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**Datasheet for the decision
of 30 July 2019**

Case Number: T 1773/15 - 3.5.05

Application Number: 09834407.0

Publication Number: 2369448

IPC: G06F3/041, G06F3/023,
H01H36/00, H03M11/04,
H03M11/02, G06F3/01

Language of the proceedings: EN

Title of invention:

INPUT DEVICE

Applicant:

Kyocera Corporation

Headword:

Input device with haptic feedback / Kyocera

Relevant legal provisions:

EPC Art. 123(2), 56

Keyword:

Amendments - allowable (no)

Inventive step - (no) - obvious combination of known features

Decisions cited:

Catchword:



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Case Number: T 1773/15 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 30 July 2019

Appellant: Kyocera Corporation
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Kyoto 612-8501 (JP)

Representative: SSM Sandmair
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 13 March 2015
refusing European patent application No.
09834407.0 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 appeal is against the examining division's decision to refuse European patent application No. 09834407.0.
- II. The reasons for the decision refer to the following prior-art documents:

D1 POUPLYREV I ET AL: "Tactile Interfaces for Small Touch Screens", PROCEEDINGS OF THE 16TH ANNUAL ACM SYMPOSIUM ON USER INTERFACE SOFTWARE AND TECHNOLOGY : VANCOUVER, CANADA, NOVEMBER 2 - 5, 2003; ACM PRESS, NEW YORK, NY, vol. 5, no. 2, pages 217-220;

D3 WO 2008/125130;

D9 WO 2008/116547.
- III. The examining division held that the sole request does not meet the requirements of Articles 123(2) and 56 EPC.
- IV. In a statement setting out the grounds of appeal, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the amended main request and amended first to third auxiliary requests and the fourth auxiliary request, the latter corresponding to the request underlying the contested decision. The appellant further submitted replacement pages 2 and 2a.
- V. The board arranged for oral proceedings to be held.
- VI. In the summons, the board set out its provisional view of the case. The board considered that none of the then pending requests met the requirements of Articles 123(2) and 56 EPC.

- VII. In response, the appellant filed by letter dated 28 June 2019 amended fifth to eighth auxiliary requests and submitted further arguments.
- VIII. By letter dated 4 July 2019, the appellant submitted further arguments.
- IX. The appellant filed by letter dated 5 July 2019 amended ninth to twelfth auxiliary request and submitted further arguments.
- X. Oral proceedings were held on 30 July 2019 and attended by the appellant's representative.
- XI. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request or any of the first to twelfth auxiliary requests, as detailed above, description pages 1,3 to 25 as originally filed, amended description pages 2, 2a submitted with the statement of grounds and drawings on which the decision under appeal was based.
- XII. Claim 1 of the main request reads as follows:
- "An input apparatus comprising:
- an input unit (12) for receiving a pressure input;
a load detection unit (13) for detecting a pressure load on the input unit (12);
a vibration unit (14) for vibrating the input unit (12); and
a control unit (15) for driving the vibration unit (14) with a drive signal for providing a click sensation, wherein the click sensation is provided by:
- a) the control unit (15) driving the vibration unit (14) with the drive signal when the pressure load detected by the load detection unit satisfies a predetermined standard,

b) the drive signal having a frequency between 140 Hz and 250 Hz, and
c) the drive signal being used for a period determined in a range from 1/4 period to 5/4 period of the drive signal,
wherein the load detection unit comprises plural sensors; and
wherein the pressure load is detected by the output of the plural sensors."

XIII. Claim 1 of the first auxiliary request reads as follows:

"An input apparatus comprising:

a display panel (11) having a display area;
an input unit (12) for receiving a pressure input;
a housing (21) provided with an upper cover (23) covering a surface area of the input unit (12) outside the display area of the display panel (11);
a load detection unit (13) for detecting a pressure load on the input unit (12);
a vibration unit (14) for vibrating the input unit (12); and
a control unit (15) for driving the vibration unit (14) with a drive signal for providing a click sensation, wherein the click sensation is provided by:
a) the control unit (15) driving the vibration unit (14) with the drive signal when the pressure load detected by the load detection unit satisfies a predetermined standard,
b) the drive signal having a frequency between 140 Hz and 250 Hz, and
c) the drive signal being used for a period determined in a range from 1/4 period to 5/4 period of the drive signal,

wherein the load detection unit comprises plural sensors (31) close to each side covered by the upper cover (23); and

wherein the pressure load is detected by the output of the plural sensors."

- XIV. Claim 1 of the second auxiliary request corresponds to claim 1 of the main request and specifies in feature b) that the drive signal is a sine wave.
- XV. Claim 1 of the third auxiliary request corresponds to claim 1 of the first auxiliary request and specifies in feature b) that the drive signal is a sine wave.
- XVI. Claim 1 of the fourth auxiliary request corresponds to claim 1 of the main request in which the load detection unit "consists of" plural sensors.
- XVII. Claim 1 of the fifth auxiliary request corresponds to claim 1 of the second auxiliary request with the following amendments:
- The input unit is vibrated by 15 μm or more.
 - The drive signal is having frequency of 140 Hz or more.
 - The period is determined in a range of 5/4 period or less.
 - The pressure load is detected by the output of the plural strain gauge sensors.
- XVIII. Claim 1 of the sixth auxiliary request corresponds to claim 1 of the third auxiliary request with the same amendments as stated above with respect to the fifth auxiliary request.
- XIX. Claim 1 of the seventh auxiliary request corresponds to claim 1 of the fifth auxiliary request in which the

drive signal is having frequency between 140 Hz and 250 Hz.

XX. Claim 1 of the eighth auxiliary request corresponds to claim 1 of the sixth auxiliary request in which the drive signal is having frequency between 140 Hz and 250 Hz.

XXI. Claim 1 of the ninth to twelfth auxiliary request corresponds to claim 1 of the fifth to eighth auxiliary request respectively in which the load detection unit comprises plural strain gauge sensors.

Reasons for the Decision

1. The application pertains to tactile feedback for an input unit.

The problem addressed in the application is how to improve precision and quality of the feedback.

The solution suggests using a plurality of load sensors and a specific frequency, amplitude and duration of the feedback.

2. Prior Art

Document D3 discloses a thin keypad for a mobile device, the keypad comprising a capacitive sensing layer, a pressure sensor and a haptic feedback device.

Main request and first to fourth auxiliary request

3. Amendments

The application documents as presently amended do not meet the requirements of Article 123(2) EPC.

3.1 Claim 1 refers twice to "plural sensors". The application documents as originally filed, in

particular paragraphs 41, 42, 46 and 81, provide basis for the more specific notion of "plural strain gauge sensors" only.

- 3.2 The appellant referred to the written submissions and did not submit any arguments in this regard.

Fifth to eighth auxiliary request

4. Amendments

- 4.1 To address the objection set out in section 8.2 of the summons, the appellant amended the last line of claim 1 of these requests to refer to "plural strain gauge sensors". The penultimate line of these claims referring to "plural sensors" was not amended.

- 4.2 Furthermore, the appellant argued, in its letter dated 4 July 2019 and at the oral proceedings that the "plural sensors" mentioned in the penultimate feature of claim 1 would have been understood to be the "plural strain gauge sensors" mentioned in the last feature because no other sensors were mentioned in the claim and because the definite article "the" was used in the last feature. Thus, it would have been implicit that the "plurals sensors" were the "plural strain gauge sensors".

- 4.3 The board disagrees. The wording in claim 1

"the load detection unit comprises plural sensors"

defines the structure of the load detection unit in broader terms than the functional definition

"the pressure load is detected by the output of the plural strain gauge sensors".

Hence, the claim covers an embodiment in which the load detection unit comprises plural strain gauge sensors

and other sensors. The application documents do not provide a basis for such an embodiment.

4.4 Moreover, the definite article in the last feature of claim 1 lacks antecedent basis for "plural strain gauge sensors". Thus, it cannot support the appellant's argument.

4.5 It may be obvious that the "plural sensors" are "plural strain gauge sensors". However, obviousness is not the correct criteria to be applied when examining for compliance with the provisions of Article 123(2) EPC.

4.6 Consequently, claim 1 as amended extends beyond the content of the application documents as originally filed.

Ninth auxiliary request

5. The boards holds that the claims meet the requirements of Article 123(2) EPC.

6. Patentability

6.1 The board agrees with the findings relating to closest prior art, distinguishing features of claim 1 of the main request then on file, technical effects and objective technical problems detailed in sections 2.1 - 2.5 of the decision under appeal.

6.2 The present ninth auxiliary request differs from the main request before the examining division (fourth auxiliary request in the present appeal) by the following features:

- Feature a) is further specified in that the input unit (12) is vibrated by 15 μ m or more.
- The sine wave specified in feature b) has a frequency of 140 Hz or more (instead of "between 140 Hz and 250 Hz").

- The drive signal in feature c) is used for a period determined "in a range of $5/4$ period or less of the drive signal" (instead of "in a range from $1/4$ period to $5/4$ period of the drive signal").
- The load detection unit "comprises plural strain gauge sensors" (instead of "consists of plural sensors").

6.3 The findings in sections 2.1 to 2.5 of the decision under appeal (above point 6.1) were not contested by the appellant in the statement setting out the grounds of appeal or at the oral proceedings. It is thus common ground that D3 represents the closest prior art and that the differentiating features of claim 1 are as follows:

- (i) The input unit is vibrated by $15\ \mu\text{m}$ or more.
- (ii) The drive signal is having frequency of 140 Hz or more.
- (iii) The period is determined in a range of $5/4$ period or less.
- (iv) The load detection unit comprises plural strain gauge sensors.
- (v) The pressure load is detected by the output of the plural strain gauge sensors.

6.4 It is further common ground that the technical problem underlying the first group of features regarding the provision of a drive signal ((i) to (iii)) is considered to be how to drive the actuator of D3 to obtain the intended tactile feedback, whereas the technical problem underlying the second group of

features ((iv) and (v)) is how to improve the accuracy of the haptic device.

- 6.5 The appellant submitted at oral proceedings that neither documents D3 or D9 disclosed "strain gauge sensors" and that the piezo sensors disclosed in document D3 would only deliver binary results, while the strain gauge sensors would output continuous values.
- 6.6 Based on this difference, the appellant argued that the problem to be addressed was to improve the control over the haptic output device.
- 6.7 The closest prior art, document D3, discloses on page 8, lines 31 to 32, a piezo sensor which detects the force of touch based on the strain subjected to it. Hence, document D3 explicitly discloses a strain sensor. On page 15, line 31, up to page 16, line 1, D3 teaches that a signal from the piezo pressure sensor is delivered to a processor. In other words, the piezo sensor outputs an electrical signal which is intrinsically characterised by a signal level, or a signal gauge. Consequently, document D3 discloses a strain gauge sensor.
- 6.8 Furthermore, claim 1 and document D3 (page 9, lines 12 to 15, and page 10, lines 8 to 10) alike refer to a threshold of the pressure load. Hence, the aspect of binary versus continuous sensor output is of no relevance for the claimed subject-matter.
- 6.9 Consequently, the appellant's arguments summarised above in sections 6.5 and 6.6 do not convince the board.
- 6.10 The appellant took issue with the disclosure of documents D9 and D1. It did not challenge that the skilled person would have combined D3 with D9 and D1.

6.11 With regard to document D9, the appellant stated "document D9 does not disclose nor suggest an input apparatus 'wherein *the pressure load is detected* by the output of the plural sensors', but merely discloses determining at which *position* on the cover pressure is applied".

The board disagrees. Document D9 discloses "(w)hen the pressure applied is above a given threshold and when the position is determined by the combined signal of the resistant sensing pads 25, the processor considers the input as a keystroke for the key associated with the position at which the input pad has been touched" (page 9, lines 29 - 34). It is evident that the pressure level is detected, based on the combined signal of the resistant sensing pads, to be compared with the given threshold. Claim 3 of document D9 further states that the "resistive sensing pads have a conductivity that is pressure dependent".

6.12 The appellant further submitted that "there is no unambiguous and explicit disclosure that the waves shown in Fig. 3 of document D4 show the complete drive signal, and thus a drive signal of one period, but are only examples for the shape of the waveform". (It appears that the passage quoted should refer to Fig. 3 of document D1.)

The board agrees that there is no explicit disclosure in document D1 that the waves shown in figure 3 show the complete signal. However, document D1 clearly discloses one period of a 200 Hz sine shaped waveform (figure 3a) to be used for generating a "sharp" click feeling (page 219, left-hand column, second full paragraph), and nowhere does it refer to using more than one period. Hence, prior-art document D1 anticipates the claimed interval "5/4 period or less".

- 6.13 The board holds that document D1 (page 218, item 3.) discloses that the input unit is vibrated by 0,05 mm with a frequency of 200 Hz, which falls under the claimed open intervals of "15 μ m or more" and "140 Hz or more".
- 6.14 In view of these observations, the subject-matter of claims 1 and 2 does not involve inventive step having regard to the disclosure of documents D3, D1 and D9.

Tenth auxiliary request

7. Patentability

The appellant submitted in writing that "none of the cited prior art documents discloses the location of the sensors."

The board disagrees. Document D9, figure 4, and page 9, lines 16-23, teaches that a plurality of resistive sensing pads 25 are disposed along the periphery of the front cover 4, the latter being integral with the top surface of the mobile phone. Furthermore, document D9 discloses a display panel 3, a housing of the mobile phone and an upper cover which covers the surface area of the input pad 7.

Hence, the subject-matter of claims 1 and 2 does not involve inventive step having regard to the disclosure of documents D3, D1 and D9.

Eleventh and twelfth auxiliary request

8. Amendments

No basis is apparent for claiming the frequency (between 140 Hz and 250 Hz) and period (5/4 period or less) interval in combination. Paragraph 53 describes evaluation results when varying the frequency using a fixed drive time of one period. Likewise, paragraph 55

sets out the results when varying the drive time (and the amplitude) using a fixed frequency of 170 Hz. Finally, paragraph 58 specifies "vibrating the touch panel 12 by approximately 15 μm or more with the drive signal of 5/4 period or less, preferably 1 period of the sine wave with the constant frequency of 140 Hz or more, preferably 170 Hz, for example". This paragraph defines the period interval as claimed in combination with a different frequency interval.

Consequently, claim 1 as amended extends beyond the content of the application documents as originally filed.

9. Patentability

The subject-matter of claim 1 of these requests does not involve an inventive step for the reasons set out in sections 6. and 7. above.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated