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**Datasheet for the decision
of 27 May 2010**

Case Number: T 1581/07 - 3.4.02

Application Number: 04090199.3

Publication Number: 1477834

IPC: G02B 6/42

Language of the proceedings: EN

Title of invention:

Optical module capable of facilitating release from locking state with cage which accommodates optical module

Applicant:

NEC CORPORATION

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56, 54(3)(4)

Relevant legal provisions (EPC 1973):

EPC Art. 54(1)(2)(3)

Keyword:

"Inventive step: yes"

Decisions cited:

-

Catchword:

-



Case Number: T 1581/07 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 27 May 2010

Appellant: NEC CORPORATION
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Tokyo 108-01 (JP)

Representative: Wenzel & Kalkoff
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 30 March 2007
refusing European patent application
No. 04090199.3 pursuant to Article 97(1) EPC
1973.

Composition of the Board:

Chairman: A. G. Klein
Members: M. Stock
D. S. Rogers

Summary of Facts and Submissions

I. The appellant has appealed against the decision of the examining division refusing European patent application number 4 090 199.3 on the grounds that certain claims lacked clarity within the meaning of Article 84 EPC 1973 and that the claimed subject-matter was not novel and lacked an inventive step within the meaning of Articles 54 and 56 EPC 1973, respectively, in view of the following documents:

D1: DE 100 55 683 A1
D2: US 2001/0016442 A1
D3: US 2002/0150344 A1
D4: US 2002/0167793 A1
D5: US 6,371,787 B1.

II. In its statement of grounds of appeal the appellant requested that a patent be granted on the basis of claims according to the third auxiliary request, filed during the procedure before the examining division.

The appellant's arguments can be summarised as follows:

Only the second embodiment described in D1 might be relevant to the subject matter of the present invention. According to this embodiment, the optical module (Transceiver in D1) comprised a case containing elements for making optical communication. The case was suitable for being inserted in a cage and included a connection port on a front surface thereof for connection with a connector which is connected to a cable. The case further included a latch which was arranged on a predetermined surface of the case. The

latch was retainable in a retaining hole formed through a spring plate possessed by the cage for accommodating the case.

Finally, the case included a lever which was arranged on the predetermined surface of the case. The lever comprised a shaft supported on the predetermined surface of the case and a tongue disposed on one side of the shaft and was movable toward the case and an actuator disposed on the opposite side of the shaft with respect to the tongue. The lever was configured to make a pivotal movement about the shaft as the tongue was moved toward the case such that the actuator presses the spring plate to be bent in a direction in which the retaining hole comes off the latch.

In D1, the lever was not configured such that, as the tongue is moved toward the case when the connector is in the connection port, the tongue comes into abutment with the connector to prevent the actuator from moving to a position at which the retaining hole comes off the latch (see present claim 1). In fact, there was only one text passage in D1 where connectors are generally mentioned, namely with respect to the third embodiment. However, no particular technical features of the third embodiment were unambiguously disclosed in D1.

However, even if the third embodiment were regarded to be relevant, D1 did not explicitly disclose a configuration of the lever for preventing actuation of the lever when connectors are inserted.

D1 did not disclose that the predetermined surface of the case is formed with a lever stopping surface

against which the tongue abuts. For the second embodiment of D1, no such stopping surface was explicitly disclosed in D1. Even by considering the first embodiment from D1, which has a construction different from those of the second embodiment, there was no stopping surface against which the tongue of the lever might abut. Moreover, in case the third embodiment of D1 was regarded as being relevant, no stopping surface would be disclosed. In addition to this, D1 did not explicitly disclose that the lever is configured such that the actuator moves to a position at which the retaining hole comes off the latch when the tongue comes into abutment to the lever stopping surface. Even if it were assumed that the lever could be moved without damage in such an abutment position, in D1, no hint was given that the lever is configured to effect unlocking in the moment when the tongue comes into abutment to the lever stopping surface.

Consequently, neither a lever stopping surface nor a particular configuration of the lever with respect to such stopping surface was disclosed in D1.

Furthermore, D1 did not disclose that the lever comprises a recess formed on a surface which opposes the lever stopping surface of the case when the optical module is accommodated in the case, at a position closer to the tongue from the shaft. In D1, it was also not disclosed that the optical module comprised a coil spring disposed between the recess and the case, wherein the coil spring has one end fitted in the recess in abutment to the bottom surface of the recess and the other end in abutment to the lever stopping surface of the case. Since D1 did not disclose the

above features, the subject-matter of claim 1 and the corresponding method-claim 10 was novel over the prior art.

The subject-matter of independent claims 1 and 10 also involved an inventive step with respect to the teaching of D1.

The objective problem to be solved by the present invention was how to modify the transceiver known from D1 in order to avoid malfunction as well as maloperation of the unlocking device, and at the same time providing a durable, robust and simple construction of the unlocking device.

The second embodiment in D1 was considered to constitute the closest prior art since it belonged to the same technical field as the claimed invention and was directed to a similar purpose as the present invention, namely to provide an unlocking device allowing a facilitated locking/unlocking operation.

The solution to this objective problem was only achieved by a complex interaction of features. In D1, neither the underlying problem was recognized nor particular means for solving this problem were described. In the present case, no incitation was found in the second embodiment of D1 to modify the teaching of D1 in order to arrive at the present invention. For example, if the feature of the shaft being pivotable was considered, the teaching from the whole of D1 clearly led away from such a particular modification since it was repeatedly pointed out therein that it is most important to design the lever and the case

integrally as a single part. However, this could only be achieved when the shaft was fixed to the case and, thus, was not pivotable at all. Hence, using the present invention, a technical prejudice in the prior art represented by D1 was overcome, namely to use a multi-part arrangement in order to achieve a similar effect as D1.

In addition to this, the teaching of D1 also led away from using a coil spring as urging member since it was technically not feasible to integrate a coil spring in the case during manufacturing as a single-piece element. Thus, the integrated plastic torsion spring corresponding to an alternative solution of a similar problem did not incite a person skilled in the art to use a multi-part arrangement instead, which has a coil spring as urging member.

Consequently, the subject matter of the independent claims involved an inventive step with respect to the second embodiment of D1. Even if the third embodiment of D1 were considered to constitute the closest prior art in spite of inconsistent disclosure therein, the subject-matter of the independent claims of the present invention would involve an inventive step.

With its letter dated 19 May 2010 and sent by Fax on the same day the appellant filed versions of independent claims 1 and 10 based on claims of the former third auxiliary request and further amended and stated its agreement to amendments received by Fax from the Board on 19 April 2010.

III. Claims 1 and 10 filed on 19 May 2010 read as follows:

1. An optical module comprising:

a case (1) containing elements for making optical communication, said case (1) being suitable for being inserted in a cage (10), said case (1) including a connection port (2a, 2b) on a front surface thereof with a connector which is connected to a cable and a latch (3) arranged on a predetermined surface of said case (1), the latch (3) being retainable in a retaining hole (11 a) formed through a spring plate (11) possessed by said cage (10); and

a lever (4), arranged on said predetermined surface of said case (1), said lever (4) comprising a shaft (4b) pivotably supported on said predetermined surface of said case (1), a tongue (4a) disposed on one side of said shaft (4b) and being movable toward said case (1), and an actuator (4c) disposed on the opposite side of said shaft (4b) with respect to said tongue (4a), wherein said lever (4) is configured to make a pivotal movement about said shaft (4b) as said tongue (4a) is moved toward said case (1), such that said actuator (4c) presses said spring plate (11) to bend in a direction in which said retaining hole (11a) comes off said latch (3),

characterized in that

said lever (4) is configured such that as said tongue (4a) is moved toward said case (1) when said connector is in said connection port, said tongue (4a) comes into abutment with said connector to prevent said actuator (4c) from

moving to a position at which said retaining hole 11a) comes off said latch (3),

said predetermined surface of said case (1) is formed with a lever stopping surface (1a) against which said tongue (4a) abuts,

said lever (4) is configured such that said actuator (4c) moves to a position at which said retaining hole (11a) comes off said latch (3) when said tongue (4a) comes into abutment to said lever stopping surface (1a), and

said lever (4') comprises a recess (4d) formed on a surface which opposes said lever stopping surface (1a) of said case (1) when the optical module is accommodated in said case (1), at a position closer to said tongue (4a) from said shaft (4b), said optical module comprising a coil spring (15) disposed between said recess (4d) and said case (1), wherein said coil spring (15) has one end fitted in said recess (4d) in abutment to a bottom surface of said recess (4d) and the other end in abutment to said lever stopping surface (1a) of said case (1).

10. A method of releasing an optical module from a locking state with a cage (10) for accommodating said optical module, said optical module comprising

a case (1) containing elements for making optical communication, said case (1) being suitable for being inserted in a cage (10), said case (1) including a connection port (2a, 2b) on a front surface thereof with a connector which is connected to a cable inserted, and a latch (3) arranged on a predetermined surface of said

case (1), said latch (3) being retainable in retaining hole (11a) formed through a spring plate (11) possessed by said cage (10), and

a lever (4), arranged on said predetermined surface of said case (1), said lever (4) comprising a shaft (4b) pivotably supported on said predetermined surface of said case (1), a tongue (4a) disposed on one side of said shaft (4b) being movable toward said case (1), and an actuator (4c) disposed on the opposite side of said shaft (4b) with respect to said tongue (4a),

said method comprising the steps of:

moving said tongue (4a) toward said case (1) for pivotally moving said lever about said shaft, causing said actuator (4c) to press said spring plate (11) to bend in a direction in which said retaining hole (11a) comes off said latch (3), and releasing said retaining hole (11a) in which said latch (3) is retained from said latch (3);

characterized in that as

said tongue (4a) is moved toward said case (1) when said connector is in said connection port, said tongue (4a) comes into abutment with said connector to prevent said lever (4) from moving to a position at which said retaining hole (11a) comes off said latch (3),

said surface of said case (1) is formed with a lever stopping surface (1a) against which said tongue (4a) abuts, and said lever (4') is configured such that said actuator (4c) moves to a position at which said retaining hole (11 a) comes off said latch (3) when said tongue (4a) comes into abutment to said lever stopping surface (1a), and

said lever (4') comprises a recess (4d) formed on a surface which opposes said lever stopping surface (1a) of said case (1) when the optical module is accommodated in said case (1), at a position closer to said tongue (4a) from said shaft (4b), said optical module comprising a coil spring (15) disposed between said recess (4d) and said case (1), wherein said coil spring (15) has one end fitted in said recess (4d) in abutment to a bottom surface of said recess (4d) and the other end in abutment to said lever stopping surface (1a) of said case (1).

Reasons for the Decision

1. *Clarity and original disclosure*
 - 1.1 The subject-matter of present claim 1 is a combination of features disclosed in original claims 1, 2 and 6 and the description, page 17, lines 15 to 26, and page 18, lines 3 to 5. Independent claim 10 is related to a corresponding method based on original method-claims 11 to 13 amended in accordance with claim 1.
 - 1.2 The decision under appeal found that there was a lack of clarity within the meaning of Article 84 EPC 1973 in the wording of claim 1 according to the first auxiliary request then on file. This objection no longer exists in claim 1 of the present request in view of the features added "a lever stopping surface (1a) against which said tongue (4a) abuts" and "said retaining hole (11a) comes off said latch (3) when said

tongue (4a) comes into abutment to said lever stopping surface (1a)".

2. *Novelty*

2.1 The subject-matter of claim 1 differs from what is disclosed in document D1, at least by the feature in the last paragraph of the claim, i.e. in that the lever comprises a recess formed on a surface which opposes the lever stopping surface of the case when the optical module is accommodated in the case, at a position closer to tongue from shaft, said optical module comprising a coil spring disposed between the recess and the case, wherein said coil spring has one end fitted in the recess in abutment to a bottom surface of the recess and the other end in abutment to the lever stopping surface of the case.

2.2 None of the cited documents D1 to D5 discloses an optical module employing a coil spring in the locking mechanism of the case to be inserted into a cage. Therefore the subject-matter of claim 1 is novel. This applies also to independent method-claim 10 reciting the same feature.

2.3 Therefore the present invention is novel within the meaning of Article 54 (1), (2), (3) EPC 1973 and Article 54 (3), (4) EPC 2000.

3. *Inventive step*

3.1 The subject-matter of claims 1 and 10 also involves an inventive step within the meaning of Article 56 EPC.

- 3.2 In view of the concept of securing optical modules (transceivers) in cages on printed circuit boards, and releasing such transceivers from such cages, based on a lever allowing pivotable movement between a latched state and a released state, which document D1 and the present invention have in common, document D1, which is the sole citation on the file to disclose a latching/releasing operation by way of a pivotable element, is undoubtedly considered as the closest prior art.
- 3.3 As was shown above, the subject-matter of claim 1 differs from what is described in D1 at least by the feature defining a coil spring. The technical effect achieved by such a coil spring can be seen in the avoidance of unwanted unlocking of the case from the cage. Document D1, see Figures 1, 3 and 4c with the connected description, also describes springs for this purpose ("Rückstellfedern 9 and 84"). However, the springs used in D1 are provided by the elastic behaviour of parts in the locking and releasing mechanism, i.e. the torsion of shaft 9 (see paragraph 41 and Figures 3 and 4c) or the bending of bridge 84 like a leaf spring (see paragraph 31 and Figure 1.) Therefore, in accordance with the objective technical problem solved by the present application an alternative spring is employed.
- 3.4 As was mentioned under point 2.2 above, none of the cited documents discloses the use of a coil spring. Even though coil springs are of course widely known, the Board in particular concurs with the appellant's convincing argument (see section II above, penultimate paragraph) that the teaching of D1, which is related to

the provision of lever with actuator and tongue in a single-piece arrangement, prevented the skilled person from considering a coil spring which would always be a separate part. The Board further agrees with the appellant that the specific arrangement according to the present invention which in addition to the provision of a coil spring also involves its particular positioning between the tongue of the lever and the shaft and its fitting between a stopping surface of the case and a recess formed on the lever opposite said surface was only achieved by a complex interaction of the features recited in claims 1 or 10, the combination of which cannot without hindsight be considered obvious.

- 3.5 Therefore the Board concludes that it was not obvious for the skilled person starting from D1 as the closest prior art to arrive at the invention as defined in the independent claims.

4. The dependent claims are related to embodiments of the invention. The description has been adapted to the claims as amended in terms of the relevant prior art cited (document D1) and disclosure of the invention and as such also meets the requirements of the EPC.

5. For these reasons the request of the appellant is allowable and there is no need to conduct the oral proceedings requested or to issue a (further) communication as requested by the appellant on 19 May 2010.

Order

For these reasons it is decided that:

1. The decision of the examining division is set aside.
2. The case is remitted to the first instance with the order to grant a patent in the following version:

Description:

Pages 1 to 3 and 10 to 18 as originally filed.
Pages 4 to 9 and 19 to 20, communicated to the appellant by Fax on 19 April 2010.

Claims:

No. 1 and 10 filed with letter dated 19 May 2010.
No. 2 to 9 and 11, communicated to the appellant by Fax on 19 April 2010.

Drawings:

14 Sheets (Figures 1 to 14c) as published.

The Registrar:

The Chairman:

M. Kiehl

A. G. Klein