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Datasheet for the decision of 15 November 2017

Case Number: T 1573/14 - 3.5.05

Application Number: 09787008.3

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Language of the proceedings: EN

Title of invention:
Input device with rotary wheel

Applicant:
Home Control Singapore Pte. Ltd.

Headword:
Wheel-based input device/SINGAPORE

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes, after amendments)

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Case Number: T 1573/14 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 15 November 2017

Appellant: (Applicant)	Home Control Singapore Pte. Ltd. 151 Lorong Chuan no. 04-03A (Lobby C) New Tech Park Singapore 556741 (SG)
Representative:	Ferreccio, Rinaldo Botti & Ferrari S.r.l. Via Cappellini, 11 20124 Milano (IT)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 9 April 2014 refusing European patent application No. 09787008.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	A. Ritzka
Members:	K. Bengi-Akyuerek
	G. Weiss

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse the present European patent application for lack of inventive step (Article 56 EPC), having regard to the disclosure of

D1: EP-A-1 840 710.

II. With the statement setting out the grounds of appeal, the appellant filed amended sets of claims as a main request and three auxiliary requests. It requested that the decision of the examining division be set aside and that a patent be granted on the basis of one of those claim requests.

III. In an annex to the summons to oral proceedings pursuant to Article 15(1) RPBA, the board gave its preliminary opinion on the appeal. In particular, it agreed with the appellant that D1 did not render obvious the subject-matter claimed but indicated that the claim requests on file gave rise to objections under Articles 54 and 56 EPC in view of the disclosure of

D3: US-A-2005/0231463,

which had been cited in the search and examination proceedings.

IV. With a letter of reply, the appellant submitted amended claims according to a main request and first to fourth auxiliary requests, replacing the former main and auxiliary requests on file, along with arguments in support of their patentability.

V. Oral proceedings were held on 15 November 2017, during which the appellant filed a new main request replacing all the previous claim requests on file.

The appellant's final request was that the decision under appeal be set aside and that a patent be granted on the basis of the claims according to the main request filed at the oral proceedings before the board.

At the end of the oral proceedings, the board's decision was announced.

VI. **Claim 1** of the main request reads as follows:

"Input device (1) for an electronic apparatus, comprising:
- a printed circuit board (200) with a top side (T), a bottom side (B), and an opening (201);
- a rotary wheel module (100) that has a rotary wheel (20);
- a signal generator (210) for generating electrical signals corresponding to an operation of the rotary wheel, said signal generator being connected to the printed circuit board (200),
the rotary wheel module (100) being mounted in the opening (201)
characterized in that the rotary wheel (20) is located above the top side of the printed circuit board (200) and the rotary wheel module (100) comprises an undercarriage (30) to which the rotary wheel (20) is rotatably mounted and in that the input device (1) further comprises a press button (10) that is mounted on said undercarriage (30), the press button (10) being non-rotatably mounted in a central opening of the rotary wheel (20), and resting on a central metal dome of a metal dome assembly (40) comprised in the rotary

wheel module (100)."

Claim 11 of the main request is directed to an "electronic apparatus" which comprises the input device as defined in claim 1.

Reasons for the Decision

1. MAIN REQUEST

Claim 1 of the present main request comprises the following features, as labelled by the board:

Input device for an electronic apparatus, comprising:
(a) a printed circuit board (PCB) with a top side, a bottom side and an opening;
(b) a rotary wheel module that has a rotary wheel, the rotary wheel being located above the top side of the PCB;
(c) a signal generator, being connected to the PCB, for generating electrical signals corresponding to an operation of the rotary wheel;
(d) wherein the rotary wheel module is mounted in the opening;
(e) wherein the rotary wheel module comprises an undercarriage to which the rotary wheel is rotatably mounted;
(f) a press button that is mounted on said undercarriage and is non-rotatably mounted in a central opening of the rotary wheel and rests on a central metal dome of a metal dome assembly comprised in the rotary wheel module.

1.1 Present claim 1 differs from claim 1 underlying the appealed decision essentially in that it additionally includes features (e) and (f). This amendment was made

in reaction to the objections raised by the board under Articles 54 and 56 EPC, and added features (e) and (f) are based on claims 2, 7, 8 and page 6, lines 32-34 in conjunction with Fig. 4 of the application as originally filed. Hence, the board is satisfied that present claim 1 complies with Article 123(2) EPC.

1.2 The present invention concerns a thin computer input device, such as a remote-control device, which is adapted to perform cursor-based scrolling, navigation (i.e. up, down, left, right) and confirmation ("OK") operations by means of a rotary wheel (see e.g. page 7, line 33 to page 8, line 9 of the present application as originally filed). According to the present application, the main problem to be solved by claim 1 is "to provide input means for an electronic apparatus that can be realized with a small thickness preferably of less than 10 mm, most preferably less than 5 mm" (cf. page 1, lines 9-11 of the application as filed).

1.3 *Novelty and inventive step having regard to* ***D1***

1.3.1 The examining division considered prior-art document D1 to be the closest prior art for the subject-matter of claim 1 then on file, and found that D1 disclosed all the features of claim 1 except for feature (d) (cf. appealed decision, Reasons 2.1.1). As to the obviousness of feature (d), the impugned decision further indicated that D1 already disclosed the mounting of the Hall sensors in an opening of the printed circuit board to achieve a thin construction and that therefore it would be obvious for the skilled person, tasked with the objective problem of "how to reduce the size of the input device", to place the rotary wheel as a whole in that opening to save more

space, without needing to use inventive skills.

1.3.2 The board agrees with the appellant that D1 does not render obvious the positioning of the rotary wheel in the opening of the PCB according to feature (d). This is mainly because, starting from the teaching of D1, the skilled person, in order to eventually come up with a solution as required by feature (d), would have to implement several intermediary steps in adapting the input device of D1 (see in particular Fig. 1):

- holder 115 has to be removed since rotary wheel 111 is mounted in holder 115 which in turn is glued to PCB 131;
- Hall sensors 135, which have to magnetically sense the movements of wheel 111, can no longer be positioned below rotary wheel 111;
- central dome switch 133, which is positioned on PCB 131 and has to detect the depression of centre key 129, has to be eliminated due to the opening in the PCB;
- the diameter of PCB 131 has to be larger than the diameter of rotary wheel 111.

1.3.3 In sum, the board holds, contrary to the finding in the impugned decision, that there are no hints towards locating rotary wheel 111 in the opening of PCB 131 in the device of D1, since the mounting of Hall sensors at that opening would not constitute a sufficient incentive for the skilled person also to mount the rotary wheel itself in the opening of the PCB - with a large number of non-obvious intermediary steps to be undertaken in such a case. Accordingly, based on feature (d) alone, the subject-matter of present claim 1 is held to be novel and to involve an inventive

step having regard to D1.

1.4 *Novelty and inventive step having regard to **D3***

1.4.1 The board holds that prior-art document D3 discloses the following features of present claim 1:

An input device ("input device 10"; see Fig. 1) for an electronic apparatus ("computer 20"), comprising:
(a) a printed circuit board ("PCB 18") with a top side, a bottom side and an opening *(see e.g. paragraph [0018] in conjunction with Fig. 3)*;
(b) a rotary wheel module ("wheel assembly 15") that has a rotary wheel, the rotary wheel being located above the top side of the PCB *(see e.g. [0017] and [0018] in conjunction with Figs. 3, 4A and 4B)*;
(c) a signal generator (e.g. "first encoder 16"; "second encoder 13" or "micro switch 14"), being connected to the PCB, for generating electrical signals corresponding to an operation of the rotary wheel *(see e.g. [0020] in conjunction with Figs. 3, 4A and 4B)*;
(d) wherein the rotary wheel module is mounted in the opening *(see [0018]; Figs. 4A and 4B)*;
(e) wherein the rotary wheel module comprises an undercarriage ("carrier 154") to which the rotary wheel is rotatably mounted *(see [0018] and [0022] in conjunction with Figs. 3, 4A, 4B, 5A to 5C)*.

1.4.2 As to feature (b), the appellant argued that the wheel assembly of D3 was not *mounted* above the top side of the PCB. However, it is apparent to the board that feature (b) only requires that the rotary wheel is <u>located</u> above the top side and that, for example, Figs. 4A and 4B of D3 show that "wheel 15" is at least

partially located above "PCB 18".

1.4.3 In view of the above, the board concludes that present claim 1 is distinguished from D3 by feature (f), i.e. by a press button, which is, on the one hand, mounted on said undercarriage and, on the other hand, non-rotatably mounted in a central opening of the rotary wheel, and which rests on a central metal dome of a metal dome assembly comprised in the rotary wheel module. Hence, the subject-matter of claim 1 is novel over D3 (Article 54 EPC).

1.4.4 As regards the technical effect of distinguishing feature (f), the board accepts that it reliably and synergistically enables the input device to activate e.g. a confirmation or "OK" command, while ensuring that the central button is readily reachable by the same finger that operates the rotary wheel and that it at the same time prevents symbols printed onto that button from changing their orientation relative to the input device (as derivable from page 3, lines 8-17 and page 6, lines 29-34 of the present description as originally filed).

1.4.5 The objective technical problem to be solved by claim 1 may therefore be framed as "how to adapt the system described in D3 to provide the above-mentioned technical effect".

1.4.6 Starting from the teaching of document D3, the skilled person in the field of computer input devices would notice that the rotary wheel of D3, whose rotation axis is situated parallel to PCB 18 and the corresponding surface on which the input device is operated (see e.g. Fig. 3), enables the user (i) to scroll in the y-axis direction by rotating the wheel to activate a signal

generator such as "encoder 13", (ii) to scroll in the x-axis direction by tilting the wheel to activate "encoder 16" and (iii) to input an extra command by depressing the wheel to activate "micro switch 14" (see e.g. paragraphs [0020] and [0021]).

However, it is evident to the board that there is no hint whatsoever in D3 which would lead the skilled person to even think about the problem of additionally incorporating a press button and ensuring that such a button is readily reachable by the same finger that operates the wheel, while at the same time preventing symbols printed onto that button from changing their orientation relative to the input device. Nor is any motivation or incentive discernible in D3 towards the solution according to feature (f) of claim 1, i.e. mounting such a button on carrier 154 and in a central opening of the wheel such that it rests on a central metal dome of wheel assembly 15.

On the contrary, given that the problem of inputting an additional command, such as a confirmation or "OK" command, is already sufficiently solved in D3 by simply pressing the rotary wheel of wheel assembly 15 (see in particular paragraph [0020], second sentence: *"In addition, when the user presses down on the wheel assembly 15 ... so as to activate the micro switch 14, such that an extra function or command can be further utilized ..."*), there is consequently neither a need nor a desire to additionally insert a press button in a hitherto non-existent opening of the rotary wheel of D3. In any event, due to space constraints, such a specific press button could practically be mounted on wheel assembly 15 and carrier 154 only if the wheel assembly were positioned such that the wheel's rotation axis were perpendicular to both PCB 18 and the

corresponding surface on which the input device is to be operated (see e.g. D3, Fig. 3).

Hence, the board considers that the implementation details according to distinguishing feature (f) cannot be arrived at through mere trial-and-error or normal design procedures, since features (a) to (f) are synergistically interrelated and appropriately reflect the desired technical effect of the claimed invention.

1.5 As a consequence, the board sees no reason why the skilled person, starting from D1 or D3, would (and not only could) come up with the solution of present claim 1. Thus, having regard to the cited prior art, the subject-matter of the sole independent claim of the present main request, i.e. claim 1, is new and involves an inventive step within the meaning of Articles 54 and 56 EPC.

2. Since all the other requirements of the EPC are also found to be fulfilled, the board decides that a patent is to be granted on the basis of the claims of the present main request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent in the following version:

   - Claims 1 to 11, submitted at the oral proceedings before the board;
   - Description:
     - page 1, submitted with letter dated 12 August 2010;
     - page 2, submitted at the oral proceedings before the board;
     - page 2a, submitted with letter dated 12 August 2010;
     - pages 3 to 8, as originally filed;
   - Drawings:
     - sheets 1 to 4, as originally filed.

The Registrar: The Chair:

M. Schalow A. Ritzka

Decision electronically authenticated