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Datasheet for the decision of 4 September 2023

Case Number: T 1181/21 - 3.5.05

Application Number: 14797889.4

Publication Number: 2997437

IPC: G06F13/38, G06F13/40, H01Q1/24

Language of the proceedings: EN

Title of invention:
ENABLING ARRANGEMENT FOR AN ELECTRONIC DEVICE WITH HOUSING-INTEGRATED FUNCTIONALITIES AND METHOD THEREFOR

Applicant:
TactoTek Oy

Headword:
Electronic device comprising housing-integrated functionalities / TactoTek

Relevant legal provisions:
EPC Art. 123(2), 56

Keyword:
Amendments - extension beyond the content of the application as filed (yes)
Inventive step - (no) - effect not made credible

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Beschwerdekammern

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Case Number: T 1181/21 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 4 September 2023

Appellant: (Applicant)	TactoTek Oy Automaatiotie 1 90460 Oulunsalo (FI)
Representative:	Berggren Oy P.O. Box 16 Eteläinen Rautatiekatu 10A 00101 Helsinki (FI)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 15 March 2021 refusing European patent application No. 14797889.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	A. Ritzka
Members:	N. H. Uhlmann
	F. Blumer

Summary of Facts and Submissions

I. The appellant appealed against the examining division's decision refusing the European patent application in suit.

II. The examining division decided that the main request and auxiliary requests 1 and 2 did not meet the requirements of Article 56 EPC.

III. The examining division made reference, *inter alia*, to the following documents:

D1 US 2010/078343
D2 WO 2009/076561
CK1 "History of Thermoforming" (05.03.2012) http://tannerkyle.blogspot.com/2012/03/blog-post.html

IV. With the statement setting out the grounds of appeal the appellant resubmitted the main request and auxiliary requests 1 and 2, and submitted further auxiliary requests 3 and 4 and two documents relating to thermoforming:

Copy of Wikipedia article on thermoforming, retrieved on 13 July 2021, and

Copy of CompositesWorld article on thermoforming process, retrieved on 13 July 2021

V. The board summoned the appellant to oral proceedings.

In a communication under Article 15(1) RPBA, the board set out its provisional opinion on the case.

VI. By letter dated 11 August 2023, the appellant withdrew the main request, stated that "auxiliary request 1 serves as the new main request", maintained auxiliary requests 2 to 4 and submitted auxiliary request 5.

VII. At the oral proceedings, the allowability of the requests on file was discussed with the appellant.

VIII. The appellant's final requests are that the decision under appeal be set aside and that a patent be granted on the basis of any one of the first to fifth auxiliary requests, the first to fourth auxiliary requests as filed with the statement setting out the grounds of appeal, and the fifth auxiliary request as filed by letter dated 11 August 2023.

IX. Claim 1 of auxiliary request 1 reads as follows:

"An electronic device (100) comprising a housing, or a 'cover', the housing material molded into a desired target shape and at least partially embedding both a plurality of functional elements (102) and an enabling arrangement provided on at least one substrate preformed, by thermoforming, to a selected 3D shape prior to molding of the housing material thereon,

said enabling arrangement, being implemented as a system-on-a-chip or a system-in-a-package, comprising:

- a first connector with a first plurality of connecting means (104) to establish a connection between the plurality of functional elements (102) and said enabling arrangement,

- a second connector with one or more second connecting means (112) to be connected a host device (114) utilizing the functionalities associated with said functional elements (102),

- a memory for storing and retrieval of instructions, and

- processing means capable of transforming signals from a one known format to another predetermined format according to stored instructions."

X. Claim 1 of auxiliary request 2 is based on claim 1 of auxiliary request 1. The wording "by thermoforming, to a selected 3D shape" has been replaced with "preferably thermoformed, to a selected shape". Claim 1 has been further amended by adding the following clause at the end:

"wherein the enabling arrangement is configured to:

- process a received signal from the one or more second connecting means (112) or the first plurality of connecting means (104), wherein the processing (204) comprises identification of a source connection and a destination connection of the received signal, and the transformation of the received signal from the one known format associated with the identified source connection to said another predetermined format associated with the identified destination connection, and

- transmit said processed signal to the identified destination connection"

XI. Auxiliary request 3 includes only one claim; it corresponds to independent method claim 12 of auxiliary request 1 and reads as follows:

"A method for permitting the interconnection of a plurality of functional elements (102) and a host device (114) utilizing functionality associated with said functional elements, said method comprising:

- providing an electronic device (100) comprising a housing, or a 'cover', the housing material molded into a desired target shape and at least partially embedding said plurality of functional elements (102) and an enabling arrangement connected to said plurality of functional elements (102), said enabling arrangement implemented as a system-on-a-chip or a system-in-a-package, said enabling arrangement comprising a memory for storing and retrieval of instructions and configuration data and processing means capable of transforming signals from a one known format to another predetermined format according to stored instructions and configuration data,

- establishing (202), by the enabling arrangement, a network over which said plurality of functional elements and said host device, each having a connector connection, can selectively communicate, then

- processing (204) a received signal employing programmed rules, and finally

- transmitting (206) said processed signal by identifying the source connection and/or destination connection of said connector;

wherein the plurality of the functional elements and the enabling arrangement are initially provided on at least one substrate that is preformed to a selected 3D shape, by thermoforming, prior to molding of the housing material thereon."

XII. Claim 1 of auxiliary request 4 reads as follows:

"A method for manufacturing an electronic device (100), said method comprising:

- providing an enabling arrangement and a plurality of functional elements (102) onto a surface of a substrate film or sheet prior to

- thermoforming the substrate film or sheet provided with the enabling arrangement and the plurality of functional elements (102) to a selected 3D shape, and subsequently

- providing a housing of the electronic device (100) by injection molding housing material into a desired target shape and at least partially embedding said plurality of functional elements (102) and the enabling arrangement,

wherein said enabling arrangement comprises: a first connector with a first plurality of connecting means (104) to establish a connection between the plurality of functional elements (102) and said enabling arrangement, a second connector with one or more second connecting means (112) for connecting to a host device (114) utilizing the functionalities associated with said functional elements (102), a memory for storing and retrieval of instructions, and processing means

capable of transforming signals from a one known format to another predetermined format according to the stored instructions; said enabling arrangement being implemented as a system-on-a-chip or a system-in-a-package."

XIII. Claim 1 of auxiliary request 5 is based on claim 1 of auxiliary request 1. The wording "to a selected 3D shape prior to molding" has been replaced with "to a predetermined 3D shape prior to injection molding".

Reasons for the Decision

1. The present application pertains to an electronic device comprising a housing or a cover. An "enabling arrangement" (i.e. a controller with memory and input/output connections to the functional elements and a host device) and functional elements (e.g. input sensors or output devices) are provided on a substrate and embedded into the housing. The substrate is preformed by thermoforming to a shape prior to molding the housing on it. The controller is capable of transforming signals between formats.

2. Document D1 discloses a cover for an electronic device. The cover can include a controller which is provided on a substrate. The controller controls the reception and manipulation of input and output data between components of the cover and components of a coupled device.

Auxiliary request 1

3. Amendments, Article 123(2) EPC

3.1 The wording

"provided on at least one substrate preformed, by thermoforming, to a selected 3D shape prior to molding of the housing material thereon"

has been added to claims 1 and 12; see appellant's submissions dated 17 June 2019 (page 1) and 6 October 2020 (page 2). Page 7, line 15 to page 8, line 8 and page 16, lines 13 to 24 were given as a basis for this addition.

3.2 The board holds that the requirements of Article 123(2) EPC are not met. The fact that the substrate is preformed by thermoforming, as claimed, is disclosed only on page 8, lines 5 to 8 of the description as filed. According to this passage, the preforming takes place before "**injection** molding or **in-mold labeling** (IML)". By contrast, the claims refer to the broader feature "prior to molding", for which no basis is apparent.

The appellant additionally pointed to page 16, lines 13 to 15 and 22 to 24 of the description and argued that thermoforming occurred prior to the molding and that the opposite order (first molding, then embedding electronics) would not make sense.

This argument is not convincing. Both page 8, lines 5 to 8 and page 16, lines 22 to 24 refer specifically to "injection molding", and page 16 also refers to the broader notion of a "housing component-establishing

process", but not to "molding". Furthermore, claim 1 states "**substrate** preformed ... prior to molding", i.e. it refers to the order of preforming and molding, and not to any electronics, unlike the passage on page 16, lines 13 to 15.

3.3 Additionally, the application as filed does not disclose any "selected" shape. In particular, page 8, lines 5 to 8 of the description refer to a "preferred and/or predetermined shape". This passage does not disclose any aspect of selecting, i.e. of having the option of choosing from a number of available alternatives.

3.4 Claim 12, pertaining to a method for permitting the interconnection of a plurality of functional elements and a host device, includes a method step of "providing an electronic device ...".

No basis is apparent for a method including such a step followed by the steps of "establishing", "processing" and "transmitting". At most, according to page 10, lines 24 to 26 of the description, to which the appellant pointed, "the method is configured to be carried out on an embodiment of the electronic device in accordance with the present invention". This teaching is clearly distinct from the claimed "providing an electronic device". The claimed sequence of steps is evidently not disclosed, either explicitly or implicitly, in this passage.

The appellant further stated that the disclosed "roll-to-roll method" (see page 17, line 27 to page 18, line 10 of the description) was evidence of the claimed order of steps.

The board is not convinced by this argument. Roll-to-roll is a manufacturing method which is not related to the claimed steps of "establishing", "processing" and "transmitting".

3.5 For these reasons, claims 1 and 12 as amended do not meet the requirements of Article 123(2) EPC. Hence, auxiliary request 1 is not allowable.

Auxiliary request 2

4. Amendments, Article 123(2) EPC

4.1 Claims 1 and 12, respectively, do not meet the requirements of Article 123(2) EPC for the reasons given in points 3.2, 3.3 and 3.4 above.

4.2 Independent claim 1 has been further amended by adding a "wherein" clause at the end; see appellant's submission dated 6 October 2020 (page 7). Page 6, lines 32 to 36 and page 19, line 29 to page 20, line 3 of the description as originally filed were given as a basis for this addition.

4.3 The board holds that there is no basis in the application as filed for a transformation from a "known format **associated** with the identified source connection" to a "predetermined format **associated** with the identified destination connection".

The passage on page 6 discloses a "compatible signal format of the element" and an "agreed structure and protocol of the applied connection type towards the host device". It does not refer to any format **associated** with a source connection. Moreover, it only

refers to specific destinations and does not disclose the broad notion of a destination connection.

The sentence bridging pages 19 and 20 reads:

"the processing of a signal may include any conversion, adaptation, compilation etc. of the signal according to the source connection, destination connection and/or applicable programmed rules."

This sentence does not disclose any known or predetermined format which is associated with a connection or a transformation between such formats.

4.4 For these reasons, auxiliary request 2 does not meet the requirements of Article 123(2) EPC and hence is not allowable.

Auxiliary request 3

5. Admission

This request includes only one claim; it corresponds to independent method claim 12 of auxiliary request 1. Therefore, it does not introduce any subject-matter which was not addressed in the impugned decision. Consequently, the board decided to admit auxiliary request 3 into the appeal proceedings.

6. Amendments, Article 123(2) EPC

Claim 1 does not meet the requirements of Article 123(2) EPC for the reasons given in points 3.2, 3.3 and

3.4 above. Therefore, auxiliary request 3 is not allowable.

Auxiliary request 4

7. Admission and allowability

7.1 Claim 1 of auxiliary request 4 pertains to a method for manufacturing an electronic device. It is based on claims 1 and 12 of auxiliary request 1 and on a number of passages in the description (see the statement of grounds, pages 19 and 20).

7.2 The decision under appeal was not based on a request including any such claim. Hence, auxiliary request 4 does not meet the requirements of Article 12(2) RPBA and is to be regarded as an amendment to the appeal case (Article 12(4) RPBA). This is the first time in the course of the prosecution of the application in suit that a method for manufacturing a device has been presented for examination.

7.3 The appellant argued that it wanted to submit a corresponding request in the course of the first-instance oral proceedings, but the chair of the division, after a preliminary discussion of a potential request, did not allow such a request to be filed.

7.4 The board notes that while the filing of a request was not formally forbidden, the chair stated that "further request in the direction the representative presented would probably not be admitted", thereby evidently strongly dissuading the appellant from submitting an amended request.

In this particular situation the board holds that it is appropriate to admit auxiliary request 4.

7.5 Claims 1, 9 and 12 contravene the requirement of Article 123(2) EPC.

7.6 The appellant pointed to claims 1 and 12 of auxiliary request 1, page 16, lines 4 to 15 and the final paragraph on page 17 of the description as a basis for claim 1.

7.7 The board holds that the claimed subject-matter, i.e. the claimed combination of features, cannot be derived, directly and unambiguously, from these passages or from the application as filed. In particular, no basis is apparent for providing the enabling arrangement and the functional elements onto the surface of a substrate **prior to** the thermoforming.

Furthermore, the objections under point 3.3 apply to claim 1.

Additionally, no basis is apparent for the current claim 9, which combines steps pertaining to manufacturing with signal-processing steps.

7.8 For these reasons auxiliary request 4 is not allowable.

Auxiliary request 5

8. Admission

Auxiliary request 5 was filed after the summons to oral proceedings was issued. It addresses and resolves new objections under Article 123(2) EPC which were raised in the board's communication under Article 15(1) RPBA. Therefore, the board decided to take auxiliary request 5 into account (Article 13(2) RPBA).

9. Inventive step

9.1 The appellant submitted that document D1 did not disclose the following two features of claim 1:

(a) an enabling arrangement provided on at least one substrate preformed, by thermoforming, to a predetermined 3D shape prior to injection molding of the housing material thereon,

(b) said enabling arrangement, being implemented as a system-on-a-chip or a system-in-a-package.

9.2 It is common ground that D1 does not disclose feature (b).

9.3 The examining division found that D1 disclosed feature (a), but not the aspect of thermoforming.

9.4 The appellant argued with regard to feature (a) that D1 did not disclose preforming the substrate, by thermoforming, to a predetermined 3D shape. The board agrees.

The appellant agrees that D1 discloses an enabling arrangement provided on at least one substrate preformed to a (2D) shape prior to injection molding of the housing material thereon; see the last full paragraph on page 10 of the statement of grounds.

9.5 Hence, the subject-matter of claim 1 is distinguished from the disclosure of D1 by feature (b) and by feature

(c) preforming the substrate, by thermoforming, to a predetermined 3D shape.

9.6 The application as filed does not ascribe any effect to feature (c) or any effect caused by features (b) and (c) in combination.

The effects referred to by the appellant in the paragraph bridging pages 6 and 7 and the following paragraph of the statement of grounds are not caused by the broadly claimed distinguishing features (b) and (c).

Claim 1 does not specify

- that the enabling arrangement is provided on the substrate before the thermoforming takes place, or
- any details of the thermoforming, of the shape and of the system-on-a-chip or a system-in-a-package.

Additionally, thermoforming (see document CK1 and the two documents submitted with the statement of grounds), a system-on-a-chip and a system-in-a-package are generally known, which was not disputed by the appellant.

9.7 At the oral proceedings the appellant argued that, in view of distinguishing feature (c), the enabling arrangement was placed on a flat substrate and then thermoforming to a required 3D shape was performed. This sequence led to increased integration of the device.

The board is not convinced because claim 1 does not define such an order between providing the enabling arrangement and the thermoforming.

9.8 The appellant submitted that the thermoforming occurred after the the components were placed, referring to the roll-to-roll example given in the description of the application in suit.

This argument is not convincing because claim 1 is not limited to a roll-to-roll process.

9.9 In view of these observations the board holds that the subject-matter of claim 1 of auxiliary request 5 does not involve an inventive step.

Conclusion

None of the requests on file meets the requirements of the EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

K. Götz-Wein A. Ritzka

Decision electronically authenticated