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Datasheet for the decision of 24 March 2025

Case Number: T 1060/21 - 3.5.06

Application Number: 15892871.3

Publication Number: 3291050

IPC: G06F1/32, H02J7/00, G06F1/26

Language of the proceedings: EN

Title of invention:
OTG PERIPHERAL DEVICE, POWER SUPPLY METHOD, TERMINAL AND SYSTEM

Applicant:
Honor Device Co., Ltd.

Headword:
OTG peripheral/HONOR

Relevant legal provisions:
EPC Art. 84, 56

Keyword:
Claims - clarity (yes)
Inventive step - (yes) - over the only document relied upon in the decision
Remittal to the department of first instance

Decisions cited:

Catchword:

Europäisches Patentamt
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Office européen des brevets

Beschwerdekammern

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Case Number: T 1060/21 - 3.5.06

D E C I S I O N
of Technical Board of Appeal 3.5.06
of 24 March 2025

Appellant: (Applicant)	Honor Device Co., Ltd. Suite 3401, Unit A, Building 6 Shum Yip Sky Park, No. 8089 Hongli West Road Xiangmihu Street Futian District Shenzhen, Guangdong 518040 (CN)
Representative:	Roth, Sebastian Mitscherlich PartmbB Patent- und Rechtsanwälte Karlstraße 7 80333 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 29 January 2021 refusing European patent application No. 15892871.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Müller
Members:	G. Zucka
	K. Kerber-Zubrzycka

Summary of Facts and Submissions

I. The appeal is against the decision by the examining division, dispatched with reasons on 29 January 2021, to refuse European patent application 15892871.3, on the basis that neither request on file satisfied the requirements of Article 56 EPC in view of the following document:

D1: EP 2 746 959 A1.

II. A notice of appeal was received on 8 March 2021, the appeal fee being paid on the same day. A statement of grounds of appeal was received on 21 May 2021.

III. The appellant requested that the decision under appeal be set aside and a patent granted on the basis of claims 1 to 13 of the main request or claims 1 to 6 of auxiliary request 1 that were the object of the refusal, both having been filed on 6 November 2020, or claims 1 to 7 of auxiliary request 2 filed with the statement of grounds of appeal. The appellant made a conditional request for oral proceedings.

IV. The board issued a communication setting out its preliminary opinion on the appeal. With its response received on 22 January 2025, the appellant filed claims for a new main and five auxiliary requests.

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

"A system comprising an On-The-Go, OTG peripheral (100) and a terminal (200), the On-The-Go, OTG peripheral (100), comprising:

a delay conduction circuit (104), a detection circuit (105), a first USB interface (101), a power interface (102), a second USB interface (103), wherein the terminal (200) is connectable to the first USB interface (101) and configured to selectively supply or stop supplying power to the second USB interface (103), wherein

the delay conduction circuit (104) comprises a switch circuit and a delay circuit, where the delay circuit controls a conduction time of the switch circuit;

the first USB interface (101) is connected to the second USB interface (103), and an ID pin of the first USB interface (101) is connected to a low level;

the power interface (102) is connected to a power pin of the first USB interface (101) by using the delay conduction circuit (104) and when the switch circuit is on, a circuit between the power interface (102) and the power pin is a closed circuit; or when the switch circuit is cut off, the circuit between the power interface and the power pin is an open circuit, and the power interface (102) is configured to: supply power to the first USB interface (101) after a preset delay time after the power interface (102) is switched to a powered on state;

the detection circuit (105) is separately connected to the ID pin of the first USB interface (101) and a VBUS pin of the power interface (102), and the detection circuit (105) is configured to: output a high-level pulse to the ID pin of the first USB interface (101) when it detects that the power interface (102) is switched to the powered on state or is switched to a powered off state, so as, if the power interface is switched to the powered on state and the terminal (200) is connected to the first USB interface (101), to trigger the terminal (200) to stop supplying

power to the second USB interface (103) and, if the power interface is switched to the powered off state and the terminal (200) is connected to the first USB interface (101), to trigger the terminal (200) (101) to supply power to the second USB interface (103);

the power interface (102) is connected to a power pin of the second USB interface (103) and is configured to supply power to the second USB interface (103) after the power interface (102) is powered on; and

wherein the OTG peripheral (100) further comprises a unilateral conduction component (108), wherein the unilateral conduction component (108) is connected in series between the detection circuit and the ID pin of the first USB interface (101), and the unilateral conduction component (108) is configured to prevent a current caused by the high-level pulse output by the detection circuit (105) from flowing to the first USB interface (101)."

VI. The remaining claims, i.e. claims 2 to 13, of the main request are dependent on claim 1.

VII. The wording of the claims of the auxiliary requests is not relevant for the present decision.

VIII. The further text on file is:

description pages
9 to 24 filed with entry into the regional phase before the EPO;
1 to 6 received on 6 November 2020 for the main request,
1 to 6 received on 6 November 2020 for auxiliary request 1;

drawing sheets
1 to 7 filed with entry into the regional phase before the EPO.

It is noted that the applicant had filed separate new description pages 1 to 6 for each of the main request and auxiliary request 1. No new description pages had however been filed for present auxiliary request 2.

Reasons for the Decision

1. *The application*

The application relates to a USB On-The-Go (OTG) peripheral device (description [0001]).

According to the description (par. [0003]), the problem is that such an OTG peripheral can drain the power of the host device ("intelligent terminal") to which it is connected, necessitating a removal of the OTG device in order to charge the host. This causes an interruption of the OTG communication between the intelligent terminal and the peripheral.

The ostensible assumption made in this passage is that in practice such intelligent terminals, e.g. many existing smartphone models, cannot at the same time be charged and maintain OTG communication with the peripheral. The reason for this is that only one USB port is usually available on the smartphone, and that port can only carry out one of both functions at any given time.

It is understood that the features in claim 1 intend to address this problem.

2. *Main request - clarity; Article 84 EPC*

Regarding claim 1 of the previous main request, the board had raised a number of clarity issues under point 4 of its communication. The board is satisfied that these were dealt with in an appropriate manner by the amendments introduced in claim 1 of the present main request.

2.1 The term "delay conduction circuit" in said earlier claim 1 was not known in the prior art, hence rendering the claim unclear. Claim 1 now states that the delay conduction circuit comprises a switch circuit and a delay circuit, where the delay circuit controls a conduction time of the switch circuit, thereby solving the clarity issue.

2.2 A similar issue existed for the term "unilateral conduction component". The board accepts the appellant's argument (response of 22 January 2025, page 4, second paragraph) that the term is self-explanatory, also because the claim now specifies that the unilateral conduction component is configured to prevent a current caused by the high-level pulse output by the detection circuit from flowing to the first USB interface.

The board also accepts the appellant's argument (*ibid.*, penultimate paragraph) that an active diode or an ultra low voltage drop diode may be used to perform the function of a unilateral conduction component.

2.3 As claim 1 was previously formulated, it was not clear whether the "terminal" was part of the claimed device. This has been resolved by directing the claim to a system which explicitly comprises the terminal.

2.4 The expression "when it is detected" has now been replaced by "when it detects", to make clear that it is the detection circuit which does the detection.

2.5 The board agrees that "the high-level pulse output by the detection circuit" on the penultimate line of claim 1 is defined in the sixth paragraph of the claim.

3. *Main request - inventive step; Article 56 EPC*

3.1 Document D1 was used as a starting point for an inventive step analysis in the reasons for the appealed decision.

3.2 D1 discloses a USB peripheral (figure 1: charging hub 100) with a first USB interface (101), a power interface (power supply 104), a second USB interface (102), and a terminal (figure 3: mobile device 300) connected to the first USB interface (101).

The peripheral selectively supplies or stops supplying power to the second USB interface (using the switch 401 in figure 6; see [0034]).

Figures 3, 4 and 6 of D1 show some kind of connection between the second USB interface (102) and the first USB interface (101).

The power interface (104) is connected to a power pin of the first USB interface (101) (figures 3, 4 and 6).

The power interface (104) is connected to a power pin of the second USB interface (102) (figures 3, 4 and 6; in figures 4 and 6, the connection is via the switch 401, i.e. it is not permanent).

3.3 The following pertinent differences therefore exist between the subject-matter of claim 1 and the device disclosed by D1:

(a) The claimed system comprises an OTG peripheral.

According to the appealed decision (section 13.1, second to fifth line), the description of D1 states that the hub is configured to operate with OTG enabled devices and mentions a connection to OTG ID pins.

The hub of D1 does mention a connection to ID pins of the mobile device, and these are used to prompt the mobile device to act as a USB host (see par. [0015]). This arguably indicates that said ID pins are USB OTG ID pins and the mobile device is an OTG enabled device.

However, the hub itself, which is mapped to the peripheral of claim 1, is not an OTG peripheral. Par. [0015] in D1 for instance says that the USB OTG Host Negotiation Protocol is not used. Par. [0016] says that the requirements of OTG are avoided. Par. [0038] says that the physical and controller changes associated with OTG USB functionality are avoided.

(b) The claimed system comprises a "delay conduction circuit".

This was not disputed.

(c) The claimed system comprises a detection circuit as claimed.

According to the appealed decision (section 13.1), the control circuit 103 in figure 1 of D1 corresponds to the detection circuit of claim 1. Amongst the reasons given in section 14.1 of the decision it is stated that claim 1 did not specify that it is the circuit which performs a detection and that "the mere knowledge of the control circuit in which state the power switching is (which knowledge is implicit since it is the circuit itself that performs the switching) corresponds to the detection itself".

The former was however a clarity problem in claim 1. The claim presently clearly states that it is the detection circuit which detects that the power interface is switched to the powered on state or to a powered off state.

With the latter the board disagrees. The control circuit "knowing" that the power interface is switched to the power on state because it has controlled the switching itself does not read on the control circuit "detecting" the power on state.

(d) An ID pin of the first USB interface is connected to a low level.

According to the reasons for the appealed decision (13.1), this feature is an implicit part of the OTG specification. The arrangement of D1, however, does

not follow the OTG specification, as indicated above.

(e) The connection between the power interface and the power pin of the first USB interface uses a "delay conduction circuit".

This was not disputed.

(f) The power interface is configured to supply power to the first USB interface after a preset delay time.

This was not disputed.

(g) The detection circuit is separately connected to the ID pin of the first USB interface and a V_{BUS} pin of the power interface, and the detection circuit is configured to output a high-level pulse to the ID pin of the first USB interface when it detects that the power interface is switched to the powered on state or is switched to a powered off state, so as, if the power interface is switched to the powered on state, to trigger the terminal to stop supplying power to the second USB interface and, if the power interface is switched to the powered off state, to trigger the terminal to supply power to the second USB interface.

According to the reasons for the appealed decision (13.1, last 6 lines on page 5 and first 4 lines on page 6), only figure 2 and par. [0027] in D1 are referred to as disclosing supplying a high signal to the ID line when the power supply is switched from on to off or from off to on, and both actions triggered by the switching.

It is however apparent that (1) the high signal 204 in D1 is generated by the control circuit 103 as a function e.g. of a "USB device-sourced signal" (see [0031]) rather than a closing of the switch of the power supply, and (2) the high signal in D1 controls the switch 401 (see e.g. D1, claims 5 and 11). In other words, no (further) switch is controlled by switching the power supply from off to on or from on to off.

More specifically, D1 does not disclose a power connection from the mobile device to the second USB interface, and certainly not that such a power connection is controlled in response to a power supply being switched on or off, so that the mobile device *does not* provide power to the second USB device if the power supply is switched *on* and vice versa.

(h) The peripheral further comprises a "unilateral conduction component", connected in series between the detection circuit and the ID pin of the first USB interface and configured to prevent a current caused by the high-level pulse output by the detection circuit from flowing to the first USB interface.

This was not disputed.

3.4 As is apparent from the above, an essential difference between the subject-matter of claim 1 of the main request and the device disclosed by D1 is that the former comprises an On-The-Go (OTG) peripheral.

3.5 The skilled person might arguably decide to transform the hub of D1 into an OTG USB hub, because an OTG USB hub would provide added possibilities when USB OTG enabled devices are connected to it.

3.6 The essential difference between the subject-matter of claim 1 and such a modified hub would then be that the former contains a detection circuit which detects that the power interface is switched to the powered on state or to a powered off state, together with an arrangement which allows a selective provision of power from a terminal connected to a first USB interface to a second USB interface, depending on such detection.

3.7 Within the context of the application, these features prevent power being drained (through the terminal) unnecessarily from the first USB interface by the second USB interface when the terminal is connected to the first USB interface, namely when power is available from the power interface.

D1 is, however, not concerned with the provision of power to the second USB interface or the corresponding drain on the mobile device. Rather, it is concerned with the question of how to provide power to the mobile device notwithstanding its role as the host (see [0015]). Therefore, when the power supply 104 is connected to any USB interface at all, it is always connected to the first USB interface (see figures 3, 4 and 6) and in some it is also connected to the second USB interface (see figure 4).

Hence, whenever the power supply in D1 is connected, there is no power drain on the mobile device. The V_{BUS} of both the USB device and the upstream USB port are nominally at 0 V (see D1, figure 5). This means that,

whenever a connection exists between the 5 V power supply and either the mobile device alone or both the mobile device and the USB hub, current will flow (at least) to the mobile device. Only if no such connection exists (i.e. when the switch 401 is open in figure 6 of D1), would it be possible, in case the actual voltage on the V_{BUS} of the mobile device is slightly higher than that of the USB hub, as may happen in practice, that the USB hub would receive some power from the mobile device. This means that the problem is already solved in D1 in a different manner.

The objective technical problem solved by said distinguishing features with regard to the hub of D1, modified to be an OTG hub, would then be to provide an alternative solution to said power drain problem.

3.8 The board considers that it would not be obvious for the skilled person to provide the claimed alternative solution which introduces, among other things, a detection circuit in the hub of D1, given that this would complicate the arrangement of D1 without any apparent additional benefit.

3.9 For this reason, the board judges that the subject-matter of claim 1 of the main request does not lack an inventive step over the disclosure of D1 alone (Article 56 EPC).

3.10 The examining division may arrive at the same or a different conclusion in view of other documents cited during the first instance proceedings or otherwise available to the division.

4. *Auxiliary requests*

Given the above findings, it is not considered necessary to discuss the claims of the auxiliary requests.

Order

For these reasons it is decided that:

1. The appealed decision is set aside.

2. The case is remitted to the examining division for further prosecution.

The Registrar: The Chairman:

L. Stridde Martin Müller

Decision electronically authenticated