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**Datasheet for the decision
of 27 November 2018**

Case Number: T 1614/13 - 3.5.02

Application Number: 04815338.1

Publication Number: 1700375

IPC: H03B7/14, H03B7/08, H01L29/88,
H03F3/12

Language of the proceedings: EN

Title of invention:
Method and Apparatus for Effecting High-Frequency
Amplification or Oscillation

Applicant:
Raytheon Company

Relevant legal provisions:
EPC 1973 Art. 84

Keyword:
Claims - all requests - clarity (no)



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Case Number: T 1614/13 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 27 November 2018

Appellant: Raytheon Company
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted on 11 March 2013
refusing European patent application No.
04815338.1 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman R. Lord
Members: F. Giesen
R. Cramer

Summary of Facts and Submissions

- I. This appeal lies from the decision of the Examining Division refusing European patent application No. 04815338.1. The reasons given in the impugned decision were *inter alia* that the independent claims 1 and 15 of the main and first auxiliary requests did not meet the requirements of Article 84 EPC 1973.
- II. The appellant (applicant) filed an appeal against this decision, requesting in their statement of grounds of appeal, in effect, that the impugned decision be set aside and that grant of a patent be ordered based on claims according to one of the main and first to third auxiliary requests filed with that statement. As a further auxiliary measure, they requested that oral proceedings be held.
- III. The Board summoned the appellant to oral proceedings and informed them in a communication pursuant to Article 15(1) RPBA of their preliminary opinion that *inter alia* the claims according to all pending requests did not meet the requirements of Article 84 EPC 1973.
- IV. In a reply dated 19 November 2018, the appellant announced that they would not be attending the oral proceedings and requested that the oral proceedings take place in their absence and that the decision be communicated to them "in the usual manner".
- V. Oral proceedings before the Board took place on 27 November 2018 in the absence of the appellant.
- VI. In the following, the wording of the independent claims is reproduced. Underlining and strike-through is added by the Board to highlight added and omitted features

(other than the reference signs, which were not present in the original claims), respectively, as compared to claim 1 (or claim 16 where applicable) as originally filed.

Claim 1 according to the **main request** reads as follows:

*"An apparatus (251) comprising a distributed resonant tunnelling section, ~~comprising which includes:~~
a plurality of inductive portions (261) coupled in series with each other between first and second nodes (41, 43), such that a respective further node (263) is present between each adjacent pair of inductive portions; and
a plurality of resonant tunnelling device portions (276), each said resonant tunnelling device portion being coupled between a third node and a respective said further node (263),
wherein each respective said further node (263) is free from electrical contact with a resonant tunnelling device (276) other than any resonant tunnelling device coupled between the third node and said respective further node (263)."*

Claim 1 according to the **first auxiliary request** reads as follows:

*"An apparatus (251) comprising a distributed resonant tunnelling section, ~~comprising which includes:~~
a plurality of inductive portions (261) coupled in series with each other between first and second nodes (41, 43), such that a respective further node (263) is present between each adjacent pair of inductive portions; and
a plurality of resonant tunnelling device portions (276), each said resonant tunnelling device portion*

being coupled between a respective third node and a respective said further node (263),
wherein each respective said further node (263) is coupled to a sole respective resonant tunnelling device (276) coupled between a said respective third node and the said respective further node (263)."

Claim 1 according to the **second auxiliary request** reads as follows:

"An apparatus (251) comprising a distributed resonant tunnelling section, ~~comprising which includes:~~
a plurality of inductive portions (261) coupled in series with each other between first and second nodes (41, 43), such that a respective further node (263) is present between each adjacent pair of inductive portions; and
a plurality of resonant tunnelling device portions (276), each said resonant tunnelling device portion being coupled between a respective third node on a common line (273) between fourth and fifth nodes (42, 44) and a respective said further node (263),
wherein each respective said further node (263) is coupled to a sole respective resonant tunnelling device (276) coupled between a said respective third node on said common line (273) and the said respective further node (263)."

Claim 1 of the **third auxiliary request** reads as follows:

"An apparatus (251) comprising a distributed resonant tunnelling section, ~~comprising which includes:~~
a plurality of inductive portions (261) coupled in series with each other between first and second nodes (41, 43) on an electrical path, such that a respective

further node (263) is present on the path between each adjacent pair of inductive portions; and a plurality of resonant tunnelling device portions (276), each coupled in parallel with the other portions between a respective third node on a common line (273) between fourth and fifth nodes (42, 44) and a respective said further node (263) on the path, wherein each resonant tunnelling device portion (276) includes a respective capacitive element (271) coupled to the common line (273) via a respective said third node, with the capacitive elements (271) being the only capacitive elements coupled to the common line (273)."

The other independent claim, method claim 16, is identical in **all requests** and reads as follows:

*"A method of forming a distributed resonant tunneling section, comprising:
coupling a plurality of inductive portions (276) in series with each other between first (41) and second (43) nodes in a manner so that a respective further node is present between each adjacent pair of said inductive portions; and
coupling each of a plurality of resonant tunneling device portions (276) between a fourth ~~third~~ node (42) and a respective said further fifth node (44), such that each respective said further node is free of resonant tunneling device portions other than said resonant tunneling device portion being coupled between said third node and said respective further node."*

VII. The appellant's arguments, in so far as they are relevant to the present decision, can be summarised as follows:

Claim 1 of the main request corresponded to claim 1 of the previous auxiliary request 1, which had not been admitted by the Examining Division. It should nevertheless be admitted by the Board because it made significant progress towards grant. The Examining Division had not read the last feature of claim 1 according to the present main request as a continuous sentence. Rather they had taken the feature "free from electrical contact" in isolation. It was indeed correct that the node 263 was free from electrical contact with all other RTDs except for the RTD that it was directly coupled to, which could, for instance, be seen in figure 7. The feature in question could only be read as meaning "free from electrical contact" apart from the one bridging the electrical path and the common line 273. Asserting otherwise implied a misunderstanding of the claimed subject-matter on the part of the Examining Division. The feature added to claim 1 of the first auxiliary request was equivalent to this, but expressed in a different way, hence the same arguments applied.

There were no further arguments concerning clarity of the claims according to the second and third auxiliary requests. The other arguments concerned the basis for the amendments as well as novelty and inventive step, and are therefore not relevant for the present decision.

Reasons for the Decision

1. The appeal is admissible.

2. Claim 1 of the main request is equivalent to that of a request which was not admitted by the Examining Division. The auxiliary requests were presented for the first time with the statement of grounds of appeal. The appellant did not indicate any reasons why the auxiliary requests could not have been filed in the first instance proceedings. Therefore, according to Article 12(4) RPBA, the Board has the discretion not to admit any of these requests into the proceedings. Nonetheless, the Board exercises this discretion so as to admit the requests, because in the light of the course of events in the first instance proceedings a final decision on the merits of the case is appropriate and can readily be reached.

3. *Clarity (Article 84 EPC 1973) - all requests*
 - 3.1 The appellant attempts to define an apparatus in claim 1 of all requests by making extensive reference to equivalent circuits used to model said apparatus (compare page 4, lines 18 to 20 and page 8, line 6 of the published application, i.e. WO2005/067138 A1). However, contrary to what was argued by the applicant before the Examining Division, the circuits of figures 4 and 7 cannot be regarded as alternative "discrete embodiments". These equivalent circuits might correctly represent some high frequency electrical properties of the apparatus, such as gain or impedance. However, they are manifestly not suitable for providing a structural

description of the real devices, as depicted for instance in figure 1. This leads to a number of clarity problems, as already identified by the Examining Division.

- 3.2 The features "inductive portions", "resonant tunnelling device (RTD) portions", "third nodes" and "further nodes" of claim 1 of the main request only exist in the equivalent circuits but do not correspond to any structural feature in a real device. They are all fictitious and not objectively discernible and therefore unsuitable for a clear definition (see for instance the explicit statement at page 4, lines 15 to 17, that the subdivision of the structure into sections in figure 1 is a "conceptual" one).
- 3.3 Claim 1 of the main request is directed to an apparatus comprising a "distributed resonant tunnelling section", yet the claim specifies discrete resonant tunnelling portions. This is an inherent contradiction.
- 3.4 In a real device it appears to make no sense technically to say that a fictitious and undiscernible node was free from contact to all but one fictitious and undiscernible RTD portion. Rather, the centre conductor and the RTD structure are in electrical contact along the entire length of the device. To make matters worse, claim 1 of the main request appears not even to be a correct representation of the equivalent circuit of figure 4 or 7, where clearly the further node (263) is in electrical contact with other RTD devices via lumped resistors and lumped inductors and the electrical line connecting nodes 41 and 43. The feature in question cannot be read more restrictively - as proposed by the appellant - than its actual wording implies. Therefore, the Board disagrees with the

appellant's argument and comes to the conclusion that the assessment in the impugned decision at point 18.3 concerning a lack of clarity of the then auxiliary request is correct and not based on any misunderstanding of the claim.

- 3.5 This applies also to claim 1 of each of the first and second auxiliary requests, which appear to differ from claim 1 of the main request in this respect only by the use of different wording ("said further node (263) is coupled to a sole respective resonant tunnelling device") which has the same technical meaning.
- 3.6 Claim 1 of the third auxiliary request is additionally unclear because in a real device there are no discernible capacitive elements. There is merely some capacitance between the centre conductor and the adjacent ground lines.
- 3.7 Regarding independent method claims 16 according to all requests, the Board observes that they all have the same wording. The amendments to the independent device claims were not effected for the independent method claims. It is unclear what the technical meaning of a "node being free of a resonant tunneling device portion" might be. All requests must be deemed not allowable for this lack of clarity alone.
4. For these reasons, the Board comes to the conclusion that the application according to all requests does not meet the requirements of Article 84 EPC 1973 and can therefore not accede to any of the requests of the appellant.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



T. Buschek

R. Lord

Decision electronically authenticated