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**Datasheet for the decision
of 14 October 2011**

Case Number: T 0659/09 - 3.5.03

Application Number: 00122917.8

Publication Number: 1199867

IPC: H04M 1/60, H04M 1/05

Language of the proceedings: EN

Title of invention:
Mobile terminal and headset

Applicant:
Sony Deutschland GmbH

Opponent:
-

Headword:
Mobile terminal/SONY

Relevant legal provisions:
EPC Art. 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Inventive step (main request) - yes"

Decisions cited:
-

Catchword:
-



Case Number: T 0659/09 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 14 October 2011

Appellant:
(Applicant)

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 13 October 2008
refusing European patent application
No. 00122917.8 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: A. S. Clelland
Members: T. Snell
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division refusing European patent application No. 00122917.8, with publication number EP-A-1199867. The decision was based on the ground that the subject-matter of claim 1 did not meet the requirement of inventive step under Article 56 EPC with respect to the disclosure of the document US-A-6122369 (D1) combined with the skilled person's common general knowledge.

II. The appellant requested that the decision be set aside and a patent granted on the basis of the claims on which the impugned decision was based, or, as an auxiliary request, of an amended claim set filed with the statement of grounds.

Oral proceedings were conditionally requested.

III. In a communication pursuant to Rule 100(2) EPC, the board indicated that although it was not convinced by the reasons given by the examining division with respect to inventive step, it was unable to accede to either of the appellant's requests for grant of a patent in view of, *inter alia*, objections related to a lack of clarity of claim 1 (Article 84 EPC).

IV. With a letter dated 31 August 2011, the appellant submitted amended claim sets of main and auxiliary requests. The appellant requested that a patent be granted on the basis of the claims of either the main or the auxiliary request. Both requests include the following pages of description and sheets of drawings:

Description:

Pages 5-9 as originally filed

Pages 1-4 as filed on 13 May 2005

Page 1a as filed on 23 November 2006

Pages 1b, 1c as filed on 26 October 2007

Drawings:

Sheets 1/2 and 2/2 as filed 18 January 2001

V. Claim 1 of the main request reads as follows:

"Mobile terminal (1) for a wireless communication system, with an internal loudspeaker (2) for outputting acoustic signals, an internal microphone (3; 23) for receiving acoustic signals, a connection means (4) for connecting an external headset (10) comprising a headset loudspeaker (12) and headset microphone (13; 42), a processing means (5) for operating the internal loudspeaker (2) and the internal microphone (3; 23) or an external headset (10) if connected to said connection means (4), a switch means (6; 26) for selectively connecting the processing means (5) to said internal loudspeaker (2) and said internal microphone (3, 23) or to an external headset (10) if connected to said connection means (4), whereby the processing means (5) comprises a detecting means (7) which is connected to a connection port (44) between said switch means (26) and said internal microphone (3, 23), whereby said internal microphone (23) is connectable to a positive (20) and a negative (21) microphone line to supply said acoustic signal to the processing means, whereby a first resistor (29) is connected between a bias voltage and the positive microphone line (20), and a second resistor (39) having the same resistance value as the

first resistor is connected between the negative microphone line (21) and ground potential, whereby said first and second resistor each have half the impedance value of the internal microphone (23), and whereby said detecting means (7) comprises a detection circuit (31, 32, 33) being adapted to detect if the external headset (10) is connected and to detect the operation state of said external headset on the basis of a variation of the potential detected in the connection port (44), whereby said processing means (5) is adapted to control the operation of the mobile terminal (1) and the connected external headset (10) on the basis of the detection result."

VI. In view of the board's decision, there is no need to reproduce claim 1 of the auxiliary request.

VII. This decision additionally refers to the following documents from the examining procedure:

D2: WO-A-99/03294

D3: US-A-5596638

D4: EP-A-0606996

D5: US-A-5859522

D6: US-A-5783926

D7: EP-A-0930802 (this document was referred to in the impugned decision and has been numbered by the board).

Reasons for the Decision

Main request

1. *Article 123(2) EPC*

Claim 1 is based on claims 1-3 and 7 as filed together with paragraph [0024] and figure 2 of the description as filed (referring to the published application EP-A-1199867). Claims 2-9 correspond to claims 4, 5, 6, 8, 9, 11, 13 and 14 as filed, respectively. Claims 1 to 9 therefore comply with Article 123(2) EPC.

2. *Article 84 EPC*

The board considers that, following amendment, the claims of the main request are clear within the meaning of Article 84 EPC.

3. *Rule 43(1) EPC*

The board agrees with the appellant (cf. the statement of grounds) that the two-part form of claim 1 would not be appropriate as it would involve a convoluted reformulation detrimental to the clarity of the claim.

4. *Inventive step (Articles 52(1) and 56 EPC)*

- 4.1 The present invention relates to a mobile terminal with connection means for connecting an external headset. The mobile terminal comprises means for determining whether a headset is connected and the operation state of the headset (eg whether the microphone is active), enabling the operation of the mobile terminal and

headset to be controlled accordingly, eg by controlling the microphone sensitivity.

4.2 Document D1 is regarded as representing the closest prior art.

Using the wording of claim 1 of the main request, D1 discloses a mobile terminal for a wireless communication system (cf. Fig. 3), with an internal loudspeaker (SPK1) for outputting acoustic signals, a connection means (80) for connecting an external headset (90) comprising a headset loudspeaker (SPK2) and headset microphone (MIC2), a processing means (25, 35, 12, 14) for operating the internal loudspeaker and the internal microphone or an external headset if connected to said connection means, a switch means (implicitly comprised between terminals 2 and 3 of connector 80, cf. col. 3, lines 59-61 and Fig. 3) for selectively connecting the processing means to said internal loudspeaker and said internal microphone or to an external headset if connected to said connection means, whereby the processing means comprises a detecting means (25) which is connected to a connection port (terminal 2 of connector 80) between said switch means and said internal microphone (MIC1), whereby said internal microphone is connectable to a positive (terminal 3 of connector 80) and a negative (earth potential) microphone line to supply said acoustic signal to the processing means, whereby a first resistor (R1, R2, R4) is connected between a bias voltage (VCC) and the positive microphone line [NB: Fig. 3 of D1 does not clearly

indicate that the lower terminal of resistor R2 is connected to connector terminal 3 but this is assumed here for the sake of argument], and whereby said detecting means comprises a detection circuit (Fig. 2: "earphone microphone detector" 20, Fig. 3: 25) being adapted to detect if the external headset is connected on the basis of a variation of the potential detected in the connection port (terminal 2 of connector 80; cf. col. 3, lines 59-64), whereby said processing means is adapted to control the operation of the mobile terminal and the connected external headset on the basis of the detection result.

4.3 The subject-matter of claim 1 differs from the disclosure of document D1 in the following respects:

(i) a second resistor having the same resistance value as the first resistor is connected between the negative microphone line and ground potential, whereby said first and second resistor each have half of the impedance value of the internal microphone;

(ii) the detection means is adapted to detect whether the external headset is connected and to detect the operation state of the external headset from the variation of the potential in the connecting port between the switch and the internal microphone. In contrast, in accordance with D1, the detection means 25 detects whether the external headset is connected from the variation of the potential in the connecting port between the switch and the internal microphone (port 2 of connector 80; cf. col. 3, lines 59-64) but the detection means 35 detects an operation state of the external headset (Fig. 2: "earphone key sensing

circuit" 30; Fig. 3: 35; cf. col. 4, lines 59-62) from a variation of the potential on the opposite side of the switch (port 3 of connector 80), ie not between the switch and the internal microphone.

4.4 As to the technical effects of these distinguishing features: Feature (i) results in a symmetrical biasing circuit and hence a balanced microphone output signal, which plausibly provides an improved noise performance. Features (i) and (ii) in combination achieve a simplification of the biasing and detecting means since they have the effect that both the connection state and operation state are determined from the variation of a single potential (as already stated, in D1, the potential values at both sides of the switch means of connector 80 are required to be detected). Moreover, the chosen resistor values result in advantageous threshold levels for the detection circuit (cf. paragraph [0026] of the description).

4.5 The problem to be solved by the above features starting out from document D1 is regarded as being to provide a simplified circuit with improved noise performance.

4.6 In order to achieve an improved noise performance, the skilled person making use of common general knowledge might arguably be aware that a symmetrical biasing circuit may be used to provide a balanced microphone output with an improved noise performance as compared with an unbalanced circuit. On the other hand, the board notes that all four documents at its disposal with detector means for detecting whether a headset is connected and/or detecting the operation state of the headset make use of an unbalanced microphone output

configuration (cf. D1, Figs. 2 and 3; D2, Fig. 2; D3, Fig. 1; D4, Fig. 5 and col. 5, lines 5-7 and 47-49). In this light, there has to be doubt whether the skilled person would regard the use of a balanced configuration as obvious for this application.

However, even if for the sake of argument it was considered obvious to bias the microphone lines so as to provide a balanced output (eg by adding a resistor with a value equal to $R1+R2+R4$ between the microphone and ground potential), the skilled person starting out from document D1 would have to take three further steps to arrive at the subject-matter of claim 1, namely (i) dimensioning the biasing resistors such that each has half the impedance value of the internal microphone, (ii) compensating for the effect this will have on the voltage measurements at ports 2 and 3 of connector 80 and thus on the operation of detectors 25 and 35, and (iii) arranging the circuit 35 to detect the variation of the potential at port 2 of connector 80 instead of port 3. In the board's view the skilled person using common general knowledge would be unlikely to take these three steps since a different detection concept would be required to that used in D1, namely discerning different voltage levels at a single output point to determine both whether a headset is connected and the operation state of the headset. The subject-matter of claim 1 therefore involves an inventive step with respect to document D1 (Articles 52(1) and 56 EPC).

4.7 Other documents:

D2 discloses a circuit for detecting an "off-hook" state of a connected headset. The microphone output is unbalanced.

D3 discloses a circuit for detecting whether a headset is connected but samples voltage from a different switch to that connected to the internal microphone. The microphone output is unbalanced.

D4 discloses a circuit for detecting whether a headset is connected and samples voltage from the switch in the headset connector (fig 4), but the internal microphone ("transmitter") feeds a signal into an entirely different circuit point.

D5 and D6 concern voltage detection means for detecting accessories plugged into a mobile terminal, including a microphone and speaker. However, no biasing circuit for a microphone is shown.

D7 discloses a microphone with a symmetrical biasing circuit. However, it is unrelated to the problem of enabling an external headset to be connected and controlled.

None of these documents therefore either alone or in combination with D1 would lead the skilled person to the subject-matter of claim 1.

4.8 The board therefore concludes that claim 1 of the main request meets the requirement of an inventive step (Articles 52(1) and 56 EPC). As claims 2 to 9 are

dependent on claim 1, they equally meet the requirement of an inventive step.

Auxiliary request

As the claims of the main request are allowable there is no need to consider the claims of the auxiliary request.

Description and drawings

The board has not examined whether the description and drawings require any amendment to comply with the EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a patent on the basis of the claims of the main request filed with letter dated 31 August 2011 and a description and drawings to be adapted as necessary.

The Registrar:

The Chairman:

G. Rauh

A. S. Clelland