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**Datasheet for the decision
of 31 January 2020**

Case Number: T 1912/17 - 3.5.05

Application Number: 05744089.3

Publication Number: 1741088

IPC: G06F3/01, G06F3/033

Language of the proceedings: EN

Title of invention:

FREE SPACE POINTING DEVICES WITH TILT COMPENSATION AND
IMPROVED USABILITY

Patent Proprietor:

IDHL Holdings, Inc.

Opponent:

Movea

Headword:

FREE SPACE POINTING DEVICES WITH TILT COMPENSATION / IDHL

Relevant legal provisions:

EPC Art. 100(a), 56

Keyword:

Inventive step - (no) - obvious alternative

Inventive step - closest prior art discloses features in combination

Decisions cited:

Catchword:



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Case Number: T 1912/17 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 31 January 2020

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 21 June 2017
rejecting the opposition filed against European
patent No. 1741088 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chair A. Ritzka
Members: N. H. Uhlmann
C. Schmidt

Summary of Facts and Submissions

- I. The appeal lies from the decision of the opposition division to reject the opposition to European patent No. 1 741 088.
- II. In the course of the first-instance proceedings, the following documents were referred to:
- A1: US5902968;
A2: US5598187;
A3: Inertial sensor: 3Axis - 2g/6g Linear accelerometer - Product Preview, ST Microelectronics, February 2003;
A4: Low Cost $\pm 2g/\pm 10g$ Dual Axis iMEMS® Accelerometers with Digital Output - ADXL202/ADXL210, Analog Devices, 1999;
A5: US2002/0140745;
A7: US2004/0075650;
A8: Talon Algorithm - Background and Implementation, Hillcrest Communications, 2006.
- III. The opposition division decided that none of the grounds of opposition pursuant to Article 100(a), (b) and (c) EPC prejudiced the maintenance of the patent as granted.
- IV. The opponent, hereinafter "appellant", requested that the decision under appeal be set aside and that the patent be revoked. In its statement setting out the grounds of appeal, the appellant submitted arguments.
- V. In its reply to the appeal dated 16 March 2018, the patent proprietor, hereinafter "respondent", submitted first to fifteenth auxiliary requests and arguments.
- VI. In a letter dated 29 October 2018, the appellant submitted further arguments.

- VII. The board summoned the parties to oral proceedings.
- VIII. In a communication pursuant to Article 15(1) RPBA 2007, the board set out its provisional view of the case.
- IX. By letter dated 10 January 2020, the appellant submitted arguments and a technical datasheet of the sensor HMC2003.
- X. On the same day, the respondent submitted arguments and a schematic drawing explaining yaw, pitch and roll angles.
- XI. Oral proceedings were held on 31 January 2020.
- XII. The appellant requested that the decision under appeal be set aside and that European patent No. 1 741 088 be revoked.
- XIII. The respondent requested that the appeal be dismissed, i.e. that the patent be maintained as granted (main request), or that the patent be maintained on the basis of one of auxiliary requests 1 to 15, all filed with the letter dated 16 March 2018.
- XIV. Claim 1 of the patent as granted reads as follows:
"A handheld, pointing device (400) comprising:

a first rotational sensor (502) for determining rotation of said pointing device about a first axis and generating a first rotational output (α) associated therewith;

a second rotational sensor (504) for determining rotation of said pointing device about a second axis and generating a second rotational output (α) associated therewith;

a three-axis accelerometer (506) for determining an acceleration of said pointing device and outputting an acceleration output (x,y,z) associated therewith; and

a processing unit (800) for receiving said first and second rotational outputs and said acceleration output and for:

- (a) determining a tilt (θ) relative to gravity associated with an orientation in which said handheld pointing device is held, wherein said tilt is determined based upon the acceleration output,
- (b) converting said first and second rotational outputs from a body frame of reference associated with said handheld pointing device into a user's frame of reference in order to remove the effects of said determined tilt; and
- (c) determining data associated with x and y coordinates which are in turn associated with movement of a screen cursor (410) said data based on said converted first and second rotational outputs, wherein said step of converting renders said movement of said screen cursor independent of said tilt."

XV. Claim 4 of the patent as granted reads as follows:

"A method for operating a free space pointing device (400) comprising the steps of:

determining, using a three-axis accelerometer (506) a tilt θ relative to gravity associated with an orientation in which said free space pointing device is held;

detecting, using first and second rotational sensors (502,504) rotational movement (α_y, α_z) of said free space pointing device about a first axis and a second axis respectively; and

transforming said detected movement from a body frame of reference associated with said free space pointing device into an inertial frame of reference,

wherein the transforming includes compensating said detected rotational movement to correct the detected rotational movement for said determined tilt."

- XVI. In auxiliary requests 1, 3, 5, 7, 9, 11, 13 and 15, the acknowledgement of prior-art document A2 on page 9a of the application documents intended for grant has been amended.
- XVII. In auxiliary requests 2, 3, 6, 7, 10, 11, 14 and 15, pages 15 and 23 of the application documents intended for grant have been amended.
- XVIII. Claim 1 of each of auxiliary requests 4 to 7 and 12 to 15 specifies that the device is a "free space pointing device".
- XIX. Claims 1 and 4 of each of auxiliary requests 8 to 15 additionally specify that the determined acceleration comprises an acceleration of the pointing device due to gravity.

Reasons for the Decision

The patent in suit pertains to a handheld pointing device and a method for operating such device. In particular, rotation about two axes and acceleration on three axes are determined. Based on the acceleration, tilt relative to gravity is determined and used for converting the rotation information from a body frame of reference associated with the handheld device to a user's frame of reference, to remove the effects of the tilt.

Main request of the respondent

1. Ground of opposition pursuant to Article 100(a) EPC in combination with Article 56 EPC

1.1 Claim interpretation

The board considers that according to the independent claims, the outputs of the rotational sensors are converted (claim 1) or transformed (claim 4) from a body frame of reference associated with the pointing device into a user's/inertial frame of reference, in order to remove the effects of (claim 1) or to correct/compensate for (claim 4) the determined tilt. The tilt relative to gravity is determined based on the output of the accelerometer. From this it is clear that the compensation is based on the output of the accelerometer, while the result of the compensation, i.e. the rotational outputs in the user's frame of reference, is based on the output of both the rotational sensors and the accelerometer.

1.2 The board holds that document A5 is the most suitable starting point for the inventive-step analysis of the subject-matter of both independent claims 1 and 4, in particular in view of the similarities regarding tilt determination and transformation of a rotational movement.

The respondent argued that A5 disclosed only a device used for "pointing towards an object of interest". However, A5 also discloses using the device to move a cursor (Figures 54-61), similar to the subject-matter of claim 1. Claim 4 does not define any specific use of the transformed movement values.

The respondent further submitted that "A5 discloses the use of magnetometers to determine attitude, not rotational movement".

This argument is not convincing, because according to A5, paragraphs 84 and 85, "attitude is a combination of two angular measures". Moreover, claim 1 of the patent in suit does not relate to rotational movement, but to "rotational output", which comprises two angles, alpha y and alpha z, and is very similar to the teaching of A5.

Claim 4 actually refers to "detecting ... rotational movement", however dependent claim 5 clearly states that the rotational movement comprises the same two angles, alpha y and alpha z.

- 1.3 Document A5 discloses solid state accelerometer tilt sensors that output angles of tilt (paragraph 164, last two sentences). In view of Figure 7 and paragraph 165, the two angles, phi and theta, anticipate the tilt relative to gravity as claimed.

Angles phi and theta are used for transforming the magnetic readings X, Y and Z back to the horizontal plane, to compensate for tilt (paragraph 165).

Based on the magnetic readings, a direction around a vertical axis is determined, using an arctan function (paragraph 165). For this purpose, and because pointing actions can be monitored and measured (paragraph 162), a first rotational sensor for detecting rotational movement about a first axis is disclosed. Figures 54 and 61 confirm this understanding.

- 1.4 Hence, document A5 does not disclose the following features of claim 4:

(A5-d1) the accelerometer is a three-axis accelerometer;

(A5-d2) a second rotational sensor for detecting rotational movement about a second axis.

- 1.5 The respondent argued that A5 comprised two separate, distinct and mutually exclusive disclosures: an embodiment described in the relevant parts in paragraphs 159 to 167 and an illustrative example described in paragraphs 363 to 381.

In the board's view, these two parts of the teaching of document A5 are not mutually exclusive. Paragraph 363 clearly states that the illustrative examples are based on the explanations set out in the previous sections of this document: "disclosure is now further improved with a few illustrative examples". Moreover, paragraph 375, which specifically pertains to changing the position of a cursor, sets out that "the attitude determining means" are used. These means are described in section A) II 1. D of A5, i.e. in paragraphs 159 ff. Consequently, the two disclosures to which the respondent referred are neither separate nor distinct; rather, they belong together.

- 1.6 The respondent submitted that document A5 did not disclose the detection of a rotational movement, but only of a direction as such.

The parties discussed extensively to what extent the independent claims require that movement, i.e. change of direction, be detected. The board holds that this question is not of decisive importance, because document A5 discloses the detection of rotational movement, as stated in claim 4 and described in the patent in suit.

Paragraph 378 of A5 discloses that rotational movements of the mobile unit cause various scroll activities on the display. It is clear that these rotational movements have to be detected, otherwise they cannot cause any activities. In this regard, paragraph 375 teaches that the mobile unit is rotated by

approximately ten degrees, and this rotational displacement is detected via the attitude determining means.

- 1.7 The respondent's argument that the tilt and the compensation of it were only relevant in the mode of operation described in paragraphs 159 ff is not convincing. The respondent explained that when the display is on the device, the user did not expect any tilt to be compensated. The board agrees that when the mobile of Figure 54 was tilted, then both the sensors and the screen with the icons were tilted, hence no compensation was needed.

However, when rotation about two axes takes place (Figures 60 and 61), then tilt compensation is again needed, for the same reasons as in the patent in suit. That the display is on the device does not change the user's expectation that the cursor should move in the same direction as the user moves their hands, independently of the holding position.

- 1.8 The respondent submitted that in the special selection mode of A5 (paragraphs 378 to 381), "no regard is given to objects being addressed and no database searches are necessary", and that "no magnetic readings are required". However, in this same selection mode, rotational displacement has to be detected, see section 1.6 above.

- 1.9 With regard to distinguishing feature (A5-d1), the board notes that the claims do not assign any particular significance to the three-axis property of the accelerometer. Moreover, for determining the two angles ϕ and θ in A5, clearly a three-axis accelerometer would be needed. Finally, such sensors

were readily available on the market at the priority date.

For these reasons, feature (A5-d1) does not contribute towards inventive step.

- 1.10 Concerning distinguishing feature (A5-d2), the following is noted.
 - 1.10.1 Paragraphs 380 and 381 and Figures 60 and 61 of A5 disclose that angular rotation in a further, second plane, i.e. rotation characterised as pitch, is detected and used to cause additional functions. In particular, a cursor is moved in two orthogonal directions.
 - 1.10.2 Furthermore, according to paragraphs 162 and 165, a three-axis magnetic compassing sensor is used, which senses Earth's magnetic field along three magnetic axes.
 - 1.10.3 Consequently, document A5 discloses the detection of rotational movements about two axes, albeit by one sensor. Differently, claim 4 states that first and second rotational sensors are used.
 - 1.10.4 The board holds that this difference relates to an alternative implementation and does not lead to any technical effect.
 - 1.10.5 The board notes that according to document A5, paragraph 162, the magnetic sensor HMC2003 is used. Consequently, the skilled person would consult the documentation of this sensor, when facing the problem of developing an alternative implementation of the rotational movement sensor. The technical datasheet of HMC2003, submitted by the appellant with its letter dated 10 January 2020, describes that the "three axis magnetic sensor hybrid uses three permalloy magneto-

resistive sensors". These three sensors are sensitive to magnetic fields along three axes (first paragraph on page 3). Hence, this technical datasheet teaches that the sensor referred to in A5 in fact comprises three sensors. Consequently, the disclosure of document A5, as supplemented by this sensor description, anticipates feature (A5-d2).

- 1.10.6 The board notes that the technical datasheet submitted by the appellant was published after the priority date of the patent in suit. However, the sensor HMC2003 was clearly available before that date, and the board does not see any reason to doubt that the datasheet correctly describes this sensor. The respondent did not submit any counter-arguments.
- 1.10.7 For these reasons, feature (A5-d2) does not contribute towards inventive step.
- 1.11 The board considers that the distinguishing features (A5-d1) and (A5-d2) do not lead to any combined technical effect.
- 1.12 Consequently, the subject-matter of claim 4 does not involve an inventive step, Article 56 EPC.
- 1.13 Document A5 discloses a handheld pointing device and that a cursor is moved in two directions, based on the converted rotational values, see sections 1.5, 1.7 and 1.10.1 above. Hence, for the reasons as explained above, the subject-matter of claim 1 does not involve an inventive step, Article 56 EPC.
2. Since the subject-matter of claims 1 and 4 of the main request lacks inventive step, the other grounds of opposition do not need to be discussed.

Auxiliary requests 1 to 15 of the respondent

3. Ground of opposition pursuant to Article 100(a) EPC in combination with Article 56 EPC

3.1 The auxiliary requests are based on different combinations of four amendments to the claims or the description of the patent.

The board holds that the subject-matter of the independent claims of these auxiliary requests does not involve an inventive step, in view of the arguments set out above and of the following explanations.

3.2 The amendment on page 9a of the application documents intended for grant concerns the presentation of the relevant prior art and does not have any impact on the subject-matter of the claims.

This amendment forms part of all the auxiliary requests with uneven numbers.

3.3 The amendments on pages 15 and 23 of the application documents intended for grant concern explanations of certain expressions in the claims. These explanations are of no relevance for the line of argument on inventive step with regard to the main request.

These amendments form part of auxiliary requests 2, 3, 6, 7, 10, 11, 14 and 15.

3.4 Specifying that the claimed device is a "free space" device does not introduce any distinguishing feature, because A5 clearly discloses a free space pointing device.

This amendment forms part of auxiliary requests 4 to 7 and 12 to 15.

3.5 That the determined acceleration comprises an acceleration of the pointing device due to gravity does not contribute towards inventive step, because document A5 discloses in paragraph 164 the use of a solid state accelerometer that measures the Earth's gravitational field.

This amendment forms part of auxiliary requests 8 to 15.

4. As a conclusion, for the reasons given above, none of the requests of the respondent/patent proprietor is allowable.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The patent is revoked.

The Registrar:

The Chair:



A. Chavinier-Tomsic

A. Ritzka

Decision electronically authenticated