RF signal" has been replaced by "from the returned RF signal due to a microcrack, a delamination, a contaminant, matrix impact damage, or a change in porosity".

Reasons for the Decision

1. The appeal is admissible.

2. No oral proceedings were requested by the appellant during the appeal proceedings. In addition, in reply to the communication annexed to the summons to oral proceedings scheduled for 2 June 2020, the appellant announced by letter dated 7 February 2020 that they would not attend the oral proceedings and asked for a decision on the state of the file, and with the mentioned letter the appellant filed no amendment and no substantive submission.

   In these circumstances, there was no need in the board's view to hold oral proceedings, and the oral proceedings were subsequently cancelled.

3. *Main request and first and second auxiliary requests - Article 84 EPC*

3.1 Claim 1 of the main request is not clear and not supported by the description within the meaning of Article 84 EPC for the following reasons:

   i) Claim 1 requires that the particles of the composite material are "non-insulating". It is not clear in the context of the claim whether this feature refers to the electrical properties or to some other physical property of the particles.

   ii) Claim 1 requires that the composite material comprises a matrix, and it is not clear in the claim what the technical nature of the matrix is. In addition, the description specifies that the matrix is

of an electrically non-conductive material (see page 3, lines 15 and 16) and this feature is disclosed in the description as an essential feature of the physical mechanism underlying the claimed invention (see page 10, line 34 to page 11, line 16, and page 12, lines 27 to 29). However, claim 1 omits the requirement that the matrix is of an electrically non-conductive material, and as a consequence claim 1 is not supported by the description.

iii) According to claim 1 the returned RF signal is produced from the source RF signal. As a consequence, it is not clear in claim 1 what is meant by "a receiver [...] arranged to receive a source RF signal and a returned RF signal" because it would appear that the receiver would only receive the returned RF signal. In addition, it is unclear in claim 1 which is the origin of the source RF signal and whether the claimed system comprises the corresponding RF source (see description, page 8, lines 24 to 26, page 10, lines 15 to 18, and page 10, line 34 to page 11, line 2).

iv) It is not clear in claim 1 what is meant by generating "a surface field profile" and which is the correspondence, if any, between, on the one hand, this surface field profile and, on the other hand, each of the signal reflected by the particles ("the source RF signal being reflected by the non-insulating particles to produce the returned RF signal") and the evanescent surface field of the material ("coupling the source RF signal to the evanescent surface field of the material"). It is also unclear in what respect the source RF signal may be coupled to the evanescent surface field of the material since this evanescent surface field would be generated, at least in part, by the source RF signal reflected by the particles.

v) It is not clear in claim 1 what is meant by "the crystallinity of the composite material". In addition, according to the description (see "quasi-crystal form", "almost similar to a quasi crystal", "pseudo-crystal", etc. on page 4, lines 29 to 31; page 6, lines 30 to 33; page 7, lines 8 to 12; page 9, lines 30 and 31; page 19, lines 14 to 17; and page 23, lines 14 to 16) the materials are not properly crystals, but they only present - as already specified in claim 1 - a spatial and electrical periodicity. The mere fact that there is an analogy between the claimed periodic structures and the periodic structures of crystals does not justify using the term "crystallinity" in the claim as it results in a misleading and therefore unclear definition of the claimed subject-matter.

vi) It is unclear in claim 1 whether the feature "exciting the material as though it was an antenna" requires or not that the composite material or sections of it constitute an "antenna" within the proper meaning of the term. In addition,

- if interpreted in the sense that the material or sections of it are required to constitute an antenna, it would then be unclear what structural features of the composite material and/or of the matrix and/or of the particles render the material an "antenna", i.e. a structure suitable for converting an electromagnetic wave into an electrical signal and/or the other way around; and

- if interpreted as not requiring that the material or sections of it constitute an antenna within the common technical meaning of the term (see description, expressions "acts as an antenna" on page 10, lines 23 to 25; "treating [...] as an antenna element" on page 10, lines 28 to 30, and page 12, lines 32 and 33; "may

be regarded as an antenna element" on page 10, lines 31 to 33; "regarded to act as an antenna element" on page 12, lines 20 and 21; etc.), then the feature would appear to be misleading and therefore unclear, and also superfluous because claim 1 already requires the reflection of the RF signal by the particles and also the generation of a surface field profile and the coupling of the source RF signal to the evanescent surface field of the material.

3.2 Claim 1 of the first and the second auxiliary requests is not clear (Article 84 EPC) for the same reasons given in paragraphs iii), iv) and vi) of point 3.1 above in respect of claim 1 of the main request.

3.3 The board notes that the objections mentioned in points 3.1 and 3.2 above were already raised, among other objections, in the communication annexed to the summons to oral proceedings, and that in their letter dated 7 February 2020 the appellant did not submit substantive arguments in reply to the mentioned objections.

4. In the absence of an allowable request, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl R. Bekkering

Decision electronically authenticated